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CAMP-Smart Grid Meters 2009-2010
PR 005303

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Division 2 – 16 – to be supplied by 2020 Engineering, Inc.

END
ADVERTISEMENT FOR BIDS
State of Colorado
University of Colorado
Notice Number:  10- 13

Project No:     PR005303
Project Title:   CAMP – Smart Grid Meters 2009-2010
Estimated Construction Cost:  $350,000.00

Project Description
Installation of new chilled water, domestic water, steam and electric meters with controls at University of Colorado Boulder campus.

Project Information
1. The Principal Representative has determined that the entire project shall be substantially complete within 60 calendar days, from the date of the Notice to Proceed, and the project shall be finally complete, including the delivery of any or all guarantees and warranties, the submittal of sales and use tax payment forms, the completion of the final punch list and the calling for final inspection, within three calendar days per building, if applicable, from the date of substantial completion. In accordance with Article 46 of the General Conditions of the Contract, Time of Completion and Liquidated Damages, failure to complete the work within the agreed number of calendar days shall be considered breach of contract and subject the bidder to liquidated damages to the extent specified in Article 54D of the General Conditions of the Contract.

2. The right is reserved to waive informalities or irregularities and to reject any and all Bids.

3. Bidders may procure Bidding Documents from the following website on May 12, 2010.
http://www.colorado.edu/facilitiesmanagement/pdc/construction/open.html
There will not be a charge for Contract Documents downloaded from the website.

4. Contact Chad Tidd - chad@2020engineer.com of 20/20 Engineering to arrange for prints if needed. A $50.00 is required for each complete set of Contract Documents. Make check payable 20/2010 Engineering. This deposit shall be a guaranty that the documents will be returned in good condition. Such deposits will be returned to (1) Actual Bidders who return the documents before the termination of five (5) business days after the opening of the Bids, (2) Other interested parties who return the documents within five (5) business days after checking them out. Additional copies of any documents, drawings, or specifications will be supplied at the actual cost of reproduction. Bidders desiring the Architect/Engineer to mail bid documents will be required to pay the full cost of mailing. Such expenses will be non-refundable.
5. Each Bid shall be submitted on the required Bid Form and must be accompanied by a Bid Bond on State Buildings Programs Bid Bond Form Sc-6.14 in an amount not less than 5% of the total Bid. The Bid Bond may also be (1) a cashier’s check or (2) a certified check made payable to the Treasurer of the State of Colorado in an amount not less than 5% of the total Bid. The Bid Bond is submitted as a guaranty that the Bid will be maintained in full force and effect for a period of thirty (30) days after the opening of the Bids for the project.

6. The Bidder promises, in submitting his Bid, that if issued a Notice of Award, he will, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, or forfeit his Bid Guaranty as Liquidated Damages.

7. Preference shall be given to Colorado resident bidders and for Colorado labor, as provided by law.

**Pre-Bid Meeting**

A mandatory Pre-Bid Meeting will be held on May 17, 2010 at 2:00 PM at the Research Laboratory No. 2 1530 30th Street, **Room 158**, Boulder, Colorado.

Sealed Bids will be received from qualified contractors until this date and time at this location:

**Date & Time:** May 27, 2010 2:00 PM

**Address:** Department of Facilities Management, Research Laboratory No. 2, 1540 30th Street, Room 321, Boulder, CO 80309

**Point of Contact**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Robert A. Jordan, Project Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency:</td>
<td>University of Colorado at Boulder</td>
</tr>
<tr>
<td>Phone:</td>
<td>303-492-1102</td>
</tr>
<tr>
<td>Fax:</td>
<td>303-492-4082</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:Robert.A.Jordan@colorado.edu">Robert.A.Jordan@colorado.edu</a></td>
</tr>
</tbody>
</table>

This Notice is also available on the web at [www.colorado.gov/dpa/dfp/sbrep](http://www.colorado.gov/dpa/dfp/sbrep)

**Media of Publication(s):** The Daily Journal

**Publication Dates:** May 10, 2010

**Note to Editor:** Transmit one copy of the Affidavit of Publication, and invoice to:

Marsha Slepicka  
University of Colorado at Boulder  
Department of Facilities Management  
Campus Box 453 UCB  
Boulder, CO 80309-0453
1. **BID FORM:** Bidders are required to use the Bid form attached to the bidding documents. Each bidder is required to bid on all alternates and indicate the time to substantial completion in calendar days, and if applicable because designated in the Advertisement For Bids, the bidder is required to indicate the period of time agreed to finally complete the project after the date of substantial completion, also in calendar days. Bids indicating times for substantial completion or final acceptance in excess of the number of days indicated in the Advertisement for Bids may be found non-responsive and may be rejected. The bid shall not be modified or conditioned in any manner. Bids shall be submitted in sealed envelopes bearing the address and information shown below. If a bid is submitted by mail, this aforementioned sealed envelope should be enclosed in an outer envelope and sent to the following addressee:

**INSERT NAME OF AGENCY AND ADDRESS WHERE BID SHOULD BE DELIVERED**

The outside of the sealed inner envelope should bear the following information:

- **Project #** PR 005303
- **Project Name** CAMP – Smart Grid Meters 2009-2010
- **Name and Address of Bidder** __________________________________________________
- **Date of Opening** 05/27/10
- **Time of Opening** 2:00 PM
- **Address:** Research Laboratory No. 2 – 1540 30th Street, Room 321, Boulder, CO 80309

A bid with missing or inconsistent information may be considered non-responsive and may not be evaluated. The University will be the sole judge in determining the acceptability of an offer. The University also reserves the right to reject any or all bids in part or in whole and to waive technicalities. Any decision shall be considered final.

2. **INCONSISTENCIES AND OMISSIONS:** Bidders may request clarification of any seeming inconsistencies, or matters seeming to require explanation, in the bidding documents at least three (3) business days prior to the time set for the opening of Bids. Decisions of major importance on such matters will be issued in the form of addendum.

3. **APPLICABLE LAWS AND REGULATIONS:** The bidder's attention is called to the fact that all work under this Contract shall comply with the provisions of all state and local laws, approved state building codes, ordinances and regulations which might in any manner affect the work to be done or those to be employed in or about the work. Attention is also called to the fact that the use of labor for work shall be governed by the provisions of Colorado law which are hereinafter set forth in Articles 27 and 52E of the GENERAL CONDITIONS.

4. Note that the Special Provisions of the General Conditions of the Contract includes the following language: **UNAUTHORIZED IMMIGRANTS – PUBLIC CONTRACTS FOR SERVICES - CRS 8-17.5-101 and 24-76.5-101.** The Contractor certifies that the Contractor shall comply with the provisions of CRS 8-17.5-101 et seq. The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. The Contractor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the
Social Security Administration and Department of Homeland Security, and (ii) otherwise will comply with the requirements of CRS 8-17.5-102(2)(b). The Contractor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Contractor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate this contract for breach and the Contractor shall be liable for actual and consequential damages to the State.

A Contractor that operates as a sole proprietor hereby swears or affirms under penalty of perjury that the Contractor (i) is a citizen of the United States or otherwise lawfully present in the United States pursuant to federal law, (ii) shall comply with the provisions of CRS 24-76.5-101 et seq, and (iii) shall produce one of the forms of identification required by CRS 24-76.5-103 prior to the effective date of this Contract. Except where exempted by federal law and except as provided in CRS 24-76.5-103(3), a Contractor that receives federal or state funds under this contract must confirm that any individual natural person eighteen years of age or older is lawfully present in the United States pursuant to CRS 24-76.5-103(4) if such individual applies for public benefits provided under this contract.

5. **TAXES:** The bidder’s attention is called to the fact that the Bid submitted shall exclude all applicable federal excise or manufacturers’ taxes and all state sales and use taxes as hereinafter set forth in Article 9C of the GENERAL CONDITIONS.

6. **OR EQUAL:** The words “OR EQUAL” are applicable to all specifications and drawings relating to materials or equipment specified. Any material or equipment that will fully perform the duties specified, will be considered “equal”, provided the bid submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of “or equal” shall be made in writing at least five (5) business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two (2) business days prior to the bid opening date.

7. **ADDENDA:** Owner/architect initiated addenda shall not be issued later than two (2) business days prior to bid opening date. All addenda shall become part of the Contract Documents and receipt must be acknowledged on the Bid form.

8. **METHOD OF AWARD - LOWEST RESPONSIBLE BIDDER:** If the bidding documents for this project require alternate prices, additive and/or deductible alternates shall be listed on the alternates bid form provided by the Principal Representative. Bidders should note the Method of Award is applicable to this Bid as stated below.

   A. **DEDUCTIBLE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid combined with deductible alternates, deducted in numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The subtraction of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be subtracted from the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   B. **ADDITIVE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid plus all additive alternates added in the numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The addition of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be added to the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   C. **DEDUCTIBLE AND ADDITIVE ALTERNATES:** Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

The Advertisement for Bids can be located at the web site: [www.colorado.gov/dpa/dfp/sbrep/constructdesign.htm](http://www.colorado.gov/dpa/dfp/sbrep/constructdesign.htm) (Click on the link below the second paragraph Colorado Construction and Design Notices)
9. **CONTRACTOR QUALIFICATIONS:**

A. Prime Contractors: The Prime Contractor may be an Electrical or General Contractor
   a. Prime Contractors bidding this project must complete "University of Colorado (UCB) Contractor Statement of Experience," and submit it with their Bid.
   b. The Prime Contractor must meet the following minimum requirements and provide written information substantiating their qualifications for evaluation. A Bidder may be found to be non-responsive and their bid rejected if the minimum requirements are not met.
      (1) The Prime Contractor must have successfully completed three (3) projects of $150,000.00 (or larger) in the last five (5) years which were similar in complexity and type to this project. For each project list:
         - Name and location of project, along with a brief description of the project (include size & function).
         - Name, address and phone number of client/owner and their representative.
         - Contract value and type of contract (prime or subcontract).
         - Year in which work was completed.
      (2) The Contractor must have successfully completed an aggregate of $500,0000 of projects in the last five (5) years which were similar in complexity and type on which he acted as the prime contractor (may be the same projects listed in item (1), if applicable).
      (3) The firm must have been in business as a Contractor for the last five (5) years.

B. Subcontractors
   a. The Prime Contractor is required to provide subcontractors which meet minimum qualifications for the trades listed below.
      The right is reserved to reject subcontractors that do not meet the minimum requirements. The Prime Contractor will be required to replace rejected subcontractor(s) with one(s) that meet the minimum requirements with no increase in the Bid Amount prior to the Award of Contract.
      Prime Contractor and Subcontractor(s) are advised that there are conditions within the Contract Documents requiring special knowledge and experience to properly execute. The University will require verification of experience to adequately provide materials and perform labor required for the following:
         - Electrical
         - Mechanical
   b. For the trades listed (subcontractors) above, the apparent low bidder must submit, within 72 hours of receipt of bids except for holidays and weekends, the “University of Colorado Contractor’s Statement of Experience.
   c. In addition to the information requested in Item (1), the Subcontractor must meet the following minimum requirements and provide written information substantiating their qualifications for evaluation. A Bidder may be found to be non-responsive and their bid rejected if the minimum requirements are not met.
      (1) The firm must have been in business for the last five (5) years as trade proposed for this work.
      (2) The firm must have successfully completed at least two (2) projects of similar size, type, and complexity in the last five (5) years. The information must include the following:
         (a) Building type description (function use)
         (b) Building gross square footage
This firm shall give evidence of being able to be bonded up to the value of his work for this project. A letter shall be provided by the bonding agency assuring capability of bonding this subcontract amount.

10. **SITE ACCESS:** Contractors / Bidders may schedule a time subsequent to the Site Inspection / Pre-bid Conference to take measurements or further observe existing conditions by contacting:

   Andy Jordan, Project Manager  
   University of Colorado at Boulder  
   Department of Facilities Management  
   (303) 735-5410  
   Email: Robert.a.jordan@colorado.edu

11. **BID SCHEDULE:**

   | Publication date: | 05/10/10 |
   | Plans specification available: | - 2:00 PM |
   | Mandatory pre-bid conference: | - 2:00 PM |
   | Last day for questions: | - 2:00 PM |
   | Last day for addenda issue: | - 2:00 PM |
   | Bid date: | - 2:00 PM |

END
To all Contractors working within the City of Boulder:

Under Boulder’s Revised Code, the contractor is deemed to be the consumer of materials used in the construction project. Contractors may not avoid payment of the City of Boulder sales or use tax by placing provisions in a construction agreement or by using the name of a tax-exempt entity on an invoice or purchase order, regardless that the contractor is indicated thereon as the agent of a tax-exempt entity. **No exemption certificate issued by the Colorado Department of Revenue or any other taxing authority shall be recognized as a basis for exemption from sales or use taxes.**

Estimated use tax must be remitted to the City of Boulder prior to the start of the project. The tax is computed on the full contract price of the project. Follow these steps to compute and remit the sales/use tax to the City:

1. Multiply the full contract price by 0.5 and then multiply the resulting product by the tax rate of 3.41% (0.0341). This is the tax that is due to the City prior to the start of the project.
2. Remit the tax to the Sales Tax Department at 1777 Broadway, P.O. Box 791, Boulder, CO 80306-0791 along with a copy of this completed form.
3. At the completion of the project the construction company has two options for closing out the project with the city.
   - Use the formula in (1.) above to compute the final tax due based on the final contract price (including all change orders). Remit the additional tax due or file a request for refund with the City; or
   - Request that the city perform a full audit. Contact Ed Kaiser at 303-441-3921 or kaisere@bouldercolorado.gov to inform the City of which option you have chosen.

Contractor Name: __________________________________________
Address: __________________________________________________
Phone #: ___________ Contact Person: __________________________
Project Name: ______________________________________________
Project Address: ____________________________________________

| Full Contract price A. | Multiply ‘A’ by 0.5 B. | Multiply ‘B’ by 0.0341 C. |

“C” is the amount of tax due to the City of Boulder. If you have any questions regarding sales/use tax or this process, contact Ed Kaiser at the above phone number or address.

Date received: ___________________________ City Authority Signature: ___________________________

1777 BROADWAY P.O. BOX 791 BOULDER, CO 80306 303/441-3921
University of Colorado at Boulder

CONTRACTOR’S
STATEMENT OF EXPERIENCE

Project Name: CAMP – Smart Grid Meters 2009-2010

Project No. PR 005303

Project Manager: Andy Jordan
Phone: 303-735-5410
Email: Robert.A.Jordan@colorado.edu

Architect/Engineer: of 20/20 Engineering, Inc
Phone: 303-926-0020
Contact: Chad Tidd
Email: chad@2020engineer.com

This is a project specific qualification form. Contractor must fill this out on each project.
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UNIVERSITY OF COLORADO AT BOULDER
CONTRACTOR’S QUALIFICATION STATEMENT

INFORMATION FORM

STATEMENT OF ________________________________

(Contractor)

ADDRESS ____________________________________________________________

(Street or PO Box)    (City)    (State)    (Zip)

TELEPHONE/FAX NO. ____________________ __________________________

(telephone)    (fax)

DATE OF EXPERIENCE STATEMENT ________________________________

PRINCIPLE OWNER/OFFICER ________________________________

(Names(s) and Official Title(s))

Please indicate below if your company qualifies as one of the following:

Minority Business Enterprise (MBE) YES __    NO ___

Justification: ____________________________________________________________

________________________________________________________________________

________________________________________________________________________

Woman-Owned Business Enterprise (WBE) YES __    NO ___

Justification: ____________________________________________________________

________________________________________________________________________

________________________________________________________________________

Small Business Enterprise (SBE) YES __    NO ___

Justification: ____________________________________________________________

________________________________________________________________________

________________________________________________________________________

Disadvantaged Business Enterprise (DBE) YES __    NO ___

Justification: ____________________________________________________________

________________________________________________________________________

________________________________________________________________________
UNIVERSITY OF COLORADO AT BOULDER
CONTRACTOR’S QUALIFICATION STATEMENT

TYPES OF WORK

(1) If you are a General Contractor interested in bidding on all types of construction, mark “All Classes of Construction” only.

(2) If you are interested in contracting directly with the University for certain types of work only, mark in the column provided after the particular types of work on which you wish to bid.

<table>
<thead>
<tr>
<th>TYPES OF WORK</th>
<th>MARK WITH (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All Classes of Construction</td>
<td></td>
</tr>
<tr>
<td>2. General</td>
<td></td>
</tr>
<tr>
<td>3. Mechanical</td>
<td></td>
</tr>
<tr>
<td>4. Electrical</td>
<td></td>
</tr>
<tr>
<td>5. Excavating and Grading</td>
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<tr>
<td>6. Concrete</td>
<td></td>
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<tr>
<td>7. Structural Steel</td>
<td></td>
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<tr>
<td>8. Steel and Miscellaneous Iron</td>
<td></td>
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<tr>
<td>9. Painting and Decorating</td>
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<tr>
<td>10. Laboratory Equipment</td>
<td></td>
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<tr>
<td>11. Elevator Installation</td>
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<tr>
<td>12. Plumbing</td>
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<tr>
<td>13. Heating and Ventilating</td>
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<tr>
<td>14. Air Conditioning</td>
<td></td>
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<tr>
<td>15. Boiler and Equipment</td>
<td></td>
</tr>
<tr>
<td>16. Environmental (Describe)</td>
<td></td>
</tr>
<tr>
<td>17. Other (Describe)</td>
<td></td>
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<tr>
<td>18. Other (Describe)</td>
<td></td>
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<tr>
<td>19. Other (Describe)</td>
<td></td>
</tr>
<tr>
<td>20. Other (Describe)</td>
<td></td>
</tr>
</tbody>
</table>
IDENTIFICATION

(The signatory of this questionnaire guarantees the truth and accuracy of all statements and of all answers to questions hereinafter made.)

LEGAL NAME ____________________________

PRINCIPAL OFFICE ____________________________

(Street or PO Box) (City) (State) (Zip)

____ A Corporation  ______ A Copartnership  ______ An Individual  __ Combination

GENERAL INFORMATION

A. Are you licensed as a contractor? Yes ( ) No ( )

Licensed in     Location     License No. & Type
the name of     (City or State)     ____________________________

B. How many years has your organization been in business as a contractor under your present business name? ________________

C. How many years experience in ________________ construction work has your organization had? (Type)

(a) As a prime contractor? ________________  (b) As a subcontractor?

D. Have you or your organization, or any officer or partner thereof, failed to complete a contract? ________________

If so, give details __________________________________________________________

______________________________________

E. If you have a controlling interest in any firms presently qualified with the University, show names thereof:

______________________________________

______________________________________

F. We normally perform __________ % of the work with our own forces.

List trades: ______________________________________________________________

______________________________________

Where qualification is based on a combination of several organizations, show the experience and equipment of the combined organizations.
G. Has your firm been involved in any litigation in the past five (5) years? Yes ( ) No ( )
   If yes, explain (listing type, kind, plaintiff, defendant, etc. and state the current status).

H. Are there any activities or interests of officers, principle stockholders, or employees of
   your firm or other factors which would place your firm and the University of Colorado
   at Boulder in a position of “Conflict of Interests”?
   Yes ( ) No ( ) If yes, or in doubt, explain.

I. Has your firm ever been involved in any bankruptcy action as a bankrupt?
   Yes ( ) No ( ) If yes, explain.
UNIVERSITY OF COLORADO AT BOULDER  
CONTRACTOR’S QUALIFICATION STATEMENT  

PERSONNEL OF ORGANIZATION  

1. Name the persons with whom you have been associated in business as partners or business associates in each of the last five (5) years.  

________________________________________________________________________  

________________________________________________________________________  

________________________________________________________________________  

2. Show the construction experience of the principal individuals of your present organization in the following tabulation:  

<table>
<thead>
<tr>
<th>Individual’s Name</th>
<th>Present Position or Office in Your Organization</th>
<th>Years of Construction Experience</th>
<th>Magnitudes and Type of Work</th>
<th>In What Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
PROJECT EXPERIENCE

Show the projects your organization has completed during the last five years in the following tabulation:

<table>
<thead>
<tr>
<th>Year Completed</th>
<th>Project</th>
<th>Type of Work (See Page 2)</th>
<th>Location</th>
<th>Contract Value</th>
<th>Contracting Authority</th>
<th>In what Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Completion Date</td>
<td>Project</td>
<td>Type of Work (See Page 1)</td>
<td>Location</td>
<td>Contract Value</td>
<td>Contracting Authority</td>
<td>Architect or Engineer</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------</td>
<td>---------------------------</td>
<td>----------</td>
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<td>-----------------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
SURETIES

List the Surety Companies that have bonded your work for the past five (5) years:

<table>
<thead>
<tr>
<th>Name of Surety and Name and Address of Agent</th>
<th>Project and Location</th>
<th>Period of Bond From</th>
<th>Period of Bond To</th>
<th>General Comments</th>
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CORPORATION / CO-PARTNERSHIP

CORPORATION:
(If a corporation, answer this:)

When Incorporated ____________________________________________

In What State ________________________________________________

President’s Name _____________________________________________

Vice President’s Name __________________________________________

Secretary’s Name ______________________________________________

Treasurer’s Name ______________________________________________

CO-PARTNERSHIP:
(If a co-partnership, answer this:)

Date of Organization __________________________________________

State whether partnership is general, limited, or association

Name and address of each partner:

______________________________________________________________  

(name)        (name)

______________________________________________________________  

(address)       (address)

______________________________________________________________  

WHERE QUALIFICATION IS BASED ON A COMBINATION OF ORGANIZATIONS, THE  
APPROPRIATE (ATTACHED) AFFIDAVITS MUST BE EXECUTED FOR EACH  
MEMBER OF SUCH COMBINATION.
UNIVERSITY OF COLORADO AT BOULDER
CONTRACTOR’S QUALIFICATION STATEMENT

AFFIDAVIT FOR CORPORATION

_______________________________ certifies and says: That he is
(Name of officer)

_______________________________ of the __________________________
(Official capacity)

corporation submitting this statement of experience: that he/she has read the same, and
that the same is true of his/her own knowledge: that the statement is for the purpose of
inducing the University of Colorado to supply the submittor with plans and specifications,
and that any vendor, or other agency therein named is hereby authorized to supply the
University of Colorado with any information necessary to verify the statement: and that
furthermore, should this statement at any time cease to properly and truly represent
his/her condition in any substantial respect, it will refrain from further bidding on
University work until it shall have submitted a revised and corrected statement.

I certify and declare under penalty of perjury that the foregoing is true and correct:

Subscribed on ___________ at ___________, __________, State of ________________
(date)  (city)  (county)

NOTE: Use full corporate name and attach corporate seal here. __________________________
(Officer must sign here)

NOTE: Statement will be returned unless affidavit is completed in EVERY respect.
AFFIDAVIT FOR CO-PARTNERSHIP

________________________________________ certifies and says: That he/she is a partner of ____________________________
   (Name of partner)

the partnership of ____________________________: That said partnership submitted this statement of experience: that he/she has read the same, and that the same is true of his/her own knowledge: that the statement is for the purpose of inducing the University of Colorado to supply the submittor with plans and specifications, and that any vendor, or other agency therein named is hereby authorized to supply the University of Colorado with any information necessary to verify the statement: and that furthermore, should this statement at any time cease to properly and truly represent the condition of said firm in any substantial respect, it will refrain from further bidding on University work until they shall have submitted a revised and corrected statement.

I certify and declare under penalty of perjury that the foregoing is true and correct:

Subscribed on __________ at __________, __________, State of ________________
   (date)    (city)         (county)

The foregoing statement and affidavit are hereby offered.

________________________________________   (Member of Firm must sign here)

________________________________________   (Title)

________________________________________   (Name of Firm)

(Remaining members of Firm sign here)

NOTE: Statement will be returned unless affidavit is completed in EVERY respect.
UNIVERSITY OF COLORADO AT BOULDER
CONTRACTOR’S QUALIFICATION STATEMENT

AFFIDAVIT FOR INDIVIDUAL

________________________  __________________________
(Name of individual)      (Name of Firm)
doing business

certifies and says: That he/she is the person submitting this statement of experience:
that he/she has read the same, and that the same is true of his/her own knowledge: that
the statement is for the purpose of inducing the University of Colorado to supply the
submitter with plans and specifications, and that any vendor, or other agency therein
named is hereby authorized to supply the University of Colorado with any information
necessary to verify the statement: and that furthermore, should this statement at any
time cease to properly and truly represent his/her condition in any substantial respect, it
will refrain from further bidding on University work until it shall have submitted a revised
and corrected statement.

I certify and declare under penalty of perjury that the foregoing is true and correct:

Subscribed on __________ at __________, __________, State of ________________
(date)                   (city)               (county)

NOTE: Statement will be returned unless affidavit is completed in EVERY respect. __________________________________

(Applicant must sign here)
UNIVERSITY OF COLORADO AT BOULDER
CONTRACTOR’S QUALIFICATION STATEMENT

BIDDING INFORMATION

QUALIFICATION

The University of Colorado will qualify or disqualify a Contractor on the basis of:

(1) The information contained in this statement and
(2) Past contract experience with the University.

NOTIFICATION

The University of Colorado will, in writing, notify Contractors of their qualification or disqualification.
BID

Institution/Agency: University of Colorado at Boulder
Name/Project No.: PR 005303 / CAMP – Smart Grid Meters 2009-2010

Bidder Acknowledges Receipt of Addenda No.s:

Base Bid
(Refer to Bid Alternate Form SC-6.13.1 Attached, If Applicable)

Bidder's Time of Completion

a. Time Period from Notice to Proceed to Substantial Completion: 60 calendar days
b. Time Period from Substantial completion to Final Acceptance: 03 calendar days per building
c. Time of Completion of Entire Project (a + b): 60 calendar days plus 3 calendar days per building

1. BID: Pursuant to the advertisement by the State of Colorado dated May 10, 2010 the undersigned bidder hereby proposes to furnish all the labor and materials and to perform all the work required for the complete and prompt execution of everything described or shown in or reasonably implied from the Bidding Documents, including the Drawings and Specifications, for the work and for the base bid indicated above. Bidders should include all taxes that are applicable.

2. EXAMINATION OF DOCUMENTS AND SITE: The bidder has carefully examined the Bidding Documents, including the Drawings and Specifications, and has examined the site of the work, so as to make certain of the conditions at the site and to gain a clear understanding of the work to be done.

3. PARTIES INTERESTED IN BID: The bidder hereby certifies that the only persons or parties interested in this Bid are those named herein, and that no other bidder or prospective bidder has given any information concerning this Bid.

4. BID GUARANTEE: This Bid is accompanied by the required Bid Guarantee. You are authorized to hold said Bid Guarantee for a period of not more than thirty (30) days after the opening of the Bids for the work above indicated, unless the undersigned bidder is awarded the Contract, within said period, in which event the Director, State Buildings and Real Estate Programs, may retain said Bid Guarantee, until the undersigned bidder has executed the required Agreement and furnished the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance.

5. TIME OF COMPLETION: The bidder agrees to achieve substantial completion of the entire project within the number of calendar days entered above, and if applicable, further agrees that the period between the date of substantial completion and the date of final acceptance of the entire project will not exceed the number of calendar days noted above. If awarded this work, the bidder agrees to begin work within ten (10) days from the date of the Notice to Proceed subject to Article 46, Time of Completion and Liquidated Damages of The General Conditions of the Contract, and agrees to prosecute the work with due diligence to completion. The bidder represents that Article 54D has been reviewed to determine the type and amount of any liquidated damages that may be specified for this contract.
6. **EXECUTION OF DOCUMENTS:** The bidder understands that if this Bid is accepted, he must execute the required Agreement and furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of the Notice of Award, and that the bidder will be required to sign to acknowledge and accept the Contract Documents, including the Drawings and Specifications.

7. **ALTERNATES:** Refer to the Information for Bidders (SC-6.12) for Method of Award for Alternates and use State Form SBO-6.13.1 Bid Alternates form to be submitted with this bid form if alternates are requested by the institution/agency in the solicitation documents.

Submit wage rates (direct labor costs) for prime contractor and subcontractor as requested by the institution/agency in the solicitation documents.

The right is reserved to waive informalities and to reject any and all Bids.

Dated this ______ Day of ____________________ , 2010.____

(Corporate Seal)  
THE BIDDER:

ATTEST

Secretary

Name (Print)

Signature

Name (Print) and Title

Print Email address: ________________________________________________

SIGNATURES: If the Bid is being submitted by a Corporation, the Bid should be signed by an officer, i.e., President or Vice-President. The signature of the officer shall be attested to by the Secretary and properly sealed. If a sole proprietorship or a partnership is submitting the Bid, the Bid shall so indicate and be properly signed.
Institution/Agency: University of Colorado at Boulder  
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Additive alternates will not be used if deductive alternates are used and deductive alternates will not be used if additive alternates are used.

Deductive Alternates (DA)
Refer to specification section 01030 for descriptions of deductive alternates. If the add/deductive alternates are accepted, the base bid would be modified by the amount entered by the bidder.

D.A. No. 1  Cristol Chemistry  Deduct $
D.A. No. 2  Recreation Center  Deduct $
D.A. No. 3  Kittredge West  Deduct $

Bidder  Date
TO BE ELIGIBLE FOR AWARD OF THIS CONTRACT, EACH CONTRACTOR (INCLUDING ARCHITECT/ENGINEER/CONSULTANT/CONTRACTOR) IS REQUESTED TO COMPLY WITH THESE REQUIREMENTS.

I. The undersigned Architect/Engineer/Consultant/Contractor hereby certifies that the (company) (joint venture) is (is not)* a minority enterprise as defined in this report. The undersigned Architect/Engineer/Consultant/Contractor hereby certifies the (company) (joint venture) is (is not)* a woman-owned business enterprise as defined. (*Strike out where inapplicable.)

*Persons signing hereby swear and affirm that they are authorized to act on Architect/Engineer/Consultant/Contractor’s behalf and acknowledge that the State is relying on their representations to that effect. Principal is not a recognized title and will not be accepted

ARCHITECT/ENGINEER/CONSULTANT/CONTRACTOR

Legal Name of Contracting Entity

*Signature

By: ____________________________ Title ____________________________

Date: ____________________________

II. It is the general policy of the State of Colorado to be as inclusive as possible to all member communities when spending taxpayer dollars.

III. REQUIREMENTS

A. Minority Business Enterprise (MBE) means, for the purpose of this report, a business enterprise at least 51 percent that is owned and controlled by minority group members, or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned and controlled by minority group members. Eligible persons are expected to be engaged full time in the day-to-day operation and management of the business. Minority group members are ethnic minorities including African American, Hispanic American, Native American or Asian/Pacific American.

B. Women Business Enterprise (WBE) means, for the purpose of this report, a business enterprise of at least 51 percent of which is owned and controlled by a woman or women, or, in the case of a publicly-owned business, at least 51 percent of the stock of which is owned and controlled by women. Women are expected to be engaged full time in the day-to-day operation and management of the business.

C. The State of Colorado does not have a certification process nor does it require MBE’s and WBE’s to be certified EXCEPT for certain contracts for highway and bridge construction administered by the Colorado Department of Transportation.

D. The percentages of minority and women-owned business participation will be determined by dollar value of the work subcontracted to or joint ventured with minority and women-owned firms, as compared to the total dollar value of the bid amount for all work bid under this contract.
E. Prior to the award of this contract, the contractor will be required to provide to the Principal Representative a list of M/WBE enterprises, stipulating the dollar amount of each subcontract or supplier of materials on page 2 of this Minority and Women Business Enterprises Participation Report.

F. The contractor will retain records and documents showing the level of participation for two years following completion of this contract. These records and documents, or copies thereof, will be made available at reasonable times and places for inspection by an authorized representative of the Principal Representative, or its designated representatives, and will be submitted to such representatives upon written request.

MBE: Yes ☐ WBE: Yes ☐
No ☐ No ☐

Total Contract Amount: $______________

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<th>Name and Address of M/WBE Subcontractors and/or Suppliers and/or Self-Performed Work by M/WBE Primes*</th>
<th>MBE Contract Amounts</th>
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*Indicate ethnicity based on Paragraph III. A. above.

Total MBE Contracts: $ ____________________
Total WBE Contracts: $ ____________________
Total MBE %: ____________________
Total WBE %: ____________________
State of Colorado
Office of the State Architect
State Buildings Programs

BID BOND

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, hereinafter called the “PRINCIPAL”, is submitting a PROPOSAL for the above described project, to the STATE OF COLORADO, hereinafter called the “OBLIGEE”.

WHEREAS, the Advertisement for Bids has required as a condition of receiving the Proposals that the Principal submit with the PROPOSAL GUARANTY in an amount not less than five per cent (5%) of the Proposal, which sum it is specifically agreed is to be forfeited as Liquidated Damages in the event that the Principal defaults in his obligation as hereinafter specified, and, in pursuance of which Requirement, this Bid is made, executed and delivered.

NOW THEREFORE, the Principal and a corporation of the State of ________, duly authorized to transact business in Colorado, as Surety, are held and firmly bound unto the Obligee, in the sum of five per cent (5%) of the Principal’s total bid price, lawful money of the United States for the payment of which sum, well and truly to be made to the Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

FURTHER THAT, a condition of the obligation that the Principal shall maintain his Proposal in full force and effect for thirty (30) days after the opening of the proposals for the project, or, if the Principal’s Proposal is accepted, the Principal shall, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy, and Certificates of Insurance, then this obligation shall be null and void, otherwise it shall remain in full force and effect, and subject to forfeiture upon demand as Liquidated Damages.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _______ day of __________, A.D., 2010.

(Corporate Seal)

THE PRINCIPAL

Company Name

ATTEST

Address (including city, state and zip)

Secretary

Phone number:

Name (Print)

Signature

Name (Print) and Title

SIGNATURES

If the “Principal” is doing business as a Corporation, the Bid Bond shall be signed by an officer, i.e., President or Vice President. The signature of the officer shall be attested to by the Secretary and properly sealed.

If the “Principal” is an individual or a partnership, the Bid Bond shall so indicate and be properly signed.

(Corporate Seal)

THE SURETY

By

Secretary

Attorney-in-Fact

THIS BOND MUST BE ACCOMPANIED BY-power of attorney, effectively dated. Failure to provide a properly executed Bid Bond with a properly executed Power of Attorney will result in the Bidder’s Proposal being deemed non-responsive.

State Form SBP-6.14
Rev. 9/2006
NOTICE OF AWARD

Date of Notice: ______________________________
Date to be inserted by the Principal Representative

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

TO:

The State of Colorado, represented by the undersigned, has considered the Proposals submitted for the above described work.

Your Proposal, deemed to be in the best interest of the State of Colorado, in the amount of and no/100 Dollars ($_________.00*) is hereby accepted, pending final execution of the Agreement.

Base Bid $_________.00*
Total Contract Amount $_________.00*

You are required to execute the approved Agreement and to furnish the Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of this Notice.

If you fail to execute said Agreement and to furnish said Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of this Notice, the State Controller will be entitled to retain the amount of the Proposal Guaranty submitted with your Proposal as Liquidated Damages. In this event, the right is reserved to consider all of your rights arising out of the acceptance of your Proposal as abandoned and to award the work covered by your Proposal to another, or to re-advertise the work, or otherwise dispose thereof.

By ______________________________________
Paul M. Leef, AIA, LEED ® AP / Date
Campus Architect
Director, Planning, Design & Construction
State Buildings Programs
(of Authorized Delegate)

By ______________________________________
Ronald L. Ried, Director / Date
Facilities Management Business Services
Principal Representative
(Institution or Agency)

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS
University of Colorado at Boulder

CONTRACTOR’S AGREEMENT
DESIGN/BID/BUILD STANDARD FORMAT
(STATE FORM SC-6.21)

CONTRACT ROUTING NO.

AGENCY IDENTIFICATION NO.

PROJECT NO. PR005303

PROJECT NAME: CAMP – Smart Grid Meters 2009-2010

PROJECT MANAGER: Robert A. Jordan

CONTRACTOR: 

DATE: May 2010
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Signed Notice of Award
GC Agreement

Exhibits:

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1. PARTIES. THIS AGREEMENT is entered into by and between the STATE OF COLORADO, acting by and through the Regents of the University of Colorado, a body corporate, hereinafter called the Principal Representative, and (vendor name) having its offices at (vendor address) hereinafter referred to as the Contractor.

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY. This Agreement shall not be effective or enforceable until it is approved and signed by the State Controller or its designee (hereinafter called the “Effective Date”), but shall be effective and enforceable thereafter in accordance with its provisions. The State shall not be liable to pay or reimburse Construction Manager for any performance hereunder or be bound by any provision hereof prior to the Effective Date.

WHEREAS, the Principal Representative intends to install smart grid meters at UCB campus, hereinafter called the Project; and

WHEREAS, authority exists in Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment in Fund Number 410, Speed Type / Account Number, 17100009-515192; Contract Encumbrance Number TBD,

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK
The Contractor shall furnish all the work, labor and materials, and shall perform, to the satisfaction of the Principal Representative and its Architect/Engineer, all of the work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents, including The General Conditions of the Contract and the Drawings and Specifications for the above Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS
The Contractor agrees to do the work in a first class, substantial and workmanlike manner to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents, including The General Conditions of the Contract and the Drawings and Specifications.

ARTICLE 3. TIME OF COMPLETION
The Contractor agrees to substantially complete the entire Project within 78 calendar days from the date of the Notice to Proceed, and, if applicable, the Contractor agrees to complete the final punch list and finally complete the Project within 14 calendar days. The Contractor shall prosecute the work with due diligence to completion.

ARTICLE 4. ESSENTIAL CONDITION
Timely completion of the project is an essential condition of this Agreement. The Contractor shall be subject to any liquidated damages described in Article 54D of The General Conditions of the Contract for failure to satisfactorily complete the work within the time periods in Article 3 above.

ARTICLE 5. CONTRACT SUM
The Contractor shall be paid for the performance of this Agreement, subject to any additions and deductions as provided for in Articles 32, 34 and 35 of The General Conditions of the Contract, the sum of Thousand, Hundred and no/100 Dollars ($*).

Base Bid $ 

Total Contract Amount $ 

ARTICLE 6. CONTRACT DOCUMENTS
The Contract Documents, as enumerated in Article 1 of The General Conditions of the Contract, are all essential parts of this Agreement and are fully incorporated herein.
ARTICLE 7. SAFETY and SECURITY - Contractor understands that concern for the safety and well-being of University students and staff is of particular importance to the University. Contractor expressly acknowledges that it is Contractor’s duty to take reasonable precautions to protect the University’s students and staff. The extent of such precautions will depend on the particular circumstances of the work to be performed. However, to the extent that work to be performed involves security-sensitive functions or security-sensitive areas (e.g. unsupervised access to minors or work involving access to security-sensitive data), such precautions may include, but are not limited to, conducting criminal history checks on employees or agents assigned to such work at the University.”

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

*Persons signing for Contractor hereby swear and affirm that they are authorized to act on Contractor’s behalf and acknowledge that the State is relying on their representations to that effect. Principal is not a recognized title and will not be accepted.

THE CONTRACTOR

STATE OF COLORADO, acting by and through:
The Regents of the University of Colorado
A Body Corporate
Ronald L. Ried, Director
Facilities Management Business Services

By: ________________________________

Date: ______________________________

*Signature

By ________________________________

Name (print) ______________________________
Title ________________________________

Date: ______________________________

APPROVED

DEPARTMENT OF PERSONNEL & ADMINISTRATION
STATE BUILDINGS PROGRAMS
State Architect (or authorized Delegate)
Paul M. Leef, AIA, LEED TM AP
Campus Architect & Director, Planning, Design & Construction

By: ________________________________

Date: ______________________________

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

APPROVED:
STATE OF COLORADO
STATE CONTROLLER’S OFFICE
State Controller (or authorized Delegate)
Steve McNally, Associate Vice Chancellor & Controller

By: ________________________________

Date: ______________________________

APPROVED:
STATE OF COLORADO
ATTORNEY GENERAL
(or authorized Delegate)
By: ________________________________

Date: ______________________________

__approved by DJ
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: University of Colorado at Boulder

Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called “Principal,”

and

as Surety and hereinafter called “Surety,” a corporation organized and existing under the laws of ________________ are held and firmly bound unto the STATE OF COLORADO acting by and through the Regents of the University of Colorado, a body corporate, hereinafter called the “Principal Representative”, in the sum of ________________ Dollars ($______________)

for the payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called “Contract,” dated ________________, 2010, for the construction of a PROJECT described as CAMP – Smart Grid Meters 2009-2010

which Contract is hereby by reference made a part hereof;
NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if the Principal shall promptly, fully and faithfully perform all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract any extensions thereof that may be granted by the Principal Representative with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE SAID SURETY, for value received hereby stipulates and agrees that whenever the Principal shall be, and declared by the Principal Representative to be in default under said Contract, the State of Colorado having performed its obligations thereunder, the Surety may promptly remedy the default or shall promptly (1) Complete the Contract in accordance with its terms and conditions, or (2) Obtain a bid or bids for submittal to the Principal Representative for completing the Contract in accordance with its terms and conditions, and upon determination by the Principal Representative and Surety of the lowest responsible bidder, arrange for a contract between such bidder and the State of Colorado acting by and through the Principal Representative and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount hereinbefore set forth. The term “balance of the contract price” as herein used shall mean the total amount payable to the Principal under the Contract and any amendments thereto, less the amount properly paid by the State of Colorado to the Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the State of Colorado.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this __________ day of __________________, A.D. 2010.

(Corporate Seal)      THE PRINCIPAL

ATTEST:

By: __________________________

Title: _________________________

Secretary

(Corporate Seal)

SURETY

By: __________________________

Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful payment for all labor and material of the contract.
LABOR AND MATERIAL BOND

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of ____________, are held and firmly bound unto the STATE OF COLORADO acting by and through The Regents of the University of Colorado, a body corporate, hereinafter called "Principal Representative," and to all subcontractors and any others who have supplied or furnished or shall supply or furnish materials, rental machinery, tools, or equipment actually used in the performance of the hereinafter identified Contract, or who have performed or shall perform labor in the performance of or in connection with said Contract, hereinafter called "Obligees" in the sum of ________________________________

______________________________ Dollars ($ ________________)

together with interest at the rate of eight per cent (8%) per annum on all payments becoming due in accordance with said Contract, from the time such payments shall become due until such payment shall be made, for the payment of which, well and truly made to the Obligees, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated ____________________________ for the construction of a PROJECT described as CAMP – Smart Grid Meters 2009-2010

which Contract is hereby by reference made a part hereof;
NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal and the Surety shall fully indemnify and save harmless the State of Colorado and the Principal Representative from and against any and all costs and damages, including patent infringements, which either may suffer by reason of any failure or failures of the Principal promptly and faithfully to perform all terms and conditions of said Contract and shall fully reimburse and repay the State of Colorado and the Principal Representative all outlay and expense which the State of Colorado and the Principal Representative may incur in making good any such failure or failures, and further, if the Principal and his subcontractors shall duly and promptly pay for any and all labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies which have been or shall be used or consumed by said Principal or his subcontractors in the performance of the work of said Contract, and it said Principal shall duly and promptly pay all his subcontractors the sums due them for any and all materials, rental machinery, tools, or equipment and labor that have been or shall be furnished, supplied, performed or used in connection with performance of said Contract, and shall also fully indemnify and save harmless the State of Colorado and the Principal Representative to the extent of any and all expenditures which either or both of them may be required to make by reason of any failures or defaults by the Principal or any subcontractor in connection with such payments; then this obligation shall be null and void, otherwise it shall remain in full force and effect.

It is expressly understood and agreed that any alterations which may be made in the terms of said Contract or in the work to be done under said Contract, or any extension(s) of time for the performance of the Contract, or any forbearance on the part of either the State of Colorado or the Principal to any of the others, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration, extension or forbearance being hereby waived.

IN WITNESS WHEREOF, the Principal and the Surety have executed this Bond, this __________ day of ____________________, A.D., 2010.

(Corporate Seal) 

THE PRINCIPAL

ATTEST:

By: __________________________ 
Title: __________________________

Secretary

(Corporate Seal)

SURETY

By: __________________________
Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful performance of the contract.
Project Name: CAMP – Smart Grid Meters 2009-2010

Project No.: PR005303

Project Manager: Andy Jordan

Date: May 2010
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General Conditions of Contract

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS

The Contract Documents consist of:

1. Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General and Supplementary General Conditions of the Contract (SC-6.23);
4. Detailed Specification Requirements, including all addenda issued prior to the opening of the bids; and,
5. Drawings, including all addenda issued prior to the opening of the bids.
6. Change Orders (SC-6.31) and Amendments (SC-6.0), if any, when properly executed.

B. PROCEDURAL DOCUMENTS

The Procedural Documents used in the administration and performance of the Agreement consist of:

1. Authorization to Bid (SBP-6.10)
2. Information for Bidders (SBP-6.12);
3. Bid (SBP-6.13);
4. Bid Bond (SBP-6.14);
5. Notice of Award (SBP-6.15);
6. Builder's risk insurance certificates of insurance (ACORD 25-S);
7. Liability and workers' compensation certificates of insurance;
8. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
9. Notice of Approval of Occupancy/Use (SBP-01);
10. Notice of Partial Substantial Completion (SBP-071);
11. Notice of Substantial Completion (SBP-07);
12. Notice of Partial Final Acceptance (SC-6.27);
13. Notice of Final Acceptance (SBP-07);
14. Notice of Partial Contractor's Settlement (SC-7.3);
15. Notice of Contractor's Settlement (SBP-7.31);
16. Application and Certificate for Contractor's Payment (SBP-7.2);
17. Other procedural and reporting documents or forms referred to in the General Conditions, the Supplementary General Conditions, the Specifications or required by the State Buildings Programs or the Principal Representative, including but not necessarily limited to Pre-Acceptance Check List (SBP-05) and Pre-Acceptance Punch List (SBP-06), and the Building Inspection Record (SBP-BIR). A list of the current standard State Buildings Programs forms applicable to this Contract may be obtained from the Principal Representative on request.

C. DEFINITIONS OF WORDS AND TERMS USED

1. AGREEMENT. The term “Agreement” shall mean the written agreement entered into by the State of Colorado acting by and through the Principal Representative and the Contractor for the performance of the Work and payment therefore, on State Form SC-6.21. The term Agreement when used without reference to State Form SC-6.21 may also refer to the entirety
of the parties’ agreement to perform the Work described in the Contract Documents or reasonably inferable there from. The term “Contract” shall be interchangeable with this latter meaning of the term Agreement

2. ARCHITECT/ENGINEER. The term “Architect/Engineer” shall mean either the architect of record or the engineer of record under contract to the State of Colorado for the Project identified in the Contract Documents.

3. OCCUPANCY. The term “Occupancy” means occupancy taken by the State as Owner after the Date of Substantial Completion at a time when a building or other discrete physical portion of the Project is used for the purpose intended. The Date of Occupancy shall be the date of such first use, but shall not be prior to the date of execution of the Notice of Approval of Occupancy/Use. Prior to the date of execution of a Notice of Approval of Occupancy/Use, the state shall have no right to occupy and the project may not be considered safe for occupancy for the intended use.

4. CHANGE ORDER. The term “Change Order” means a written order, signed by a Procurement Officer, directing the Contractor to make changes in the Work, in accordance with Article 35A, The Value of Changed Work.

5. COLORADO LABOR. The term “Colorado labor” shall be defined, as provided in § 8-17-101, C.R.S., as any person who is a resident of the state of Colorado, at the time of employment, without discrimination as to race, color, creed, sex, age, or religion except when sex or age is a bona fide occupational qualification, or shall have such other meaning as the term may otherwise be given in § 8-17-101, C.R.S., as amended.

6. CONTRACTOR. The word “Contractor” shall mean the person, company, firm, corporation or other legal entity entering into a contract with the State of Colorado acting by and through the Principal Representative.

7. DAYS. The term “days” whether singular or plural shall mean calendar days unless expressly stated otherwise. Where the term “business days” is used it shall mean business days of the State of Colorado.

8. DRAWINGS. The term “Drawings” shall mean all drawings approved by appropriate State officials which have been prepared by the Architect/Engineer showing the work to be done, except that where a list of drawings is specifically enumerated in the Supplementary General Conditions or division 1 of the Specifications, the term shall mean the drawings so enumerated, including all addenda drawings.

9. EMERGENCY FIELD CHANGE ORDER. The term “Emergency Field Change Order” shall mean a written change order for extra work or a change in the work necessitated by an emergency as defined in Article 35C executed on State form SC 6.31 and identified as an Emergency Field Change Order. The use of such orders is limited to emergencies and to the amounts shown in Article 35C.

10. FINAL ACCEPTANCE. The terms “final acceptance” or “finally complete” mean the stage in the progress of the work, after substantial completion, when all remaining items of work have been completed, all requirements of the Contract Documents are satisfied and the Notice of Acceptance can be issued. Discrete physical portions of the Project may be separately and partially deemed finally complete at the discretion of the Principal Representative when that portion of the Project reaches such stage of completion and a partial Notice of Acceptance can be issued.

11. NOTICE. The term “Notice” shall mean any communication in writing from either contracting party to the other by such means of delivery that receipt cannot properly be denied. Notice shall be provided to the person identified to receive it in Article 54E, Notice Identification, or to such other person as either party identifies in writing to receive Notice. Notice by facsimile transmission where proper transmission is evidence shall be adequate where facsimile numbers are included in Article 54E. Notwithstanding an email delivery or return receipt, email Notice shall not be adequate. Acknowledgment of receipt of a voice message shall not be deemed to waive the requirement that Notice, where required, shall be in writing.
12. OWNER. The term “Owner” shall mean the Principal Representative.
13. PRINCIPAL REPRESENTATIVE. The term “Principal Representative” shall be defined, as provided in § 24-30-1301(11), C.R.S., as the governing board of a state department, institution, or agency; or if there is no governing board, then the executive head of a state department, institution, or agency, as designated by the governor or the general assembly and as specifically identified in the Contract Documents, or shall have such other meaning as the term may otherwise be given in § 24-30-1301(11), C.R.S., as amended. The Principal Representative may delegate authority. The Contractor shall have the right to inquire regarding the delegated authority of any of the Principal Representative’s representatives on the project and shall be provided with a response in writing when requested.
14. PROCUREMENT OFFICER. The term “Procurement Officer” means any person duly authorized to enter into and administer contracts and make written determinations with respect thereto. “Procurement Officer” includes an authorized representative of the Principal Representative acting within the limits of his or her authority.
15. PRODUCT DATA. The term “Product Data” shall mean all submittals in the form of printed manufacturer’s literature, manufacturer’s specifications, and catalog cuts.
16. REASONABLY INFERABLE. The phrase “reasonably inferable” means that if an item or system is either shown or specified, all material and equipment normally furnished with such items or systems and needed to make a complete installation shall be provided whether mentioned or not, omitting only such parts as are specifically excepted, and shall include only components which the Contractor could reasonably anticipate based on his or her skill and knowledge using an objective, industry standard, not a subjective standard. This term takes into consideration the normal understanding that not every detail is to be given on the Drawings and Specifications. The phrase shall not, however, be construed to make the Contractor, rather than the Architect/Engineer, responsible for producing the Drawings and Specifications.
17. SAMPLES. The term “Samples” shall mean examples of materials or work provided to establish the standard by which the Work will be judged.
18. SC. The term “SC” means “State Contract” which is used in connection with labeling applicable State form documents (e.g., “SC 6.23” is the State form number for these General Conditions of the Contract).
19. SBP. The term “SBP” means “State Buildings”, which is used in connection with labeling applicable State form documents (e.g., “SBP-01” is the form number for Notice of Approval of Occupancy/Use).
20. SHOP DRAWINGS. The term “Shop Drawings” shall mean any and all detailed drawings prepared and submitted by Contractor, Subcontractor at any tier, vendors or manufacturers providing the products and equipment specified on the Drawings or called for in the Specifications.
21. SPECIFICATIONS. The term “Specifications” shall mean the requirements of divisions 1 through 17 of the project manual prepared by the Architect/Engineer describing the work to be accomplished.
22. STATE BUILDINGS PROGRAMS. The term “State Buildings Programs” is the shortened name of the division of State Buildings Programs. It shall refer to the division of the executive department of State government responsible for project administration, review, approval and coordination of plans, construction procurement policy, contractual procedures, and code compliance and inspection of all buildings, public works and improvements erected for state purposes; except public roads and highways and projects under the supervision of the division of wildlife and the division of parks and outdoor recreation as provided in § 24-30-1301, et seq., C.R.S. The term State Buildings Programs shall also mean that individual within a State Department agency or institution, including institutions of higher education, who has signed an agreement accepting delegation to perform all or part of the responsibilities and functions of State Buildings Programs.
23. SUBMITTALS. The term “submittals” means drawings, lists, tables, documents and samples prepared by the Contractor to facilitate the progress of the work as required by these General Conditions or the Drawings and Specifications. They consist of Shop Drawings, Product Data, Samples, and various administrative support documents including but not limited to lists of subcontractors, construction progress schedules, schedules of values, applications for
payment, inspection and test results, requests for information, various document logs, and as-built drawings. Submittals are required by the Contract Documents, but except to the extent expressly specified otherwise are not themselves a part of the Contract Documents.

24. SUBSTANTIAL COMPLETION. The terms “substantial completion” or “substantially complete” mean the stage in the progress of the work when the construction is sufficiently complete, in accordance with the Contract Documents as modified by any Change Orders, so that the Work, or at the discretion of the Principal Representative, any designated portion thereof, is available for its intended use by the Principal Representative and a Notice of Substantial Completion can be issued. Portions of the Project may, at the discretion of the Principal Representative, be designated as substantially complete.

25. SURETY. The term “Surety” shall mean the company providing the labor and material payment and performance bonds for the Contractor as obligor.

26. WORK. The term “Work” shall mean all or part of the labor, materials, equipment, and other services required by the Contract Documents or otherwise required to be provided by the Contractor to meet the Contractor's obligations under the Contract.

ARTICLE 2. EXECUTION, CORRELATION, INTENT OF DOCUMENTS, COMMUNICATION AND COOPERATION

A. EXECUTION
   The Contractor, within ten (10) days from the date of Notice of Award, will be required to:
   1. Execute the Agreement, State Form SC-6.21;
   2. Furnish fully executed Performance and Labor and Material Payment Bonds on State Forms SC-6.22 and SC-6.221; and
   3. Furnish certificates of insurance evidencing all required insurance on standard Acord forms designed for such purpose.
   4. Furnish certified copies of any insurance policies requested by the Principal Representative.

B. CORRELATION
   By execution of the Agreement the Contractor represents that the Contractor has visited the site, has become familiar with local conditions and local requirements under which the Work is to be performed, including the building code programs of the State Buildings Program as implemented by the Principal Representative, and has correlated personal observations with the requirements of the Contract Documents.

C. INTENT OF DOCUMENTS
   The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment and transportation necessary for the proper execution of the Work. Words describing materials or work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.

   In any event, if any error exists, or appears to exist, in the requirements of the Drawings or Specifications, or if any disagreement exists as to such requirements, the Contractor shall have the same explained or adjusted by the Architect/Engineer before proceeding with the work in question. In the event of the Contractor's failure to give prior written Notice of any such errors or disagreements of which the Contractor or the Subcontractors at any tier are aware, the Contractor shall, at no additional cost to the Principal Representative, make good any damage to, or defect in, work which is caused by such omission.

   Where a conflict occurs between or within standards, Specifications or Drawings, which is not resolved by reference to the precedence between the Contract Documents, the more stringent or higher quality requirements shall apply so long as such more stringent or higher quality requirements are reasonably inferable. The Architect/Engineer shall decide which requirements will provide the best installation.

   With the exception noted in the following paragraph, the precedence of the Contract Documents is in the following sequence:
1. The Agreement (SC-6.21);
2. The Supplementary General Conditions, if any;
3. The General Conditions (SC-6.23); and
4. Drawings and Specifications, all as modified by any addenda.

Change Orders and Amendments, if any, to the Contract Documents take precedence over the original Contract Documents.

Notwithstanding the foregoing order of precedence, the Special Provisions of Article 52 of the General Conditions, Special Provisions, shall take precedence, rule and control over all other provisions of the Contract Documents.

Unless the context otherwise requires, form numbers in this document are for convenience only. In the event of any conflict between the form required by name or context and the form required by number, the form required by name or context shall control. The Contractor may obtain State forms from the Principal Representative upon request.

D. PARTNERING, COMMUNICATIONS AND COOPERATION

In recognition of the fact that conflicts, disagreements and disputes often arise during the performance of construction contracts, the Contractor and the Principal Representative aspire to encourage a relationship of open communication and cooperation between the employees and personnel of both, in which the objectives of the Contract may be better achieved and issues resolved in a more fully informed atmosphere.

The Contractor and the Principal Representative each agree to assign an individual who shall be fully authorized to negotiate and implement a voluntary partnering plan for the purpose of facilitating open communications between them. Within thirty days (30) of the Notice to Proceed, the assigned individuals shall meet to discuss development of an informal agreement to accomplish these goals.

The assigned individuals shall endeavor to reach an informal agreement, but shall have no such obligation. Any plans these parties voluntarily agree to implement shall result in no change to the contract amount, and no costs associated with such plan or its development shall be recoverable under any contract clause. In addition, no plan developed to facilitate open communication and cooperation shall alter, amend or waive any of the rights or duties of either party under the Contract unless and except by written Amendment to the Contract, nor shall anything in this clause or any subsequently developed partnering plan be deemed to create fiduciary duties between the parties unless expressly agreed in a written Amendment to the Contract. It is also recognized that projects with relatively low contract values may not justify the expense or special efforts required. In the case of small projects with an initial Contract value under $500,000, the requirements of the preceding paragraph shall not apply.

ARTICLE 3. COPIES FURNISHED

The Contractor will be furnished, free of charge, the number of copies of Drawings and Specifications as specified in the Contract Documents, or if no number is specified, all copies reasonably necessary for the execution of the work.

ARTICLE 4. OWNERSHIP OF DRAWINGS

Drawings or Specifications, or copies of either, furnished by the Architect/Engineer, are not to be used on any other work. At the completion of the Work, at the written request of the Architect/Engineer, the Contractor shall endeavor to return all Drawings and Specifications.

The Contractor may retain the Contractor’s Contract Document set, copies of Drawings and Specifications used to contract with others for any portion of the Work and a marked up set of as-built drawings.
ARTICLE 5. ARCHITECT/ENGINEER’S STATUS
The Architect/Engineer is the representative of the Principal Representative for purposes of administration of the Contract, as provided in the Contract Documents and the Agreement. In case of termination of employment or the death of the Architect/Engineer, the Principal Representative will appoint a capable Architect/Engineer against whom the Contractor makes no reasonable objection, whose status under the Contract shall be the same as that of the former Architect/Engineer.

ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS, ACCESS TO WORK AND INSPECTION
A. DECISIONS
The Architect/Engineer shall, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work or the interpretation of the Contract Documents, and in the exercise of due diligence shall be reasonably available to the Contractor to timely interpret and make decisions with respect to questions relating to the design or concerning the Contract Documents.

B. JUDGMENTS
The Architect/Engineer is, in the first instance, the judge of the performance required by the Contract Documents as it relates to compliance with the Drawings and Specifications and quality of workmanship and materials.

The Architect/Engineer shall make judgments regarding whether directed work is extra or outside the scope of Work required by the Contract Documents at the time such direction is first given. If, in the Contractor's judgment, any performance directed by the Architect/Engineer is not required by the Contract Documents or if the Architect/Engineer does not make the judgment required, it shall be a condition precedent to the filing of any claim for additional cost related to such directed work that the Contractor, before performing such work, shall first obtain in writing, the Architect/Engineer's written decision that such directed work is included in the performance required by the Contract Documents. If the Architect/Engineer's direction to perform the work does not state that the work is included in the performance required by the Contract Documents, the Contractor shall, in writing, request the Architect/Engineer to advise in writing whether the directed work will be considered extra work or work included in the performance required by the Contract Documents.

The Architect/Engineer shall respond to any such written request for such a decision within three (3) business days and if no response is provided, or if the Architect/Engineer’s written decision is to the effect that the work is included in the performance required by the Contract Documents, the Contractor may file with the Principal Representative and the Architect/Engineer a Notice of claim in accordance with Article 36, Claims. Whether or not a Notice of claim is filed, the Contractor shall proceed with the ordered work. Disagreement with the decision of the Architect/Engineer shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance.

C. ACCESS TO WORK
The Architect/Engineer, the Principal Representative and representatives of State Buildings Programs shall at all times have access to the work. The Contractor shall provide proper facilities for such access and for their observations or inspection of the work.

D. INSPECTION
The Architect/Engineer has agreed to make, or that structural, mechanical, electrical engineers or other consultants will make, periodic visits to the site to generally observe the progress and quality of the Work to determine in general if the Work is proceeding in accordance with the Contract Documents. Observation may extend to all or any part of the Work and to the preparation, fabrication or manufacture of materials.

Without in any way meaning to be exclusive or to limit the responsibilities of the Architect/Engineer or the Contractor, the Architect/Engineer has agreed to observe, among other aspects of the Work, the following for compliance with the Contract Documents:
1. Bearing surfaces of excavations before concrete is placed based upon the findings and recommendations of the Principal Representative’s soils engineering consultant;
2. Reinforcing steel after installation and before concrete is poured;
3. Structural concrete;
4. Laboratory reports on all concrete testing based upon the findings and recommendations of the Principal Representative’s testing consultant;
5. Structural steel during and after erection and prior to its being covered or enclosed;
6. Steel welding; Principal Representative will furnish steel welding inspection consultant/agency if required or necessary for the project;
7. Mechanical and plumbing work following its installation and prior to its being covered or enclosed;
8. Electrical work following its installation and prior to its being covered or enclosed;
9. Compaction testing reports based upon the findings and recommendations of the Principal Representative’s testing consultant; and
10. Any special or quality control testing required in the Contract Documents provided by the Principal Representative’s testing consultant.

If the Specifications, the Architect/Engineer’s instructions, laws, ordinances of any public authority require any work to be specifically tested or approved, the Contractor shall give the Architect/Engineer timely notice of its readiness for observation by the Architect/Engineer or inspection by another authority, and if the inspection is by another authority, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. The Contractor shall give all required Notices to the Principal Representative or his or her designee for inspections required for the building inspection program. It shall be the responsibility of the Contractor to determine the Notice required by the State pursuant to Building Inspection Record for the Project, according to State form SBP-B.I.R., or the equivalent form required by the Principal Representative as approved by the State Buildings Program. If any such work is covered up without approval or consent of the Architect/Engineer or prior to any building code inspection, it must, if required by the Architect/Engineer, the Principal Representative or the State Buildings Programs, be uncovered for examination, at the Contractor’s expense. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such costs, unless he or she shall show that the defect in the work was caused by another contractor engaged by the Principal Representative. In that event, the Principal Representative shall pay such cost. In addition, examination of questioned work may be ordered, and if so ordered, the work must be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the Contractor shall be reimbursed the cost of examination and replacement.

ARTICLE 7. CONTRACTOR’S SUPERINTENDENCE AND SUPERVISION
The Contractor shall employ, and keep present on the Project during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Architect/Engineer and the Principal Representative. The superintendent shall not be changed except with the consent of the Architect/Engineer and the Principal Representative, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his or her employ. The superintendent shall represent the Contractor in his or her absence and all directions given to the superintendent shall be as binding as if given to the Contractor. Directions received by the superintendent shall be documented by the superintendent and confirmed in writing with the Contractor.

The Contractor shall give efficient supervision to the Work, using his or her best skill and attention. He or she shall carefully study and compare all Drawings, Specifications and other written instructions and shall without delay report any error, inconsistency or omission which he or she may discover in writing to the Architect/Engineer. The Contractor shall not be liable to the Principal Representative for damage to the extent it results from errors or deficiencies in the Contract Documents or other instructions by the Architect/Engineer, unless the Contractor knew or had reason to know, that damage would result by proceeding and the Contractor fails to so advise the Architect/Engineer.

The superintendent shall see that the Work is carried out in accordance with the Contract Documents and in a uniform, thorough and first-class manner in every respect. The Contractor’s superintendent shall establish
all lines, levels, and marks necessary to facilitate the operations of all concerned in the Contractor’s Work. The Contractor shall lay out all work in a manner satisfactory to the Architect/Engineer, making permanent records of all lines and levels required for excavation, grading, foundations, and for all other parts of the Work.

ARTICLE 8. MATERIALS AND EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the Work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be first class and of uniform quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor is fully responsible for all acts and omissions of the Contractor’s employees and shall at all times enforce strict discipline and good order among employees on the site. The Contractor shall not employ on the Work any person reasonably deemed unfit by the Principal Representative or anyone not skilled in the work assigned to him.

ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS

A. SURVEYS

The Principal Representative shall furnish all surveys, property lines and bench marks deemed necessary by the Architect/Engineer, unless otherwise specified.

B. PERMITS AND LICENSES

Permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Unless otherwise specified in the Specifications, no local municipal or county building permit shall be required. However, State Buildings Programs requires each Principal Representative to administer a building code inspection program, the implementation of which may vary at each agency or institution of the State. The Contractors’ employees shall become personally familiar with these local conditions and requirements and shall fully comply with such requirements. State electrical and plumbing permits are required, unless the requirement to obtain such permits is altered by State Building’s Programs. The Contractor shall obtain and pay for such permits.

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Principal Representative, unless otherwise specified.

C. TAXES

1. REFUND OF SALES AND USE TAXES

The Contractor shall pay all local taxes required to be paid, including but not necessarily limited to all sales and use taxes. If requested by the Principal Representative prior to issuance of the Notice to Proceed or directed in the Supplementary General Conditions or the Specifications, the Contractor shall maintain records of such payments in respect to the Work, which shall be separate and distinct from all other records maintained by the Contractor, and the Contractor shall furnish such data as may be necessary to enable the State of Colorado, acting by and through the Principal Representative, to obtain any refunds of such taxes which may be available under the laws, ordinances, rules or regulations applicable to such taxes. When so requested or directed, the Contractor shall require Subcontractors at all tiers to pay all local sales and use taxes required to be paid and to maintain records and furnish the Contractor with such data as may be necessary to obtain refunds of the taxes paid by such Subcontractors. No State sales and use taxes are to be paid on material to be used in this Project. On application by the purchaser or seller, the Department of Revenue shall issue to a Contractor or to a Subcontractor at any tier, a certificate or certificates of exemption per § 39-26-114(1)(d), C.R.S., and § 39-26-203, C.R.S.

2. FEDERAL TAXES
The Contractor shall exclude the amount of any applicable federal excise or manufacturers’
taxes from the proposal. The Principal Representative will furnish the Contractor, on request
exemption certificates.

D. LAWS AND REGULATIONS
The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations
bearing on the conduct of the Work as drawn or specified. If the Contractor observes that the
Drawings or Specifications require work which is at variance therewith, the Contractor shall without
delay notify the Architect/Engineer in writing and any necessary changes shall be adjusted as provided
in Article 35, Changes In The Work.

The Contractor shall bear all costs arising from the performance of work required by the Drawings or
Specifications that the Contractor knows to be contrary to such laws, ordinances, rules or regulations,
if such work is performed without giving Notice to the Architect/Engineer.

ARTICLE 10. PROTECTION OF WORK AND PROPERTY
A. GENERAL PROVISIONS
The Contractor shall continuously maintain adequate protection of all work and materials, protect the
property from injury or loss arising in connection with this Contract and adequately protect adjacent
property as provided by law and the Contract Documents. The Contractor shall make good any
damage, injury or loss, except to the extent:

1. Directly due to errors in the Contract Documents;
2. Caused by agents or employees of the Principal Representative; and,
3. Due to causes beyond the Contractor’s control and not to fault or negligence; provided such
damage, injury or loss would not be covered by the insurance required to be carried by the
Contractor;

B. SAFETY PRECAUTIONS
The Contractor shall take all necessary precautions for the safety of employees on the Project, and
shall comply with all applicable provisions of federal, State and municipal safety laws and building
codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work
is being performed. He or she shall erect and properly maintain at all times, as required by the
conditions and progress of the Work, all necessary safeguards for the protection of workers and the
public and shall post danger signs warning against the hazards created by such features of
construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings,
stairways and falling materials; and he or she shall designate a responsible member of his or her
organization on the Project, whose duty shall be the prevention of accidents. The name and position
of any person so designated shall be reported to the Architect/Engineer by the Contractor.

The Contractor shall provide all necessary bracing, shoring and tying of all structures, decks and
framing to prevent any structural failure of any material which could result in damage to property or the
injury or death of persons; take all precautions to insure that no part of any structure of any description
is loaded beyond its carrying capacity with anything that will endanger its safety at any time during the
execution of this Contract; and provide for the adequacy and safety of all scaffolding and hoisting
equipment. The Contractor shall not permit open fires within the building enclosure. The Contractor
shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep
excavations and floors, pits and trenches free of water. The Contractor shall be solely responsible for
all construction means, methods, techniques, sequences and procedures, and for coordinating all
portions of the Work, except as otherwise noted.

The Contractor shall take due precautions when obstructing sidewalks, streets or other public ways in
any manner, and shall provide, erect and maintain barricades, temporary walkways, roadways, trench
covers, colored lights or danger signals and any other devices necessary or required to assure the
safe passage of pedestrians and automobiles.
C. EMERGENCIES
In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor
without special instruction or authorization from the Architect/Engineer or Principal Representative, is
hereby permitted to act, at his or her discretion, to prevent such threatened loss or injury; and he or
she shall so act, without appeal, if so authorized or instructed. Provided the Contractor has no
responsibilities for the emergency, if the Contractor incurs additional cost not otherwise recoverable
from insurance or others on account of any such emergency work, the Contract sum shall be equitably
adjusted in accordance with Article 35, Changes In The Work.

ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK
The Contractor shall keep on the job site one copy of the Contract Documents in good order, including
current copies of all Drawings and Specifications for the Work, and any approved Shop Drawings, Product
Data or Samples, and as-built drawings. As-built drawings shall be updated weekly by the Contractor and
Subcontractors to reflect actual constructed conditions including dimensioned locations of underground work
and the Contractor's failure to maintain such updates may be grounds to withhold portions of payments
otherwise due in accordance with Article 33, Payments Withheld. All such documents shall be available to
the Architect/Engineer and representatives of the State. In addition, the Contractor shall keep on the job site
one copy of all approved addenda, Change Orders and requests for information issued for the Work.

The Contractor shall develop procedures to insure the currency and accuracy of as-built drawings and shall
maintain on a current basis a log of requests for information and responses thereto, a Shop Drawing and
Product Data submittal log, and a Sample submittal log to record the status of all necessary and required
submittals.

ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES
A. REQUESTS FOR INFORMATION
The Architect/Engineer shall furnish additional instructions with reasonable promptness, by means of
drawings or otherwise, necessary for the proper execution of the Work. All such drawings and
instructions shall be consistent with the Contract Documents and reasonably inferable there from. The
Architect/Engineer shall determine what additional instructions or drawings are necessary for the
proper execution of the Work.

The Work shall be executed in conformity with such instructions and the Contractor shall do no work
without proper drawings, specifications or instructions. If the Contractor believes additional
instructions, specifications or drawings are needed for the performance of any portion of the Work, the
Contractor shall give Notice of such need in writing through a request for information furnished to the
Architect/Engineer sufficiently in advance of the need for such additional instructions, specifications or
drawings to avoid delay and to allow the Architect/Engineer a reasonable time to respond. The
Contractor shall maintain a log of the requests for information and the responses provided.

B. SCHEDULES
1. SUBMITTAL SCHEDULES
Prior to filing the Contractor’s first application for payment, a schedule shall be prepared which
may be preliminary to the extent required, fixing the dates for the submission and initial review
of required Shop Drawings, Product Data and Samples for the beginning of manufacture and
installation of materials, and for the completion of the various parts of the Work. It shall be
prepared so as to cause no delay in the Work or in the work of any other contractor. The
schedule shall be subject to change from time to time in accordance with the progress of the
Work, and it shall be subject to the review and approval by the Architect/Engineer. It shall fix
the dates at which the various Shop Drawings Product Data and Samples will be required from
the Architect/Engineer. The Architect/Engineer, after review and agreement as to the time
provided for initial review, shall review and comment on the Shop Drawings, Product Data and
Samples in accordance with that schedule. The schedule shall be finalized, prepared and
submitted with respect to each of the elements of the Work in time to avoid delay, considering
reasonable periods for review, manufacture or installation.
At the time the schedule is prepared, the Contractor, the Architect/Engineer and Principal Representative shall jointly identify the Shop Drawing, Product Data and Samples, if any, which the Principal Representative shall receive simultaneously with the Architect/Engineer for the purposes of owner coordination with existing facility standards and systems. The Contractor shall furnish a copy for the Principal Representative when so requested. Transmittal of Shop Drawings and Product Data copies to the Principal Representative shall be solely for the convenience of the Principal Representative and shall neither create nor imply responsibility or duty of review by the Principal Representative.

The Contractor may also, or at the direction of the Principal Representative at any time shall, prepare and maintain a schedule, which may also be preliminary and subject to change to the extent required, fixing the dates for the initial responses to requests for information or for detail drawings which will be required from the Architect/Engineer to allow the beginning of manufacture, installation of materials and for the completion of the various parts of the Work. The schedule shall be subject to review and approval by the Architect/Engineer. The Architect/Engineer shall, after review and agreement, furnish responses and detail drawings in accordance with that schedule. Any such schedule shall be prepared and approved in time to avoid delay, considering reasonable periods for review, manufacture or installation, but so long as the request for information schedule is being maintained, it shall not be deemed to transfer responsibility to the Contractor for errors or omissions in the Contract Documents where circumstances make timely review and performance impossible.

The Architect/Engineer shall not unreasonably withhold approval of the Contractor’s schedules and shall inform the Contractor and the Principal Representative of the basis of any refusal to agree to the Contractor’s schedules. The Principal Representative shall attempt to resolve any disagreements.

2. SCHEDULE OF VALUES

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and Principal Representative, for approval, and to the State Buildings Programs when specifically requested, a complete itemized schedule of the values of the various parts of the Work, as estimated by the Contractor, aggregating the total price. The schedule of values shall be in such detail as the Architect/Engineer or the Principal Representative shall require, prepared on forms acceptable to the Principal Representative. It shall, at a minimum, identify on a separate line each division of the Specifications including the general conditions costs to be charged to the Project. The Contractor shall revise and resubmit the schedule of values for approval when, in the opinion of the Architect/Engineer or the Principal Representative, such resubmittal is required due to changes or modifications to the Contract Documents or the Contract sum.

The total cost of each line item so separately identified shall, when requested by the Architect/Engineer or the Principal Representative, be broken down into reasonable estimates of the value of:

a. Material, which shall include the cost of material actually built into the Project plus any local sales or use tax paid thereon; and,

b. Labor and other costs.

The cost of subcontracts shall be incorporated in the Contractor’s schedule of values, and when requested by the Architect/Engineer or the Principal Representative, shall be separately shown as line items.

The Architect/Engineer shall review the proposed schedules and approve it after consultation with the Principal Representative, or advise the Contractor of any required revisions within ten (10) days of its receipt. In the event no action is taken on the submittal within ten days, the
Contractor may utilize the schedule of values as its submittal for payment until it is approved or until revisions are requested.

When the Architect/Engineer deems it appropriate to facilitate certification of the amounts due to the Contractor, further breakdown of subcontracts, including breakdown by labor and materials, may be directed.

This schedule of values, when approved, will be used in preparing Contractor’s applications for payment on State Form SC-7.2, Application for Payment.

3. CONSTRUCTION SCHEDULES
Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and the Principal Representative, and to the State Buildings Programs when specifically requested, on a form acceptable to them, an overall timetable of the construction schedule for the Project. Unless the Supplementary General Conditions or the Specifications allow scheduling with bar charts or other less sophisticated scheduling tools, the Contractor’s schedule shall be a critical-path method (CPM) construction schedule. The CPM schedule shall start with the date of the Notice to Proceed and include submittals activities, the various construction activities, change order work (when applicable), close-out, testing, demonstration of equipment operation when called for in the Specifications, and acceptance. The CPM shall at a minimum correlate to the schedule of values line items and shall be cost loaded if requested by the Architect/Engineer or Principal Representative. The completion time shall be the time specified in the Agreement and all Project scheduling shall allocate float utilizing the full period available for construction as specified in the Agreement on State Form SC 6.13, without indication of early completion, unless such earlier completion is approved in writing by the Principal Representative and State Building Programs.

The time shown between the starting and completion dates of the various elements within the construction schedule shall represent one hundred per cent (100%) completion of each element.

All other elements of the CPM schedule shall be as required by the Specifications. In addition, the Contractor shall submit monthly updates of the construction schedule. These updates shall reflect the Contractor’s “work in place” progress.

When requested by the Architect/Engineer, the Principal Representative or the State Buildings Programs, the Contractor shall revise the construction schedule to reflect changes in the schedule of values.

When the testing of materials is required by the Specifications, the Contractor shall also prepare and submit to the Architect/Engineer and the Principal Representative a schedule for testing in accordance with Article 14, Samples and Testing.

ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
A. SUBMITTAL PROCESS
The Contractor shall check and field verify all dimensions. The Contractor shall check, approve and submit to the Architect/Engineer in accordance with the schedule described in Article 12, Requests for Information and Schedules, all Shop Drawings, Product Data and Samples required by the specifications or required by the Contractor for the work of the various trades. All Drawings and Product Data shall contain identifying nomenclature and each submittal shall be accompanied by a letter of transmittal identifying in detail all enclosures. The number of copies of Shop Drawings and Product Data to be submitted shall be as specified in the Specifications and if no number is specified then three copies shall be submitted.

The Architect/Engineer shall review and comment on the Shop Drawings and Product Data within the time provided in the agreed upon schedule for conformance with information given and the design
concept expressed in, or reasonably inferred from, the Contract Documents. The nature of all corrections to be made to the Shop Drawings and Product Data, if any, shall be clearly noted, and the submittals shall be returned to the Contractor for such corrections. If a change in the scope of the Work is intended by revisions requested to any Shop Drawings and Product Data, the Contractor shall be requested to prepare a change proposal in accordance with Article 35, Changes In The Work. On resubmitted Shop Drawings, Product Data or Samples, the Contractor shall direct specific attention in writing on the transmittal cover to revisions other than those corrections requested by the Architect/Engineer on any previously checked submittal. The Architect/Engineer shall promptly review and comment on, and return, the resubmitted items.

The Contractor shall thereafter furnish such other copies in the form approved by the Architect/Engineer as may be needed for the prosecution of the work.

B. FABRICATION AND ORDERING
Fabrication shall be started by the Contractor only after receiving approved Shop Drawings from the Architect/Engineer. Materials shall be ordered in accordance with approved Product Data. Work which is improperly fabricated, whether through incorrect Shop Drawings, faulty workmanship or materials, will not be acceptable.

C. DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS
The review and comments of the Architect/Engineer of Shop Drawings, Product Data or Samples shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications, unless he or she has in writing called the attention of the Architect/Engineer to such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in Shop Drawings or Product Data. Review and comments on Shop Drawings or Product Data containing identified deviations from the Contract Documents shall not be the basis for a Change Order or a claim based on a change in the scope of the Work unless Notice is given to the Architect/Engineer and Principal Representative of all additional costs, time and other impacts of the identified deviation by bringing it to their attention in writing at the time the submittals are made, and any subsequent change in the Contract sum or the Contract time shall be limited to cost, time and impacts so identified.

D. CONTRACTOR REPRESENTATIONS
By preparing, approving, and/or submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, and has checked and co-ordinated the information contained within each submittal with the requirements of the Work, the Project and the Contract Documents and prior reviews and approvals.

ARTICLE 14. SAMPLES AND TESTING
A. SAMPLES
The Contractor shall furnish for approval, with such promptness as to cause no delay in his or her work or in that of any other Contractor, all Samples as directed by the Architect/Engineer. The Architect/Engineer shall check and approve such Samples, with reasonable promptness, but only for conformance with the design intent of the Contract Documents and the Project, and for compliance with any submission requirements given in the Contract Documents.

B. TESTING - GENERAL
The Contractor shall provide such equipment and facilities as the Architect/Engineer may require for conducting field tests and for collecting and forwarding samples to be tested. Samples themselves shall not be incorporated into the Work after approval without the permission of the Architect/Engineer.

All materials or equipment proposed to be used may be tested at any time during their preparation or use. The Contractor shall furnish the required samples without charge and shall give sufficient Notice of the placing of orders to permit the testing thereof. Products may be sampled either prior to shipment or after being received at the site of the Work.
Tests shall be made by an accredited testing laboratory. Except as otherwise provided in the Specifications, sampling and testing of all materials, and the laboratory methods and testing equipment, shall be in accordance with the latest standards and tentative methods of the American Society of Testing Materials (ASTM). The cost of testing which is in addition to the requirements of the Specifications shall be paid by the Contractor if so directed by the Architect/Engineer, and the Contract sum shall be adjusted accordingly by Change Order; provided however, that whenever testing shows portions of the Work to be deficient, all costs of testing including that required to verify the adequacy of repair or replacement work shall be the responsibility of the Contractor.

C. TESTING - CONCRETE AND SOILS

Unless otherwise specified or provided elsewhere in the Contract Documents, the Principal Representative will contract for and pay for the testing of concrete and for soils compaction testing through an independent laboratory or laboratories selected and approved by the Principal Representative. The Contractor shall assume the responsibility of arranging, scheduling and coordinating the concrete sample collection efforts and soils compaction efforts. Testing shall be performed in accordance with the requirements of the Specifications, and if no requirements are specified, the Contractor shall request instructions and testing shall be as directed by the Architect/Engineer or the soils engineer, as applicable, and in accordance with standard industry practices.

The Principal Representative and the Architect/Engineer shall be given reasonable advance notice of each concrete pour and reserve the right to either increase or decrease the number of cylinders or the frequency of tests.

Soil compaction testing shall be at random locations selected by the soils engineer. In general, soils compaction testing shall be as directed by the soils engineer and shall include all substrate prior to backfill or construction.

D. TESTING - OTHER

Additional testing required by the Specifications will be accomplished and paid for by the Principal Representative in a manner similar to that for concrete and soils unless noted otherwise in the Specifications. In any case, the Contractor will be responsible for arranging, scheduling and coordinating additional tests. Where the additional testing will be contracted and paid for by the Principal Representative the Contractor shall give the Principal Representative not less than one month advance written Notice of the date the first such test will be required.

ARTICLE 15. SUBCONTRACTS

The Contractor shall, within twenty one (21) days after the date of the Notice of Award, submit to the Architect/Engineer, the Principal Representative and State Buildings Programs a preliminary list of Subcontractors. It shall be as complete as possible at the time, showing all known Subcontractors planned for the work. The list shall be supplemented as other Subcontractors are determined by the Contractor and any such supplemental list shall be submitted to the Architect/Engineer, the Principal Representative and State Buildings Programs not less than ten (10) days before the Subcontractor commences work.

The Contractor’s list shall include those Subcontractors, if any, which the Contractor indicated in its bid would be employed for specific portions of the Work if such indication was requested in the bid documents issued by the State. The substitution of any Subcontractor listed in the Contractor’s bid shall be justified in writing not less than ten (10) days after the date of the Notice of Award, and shall be subject to the approval of the Principal Representative. For reasons such as the Subcontractor’s refusal to perform as agreed, subsequent unavailability or later discovered bid errors, or other similar reasons, but not including the availability of a lower Subcontract price, such substitution may be approved. The Contractor shall bear any additional cost incurred by such substitutions.

The Contractor shall not employ any Subcontractor that the Architect/Engineer, within seven (7) days after the date of receipt of the Contractor’s list of Subcontractors or any supplemental list, objects to in writing as being unacceptable to either the Architect/Engineer, the Principal Representative or State Buildings
Programs. If a Subcontractor is deemed unacceptable, the Contractor shall propose a substitute Subcontractor and the Contract sum shall be adjusted by any demonstrated difference between the Subcontractor's bids, except where the Subcontractor has been debarred by the State or fails to meet qualifications of the Contract Documents to perform the work proposed.

The Contractor shall be fully responsible to the Principal Representative for the acts and omissions of Subcontractors and of persons either directly or indirectly employed by them. All instructions or orders in respect to work to be done by Subcontractors shall be given to the Contractor.

ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

The Contractor agrees to bind each Subcontractor to the terms of these General Conditions and to the requirements of the Drawings and Specifications, and any Addenda thereto, and also all the other Contract Documents, so far as applicable to the work of such Subcontractor. The Contractor further agrees to bind each Subcontractor to those terms of the General Conditions which expressly require that Subcontractors also be bound, including without limitation, requirements that Subcontractors waive all rights of subrogation, provide adequate general commercial liability and property insurance, automobile insurance and workers' compensation insurance as provided in Article 25, Insurance.

Nothing contained in the Contract Documents shall be deemed to create any contractual relationship whatsoever between any Subcontractor and the State of Colorado acting by and through its Principal Representative.

ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should the Contractor cause damage to any separate contractor on the work, the Contractor agrees, upon due Notice, to settle with such contractor by agreement, if he or she will so settle. If such separate contractor sues the Principal Representative on account of any damage alleged to have been so sustained, the Principal Representative shall notify the Contractor, who shall defend such proceedings if requested to do so by Principal Representative. If any judgment against the Principal Representative arises there from, the Contractor shall pay or satisfy it and pay all costs and reasonable attorney fees incurred by the Principal Representative, in accordance with Article 52C, Indemnification, provided the Contractor was given due Notice of an opportunity to settle.

ARTICLE 18. SEPARATE CONTRACTS

The Principal Representative reserves the right to enter into other contracts in connection with the Project or the Contract. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his or her work with theirs. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Architect/Engineer any defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of work, except as to defects which may develop in the other Contractor's work after the execution of the Contractor's work.

To insure the proper execution of subsequent work, the Contractor shall measure work already in place and shall at once report to the Architect/Engineer any discrepancy between the executed work and the Drawings.

ARTICLE 19. USE OF PREMISES

The Contractor shall confine apparatus, the storage of materials and the operations of workmen to limits indicated by law, ordinances, permits and any limits lines shown on the Drawings. The Contractor shall not unreasonably encumber the premises with materials.

The Contractor shall enforce all of the Architect/Engineer's instructions and prohibitions regarding, without limitation, such matters as signs, advertisements, fires and smoking.
ARTICLE 20. CUTTING, FITTING OR PATCHING
The Contractor shall do all cutting, fitting or patching of work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon, or reasonably inferred from, the Drawings and Specifications for the complete structure, and shall provide for such finishes to patched or fitted work as the Architect/Engineer may direct. The Contractor shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other Contractor save with the consent of the Architect/Engineer.

ARTICLE 21. UTILITIES
A. TEMPORARY UTILITIES
Unless otherwise specifically stated in the Specifications or on the Drawings, the Principal Representative shall be responsible for the locations of all utilities as shown on the Drawings or indicated elsewhere in the Specifications, subject to the Contractor's compliance with all statutory or regulatory requirements to call for utility locates. When actual conditions deviate from those shown the Contractor shall comply with the requirements of Article 37, Differing Site Conditions. The Contractor shall provide and pay for the installation of all temporary utilities required to supply all the power, light and water needed by him and other Contractors for their Work and shall install and maintain all such utilities in such manner as to protect the public and workmen and conform with any applicable laws and regulations. Upon completion of the work, he or she shall remove all such temporary utilities from the site. The Contractor shall pay for all consumption of power, light and water used by him or her and the other Contractors, without regard to whether such items are metered by temporary or permanent meters. The Superintendent shall have full authority over all trades and Subcontractors at any tier to prevent waste. The cut-off date on permanent meters shall be either the agreed date of the date of the Notice of Substantial Completion or the Notice of Approval of Occupancy/Use of the Project.

B. PROTECTION OF EXISTING UTILITIES
Where existing utilities, such as water mains, sanitary sewers, storm sewers and electrical conduits, are shown on the Drawings, the Contractor shall be responsible for the protection thereof, without regard to whether any such utilities are to be relocated or removed as a part of the Work. If any utilities are to be moved, the moving must be conducted in such manner as not to cause undue interruption or delay in the operation of the same.

C. CROSSING OF UTILITIES
When new construction crosses highways, railroads, streets, or utilities under the jurisdiction of State, city or other public agency, public utility or private entity, the Contractor shall secure proper written permission before executing such new construction. The Contractor will be required to furnish a proper release before final acceptance of the Work.

ARTICLE 22. UNSUITABLE CONDITIONS
The Contractor shall not work at any time, or permit any work to be done, under any conditions contrary to those recommended by manufacturers or industry standards which are otherwise proper, unsuited for proper execution, safety and performance. Any cost caused by ill-timed work shall be borne by the Contractor unless the timing of such work shall have been directed by the Architect/Engineer or the Principal Representative, after the award of the Contract, and the Contractor provided Notice of any additional cost.

ARTICLE 23. TEMPORARY FACILITIES
A. OFFICE FACILITIES
The Contractor shall provide and maintain without additional expense for the duration of the Project temporary office facilities, as required and as specified, for his or her own use and the use of the Architect/Engineer, representatives of the Principal Representative and State Buildings Programs.

B. TEMPORARY HEAT
The Contractor shall furnish and pay for all the labor, facilities, equipment, fuel and power necessary to supply temporary heating, ventilating and air conditioning, except to the extent otherwise specified, and shall be responsible for the installation, operation, maintenance and removal of such facilities and
equipment. Unless otherwise specified, the permanent HVAC system shall not be used for temporary heat in whole or in part. If the Contractor desires to put the permanent system into use, in whole or in part, the Contractor shall set it into operation and furnish the necessary fuel and manpower to safely operate, protect and maintain that HVAC system. Any operation of all or any part of the permanent HVAC system including operation for testing purposes shall not constitute acceptance of the system, nor shall it relieve the Contractor of his or her one-year guarantee of the system from the date of the Notice of Substantial Completion of the entire Project, and if necessary due to prior operation, the Contractor shall provide manufacturers’ extended warranties from the date of the Contractor’s use prior to the date of the Notice of Substantial Completion.

C. WEATHER PROTECTION
The Contractor shall, at all times, provide protection against weather, so as to maintain all work, materials, apparatus and fixtures free from injury or damages.

D. DUST PARTITIONS
If the Work involves work in an occupied existing building, the Contractor shall erect and maintain during the progress of the work, suitable dust-proof temporary partitions, or more permanent partitions as specified, to protect such building and the occupants thereof.

E. BENCH MARKS
The Contractor shall maintain any site bench marks provided by the Principal Representative and shall establish any additional benchmarks specified by the Architect/Engineer as necessary for the Contractor to layout the work and ascertain all grades and levels as needed.

F. SIGN
The Contractor shall erect and permit one 4’ x 8’ sign only at the site to identify the Project as specified or directed by the Architect/Engineer which shall be maintained in good condition during the life of the Project.

G. SANITARY PROVISION
The Contractor shall provide and maintain suitable, clean, temporary sanitary toilet facilities for any and all workmen engaged on the Work, for the entire construction period, in strict compliance with the requirement of all applicable codes, regulations, laws and ordinances, and no other facilities, new or existing, may be used by any person on the Project. When the Project is complete the Contractor shall promptly remove them from the site, disinfect, and clean or treat the areas as required. If any new construction surfaces in the Project other than the toilet facilities provided for herein are soiled at any time, the entire areas so soiled shall be completely removed from the Project and rebuilt.

ARTICLE 24. CLEANING UP
The Contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by employees or work, and at the completion of the Work shall remove all such surplus material, waste material, dirt, and rubbish, as well as all tools, equipment and scaffolding, and shall wash and clean all window glass and plumbing fixtures, perform cleanup and cleaning required by the Specifications and leave all of the work clean unless more exact requirements are specified.

ARTICLE 25. INSURANCE
A. GENERAL LIABILITY, PROPERTY DAMAGE AND AUTOMOBILE
The Contractor shall procure and maintain comprehensive commercial general liability and property damage insurance and comprehensive automobile liability and property damage insurance as hereinafter specified, at his or her own expense, during the life of this Contract. This insurance shall include a provision preventing cancellation without forty-five (45) days’ prior Notice by certified mail and shall state whether the coverage is “claims made” or “per occurrence”. The Contractor shall obtain “per occurrence” insurance unless otherwise agreed in writing by the Principal Representative. A completed Certificate of Insurance shall be filed with State Buildings Programs within ten (10) days after the date of the Notice of Award, said Certificate to specifically state the inclusion of the coverages and provisions set forth herein.
This insurance must protect the Contractor from all claims for bodily injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with, any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor under him or anyone directly or indirectly employed by the Contractor or by a Subcontractor. All such insurance shall be written with limits and coverages as specified below and shall be written on a Comprehensive Form of Policy. In the event any of the hazards or exposures, normally listed in standard policies as “Exclusions”, are involved or required under this Contract, then such hazards or exposures shall be covered and protection afforded under the policy and such exclusions (X), (c) and (u), as excerpted from standard policies, must be removed from the policy as listed below:

“(X) Injury to or destruction of any property arising out of blasting or explosion, other than the explosion of air or steam vessels, piping under pressure, prime movers, machinery of power transmitting equipment”

“(c) The collapse of or structural injury to any building or structure due to: (1) grading of land, excavating, burrowing, filling, backfilling, tunneling, pile driving, cofferdam work or caisson work; or (2) moving, shoring, underpinning, raising or demolition of any building or structure, or removal or rebuilding of any structural support thereof;”

“(u) (1) injury to or destruction of wires, conduits, pipes, mains, sewers or other similar property, or any apparatus in connection therewith, below the surface of the ground, if such injury or destruction is caused by and occurs during the use of mechanical equipment for the purpose of grading of land, paving, excavating or drilling; or, (2) injury to or destruction of property at any time resulting there from.”

Such insurance shall be written with limits and coverages as follows, and the State of Colorado shall be named as an additional insured listed on the Acord form. The additional insured endorsement shall be requested on Insurance Services Office, Inc. (ISO) endorsement form No. CG20101185. If CG20101185 is not available, the endorsement shall be furnished by CG20101093. Additionally, CG20371001 shall be included, if possible. All aggregate amounts must be specified on the Acord form.

A. Commercial General Liability (CGL), (including bodily injury, personal injury and property damage) with the following coverages depending upon format:

1. Occurrence basis policy-combined single limit of $1,000,000
2. Annual Aggregate limit policy-not less than $2,000,000
   (Acord example) Minimum limits: $1,000,000 each occurrence
                                  $2,000,000 general aggregate with dedicated
                                  limits per project site
                                  $2,000,000 products and completed operations
                                  aggregate

The following coverages shall be included in the CGL:

1. Premises-Operations
2. Explosion/Collapse Hazard
3. Underground Hazard
4. Products/Completed Operations Hazard
5. Broad Form Contractual
6. Independent Contractors
7. Broad Form Property Damage
8. Personal Injury
B. **Automobile Liability** and business auto liability covering liability arising out of any auto (including owned, hired and non-owned autos).

Occurrence basis policy-combined single limit of $1,000,000

(Acord example) Minimum limit: $1,000,000 combined single limit each accident

Coverages:

1. Specific waiver of subrogation
2. Contractual liability

C. **Umbrella/Excess Liability (for construction projects exceeding $10,000,000, provide the following coverage):** The vendor shall maintain umbrella/excess liability insurance on an occurrence basis in excess of the underlying insurance described in Sections A, B, and D, which is at least as broad as each and every area of the underlying policies. The amounts of insurance required in Sections A, B, and D may be satisfied by the vendor purchasing coverage for the limits specified or by any combination of underlying and umbrella limits, so long as the total amount of insurance is not less than the limits specified in each section previously mentioned.

(Acord example) Minimum limit: $5,000,000 combined single limit and aggregate limit

Coverages:

1. Additional insured endorsement
2. Pay on behalf of wording
3. Concurrency of effective dates with primary
4. Blanket contractual liability
5. Punitive damages coverage (where not prohibited by law)

B. **WORKERS’ COMPENSATION INSURANCE**

The Contractor shall procure and maintain Workers’ Compensation Insurance at his or her own expense during the life of this Contract, including occupational disease provisions for all employees. This insurance, if issued by a private carrier, shall contain the same forty-five (45) days’ Notice of cancellation as required in Article 25, Insurance for the Comprehensive General Liability Insurance. Evidence of such insurance shall be by the issuance of either a Certificate by the State Compensation Insurance Fund (or its successor) or, if issued by a private carrier, the completion of a Certificate of Insurance, and such Certificate shall be filed with the State Buildings Program. The Certificate shall be filed within ten (10) days after the date of the Notice of Award.

The Contractor shall also require each Subcontractor to furnish Workers’ Compensation Insurance, including occupational disease provisions for all of the latter’s employees, and to the extent not furnished, the Contractor accepts full liability and responsibility for Subcontractor’s employees.

In cases where any class of employees engaged in hazardous work under this Contract at the site of the Project is not protected under the Workers’ Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise protected.
C. **BUILDER’S RISK INSURANCE**

Unless otherwise expressly stated in the Supplementary General Conditions (e.g. where the State elects to provide for projects with a completed value of less than $1,000,000), the Contractor shall effect and maintain a policy of insurance to provide, at Contractor’s expense, All Risk Builder’s Risk Insurance Coverage which shall be in the dollar amount of the total Project for which the Work of this Contract is to be done. Such policy may have a deductible clause but not to exceed ten thousand dollars ($10,000.00).

The Contractor shall waive all rights of subrogation as regards the State of Colorado, its officials, its officers, its agents and its employees, all while acting within the scope and course of their employment. The Insurer shall not void such insurance policy by reason of the Contractor waiving said rights. The Contractor shall require all Subcontractors at any tier to similarly waive all such rights of subrogation and shall expressly include such a waiver in all subcontracts. The insurance shall remain in effect until the Date of Notice specified on the Notice of Acceptance, State Form SBP-6.27, whether or not the building or some part thereof is occupied in any manner prior to final acceptance of the Project, and shall remain fully in effect notwithstanding any acceptance of the work of any Subcontractor on the Project. Such insurance shall be in an amount equal to the total insurable value of the construction. Upon request, the amount of such insurance shall be increased to include the cost of any additional work to be done on the Project, or materials or equipment to be incorporated in the Project, under other independent contracts let or to be let. In such event, the Contractor shall be reimbursed for this cost as his or her share of the insurance in the same ratio as the ratio of the insurance represented by such independent contracts let or to be let to the total insurance carried.

All such insurance shall insure the State of Colorado acting by and through its Principal Representative, the Contractor and his or her Subcontractors at any tier as their interests may appear. The insurance shall include a loss payable provision naming the State Controller, as loss payee.

The Principal Representative, with approval of the State Controller, shall have the power to adjust and settle any loss. Unless it is agreed otherwise, all monies received shall be applied first on rebuilding or repairing the destroyed or injured work.

The Certificate of Insurance shall specifically state the inclusion of the provisions herein above. A certificate for such insurance shall be filed with State Buildings Programs within ten (10) days after date of Notice of Award. The Insurance shall include a provision preventing cancellation without forty five (45) days’ prior Notice in writing by certified mail.

D. **ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS**

Certificates of Insurance and/or insurance policies required under this Contract shall be subject to the following stipulations and additional requirements:

1. The clause entitled “Other Insurance Provisions” contained in any policy including the State of Colorado as an additional named insured shall not apply to the State of Colorado;
2. Any and all deductibles or self-insured retentions contained in any Insurance policy shall be assumed by and at the sole risk of the Contractor;
3. If any of the said policies shall fail at any time to meet the requirements of the Contract Documents as to form or substance, or if a company issuing any such policy shall be or at any time cease to be approved by the Division of Insurance of the State of Colorado, or be or cease to be in compliance with any stricter requirements of the Contract Documents, the Contractor shall promptly obtain a new policy, submit the same to State Building Programs for approval if requested, and submit a Certificate of Insurance as hereinbefore provided. Upon failure of the Contractor to furnish, deliver and maintain such insurance as provided herein, this Contract, in the sole discretion of the State of Colorado, may be immediately declared suspended, discontinued, or terminated. Failure of the Contractor in obtaining and/or maintaining any required insurance shall not relieve the Contractor from any liability under the Contract, nor
shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification;

4. All requisite insurance shall be obtained from financially responsible insurance companies, authorized to do business in the State of Colorado and acceptable to the State;

5. Receipt, review or acceptance by the State of any insurance policies or certificates of insurance required by this Contract shall not be construed as a waiver or relieve the Contractor from its obligation to meet the insurance requirements contained in these General Conditions.

ARTICLE 26. CONTRACTOR’S PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond on State Forms SC-6.22, Performance Bond, and SC-6.221, Labor and Material Payment Bond, or such other forms as State Buildings Programs may approve for the Project, executed by a corporate Surety authorized to do business in the State of Colorado and in the full amount of the Contract sum. The expense of these bonds shall be borne by the Contractor and the bonds shall be filed with State Buildings Programs.

If, at any time, a Surety on such a bond is found to be, or ceases to be in strict compliance with any qualification requirements of the Contract Documents or the bid documents, or loses its right to do business in the State of Colorado, another Surety will be required, which the Contractor shall furnish to State Buildings Programs within ten (10) days after receipt of Notice from the State or after the Contractor otherwise becomes aware of such conditions.

ARTICLE 27. LABOR AND WAGES

In accordance with laws of Colorado, C.R.S. § 8-17-101, et. seq., as amended, Colorado labor shall be employed to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on the Project. If the Federal Davis-Bacon Act shall be applicable to the Project, as indicated in Article 54B, Modification of Article 27, the minimum wage rates to be paid on the Project will be specified in the Contract Documents.

ARTICLE 28. ROYALTIES AND PATENTS

The Contractor shall be responsible for assuring that all rights to use of products and systems have been properly arranged and shall take such action as may be necessary to avoid delay, at no additional charge to the Principal Representative, where such right is challenged during the course of the work. The Contractor shall pay all royalties and license fees required to be paid and shall defend all suits or claims for infringement of any patent rights and shall save the State of Colorado harmless from loss on account thereof, in accordance with Article 52C, Indemnification; provided, however, the Contractor shall not be responsible for such loss or defense for any copyright violations contained in the Contract Documents prepared by the Architect/Engineer or the Principal Representative of which the Contractor is unaware, or for any patent violations based on specified processes that the Contractor is unaware are patented or that the Contractor should not have had reason to believe were patented.

ARTICLE 29. ASSIGNMENT

Except as otherwise provided hereafter the Contractor shall not assign the whole or any part of this Contract without the written consent of the Principal Representative. This provision shall not be construed to prohibit assignments of the right to payment to the extent permitted by Section 4-9-406, C.R.S., as amended, provided that written Notice of assignment adequate to identify the rights assigned is received by the Principal Representative and the controller for the agency, department, or institution executing this Contract (as distinguished from the State Controller). Such assignment of the right to payment shall not be deemed valid until receipt by the Principal Representative and such controller and the Contractor assumes the risk that such written Notice of assignment is received by the Principal Representative and the controller for the agency, department, or institution involved. In case the Contractor assigns all or part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this Contract, whether said service or materials were supplied prior to or after the assignment. Nothing in this Article shall be deemed a waiver of any other defenses available to the State against the Contractor or the assignee.
ARTICLE 30.  CORRECTION OF WORK BEFORE ACCEPTANCE

The Contractor shall promptly remove from the premises all work or materials condemned or declared irreparably defective as failing to conform to the Contract Documents on receipt of written Notice from the Architect/Engineer or the Principal Representative, whether incorporated in the Work or not. If such materials shall have been incorporated in the Work, or if any unsatisfactory work is discovered, the Contractor shall promptly replace and re-execute his or her work in accordance with the requirements of the Contract Documents without expense to the Principal Representative, and shall also bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement of such defective material or work.

If the Contractor does not remove such condemned or irreparably defective work or material within a reasonable time, the Principal Representative may, after giving a second seven (7) day advance Notice to the Contractor and the Surety, remove them and may store the material at the Contractor’s expense. The Principal Representative may accomplish the removal and replacement with its own forces or with another Contractor. If the Contractor does not pay the expense of such removal and pay all storage charges within ten (10) days thereafter, the Principal Representative may, upon ten (10) days’ written Notice, sell such material at auction or at private sale and account for the net proceeds thereof, after deducting all costs and expenses which should have been borne by the Contractor. If the Contractor shall commence and diligently pursue such removal and replacement before the expiration of the seven day period, or if the Contractor shall show good cause in conjunction with submittal of a revised CPM schedule showing when the work will be performed and why such removal of condemned work should be scheduled for a later date, the Principal Representative shall not proceed to remove or replace the condemned work.

Should any defective work or material be discovered during the process of construction, or should reasonable doubt arise as to whether certain material or work is in accordance with the Contract Documents, the value of such defective or questionable material or work shall not be included in any application for payment, or if previously included, shall be deducted by the Architect/Engineer from the next application submitted by the Contractor.

If the Contractor does not perform repair, correction and replacement of defective work, in lieu of proceeding by issuance of a Notice of intent to remove condemned work as outlined above, the Principal Representative may, not less than seven (7) days after giving the original written Notice of the need to repair, correct, or replace defective work, deduct all costs and expenses of replacement or correction as instructed by the Architect/Engineer from the Contractor’s next application for payment in addition to the value of the defective work or material. The Principal Representative may also make an equitable deduction from the Contract sum by unilateral Change Order, in accordance with Article 33, Payments Withheld and Article 35, Changes In The Work.

If the Contractor disagrees with the Notice to remove work or materials condemned or declared irreparably defective, the Contractor may request facilitated negotiation of the issue and the Principal Representative’s right to proceed with removal and to deduct costs and expenses of repair shall be suspended and tolled until such time as the parties meet and negotiate the issue.

During construction, whenever the Architect/Engineer has advised the Contractor in writing, in the Specifications, by reference to Article 6, Architect/Engineer Decisions And Judgments, of these General Conditions or elsewhere in the Contract Documents of a need to observe materials in place prior to their being permanently covered up, it shall be the Contractor’s responsibility to notify the Architect/Engineer at least forty-eight (48) hours in advance of such covering operation. If the Contractor fails to provide such notification, Contractor shall, at his or her expense, uncover such portions of the work as required by the Architect/Engineer for observation, and reinstall such covering after observation. When a covering operation is continued from day to day, notification of the commencement of a single continuing covering operation shall suffice for the activity specified so long as it proceeds regularly and without interruption from day to day, in which event the Contractor shall coordinate with the Architect/Engineer regarding the continuing covering operation.
ARTICLE 31. APPLICATIONS FOR PAYMENTS

A. CONTRACTOR’S SUBMITTALS

On or before the first day of each month and no more than five days prior thereto, the Contractor may submit applications for payment for the work performed during such month covering the portion of the Work completed as of the date indicated, and payments on account of this Contract shall be due within thirty (30) days after the last day of the period for which payment is requested. The Contractor shall submit the application for payment to the Architect/Engineer on State forms SBP-7.2, Certificate for Contractor’s Payment, or such other format as the State Buildings Programs shall approve, in an itemized format in accordance with the schedule of values or a cost loaded CPM when required, supported to the extent reasonably required by the Architect/Engineer or the Principal Representative by receipts or other vouchers, showing payments for materials and labor, prior payments and payments to be made to Subcontractors and such other evidence of the Contractor’s right to payments as the Architect/Engineer or Principal Representative may direct.

If payments are made on account of materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the Principal Representative’s title to such material or otherwise adequately protect the Principal Representative’s interests, and shall provide proof of insurance whenever requested by the Principal Representative or the Architect/Engineer, and shall be subject to the right to inspect the materials at the request of either the Architect/Engineer or the Principal Representative.

All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error.

B. ARCHITECT/ENGINEER CERTIFICATION

In accordance with the Architect/Engineer’s agreement with the Principal Representative, the Architect/Engineer after appropriate observation of the progress of the work shall certify to the Principal Representative the amount that the Contractor is entitled to, and forward the application to the Principal Representative. If the Architect/Engineer certifies an amount different from the amount requested or otherwise alters the Contractor’s application for payment, a copy shall be forwarded to the Contractor.

If the Architect/Engineer is unable to certify all or portions of the amount requested due to the absence or lack of required supporting evidence, the Architect/Engineer shall advise the Contractor of the deficiency. If the deficiency is not corrected at the end of ten (10) days, the Architect/Engineer may either certify the remaining amounts properly supported to which the Contractor is entitled, or return the application for payment to the Contractor for revision with a written explanation as to why it could not be certified.

C. RETAINAGE WITHHELD

Unless otherwise provided in the Supplementary General Conditions, an amount equivalent to ten percent (10%) of the amount shown to be due the Contractor on each application for payment shall be withheld until fifty percent (50%) of the work required by the Contract has been performed. Thereafter, the remaining Certificates for Contractor’s Payment (SBP-7.2) shall be paid without retaining additional funds, if in the opinion of the Architect/Engineer and the Principal Representative, satisfactory progress is being made in the Work. The withheld percentage of the contract price of any such work, improvement, or construction shall be administered according to § 24-91-101, et seq., C.R.S., as amended, and except as provided in § 24-91-103, C.R.S., as amended, and Article 31D, shall be retained until the Work or discrete portions of the Work, have been completed satisfactorily, finally or partially accepted, and advertised for final settlement as further provided in Article 41.

D. RELEASE OF RETAINAGE

The Contractor may, for satisfactory and substantial reasons shown to the Principal Representative’s satisfaction, make a written request to the Principal Representative and the Architect/Engineer for release of part or all of the withheld percentage applicable to the work of a Subcontractor which has
completed the subcontracted work in a manner finally acceptable to the Architect/Engineer, the Contractor, and the Principal Representative. Any such request shall be supported by a written approval from the Surety furnishing the Contractor’s bonds and any surety that has provided a bond for the Subcontractor. The release of any such withheld percentage shall be further supported by such other evidence as the Architect/Engineer or the Principal Representative may require, including but not limited to, evidence of prior payments made to the Subcontractor, copies of the Subcontractor’s contract with the Contractor, any applicable warranties, as-built information, maintenance manuals and other customary close-out documentation. Neither the Principal Representative nor the Architect Engineer shall be obligated to review such documentation nor shall they be deemed to assume any obligations to third parties by any review undertaken.

The Contractor’s obligation under these General Conditions to guarantee work for one year from the date of the Notice of Substantial Completion or the date of any Notice of Partial Substantial Completion of the applicable portion or phase of the Project, shall be unaffected by such partial release; unless a Notice of Partial Substantial Completion is issued for the work subject to the release of retainage.

Any rights of the Principal Representative which might be terminated by or from the date of any final acceptance of the Work, whether at common law or by the terms of this Contract, shall not be affected by such partial release of retainage prior to any final acceptance of the entire Project.

The Contractor remains fully responsible for the Subcontractor’s work and assumes any risk that might arise by virtue of the partial release to the Subcontractor of the withheld percentage, including the risk that the Subcontractor may not have fully paid for all materials, labor and equipment furnished to the Project.

If the Principal Representative considers the Contractor’s request for such release satisfactory and supported by substantial reasons, the Architect/Engineer shall make a “final inspection” of the applicable portion of the Project to determine whether the Subcontractor’s work has been completed in accordance with the Contract Documents. A final punch list shall be made for the Subcontractor’s work and the procedures of Article 41, Completion, Final Inspection, Acceptance and Settlement, shall be followed for that portion of the work, except that advertisement of the intent to make final payment to the Subcontractor shall be required only if the Principal Representative has reason to believe that a supplier or Subcontractor to the Subcontractor for which the request is made, may not have been fully paid for all labor and materials furnished to the Project.

ARTICLE 32. CERTIFICATES FOR PAYMENTS
State Form SBP-7.2, Certificate For Contractor’s Payment, and its continuation detail sheets, when submitted, shall constitute the Certificate of Contractor’s Application for Payment, and shall be a representation by the Contractor to the Principal Representative that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and materials for which payment is requested have been incorporated into the Project except as noted in the application. If requested by the Principal Representative the Certificate of Contractor’s Application for Payment shall be sworn under oath and notarized.

ARTICLE 33. PAYMENTS WITHHELD
The Architect/Engineer, the Principal Representative or State Buildings Programs may withhold, or on account of subsequently discovered evidence nullify, the whole or any part of any application on account of, but not limited to any of the following:

1. Defective work not remedied;
2. Claims filed or reasonable evidence indicating probable filing of claims;
3. Failure of the Contractor to make payments to Subcontractors for material or labor;
4. A reasonable doubt that the Contract can be completed for the balance of the contract price then unpaid;
5. Damage or injury to another contractor or any other person, persons or property except to the extent of coverage by a policy of insurance;
6. Failure to obtain necessary permits or licenses or to comply with applicable laws, ordinances, codes, rules or regulations or the directions of the Architect/Engineer;
7. Failure to submit a monthly construction schedule;
8. Failure of the Contractor to keep work progressing in accordance with the time schedule;
9. Failure to keep a superintendent on the work;
10. Failure to maintain as built drawings of the work in progress;
11. Unauthorized deviations by the Contractor from the Contract Documents; or
12. On account of liquidated damages.

In addition, the Architect Engineer, Principal Representative or State Buildings Programs may withhold or nullify the whole or any part of any application for any reason noted elsewhere in these General Conditions of the Contract. Nullification shall mean reduction of amounts shown as previously paid on the application. The amount withheld or nullified may be in such amount as the Architect/Engineer or the Principal Representative estimates to be required to allow the State to accomplish the Work, cure the failure and cover any damages or injuries, including an allowance for attorneys fees and costs where appropriate. When the grounds for such withholding or nullifying are removed, payment shall be made for the amounts thus withheld or nullified on such grounds.

ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK
If the Architect/Engineer and the Principal Representative deem it inexpedient to correct work injured or not performed in accordance with the Contract Documents, the Principal Representative may, after consultation with the Architect/Engineer and ten (10) days’ Notice to the Contractor of intent to do so, make reasonable reductions from the amounts otherwise due the Contractor on the next application for payment. Notice shall specify the amount or terms of any contemplated reduction. The Contractor may during this period elect to correct or perform the work. If the Contractor does not elect to correct or perform the work, an equitable deduction from the Contract sum shall be made by Change Order, in accordance with Article 35, Changes In The Work, unilaterally if necessary. If either party elects facilitation of this issue after Notice is given, the ten-day notice period shall be extended and tolled until facilitation has occurred.

ARTICLE 35. CHANGES IN THE WORK
The Principal Representative, or such other Procurement Officer as the Principal Representative may designate, without invalidating the Agreement, and with the approval of State Buildings Programs and the State Controller, may order extra work or make changes with or without the consent of the Contractor as hereafter provided, by altering, adding to or deducting from the Work, the Contract sum being adjusted accordingly. All such changes in the Work shall be within the general scope of and be executed under the conditions of the Contract, except that any claim for extension of time made necessary due to the change or any claim of other delay or other impacts caused by or resulting from the change in the Work shall be presented by the Contractor and adjusted by Change Order to the extent known at the time such change is ordered and before proceeding with the extra or changed work. Any claims for extension of time or of delay or other impacts, and any costs associated with extension of time, delay or other impacts, which are not presented before proceeding with the change in the Work, and which are not adjusted by Change Order to the extent known, shall be waived.

The Architect/Engineer shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the intent of the Contract Documents, but otherwise, except in an emergency endangering life or property, no extra work or change in the Contract Documents shall be made unless by 1) a written Change Order, approved by the Principal Representative, State Buildings Programs, and the State Controller prior to proceeding with the changed work; or 2) by an Emergency Field Change Order approved by the Principal Representative and State Buildings Programs as hereafter provided in Article 35C, Emergency Field Ordered Changed Work; or 3) by an allocation in writing of any allowance already provided in the encumbered contract amount, the Contract sum being later adjusted to decrease the Contract sum by any unallocated or unexpended amounts remaining in such allowance. No change to the Contract sum shall be valid unless so ordered.
A. THE VALUE OF CHANGED WORK

1. The value of any extra work or changes in the Work shall be determined by agreement in one or more of the following ways:
   a. By estimate and acceptance of a lump-sum amount;
   b. By unit prices specified in the Agreement, or subsequently agreed upon, that are extended by specific quantities;
   c. By actual cost plus a fixed fee in a lump sum amount for profit, overhead and all indirect and off-site home office costs, the latter amount agreed upon in writing prior to starting the extra or changed work.

2. Where the Contractor and the Principal Representative cannot agree on the value of extra work, the Principal Representative may order the Contractor to perform the changes in the Work and a Change Order may be unilaterally issued based on an estimate of the change in the Work prepared by the Architect/Engineer. The value of the change in the Work shall be the Principal Representative’s determination of the amount of equitable adjustment attributable to the extra work or change. The Principal Representative’s determination shall be subject to appeal by the Contractor pursuant to the claims process in Article 36, Claims. The Principal Representative is the Procurement Officer for purposes of all of the remedies provisions of the Contract.

3. Except as otherwise provided in Article 35B, Detailed Breakdown, below, the Cost Principles of the Colorado Procurement Rules in effect on the date of this Contract, pursuant to § 24-107-101, C.R.S., as amended, shall govern all Contract changes.

B. DETAILED BREAKDOWN

In all cases where the value of the extra or changed work is not known based on unit prices in the Contractor’s bid or the Agreement, a detailed change proposal shall be submitted by the Contractor on a Change Order Proposal (SC-6.312), or in such other format as the State Buildings Program approves, with which the Principal Representative may require an itemized list of materials, equipment and labor, indicating quantities, time and cost for completion of the changed work.

Such detailed change proposals shall be stated in lump sum amounts and shall be supported by a separate breakdown, which shall include estimates of all or part of the following when requested by the Architect/Engineer or the Principal Representative:

1. Materials, indicating quantities and unit prices including taxes and delivery costs if any (separated where appropriate into general, mechanical and electrical and/or other Subcontractors’ work; and the Principal Representative may require in its discretion any significant subcontract costs to be similarly and separately broken down).

2. Labor costs, indicating hourly rates and time and labor burden to include Social Security and other payroll taxes such as unemployment, benefits and other customary burdens.

3. Costs of project management time and superintendence time of personnel stationed at the site, and other field supervision time, but only where a time extension, other than a weather delay, is approved as part of the Change Order, and only where such project management time and superintendence time is directly attributable to and required by the change; provided however that additional cost of on-site superintendence shall be allowable whenever in the opinion of the Architect/Engineer the impact of multiple change requests to be concurrently performed will result in inadequate levels of supervision to assure a proper result unless additional superintendence is provided.

4. Construction equipment (including small tools). Expenses for equipment and fuel shall be based on customary commercially reasonable rental rates and schedules. Equipment and hand tool costs shall not include the cost of items customarily owned by workers.

5. Workers’ compensation costs, if not included in labor burden.

6. The cost of commercial general liability and property damage insurance premiums but only to the extent charged the Contractor as a result of the changed work.
7. Overhead and profit, as hereafter specified.
8. Builder’s risk insurance premium costs.
9. Bond premium costs.
10. Testing costs not otherwise excluded by these General Conditions.
11. Subcontract costs.

Unless modified in the Supplementary General Conditions, overhead and profit shall not exceed the percentages set forth in the table below.

<table>
<thead>
<tr>
<th>TO THE CONTRACTOR OR TO SUBCONTRACTORS</th>
<th>OVERHEAD</th>
<th>PROFIT</th>
<th>COMMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR THE PORTION OF WORK PERFORMED</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>WITH THEIR OWN FORCES:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FOR WORK PERFORMED BY OTHERS AT A TIER</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>IMMEDIATELY BELOW EITHER OF THEM:</td>
<td></td>
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</tbody>
</table>

Overhead shall include: a) insurance premium for policies not purchased for the Project and itemized above, b) home office costs for office management, administrative and supervisory personnel and assistants, c) estimating and change order preparation costs, d) incidental job burdens, e) legal costs, f) data processing costs, g) interest costs on capital, h) general office expenses except those attributable to increased rental expenses for temporary facilities, and all other indirect costs, but shall not include the Social Security tax and other direct labor burdens. The term “work” as used in the proceeding table shall include labor, materials and equipment and the “Commission” shall include all costs and profit for carrying the subcontracted work at the tiers below except direct costs as listed in items 1 through 11 above if any.

On proposals for work involving both additions and credits in the amount of the Contract sum, the overhead and profit will be allowed on the net increase only. On proposals resulting in a net deduct to the amount of the Contract sum, profit on the deducted amount shall be returned to the Principal Representative at fifty percent (50%) of the rate specified. The inadequacy of the profit specified shall not be a basis for refusal to submit a proposal.

Except in the case of Change Orders or Emergency Field Change Orders agreed to on the basis of a lump sum amount or unit prices as described in paragraphs 35A1 and 35A2 above, The Value of Changed Work, the Contractor shall keep and present a correct and fully auditable account of the several items of cost, together with vouchers, receipts, time cards and other proof of costs incurred, summarized on a Change Order form (SC-6.31) using such format for supporting documentation as the Principal Representative and State Buildings Programs approve. This requirement applies equally to work done by Subcontractors. Only auditable costs shall be reimbursable on Change Orders where the value is determined on the basis of actual cost plus a fixed fee pursuant to paragraph 35A3 above, or where unilaterally determined by the Principal Representative on the basis of an equitable adjustment in accordance with the Procurement Rules, as described above in Article 35A, The Value Of Changed Work.

Except for proposals for work involving both additions and credits, changed work shall be adjusted and considered separately for work either added or omitted. The amount of adjustment for work omitted shall be estimated at the time it is directed to be omitted, and when reasonable to do so, the agreed adjustment shall be reflected on the schedule of values used for the next Contractor’s application for payment.

The Principal Representative reserves the right to contract with any person or firm other than the Contractor for any or all extra work; however, unless specifically required in the Contract Documents, the Contractor shall have no responsibility without additional compensation to supervise or coordinate the work of persons or firms separately contracted by the Principal Representative.
C. EMERGENCY FIELD CHANGE ORDERED WORK
The Principal Representative, without invalidating the Agreement, and with the approval of State Buildings Programs and without the approval of the State Controller, may order extra work or make changes in the case of an emergency that is a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and or significant cost increases for the Project. Emergency Field Orders are not to be used solely to expedite normal Change Order processing absent a clear showing of a high potential for significant and substantial cost or delay. Such changes in the Work may be directed through issuance of an Emergency Field Change Order signed by the Contractor, the Principal Representative (or by a designee specifically appointed to do so in writing), and approved by the Director of State Buildings Program or his or her delegate. The change shall be directed using a State Change Order form (SC-6.31), modified with the words “Emergency Field Change Order” at the top.

If the amount of the adjustment of the Contract price and time for completion can be determined at the time of issuance of the Emergency Field Change Order, those adjustments shall be reflected on the face of theEmergency Field Change Order. Otherwise, the Emergency Field Change Order shall reflect a not to exceed (NTE) amount for any schedule adjustment (increasing or decreasing the time for completion) and an NTE amount for any adjustment to Contract sum, which NTE amount shall represent the maximum amount of adjustment to which the Contractor will be entitled, including direct and indirect costs of changed work, as well as any direct or indirect costs attributable to delays, inefficiencies or other impacts arising out of the change. Emergency Field Change Orders directed in accordance with this provision need not bear the approval signatures of the State Controller.

On Emergency Field Change Orders where the price and schedule have not been finally determined, the Contractor shall submit final costs for adjustment as soon as practicable. No later than seven (7) days after issuance, except as otherwise permitted, and every seven days thereafter, the Contractor shall report all costs to the Principal Representative and the Architect/Engineer. Weekly cost reports and the final adjustment of the Emergency Field Change Orders amount and the adjustment to the Project time for completion shall be prepared in accordance with the procedures described in Article 35A, The Value of Changed Work, and B, Detailed Breakdown, above. Unless otherwise provided in writing signed by the Director of State Buildings Programs to the Principal Representative and the Contractor, describing the extent and limits of any greater authority, individual Emergency Field Change Orders shall not be issued for more than $25,000, nor shall the cumulative value of Emergency Field Change Orders exceed an amount of $100,000.

D. APPROPRIATION LIMITATIONS - § 24-91-103.6, C.R.S., as amended
The amount of money appropriated, as shown on the Agreement (SC 6.21), is equal to or in excess of the Contract amount. No Change Order, Emergency Field Change Order, or other type of order or directive shall be issued by the Principal Representative, or any agent acting on his or her behalf, which directs additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original Contract, as shown on the Agreement (SC-6.13), unless one of the following occurs: (1) the Contractor is provided written assurance from the Principal Representative that sufficient additional lawful appropriations exist to cover the cost of the additional work; or (2) the work is covered by a contractor remedy provision under the Contract, such as a claim for extra cost. By way of example only, no assurance is required for any order, directive or instruction by the Architect/Engineer or the Principal Representative to perform work which is determined to be within the performance required by the Contract Documents; the Contractor’s remedy shall be as described elsewhere in these General Conditions.

Written assurance shall be in the form of an Amendment to the Contract reciting the source and amount of such appropriation available for the Project. No remedy granting provision of this Contract shall obligate the Principal Representative to seek appropriations to cover costs in excess of the amounts recited as available to pay for the work to be performed.
ARTICLE 36. CLAIMS

It is the intent of these General Conditions to provide procedures for speedy and timely resolution of disagreements and disputes at the lowest level possible. In the spirit of on the job resolution of job site issues, the parties are encouraged to use the partnering processes of Article 2D, Partnering, Communications and Cooperation, before turning to the more formal claims processes described in this Article 36, Claims. The use of non-binding dispute resolution, whether through the formal processes described in Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, or through less formal alternative processes developed as part of a partnering plan, are also encouraged. Where such process cannot resolve the issues in dispute, the claims process that follows is intended to cause the issues to be presented, decided and where necessary, documented in close proximity to the events from which the issues arise. To that end, and in summary of the remedy granting process that follows commencing with the next paragraph of this Article 36, Claims, the Contractor shall 1) first, seek a decision by the Architect/Engineer, and 2) second, informally present the claim to Principal Representative as described hereafter, and 3) failing resolution in the field, give Notice of intent to exercise statutory rights of review of a formal contract controversy, and 4) seek resolution outside the Contract as provided by the Procurement Code.

If the Contractor claims that any instructions, by detailed drawings, or otherwise, or any other act or omission of the Architect/Engineer or Principal Representative affecting the scope of the Contractor’s work, involve extra cost, extra time or changes in the scope of the Work under this Contract, the Contractor shall have the right to assert a claim for such costs or time, provided that before either proceeding to execute such work (except in an emergency endangering life or property), or filing a Notice of claim, the Contractor shall have obtained or requested a written decision of the Architect/Engineer following the procedures as provided in Article 6A and B, Architect/Engineer Decisions and Judgments, respectively; provided, however, that in the case of a directed change in the Work pursuant to Article 36A4, no written judgment or decision of the Architect/Engineer is required. If the Contractor is delayed by the lack of a response to a request for a decision by the Architect/Engineer, the Contractor shall give Notice in accordance with Article 38, Delays And Extensions Of Time.

Unless it is the Architect/Engineer’s judgment and determination that the work is not included in the performance required by the Contract Documents, the Contractor shall proceed with the work as originally directed. Where the Contractor’s claim involves a dispute concerning the value of work unilaterally directed pursuant to Article 35A4 the Contractor shall also proceed with the work as originally directed while his or her claim is being considered.

The Contractor shall give the Principal Representative and the Architect/Engineer Notice of any claim promptly after the receipt of the Architect/Engineer’s decision, but in no case later than three (3) business days after receipt of the Architect/Engineer’s decision (or no later than ten (10) days from the date of the Contractor’s request for a decision when the Architect/Engineer fails to decide as provided in Article 6). The Notice of claim shall state the grounds for the claim and the amount of the claim to the extent known in accordance with the procedures of Article 35, Changes In The Work. The period in which Notice must be given may be extended by the Principal Representative if requested in writing by the Contractor with good cause shown, but any such extension to be effective shall be in writing.

The Principal Representative shall respond in writing, with a copy to the Architect/Engineer, within a reasonable time, and except where a request for facilitation of negotiation has been made as hereafter provided, in no case later than seven (7) business days (or at such other time as the Contractor and Principal Representative agree) after receipt of the Contractor’s Notice of claim regarding such instructions or alleged act or omission. If no response to the Contractor’s claim is received within seven (7) business days of Contractor’s Notice (or at such other time as the Contractor and Principal Representative agree) and the instructions have not been retracted, it shall be deemed that the Principal Representative has denied the claim.

The Principal Representative may grant or deny the claim in whole or in part, and a Change Order shall be issued if the claim is granted. To the extent any portion of claim is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by
any method allowed in Article 35A, The Value Of Changed Work. Except in the case of a deemed denial, the Principal Representative shall provide a written explanation regarding any portion of the Contractor's claim that is denied.

If the Contractor disagrees with the Principal Representative's judgment and determination on the claim and seeks an equitable adjustment of the Contract sum or time for performance, he or she shall give Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy within ten (10) days of receipt of the Principal Representative's decision denying the claim. A “contract controversy,” as such term is used in the Colorado Procurement Code, § 24-109-106, C.R.S., shall not arise until the initial claim process described above in this Article 36 has been properly exhausted by the Contractor. The Contractor's failure to proceed with work directed by the Architect/Engineer or to exhaust the claim process provided above in this Article 36, shall constitute an abandonment of the claim by the Contractor and a waiver of the right to contest the decision in any forum.

At the time of filing the Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy, the Contractor may request that the Principal Representative defer a decision on the contract controversy until a later date or until the end of the Project. If the Principal Representative agrees, he or she shall so advise the Contractor in writing. If no such request is made, or if the Principal Representative does not agree to such a request, the Principal Representative shall render a written decision within twenty (20) business days and advise the Contractor of the reasons for any denial. Unless the claim has been decided by the Principal Representative (as opposed to delegates of the Principal Representative), the person who renders the decision on this statutory contract controversy shall not be the same person who decided the claim. To the extent any portion of the contract controversy is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by any method allowed in Article 35A, The Value Of Changed Work. In the event of a denial the Principal Representative shall give Notice to the Contractor of his or her right to administrative and judicial reviews as provided in the Colorado Procurement Code, § 24-109-201 et seq, C.R.S., as amended. If no decision regarding the contract controversy is issued within twenty (20) business days of the Contractor's giving Notice (or such other date as the Contractor and Principal Representative have agreed), and the instructions have not been retracted or the alleged act or omission have not been corrected, it shall be deemed that the Principal Representative has ruled by denial on the contract controversy. Except in the case of a deemed denial, the Principal Representative shall provide an explanation regarding any portion of the contract controversy that involves denial of the Contractor's claim.

Either the Contractor or the Principal Representative may request facilitation of negotiations concerning the claim or the contract controversy, and if requested, the parties shall consult and negotiate before the Principal Representative decides the issue. Any request for facilitation by the Contractor shall be made at the time of the giving of Notice of the claim or Notice of the contract controversy. Facilitation shall extend the time for the Principal Representative to respond by commencing the applicable period at the completion of the facilitated negotiation, which shall be the last day of the parties’ meeting, unless otherwise agreed in writing.

Disagreement with the decision of the Architect Engineer, or the decision of the Principal Representative to deny any claim or denying the contract controversy, shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance. During the period that any claim or contract controversy decision is pending under this Article 36, Claims, the Contractor shall proceed diligently with the work directed.

In all cases where the Contractor proceeds with the work and seeks equitable adjustment by filing a claim and or statutory appeal, the Contractor shall keep a correct account of the extra cost, in accordance with Article 35B, Detailed Breakdown supported by receipts. The Principal Representative shall be entitled to reject any claim or contract controversy whenever the foregoing procedures are not followed and such accounts and receipts are not presented.

The payments to the Contractor in respect of such extra costs shall be limited to reimbursement for the current additional expenditure by the Contractor made necessary by the change in the work, plus a
reasonable amount for overhead and profit, determined in accordance with Article 35B, Detailed Breakdown, determined solely with reference to the additional work, if any, required by the change.

ARTICLE 37. DIFFERING SITE CONDITIONS
A. NOTICE IN WRITING
The Contractor shall promptly, and where possible before conditions are disturbed, give the Architect/Engineer and the Principal Representative Notice in writing of:

1. subsurface or latent physical conditions at the site differing materially from those indicated in or reasonably assumed from the information provided in the Contract Documents; and,
2. unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

The Architect/Engineer shall promptly investigate the conditions, and if it is found that such conditions do materially so differ and cause an increase or decrease in the Contractor’s costs of performance of any part of the work required by the Contract Documents, whether or not such work is changed as a result of such conditions, an equitable adjustment shall be made and the Contract sum shall be modified in accordance with Article 35, Changes In The Work.

If the time required for completion of the work affected by such materially differing conditions will extend the work on the critical path as indicated on the CPM schedule, the time for completion shall also be equitably adjusted.

B. LIMITATIONS
No claim of the Contractor under this clause shall be allowed unless the Contractor has given the Notice required in Article 37A, Notice In Writing, above. The time prescribed for presentation and adjustment in Articles 36, Claims and 38, Delays And Extensions Of Time, shall be reasonably extended by the State to the extent required by the nature of the differing conditions; provided, however, that even when so extended no claim by the Contractor for an equitable adjustment hereunder shall be allowed if not quantified and presented prior to the date the Contractor requests a final inspection pursuant to Article 41A, Notice Of Completion.

ARTICLE 38. DELAYS AND EXTENSIONS OF TIME
If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the State of Colorado or the Architect/Engineer, or of any employee or agent of either, or by any separately employed Contractor or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any other causes beyond the Contractor’s control, including weather delays as defined below, the time of Completion of the Work shall be extended for a period equal to such portion of the period of delays directly affecting the completion of the Work as the Contractor shall be able to show he or she could not have avoided by the exercise of due diligence.

The Contractor shall provide Notice in writing to the Architect/Engineer, the Principal Representative and State Buildings Programs within three (3) business days from the beginning of such delay and shall file a written claim for an extension of time within seven (7) business days after the period of such delay has ceased, otherwise, any claim for an extension of time is waived.

Provided that the Contractor has submitted reasonable schedules for approval when required by Article 12, Requests for Information and Schedules, if no schedule is agreed to fixing the dates on which the responses to requests for information or detail drawings will be needed, or Shop Drawings, Product Data or Samples are to be reviewed as required or allowed by Article 12B, Schedules, no extension of time will be allowed for the Architect/Engineer’s failure to furnish such detail drawings as needed, or for the failure to initially review Shop Drawings, Product Data or Samples, except in respect of that part of any delay in furnishing detail drawings or instructions extending beyond a reasonable period after written demand for such detailed drawings or instructions is received by the Architect/Engineer. In any event, any claim for an extension of time for such cause will be recognized only to the extent of delay directly caused by failure to furnish detail
drawings or instructions or to review Shop Drawings, Product Data or Samples pursuant to schedule, after such demand.

All claims for extension of time due to a delay claimed to arise or result from ordered changes in the scope of the Work, or due to instructions claimed to increase the scope of the Work, shall be presented to the Architect/Engineer, the Principal Representative and State Buildings Programs as part of a claim for extra cost, if any, in accordance with Article 36, Claims, and in accordance with the Change Order procedures required by Article 35, Changes In The Work.

Except as otherwise provided in this paragraph, no extension of time shall be granted when the Contractor has failed to utilize a CPM schedule or otherwise identify the Project’s critical path as specified in Article 12, Requests for Information and Schedules, or has elected not to do so when allowed by the Supplementary General Conditions or the Specifications to use less sophisticated scheduling tools, or has failed to maintain such a schedule. Delay directly affecting the completion of the Work shall result in an extension of time only to the extent that completion of the Work was affected by impacts to the critical path shown on Contractor’s CPM schedule. Where the circumstances make it indisputable in the opinion of the Architect/Engineer that the delay affected the completion of the Work so directly that the additional notice of the schedule impact by reference to a CPM schedule was unnecessary, a reasonable extension of time may be granted.

Extension of the time for completion of the Work will be granted for delays due to weather conditions only when the Contractor demonstrates that such conditions were more severe and extended than those reflected by the ten-year average for the month, as evidenced by the Climatological Data, U. S. Department of Commerce, for the Project area.

Extensions of the time for completion of the Work due to weather will be granted on the basis of one and three tenths (1.3) calendar days for every day that the Contractor would have worked but was unable to work, with each separate extension figured to the nearest whole calendar day.

For weather delays and delays caused by events, acts or omissions not within the control of the Principal Representative or any person acting on the Principal Representative’s behalf, the Contractor shall be entitled to an extension of time only and shall not be entitled to recovery of additional cost due to or resulting from such delays. This Article does not, however, preclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS
The Contractor and Principal Representative agree to designate one or more mutually acceptable persons willing and able to facilitate negotiations and communications for the resolution of conflicts, disagreements or disputes between them at the specific request of either party with regard to any Project decision of either of them or any decision of the Architect/Engineer. The designation of such person(s) shall not carry any obligation to use their services except that each party agrees that if the other party requests the intervention of such person(s) with respect to any such conflict, dispute or disagreement, the non-requesting party shall participate in good faith attempts to negotiate a resolution of the issue in dispute. If the parties cannot agree on a mutually acceptable person to serve in this capacity one shall be so appointed; provided, however, that either party may request the director of State Buildings Programs to appoint such a person, who, if appointed, shall be accepted for this purpose by both the Contractor and the Principal Representative.

The cost, if any, of the facilitative services of the person(s) so designated shall be shared if the parties so agree in any partnering plan; or in the absence of agreement the cost shall be borne by the party requesting the facilitation of negotiation.

Any dispute, claim, question or disagreement arising from or relating to the Contract or an alleged breach of the Contract may be subject to a request by either party for facilitated negotiation subject to the limitations hereafter listed, and the parties shall participate by consultation and negotiation with each other, as guided by the facilitator and with recognition of their mutual interests, in an attempt to reach an equitable solution satisfactory to both parties.
The obligation to participate in facilitated negotiations shall be as described above and elsewhere in these General Conditions, as by way of example in Article 36, Claims, or Article 34, Deductions for Uncorrected Work, and to the extent not more particularly described or limited elsewhere, each party's obligations shall be as follows:

1. a party shall not initiate communication with the facilitator regarding the issues in dispute; except that any request for facilitation shall be made in writing with copies sent, faxed or delivered to the other party;
2. a party shall prepare a brief written description of its position if so requested by the facilitator (who may elect to first discuss the parties' positions with each party separately in the interest of time and expense);
3. a party shall respond to any reasonable request for copies of documents requested by the facilitator, but such requests, if voluminous, may consist of an offer to allow the facilitator access to the parties' documents;
4. a party shall review any meeting agenda proposed by a facilitator and endeavor to be informed on the subjects to be discussed;
5. a party shall meet with the other party and the facilitator at a mutually acceptable place and time, or, if none can be agreed to, at the time and place designated by the facilitator for a period not to exceed four hours unless the parties agree to a longer period;
6. a party shall endeavor to assure that any facilitation meeting shall be attended by any other persons in their employ that the facilitator requests be present, if reasonably available, including the Architect/Engineer;
7. each party shall participate in such facilitated face-to-face negotiations of the issues in dispute through persons fully authorized to resolve the issue in dispute;
8. each party shall be obligated to participate in negotiations requested by the other party and to perform the specific obligations described in paragraphs (1) through (10) this Article 39, Facilitated Negotiation, no more than three times during the course of the Project;
9. neither party shall be under any obligation to resolve any issue by facilitated negotiation, but each agrees to participate in good faith and the Principal Representative shall direct the Architect/Engineer to appropriately document any resolution or agreement reached and to execute any Amendment or Change Order to the Contract necessary to implement their agreement; and,
10. any discussions and documents prepared exclusively for use in the negotiations shall be deemed to be matters pertaining to settlement negotiations and shall not be subsequently available in further proceedings except to the extent of any documented agreement.

In accordance with State Fiscal Rules and Article 52F, Choice of Law; No Arbitration, nothing in this Article 39 shall be deemed to call for arbitration or otherwise obligate the State to participate in any form of binding alternative dispute resolution.

A partnering plan developed as described in Article 2D, Communications and Cooperation, may modify or expand the requirements of this Article but may not reduce the obligation to participate in facilitated negotiations when applicable. In the case of small projects estimated to be valued under $500,000, the requirements of this Article may be deleted from this Contract, by modification in Article 54, Optional Provisions And Elections. When so modified, the references to the parties' right to elect facilitated negotiation elsewhere in these General Conditions shall be deleted.

ARTICLE 40. RIGHT OF OCCUPANCY
The Principal Representative shall have the right to take possession of and to use any completed or partially completed portions of the Work, even if the time for completing the entire Work or portions of the Work has not expired and even if the Work has not been finally accepted, and the Contractor shall fully cooperate with the Principal Representative to allow such possession and use. Such possession and use shall not constitute an acceptance of such portions of the Work.

Prior to any occupancy of the Project, an inspection shall be made by the Architect/Engineer, State Buildings Programs and the Contractor. Such inspection shall be made for the purpose of ensuring that the building is
secure, protected by operation safety systems as designed, operable exits, power, lighting and HVAC systems, and otherwise ready for the occupancy intended and the Notice of Substantial Completion has been issued for the occupancy intended. The inspection shall also document existing finish conditions to allow assessment of any damage by occupants. The Contractor shall assist the Principal Representative in completing and executing State Form SBP-01, Approval of Occupancy/Use, prior to the Principal Representative’s possession and use. Any and all areas so occupied will be subject to a final inspection when the Contractor complies with Article 41, Completion, Final Inspection, Acceptance and Settlement.

ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT

A. NOTICE OF COMPLETION

When the Work, or a discrete physical portion of the Work (as hereafter described) which the Principal Representative has agreed to accept separately, is substantially complete and ready for final inspection, the Contractor shall file a written Notice with the Architect/Engineer that the Work, or such discrete physical portion, in the opinion of the Contractor, is substantially complete under the terms of the Contract. The Contractor shall prepare and submit with such Notice a comprehensive list of items to be completed or corrected prior to final payment, which shall be subject to review and additions as the Architect/Engineer or the Principal Representative shall determine after inspection. If the Architect/Engineer or the Principal Representative believe that any of the items on the list of items submitted, or any other item of work to be corrected or completed, or the cumulative number of items of work to be corrected or completed, will prevent a determination that the Work is substantially complete, those items shall be completed by the Contractor and the Notice shall then be resubmitted.

B. FINAL INSPECTION

Within ten (10) days after the Contractor files written Notice that the Work is substantially complete, the Architect/Engineer, the Principal Representative, and the Contractor shall make a “final inspection” of the Project to determine whether the Work is substantially complete and has been completed in accordance with the Contract Documents. State Buildings Programs shall be notified of the inspection not less than three (3) business days in advance of the inspection. The Contractor shall provide the Principal Representative and the Architect/Engineer an updated punch list in sufficient detail to fully outline the following:

1. work to be completed, if any; and
2. work not in compliance with the Drawings or Specifications, if any.

A final punch list shall be made by the Architect/Engineer in sufficient detail to fully outline to the Contractor:

1. work to be completed, if any;
2. work not in compliance with the Drawings or Specifications, if any; and
3. unsatisfactory work for any reason, if any.

The required number of copies of the final punch list will be countersigned by the authorized representative of the Principal Representative and will then be transmitted by the Architect/Engineer to the Contractor, the Principal Representative, and State Buildings Programs. The Architect/Engineer's final punch list shall control over the Contractor's preliminary punch list.

C. NOTICE OF SUBSTANTIAL COMPLETION

Notice of Substantial Completion shall establish the date of substantial completion of the Project. The Contractor acknowledges and agrees that because the departments, agencies and institutions of the State of Colorado are generally involved with the business of the public at large, greater care must be taken in establishing the date of substantial completion than might otherwise be the case to ensure that a project or building or discrete physical portion of the Work is fully usable and safe for public use, and that such care necessarily raises the standard by which the concept of substantial completion is applied for a public building.
The Notice of Substantial Completion shall not be issued until the following have been fully established:

1. All required building code inspections have been called for and the appropriate code officials have affixed their signatures to the Building Inspection Record indicating successful completion of all required code inspections;
2. All required corrections noted on the Building Inspection Record shall have been completed unless the Architect/Engineer, the Principal Representative and State Buildings Programs, in their complete and absolute discretion, all concur that the condition requiring the remaining correction is not in any way life threatening, does not otherwise endanger persons or property, and does not result in any undue inconvenience or hardship to the Principal Representative or the public;
3. The building, structure or Project can be fully and comfortably used by the Principal Representative and the public without undue interference by the Contractor’s employees and workers during the completion of the final punch list taking into consideration the nature of the public uses intended and taking into consideration any stage or level of completion of HVAC system commissioning or other system testing required by the Specifications to be completed prior to issuance of the Notice of Substantial Completion;
4. The Project has been fully cleaned as required by these General Conditions, and as required by any stricter requirements of the Specifications, and the overall state of completion is appropriate for presentation to the public; and
5. The Contractor has provided a schedule for the completion of each and every item identified on the punch list which specifies the Subcontractor or trade responsible for the work, and the dates the completion or correction of the item will be commenced and finished; such schedule will show completion of all remaining final punch list items within the period indicated in the Contract for final punch list completion prior to Final Acceptance, with the exception of only those items which are beyond the control of the Contractor despite due diligence. The schedule shall provide for a reasonable punch list inspection process. Unless liquidated damages have been specified in Article 54D(2), the cost to the Principal Representative, if any, for re-inspections due to failure to adhere to the Contractor’s proposed punch-list completion schedule shall be the responsibility of the Contractor and may be deducted by the Principal Representative from final amounts due to the Contractor.

Substantial completion of the entire Project shall not be conclusively established by a decision by the Principal Representative to take possession and use of a portion, or all of the Project, where portions of the Project cannot meet all the criteria noted above. Notice of Substantial Completion for the entire Project shall, however, only be withheld for substantial reasons when the Principal Representative has taken possession and uses all of the Project in accordance with the terms of Article 40, Right Of Occupancy. Failure to furnish the required completion schedule shall constitute a substantial reason for withholding the issuance of any Notice of Substantial Completion.

The Contractor shall have the right to request a final inspection of any discrete physical portion of the Project when in the opinion of the Architect/Engineer a final punch list can be reasonably prepared, without confusion as to which portions of the Project are referred to in any subsequent Notice of Partial Final Settlement which might be issued after such portion is finally accepted. Discrete physical portions of the Project may be, but shall not necessarily be limited to, such portions of the Project as separate buildings where a Project consists of multiple buildings. Similarly, an addition to an existing building where the Project also calls for renovation or remodeling of the existing building may constitute a discrete physical portion of the Project. In such circumstances, when in the opinion of the Principal Representative, the Architect/Engineer and State Buildings Programs, the requirements for issuance of a Notice of Substantial Completion can be satisfied with respect to the discrete portion of the Project, a partial Notice of Substantial Completion may be issued for such discrete physical portion of the Project. The ability to beneficially occupy a discrete physical portion of the Project shall also be considered.
D. NOTICE OF ACCEPTANCE

The Notice of Acceptance shall establish the completion date of the Project. It shall not be authorized until the Contractor shall have performed all of the work to allow completion and approval of the Pre-Acceptance Checklist (SBP-05). It shall not be authorized until the Pre-Acceptance punch list (SBP-06) shall have been prepared and approved containing no more than ten items of work remaining to be completed or repaired.

Where partial Notices of Substantial Completion have been issued, partial Notices of Final Acceptance may be similarly issued when appropriate for that portion of the Work. Partial Notice of Final Acceptance may also be issued to exclude the work described in Change Orders executed during later stages of the Project where a later completion date for the Change Ordered work is expressly provided for in the Contract as amended by the Change Order, provided the work can be adequately described to allow partial advertisement of any Notice of Partial Final Settlement to be issued without confusion as to the work included for which final payment will be made.

E. SETTLEMENT

Final payment and settlement shall be made on the date fixed and published for such payment except as hereafter provided. The Principal Representative shall not authorize final payment until all items on the Pre-Acceptance punch list (SBP-06) have been completed, the Notice of Acceptance issued, and the Notice of Contractors Settlement published. If the work shall be substantially completed, but Final Acceptance and completion thereof shall be prevented through delay in correction of minor defects, or unavailability of materials or other causes beyond the control of the Contractor, the Principal Representative in his or her discretion may release to the Contractor such amounts as may be in excess of three times the cost of completing the unfinished work or the cost of correcting the defective work, as estimated by the Architect/Engineer and approved by State Buildings Programs. Before the Principal Representative may issue the Notice of Contractor’s Settlement and advertise the Project for final payment, the Contractor shall have corrected all items on the punch list except those items for which delayed performance is expressly permitted, subject to withholding for the cost thereof, and shall have:

1. Delivered to the Architect/Engineer:
   a. All guarantees and warranties;
   b. All statements to support local sales tax refunds, if any;
   c. Three (3) complete bound sets of required operating maintenance instructions; and,
   d. One (1) set of as-built Contract Documents showing all job changes.

2. Demonstrated to the operating personnel of the Principal Representative the proper operation and maintenance of all equipment.

Upon completion of the foregoing the Project shall be advertised in accordance with the Notice of Contractor’s Settlement by two publications of Notice, the last publication appearing at least ten (10) days prior to the time of final settlement. Publication and final settlement should not be postponed or delayed solely by virtue of unresolved claims against the Project or the Contractor from Subcontractors, suppliers or materialmen based on good faith disputes; the resolution of the question of payment in such cases being directed by statute.

Except as hereafter provided, on the date of final settlement thus advertised, provided the Contractor has submitted a written Notice to the Architect/Engineer that no claims have been filed, and further provided the Principal Representative shall have received no claims, final payments and settlement shall be made in full. If any unpaid claim for labor, materials, rental machinery, tools, supplies or equipment is filed before payment in full of all sums due the Contractor, the Principal Representative and the State Controller shall withhold from the Contractor on the date established for final settlement, sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or an order for withdrawal signed by the claimant or his or her duly authorized agent or assignee. The amount so withheld may be in the
amount of 125% of the claims or such other amount as the Principal Representative reasonably deems necessary to cover expected legal expenses. Such withheld amounts shall be in addition to any amount withheld based on the cost to compete unfinished work or the cost to repair defective work. However, as provided by statute, such funds shall not be withheld longer than ninety (90) days following the date fixed for final settlement with the Contractor, as set forth in the published Notice of Contractor’s Settlement, unless an action at law shall be commenced within that time to enforce such unpaid claim and a Notice of such action at law shall have been filed with the Principal Representative and the State Controller. At the expiration of the ninety (90) day period, the Principal Representative shall authorize the State Controller to release to the Contractor all other money not the subject of such action at law or withheld based on the cost to compete unfinished work or the cost to repair defective work.

Notices of Partial Final Settlement may be similarly advertised, provided all conditions precedent have been satisfied as though that portion of the work affected stood alone, a Notice of Partial Acceptance has been issued, and the consent of surety to the partial final settlement has been obtained in writing. Thereafter, partial final payments may be made to the Contractor subject to the same conditions regarding unpaid claims.

ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE
The Contractor warrants that the materials used and the equipment furnished shall be new and of good quality unless specified to the contrary. The Contractor further warrants that the Work shall in all respects be free from material defects not permitted by the Specifications and shall be in accordance with the requirements of the Contract Documents. Neither the final certificate for payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for defects or faulty materials or workmanship. The Contractor shall be responsible to the Principal Representative for such warranties for the longest period permitted by any applicable statute of limitations.

In addition to these general warranties, and without limitation of these general warranties, for a period of one year after the date of any Notice of Substantial Completion, or any Notice of Partial Substantial Completion if applicable, the Contractor shall remedy defects, and faulty workmanship or materials, and work not in accordance with the Contract Documents which was not accepted at the time of the Notice of Final Acceptance, all in accordance with the provisions of Article 45, One-Year Guarantee And Special Guarantees And Warranties.

ARTICLE 43. LIENS
Colorado statutes do not provide for any right of lien against public buildings. In lieu thereof, § 38-26-107, C.R.S., provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public work in that final payment may not be made to a Contractor until all such creditors have been put on Notice by publication in the public press of such pending payment and given opportunity for a period of up to ninety (90) days to stop payment to the Contractor in the amount of such claims.

ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES
A. ONE-YEAR GUARANTEE OF THE WORK
The Contractor shall guarantee to remedy defects and repair or replace the Work for a period of one year from the date of the Notice of Substantial Completion or from the dates of any partial Notices of Substantial Completion issued for discrete physical portions of the Work. The Contractor shall remedy any defects due to faulty materials or workmanship and shall pay for, repair and replace any damage to other work resulting there from, which shall appear within a period of one year from the date of such Notice(s) of Substantial Completion. The Contractor shall also remedy any deviation from the requirements of the Contract Documents which shall later be discovered within a period of one year from the date of the Notice of Substantial Completion; provided, however, that the Contractor shall not be required to remedy deviations from the requirements of the Contract Documents where such deviations were obvious, apparent and accepted by the Architect/Engineer or the Principal Representative at the time of the Notice of Final Acceptance. The Principal Representative shall give
Notice of observed defects or other work requiring correction with reasonable promptness. Such Notice shall be in writing to the Architect/Engineer and the Contractor.

The one year guarantee of the Contractor’s work may run separately for discrete physical portions of the Work for which partial Notices of Substantial Completion have been issued, however, it shall run from the last Notice of Substantial Completion with respect to all or any systems common to the work to which more than one Notice of Substantial Completion may apply.

This one-year guarantee shall not be construed to limit the Contractor’s general warranty described in Article 42, General Warranty and Correction of Work After Acceptance, that all materials and equipment are new and of good quality, unless specified to the contrary, and that the Work shall in all respects be free from material defects not permitted by the Specifications and in accordance with the requirements of the Contract Documents.

**B. SPECIAL GUARANTEES AND WARRANTIES**

In case of work performed for which product, manufacturers or other special warranties are required by the Specifications, the Contractor shall secure the required warranties and deliver copies thereof to the Principal Representative through the Architect/Engineer upon completion of the work.

These product, manufacturers or other special warranties, as such, do not in any way lessen the Contractor’s responsibilities under the Contract. Whenever guarantees or warranties are required by the Specifications for a longer period than one year, such longer period shall govern.

**ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION**

The Architect/Engineer, the Principal Representative and the Contractor together shall make at least two (2) complete inspections of the work after the Work has been determined to be substantially complete and accepted. One such inspection, the “Six-Month Guarantee Inspection,” shall be made approximately six (6) months after date of the Notice of Substantial Completion, unless in the case of smaller projects valued under $500,000 this inspection is declined in Article 54A, Modification of Article 45, in which case the inspection to occur at six months shall not be required. Another such inspection, the “Eleven-Month Guaranty Inspection” shall be made approximately eleven (11) months after the date of the Notice of Substantial Completion. The Principal Representative shall schedule and so notify all parties concerned, including State Buildings Programs, of these inspections. If more than one Notice of Substantial Completion has been issued at the reasonable discretion of the Principal Representative separate eleven month inspections may be required where the one year guarantees do not run reasonably concurrent.

Written punch lists and reports of these inspections shall be made by the Architect/Engineer and forwarded to the Contractor, the Principal Representative, State Buildings Programs, and all other participants within ten (10) days after the completion of the inspections. The punch list shall itemize all guarantee items, prior punch list items still to be corrected or completed and any other requirements of the Contract Documents to be completed which were not waived by final acceptance because they were not obvious or could not reasonably have been previously observed. The Contractor shall immediately initiate such remedial work as may be necessary to correct any deficiencies or defective work shown by this report, and shall promptly complete all such remedial work in a manner satisfactory to the Architect/Engineer, the Principal Representative and State Buildings Programs.

If the Contractor fails to promptly correct all deficiencies and defects shown by this report, the Principal Representative may do so, after giving the Contractor ten (10) days written Notice of intention to do so.

The State of Colorado, acting by and through the Principal Representative, shall be entitled to collect from the Contractor all costs and expenses incurred by it in correcting such deficiencies and defects, as well as all damages resulting from such deficiencies and defects.

**ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES**

*It is hereby understood and mutually agreed, by and between the parties hereto, that the date of beginning, rate of progress, and the time for completion of the Work to be done hereunder are ESSENTIAL*
CONDITIONS of this Agreement, and it is understood and agreed that the Work embraced in this Contract shall be commenced at the time specified in the Notice to Proceed (SC-6.26).

It is further agreed that time is of the essence of each and every portion of this Contract, and of any portion of the Work described on the Drawings or Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever. The parties further agree that where under the Contract additional time is allowed for the completion of the Work or any identified portion of the Work, the new time limit or limits fixed by such extension of the time for completion shall be of the essence of this Agreement.

The Contractor acknowledges that subject to any limitations in the Advertisement for Bids, issued for the Project, the Contractor’s bid is consistent with and considers the number of days to substantially complete the Project and the number of days to finally complete the Project to which the parties may have stipulated in the Agreement, which stipulation was based on the Contractor’s bid. The Contractor agrees that work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure the Project will be substantially complete, and fully and finally complete, as recognized by the issuance of all required Notices of Substantial Completion and Notices of Final Acceptance, within any times stipulated and specified in the Agreement, as the same may be amended by Change Order or other written modification, and that the Principal Representative will be damaged if the times of completion are delayed.

It is expressly understood and agreed, by and between the parties hereto, that the times for the Substantial Completion of the Work or for the final acceptance of the Work as may be stipulated in the Agreement, and as applied here and in Article 54D, Modifications of Article 46, are reasonable times for these stages of completion of the Work, taking into such consideration all factors, including the average climatic range and usual industrial conditions prevailing in the locality of the building operations.

If the Contractor shall neglect, fail or refuse to complete the Work within the times specified in the Agreement, such failure shall constitute a breach of the terms of the Contract and the State of Colorado, acting by and through the Principal Representative, shall be entitled to liquidated damages for such neglect, failure or refusal, as specified in Article 54D, Modification of Article 46.

The Contractor and the Contractor’s Surety shall be jointly liable for and shall pay the Principal Representative, or the Principal Representative may withhold, the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the entire Project is 1) substantially completed, and the Notice (or all Notices) of Substantial Completion are issued, 2) finally complete and accepted and the Notice (or all Notices) of Acceptance are issued, or 3) both. Delay in substantial completion shall be measured from the Date of the Notice to Proceed and delay in final completion and acceptance shall be measured from the Date of the Notice of Substantial Completion.

In the first instance, specified in Article 54D(1), Modification of Article 46, liquidated damages, if any, shall be the amount specified therein, for each calendar day of delay beginning after the stipulated number of days for Substantial Completion from the date of the Notice to Proceed, until the date of the Notice of Substantial Completion. Unless otherwise specified in any Supplementary General Conditions, in the event of any partial Notice of Substantial Completion, liquidated damages shall accrue until all required Notices of Substantial Completion are issued.

In the second instance, specified in Article 54D(2), Modification of Article 46, liquidated damages, if any, shall be the amount specified in Article 54D, Modification of Article 46, for each calendar day in excess of the number of calendar days specified in the Contractor’s bid for the Project and stipulated in the Agreement to finally complete the Project (as defined by the issuance of the Notice of Acceptance) after the final Notice of Substantial Completion has been issued.

In the third instance, when so specified in both Articles 54D(1) and (2), both types of liquidated damages shall be separately assessed where those delays have occurred.

The parties expressly agree that said amounts are a reasonable estimate of the presumed actual damages that would result from any of the breaches listed, and that any liquidated damages that are assessed have
been agreed to in light of the difficulty of ascertaining the actual damages that would be caused by any of these breaches at the time this Contract was formed; the liquidated damages in the first instance representing an estimate of damages due to the inability to use the Project; the liquidated damages in the second instance representing an estimate of damages due to the additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period including delivery of any or all guarantees and warranties, the submittals of sales and use tax payment forms, the calling for the final inspection and the completion of the final punch list.

The parties also agree and understand that the liquidated damages to be assessed in each instance are separate and distinct, although potentially cumulative, damages for the separate and distinct breaches of delayed substantial completion or final acceptance. Such liquidated damages shall not be avoided by virtue of the fact of concurrent delay caused by the Principal Representative, or anyone acting on behalf of the Principal Representative, but in such event the period of delay for which liquidated damages are assessed shall be equitably adjusted in accordance with Article 38, Delays And Extensions Of Time.

ARTICLE 47. DAMAGES
If either party to this Contract shall suffer damage under this Contract in any manner because of any wrongful act or neglect of the other party or of anyone employed by either of them, then the party suffering damage shall be reimbursed by the other party for such damage. Except to the extent of damages liquidated for the Contractor’s failure to achieve timely completion as set forth in Article 46, Time of Completion and Liquidated Damages, the Principal Representative shall be responsible for, and at his or her option may insure against, loss of use of any existing property not included in the Work, due to fire or otherwise, however caused. Notwithstanding the foregoing, or any other provision of this Contract, to the contrary, no term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, Section 24-10-101, et seq., CRS, as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of Section 24-10-101, et seq., CRS, as now or hereafter amended and the risk management statutes, Section 24-30-1501, et seq., CRS, as now or hereafter amended.

Notice of intent to file a claim under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except that in the case of claims by the Principal Representative involving warranties against faulty work or materials Notice shall be required only to the extent stipulated elsewhere in these General Conditions. Claims made to the Principal Representative involving extra cost or extra time arising by virtue of instructions to the Contractor to which Article 36, Claims, applies shall be made in accordance with Article 36. Other claims arising under the Contract involving extra cost or extra time which are made to the Principal Representative under this clause shall also be made in accordance with the procedures of Article 36, whether or not arising by virtue of instructions to the Contractor; provided however that it shall not be necessary to first obtain or request a written judgment of the Architect/Engineer.

Provided written Notice of intent to file a claim is provided as required in the preceding paragraph, nothing in this Article shall limit or restrict the rights of either party to bring an action at law or to seek other relief to which either party may be entitled, including consequential damages, if any, and shall not be construed to limit the time during which any action might be brought. Nothing in these General Conditions shall be deemed to limit the period of time during which any action may be brought as a matter of contract, tort, warranty or otherwise, it being the intent of the parties to allow any and all actions at law or in equity for such periods as the law permits. All such rights shall, however be subject to the obligation to assert claims and to appeal denials pursuant to Article 36, Claims, where applicable.

ARTICLE 48. STATE’S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES
A. STATE’S RIGHT TO DO THE WORK
If after receipt of Notice to do so, the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, the Principal Representative, after a second seven (7) days’
advance written Notice to the Contractor and the Surety may, without prejudice to any other remedy the Principal Representative may have, take control of all or a portion of the Work, as the Principal Representative deems necessary and make good such deficiencies deducting the cost thereof from the payment then or thereafter due the Contractor, as provided in Article 30, Correction Of Work Before Acceptance and Article 33, Payments Withheld, provided, however, that the Architect/Engineer shall approve the amount charged to the Contractor by approval of the Change Order.

B. TEMPORARY SUSPENSION OF WORK
The State, acting for itself or by and through the Architect/Engineer, shall have the authority to suspend the Work, either wholly or in part, for such period or periods as may be deemed necessary due to:

1. Unsuitable weather;
2. Faulty workmanship;
3. Improper superintendence;
4. Contractor’s failure to carry out orders or to perform any provision of the Contract Documents;
5. Loss of, or restrictions to, appropriations;
6. Conditions, which may be considered unfavorable for the prosecution of the Work.

If it should become necessary to stop work for an indefinite period, the Contractor shall store materials in such manner that they will not become an obstruction or become damaged in any way; and he or she shall take every precaution to prevent damage to or deterioration of the Work, provide suitable drainage and erect temporary structures where necessary.

Notice of suspension of work shall be provided to the Contractor in writing stating the reasons therefore. The Contractor shall again proceed with the work when so notified in writing.

The Contractor understands and agrees that the State of Colorado cannot predict with certainty future revenues and could ultimately lack the revenue to fund the appropriations applicable to this Contract. The Contractor further acknowledges and agrees that in such event that State may, upon Notice to the Contractor, suspend the work in anticipation of a termination of the Contract for the convenience of the State, pursuant to Article 50, Termination For Convenience of State. If the Contract is not so terminated the Contract sum and the Contract time shall be equitably adjusted at the time the Principal Representative directs the work to be recommenced and gives Notice that the revenue to fund the appropriation is available.

C. DELAY DAMAGES
The Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of any claim for extra costs, extra compensation or damages occasioned by hindrances or delays encountered in the work only when and to the limited extent that such hindrance or delay is caused by an act or omission within the control of the Principal Representative, the Architect/Engineer or other persons or entities acting on behalf of the Principal Representative. Further, the Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of such a claim only if the Contractor has provided required Notice of the delay or impact, or has presented its claim for an extension of time or claim of other delay or other impact due to changes ordered in the work before proceeding with the changed work. Except as otherwise provided, claims for extension of time shall be Noticed and filed in accordance with Article 38, Delays and Extensions of Time, within three (3) business days of the beginning of the delay with any claim filed within seven (7) days after the delay has ceased, or such claim is waived. Claims for extension of time or for other delay or other impact resulting from changes ordered in the Work shall be presented and adjusted as provided in Article 35, Changes in the Work.

ARTICLE 49. STATE’S RIGHTS TO TERMINATE CONTRACT
A. GENERAL
If the Contractor should be adjudged bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed to take over his affairs, or if he or
she should fail to prosecute his or her work with due diligence and carry the work forward in accordance with the construction schedule and the time limits set forth in the Contract Documents, or if he or she should fail to subsequently perform one or more of the provisions of the Contract Documents to be performed by him, the Principal Representative may serve written Notice on the Contractor and the Surety on performance and payment bonds, stating his or her intention to exercise one of the remedies hereinafter set forth and the grounds upon which the Principal Representative bases his or her right to exercise such remedy.

In such event, unless the matter complained of is satisfactorily cleared within ten (10) days after delivery of such Notice, the Principal Representative may, without prejudice to any other right or remedy, exercise one of such remedies at once, having first obtained the concurrence of the Architect/Engineer in writing that sufficient cause exists to justify such action.

B. CONDITIONS AND PROCEDURES

1. The Principal Representative may terminate the services of the Contractor, which termination shall take effect immediately upon service of Notice thereof on the Contractor and his or her Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not provide Notice to the Principal Representative of its intent to commence performance of the Contract within ten (10) days after delivery of the Notice of termination, the Principal Representative may take over the Work, take possession of and use all materials, tools, equipment and appliances on the premises and prosecute the Work to completion by such means as he or she shall deem best. In the event of such termination of his or her service, the Contractor shall not be entitled to any further payment under the Contract until the Work is completed and accepted. If the Principal Representative takes over the Work and if the unpaid balance of the contract price exceeds the cost of completing the Work, including compensation for any damages or expenses incurred by the Principal Representative through the default of the Contractor, such excess shall be paid to the Contractor. If, however, the cost, expenses and damages as certified by the Architect/Engineer exceed such unpaid balance of the contract price, the Contractor and his or her Surety shall pay the difference to the Principal Representative.

2. The Principal Representative may require the Surety on the Contractor’s bond to take control of the Work and see to it that all the deficiencies of the Contractor are made good, with due diligence within ten (10) days of delivery of Notice to the Surety to do so. As between the Principal Representative and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the Work, either by election upon termination of the services of the Contractor pursuant to Section B(1) of this Article 49, State’s Right To Terminate Contract, or upon instructions from the Principal Representative to do so, the provisions of the Contract Documents shall govern the work to be done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to payment for the Work, the times of completion and provisions of this Article as to the right of the Principal Representative to do the Work or to take control of all or a portion of the Work.

3. The Principal Representative may take control of all or a portion of the Work and make good the deficiencies of the Contractor, or the Surety if the Surety has been substituted for the Contractor, with or without terminating the Contract, employing such additional help as the Principal Representative deems advisable in accordance with the provisions of Article 48A, State’s Right To Do The Work; Temporary Suspension Of Work; Delay Damages. In such event, the Principal Representative shall be entitled to collect from the Contractor and his or her Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred in having such deficiencies made good and any damages or expenses incurred through the default of Contractor, provided the Architect/Engineer approves the amount thus charged to the Contractor.

If the Contract is not terminated, a Change Order to the Contract shall be executed, unilaterally if necessary, in accordance with the procedures of Article 35, Changes In The Work.
C. ADDITIONAL CONDITIONS

If any termination by the Principal Representative for cause is later determined to have been improper, the termination shall be automatically converted to and deemed to be a termination by the Principal Representative for convenience and the Contractor shall be limited in recovery to the compensation provided for in Article 50, Termination For Convenience Of State. Termination by the Contractor shall not be subject to such conversion.

ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE

A. NOTICE OF TERMINATION

The performance of Work under this Contract may be terminated, in whole or from time to time in part, by the State whenever for any reason the Principal Representative shall determine that such termination is in the best interest of State. Termination of work hereunder shall be effected by delivery to the Contractor of a Notice of such termination specifying the extent to which the performance of work under the Contract is terminated and the date upon which such termination becomes effective.

B. PROCEDURES

After receipt of the Notice of termination, the Contractor shall, to the extent appropriate to the termination, cancel outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of all applicable outstanding commitments covering personal performance of any work terminated by the Notice. With respect to such canceled commitments, the Contractor agrees to:

1. settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with approval or ratification of the Principal Representative, to the extent he or she may require, which approval or ratification shall be final for all purposes of this clause; and,
2. assign to the State, in the manner, at the time, and to the extent directed by the Principal Representative, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the State shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.

The Contractor shall submit his or her termination claim to the Principal Representative promptly after receipt of a Notice of termination, but in no event later than three (3) months from the effective date thereof, unless one or more extensions in writing are granted by the Principal Representative upon written request of the Contractor within such three month period or authorized extension thereof. Upon failure of the Contractor to submit his or her termination claim within the time allowed, the Principal Representative may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

Costs claimed, agreed to, or determined pursuant to the preceding and following paragraph shall be in accordance with the provisions of § 24-107-101, C.R.S., as amended and associated Cost Principles of the Colorado Procurement Rules as in effect on the date of this Contract.

Subject to the preceding provisions, the Contractor and the Principal Representative may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Contractor and any reasonable loss upon outstanding commitments for personal services which he or she is unable to cancel; provided, however, that in connection with any outstanding commitments for personal services which the Contractor is unable to cancel, the Contractor shall have exercised reasonable diligence to divert such commitments to other activities and operations. Any such agreement shall be embodied in an Amendment to this Contract and the Contractor shall be paid the agreed amount.

The State may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Contractor in connection with the termination portion of this
Contract, whenever, in the opinion of the Principal Representative, the aggregate of such payments is within the amount to which the Contractor will be entitled hereunder.

The Contractor agrees to transfer title and deliver to the State, in the manner, at the time, and to the extent, if any, directed by the Principal Representative, such information and items which, if the Contract had been completed, would have been required to be furnished to the State, including:

a. completed or partially completed plans, Drawings and information; and,

b. materials or equipment produced or in process or acquired in connection with the performance of the work terminated by the Notice.

Other than the above, any termination inventory resulting from the termination of the Contract may, with written approval of the Principal Representative, be sold or acquired by the Contractor under the conditions prescribed by and at a price or prices approved by the Principal Representative. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the State to the Contractor under this Contract or shall otherwise be credited to the price or cost of work covered by this Contract or paid in such other manners as the Principal Representative may direct. Pending final disposition of property arising from the termination, the Contractor agrees to take such action as may be necessary, or as the Principal Representative may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the State has or may acquire an interest.

Any disputes as to questions of fact, which may arise hereunder, shall be subject to the Remedies provisions of the Colorado Procurement Code, §§ 24-109-101, et seq., C.R.S., as amended.

ARTICLE 51. CONTRACTOR’S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court or other public authority for a period of three (3) months through no act or fault of the Contractor or of any one employed by him, then the Contractor may on seven (7) days’ written Notice to the Principal Representative and the Architect/Engineer stop work or terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained on any plant or material, and a reasonable profit. If the Architect/Engineer shall fail to issue or otherwise act in writing upon any certificate for payment within ten (10) days after it is presented and received by the Architect/Engineer, as provided in Article 31, Applications For Payments, or if the Principal Representative shall fail to pay the Contractor any sum certified that is not disputed in whole or in part by the Principal Representative in writing to the Contractor and the Architect/Engineer within thirty (30) days after the Architect/Engineer’s certification, then the Contractor may on ten (10) days’ written Notice to the Principal Representative and the Architect/Engineer stop work and/or give written Notice of intention to terminate this Contract.

If the Principal Representative shall thereafter fail to pay the Contractor any amount certified by the Architect/Engineer and not disputed in writing by the Principal Representative within ten (10) days after receipt of such Notice, then the Contractor may terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained upon any plant or materials, and a reasonable profit. The Principal Representative’s right to dispute an amount certified by the Architect/Engineer shall not relieve the Principal Representative of the obligation to pay amounts not in dispute as certified by the Architect/Engineer.

ARTICLE 52. SPECIAL PROVISIONS

A. CONTROLLER’S APPROVAL CRS 24-30-202(1)

This Contract shall not be deemed valid until it has been approved by the Colorado State Controller or designee.

B. FUND AVAILABILITY CRS 24-30-202(5.5)

Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available.
C. **GOVERNMENTAL IMMUNITY**
No term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.

D. **INDEPENDENT CONTRACTOR 4 CCR 801-2**
Contractor shall perform its duties hereunder as an independent contractor and not as an employee. Neither Contractor nor any agent or employee of Contractor shall be deemed to be an agent or employee of the State. Contractor and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Contractor or any of its agents or employees. Unemployment insurance benefits will be available to Contractor and its employees and agents only if such coverage is made available by Contractor or a third party. Contractor shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this contract. Contractor shall not have authorization, express or implied, to bind the State to any agreement, liability or understanding, except as expressly set forth herein. Contractor shall (a) provide and keep in force workers’ compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.

E. **COMPLIANCE WITH LAW**
Contractor shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.

F. **CHOICE OF LAW**
Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this contract, to the extent capable of execution.

G. **BINDING ARBITRATION PROHIBITED**
The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. **SOFTWARE PIRACY PROHIBITION. Governor’s Executive Order D 002 00**
State or other public funds payable under this contract shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Contractor hereby certifies and warrants that, during the term of this contract and any extensions, Contractor has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Contractor is in violation of this provision, the State may exercise any remedy available at law or in equity or under this contract, including, without limitation, immediate termination of this contract and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. **EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST CRS 24-18-201 & CRS 24-50-507**
The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this contract. Contractor has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Contractor’s services and Contractor shall not employ any person having such known interests.
J. VENDOR OFFSET CRS 24-30-202(1) & CRS 24-30-202.4
Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State’s vendor offset intercept system for debts owed to State agencies for: (a) unpaid child support debts or child support arrearages; (b) unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; (c) unpaid loans due to the Student Loan Division of the Department of Higher Education; (d) amounts required to be paid to the Unemployment Compensation Fund; and (e) other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. PUBLIC CONTRACTS FOR SERVICES. CRS §8-17.5-101. [Not Applicable to agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental agreements, or information technology services or products and services] Contractor certifies, warrants, and agrees that it does not knowingly employ or contract with an illegal alien who will perform work under this contract and will confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform work under this contract, through participation in the E-Verify Program or the Department program established pursuant to CRS §8-17.5-102(5)(c), Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. Contractor (a) shall not use E-Verify Program or Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed, (b) shall notify the subcontractor and the contracting State agency within three days if Contractor has actual knowledge that a subcontractor is employing or contracting with an illegal alien for work under this contract, (c) shall terminate the subcontract if a subcontractor does not stop employing or contracting with the illegal alien within three days of receiving the notice, and (d) shall comply with reasonable requests made in the course of an investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Contractor participates in the Department program, Contractor shall deliver to the contracting State agency, Institution of Higher Education or political subdivision a written, notarized affirmation, affirming that Contractor has examined the legal work status of such employee, and shall comply with all of the other requirements of the Department program. If Contractor fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the contracting State agency, institution of higher education or political subdivision may terminate this contract for breach and, if so terminated, Contractor shall be liable for damages.

L. PUBLIC CONTRACTS WITH NATURAL PERSONS. CRS §24-76.5-101. Contractor, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this contract.

ARTICLE 53. MISCELLANEOUS PROVISIONS
A. CONSTRUCTION OF LANGUAGE
The language used in these General Conditions shall be construed as a whole according to its plain meaning, and not strictly for or against any party. Such construction shall, however, construe language to interpret the intent of the parties giving due consideration to the order of precedence noted in Article 2C, Intent of Documents.

B. SEVERABILITY
If any covenant, term, condition, or provision contained in these General Conditions is held by a court of competent jurisdiction to be invalid, illegal, or unenforceable in any respect, such covenant, term, condition, or provision shall be severed or modified to the extent necessary to make it enforceable, and the resulting General Conditions shall remain in full force and effect, and such invalidity or other failure shall not affect the validity of any other covenant, term or provision hereof. Provided the same does not work a substantial injustice, these General Conditions shall be construed as if such invalid portion had not been inserted.
C. SECTION HEADINGS
The section or paragraph headings contained within these General Conditions are inserted for convenience only and shall not be construed to vary or add to the meaning of this Contract.

D. AUTHORITY
Each person executing the Agreement and its Exhibits in a representative capacity expressly represents and warrants that he or she has been duly authorized by one of the parties to execute the Agreement and has authority to bind said party to the terms and conditions hereof.

E. INTEGRATION OF UNDERSTANDING
This Contract is intended as the complete integration of all understandings between the parties and supercedes all prior negotiations, representations, or agreements, whether written or oral. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written Change Order or Amendment to this Contract.

F. VENUE
The parties agree that venue for any action related to performance of this Contract shall be an appropriate District Court of the State of Colorado.

G. NO THIRD PARTY BENEFICIARIES
Except as herein specifically provided otherwise, this Contract shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns. The enforcement of the terms and conditions of this Contract and all rights of action relating to such enforcement, shall be strictly reserved to the parties to the Agreement. Nothing contained in the Contract Documents shall give or allow any claim or right of action whatsoever by any other person or entity as beneficiary; all such non-parties shall be deemed incidental beneficiaries only.

H. WAIVER
The waiver of any breach of a term hereof shall not be construed as a waiver of any other term, of the same term upon subsequent breach.

I. INDEMNIFICATION
Contractor shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees and related costs, incurred as a result of any act or omission by Contractor, or its employees, agents, subcontractors, or assignees pursuant to the terms of this contract.

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM
If the maximum amount payable to Construction Manager under this Contract is $500,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

Construction Manager agrees to be governed, and to abide, by the provisions of C.R.S. §24-102-205, §24-102-206, §24-103-601, §24-103.5-101, §24-105-101, §24-105-102, and §24-105-201 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.

Construction Manager understands that if the maximum amount payable to Construction Manager under this Contract is $500,000 or greater, either on the Effective Date or at anytime thereafter, the State shall have the additional responsibility to prepare a Contractor Performance Evaluation Report. This Report shall be maintained as part of the Contractor's file and remain part of CMS for at least 5 years following the Report date.
Construction Manager’s performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Contract, State law, including C.R.S §24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Construction Manager’s performance shall be part of the normal contract administration process and Construction Manager’s performance will be systematically recorded in the statewide Contract Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Construction Manager’s obligations under this Contract shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Construction Manager’s obligations. Such performance information shall be entered into the statewide Contract Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Contract term. Construction Manager shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain work progress.

Should the final performance Evaluation and Review determine that Construction Manager demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the [Insert Dept or IHE Acronym], and showing of good cause, may debar Construction Manager and prohibit Construction Manager from bidding on future contracts. Construction Manager may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS §24-105-102(6)), or (b) under CRS §24-105-102(6), exercising the debarment protest and appeal rights provided in CRS §§24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Construction Manager, by the Executive Director, upon showing of good cause.

**ARTICLE 54. OPTIONAL PROVISIONS AND ELECTIONS**

The provisions of this Article 54 alter the preceding Articles or enlarge upon them as indicated:

The Principal Representative and or the State Buildings Programs shall mark boxes and initial where applicable.

**A. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION**

If the box below is marked the six month guarantee inspection is not required.

☐ ______ Principal Representative initial

**B. MODIFICATION OF ARTICLE 27. LABOR AND WAGES**

If the box is marked the Federal Davis-Bacon Act shall be applicable to the Project. The minimum wage rates to be paid on the Project shall be furnished by the Principal Representative and included in the Contract Documents.

☐ ______ Principal Representative initial

**C. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS**

If the box is marked, and initialied by the State as noted, the requirement to participate in facilitated negotiations shall be deleted from this Contract. Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, shall be deleted in its entirety and all references to the right to the same where ever they appear in the contract shall be similarly deleted.

The box may be marked only for projects with an estimated value of less than $500,000.

☐ ______ Principal Representative initial
D. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

If an amount is indicated immediately below, liquidated damages shall be applicable to this Project as, and to, the extent shown below. Where an amount is indicated below, liquidated damages shall be assessed in accordance with and pursuant to the terms of Article 46, Time Of Completion And Liquidated Damages, in the amounts and as here indicated. The election of liquidated damages shall limit and control the parties right to damages only to the extent noted.

1. For the inability to use the Project, for each day after the number of calendar days specified in the Contractor’s bid for the Project and the Agreement for achievement of Substantial Completion, until the day that the Project has achieved Substantial Completion and the Notice of Substantial Completion is issued, the Contractor agrees that an amount equal to N/A Dollars ($N/A) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor’s Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due, but amounts remaining are insufficient to cover the entire assessment.

2. For damages related to or arising from additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period, for each day in excess of the number of calendar days specified in the Contractor’s bid for the Project and the Agreement to finally complete the Project as defined by the issuance of the Notice of Final Acceptance) after the issuance of the final Notice of Substantial Completion, the Contractor agrees that an amount equal to N/A Dollars ($N/A) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor’s Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due but amounts remaining are insufficient to cover the entire assessment.

E. NOTICE IDENTIFICATION

All Notices pertaining to General Conditions or otherwise required to be given shall be transmitted in writing, to the individuals at the addresses listed below, and shall be deemed duly given when received by the parties at their addresses below or any subsequent persons or addresses provided to the other party in writing.

Notice to Principal Representative: _______________________________
_____________________________________________________________
With copies to: State Buildings Programs (or Delegate) State of Colorado
_____________________________________________________________
_____________________________________________________________
Notice to Contractor: _______________________________
_____________________________________________________________
_____________________________________________________________
_____________________________________________________________
With copies to: _______________________________
_____________________________________________________________
_____________________________________________________________
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Supplementary General Conditions
University of Colorado at Boulder

1. GENERAL CONDITIONS, ARTICLE 23. F. SIGN – DELETE the entire section.

2. GENERAL CONDITIONS, ARTICLE 25 INSURANCE - DELETE the entire section and replace with the following:

The Contractor shall obtain and maintain, at its own expense and for the duration of the contract, the minimum insurance coverages set forth below. By requiring such minimum insurance, the University shall not be deemed or construed to have assessed the risk that may be applicable to the Contractor under this contract. The Contractor shall assess its own risks and if it deems appropriate and/or prudent, maintain higher limits and/or broader coverages. The Contractor is not relieved of any liability or other obligations assumed or pursuant to the Contract by reason of its failure to obtain or maintain insurance in sufficient amounts, duration, or types.

COVERAGES

1. **Commercial General Liability – ISO CG 00001 or equivalent. Coverage to include:**
   - Premises and Operations
   - Explosions, Collapse and Underground Hazards
   - Personal / Advertising Injury
   - Products / Completed Operations
   - Liability assumed under an Insured Contract (including defense costs assumed under contract)
   - Broad Form Property Damage
   - Independent Contractors
   - Additional Insured—Owners, Lessees or Contractors Endorsement, ISO Form 2010 (2004 Edition or equivalent), if possible.
   - Additional Insured—Owners, Lessees or Contractors Endorsement, ISO CG 2037 (7/2004 Edition or equivalent), if possible.

2. **Automobile Liability including all:**
   - Owned Vehicles
   - Non-Owned Vehicles
   - Hired Vehicles

3. **Excess/Umbrella Liability (Applies to projects totaling $10,000,000 or more)**
   - Excess of Commercial General Liability, Automobile Liability, and Employers’ Liability.
   - Coverages should be as broad as primary.
   - Risk Management reserves the right to require higher limits.

4. **Workers Compensation**
   - Statutory Benefits (Coverage A)
   - Employers Liability (Coverage B)

5. **Builder’s Risk Completed Value (Applies to buildings additions and new buildings)**
   - See Builders Risk section in this document.

6. **Installation Floater**
   - Special cause of loss
   - Theft
   - Faulty workmanship
   - Vandalism
   - Labor costs to repair damaged work
7. **Contractors Pollution Liability**

This section applies only to the following types of proposals:

- ASBESTOS/LEAD ABATEMENT Contracting Services

The University requires this coverage whenever work at issue under this contract involves potential pollution risk to the environment or losses caused by pollution conditions (including asbestos) that may arise from the operations of the Contractor described in the Contractor’s scope of services. Policy shall cover the Contractors completed operations. Such coverage shall include:

- Bodily Injury, sickness, disease, mental anguish or shock sustained by any person, including death.
- Property Damage including natural resource damages, physical injury to or destruction of tangible property including resulting loss of use, clean up costs, and the loss of use of tangible property that has not been physically injured or destroyed.
- Defense, including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.
- Cleanup costs, removal, storage, disposal, and or use of the pollutant; and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims.
- Coverage shall apply to sudden and gradual pollution conditions resulting from the escape of release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (or specify desired number) years beginning from the time that work under this contract is completed.
- On the Automobile Liability Coverage endorsements CA9948 and MCS-90 are required if the Contractor is transporting any type of hazardous materials.
- The Regents of the University of Colorado, a body corporate as “Additional Insured” for work that is being performed by the Contractor and as respects the Contractors Pollution Liability.

**LIMITS REQUIRED**

The Contractor shall carry the following limits of liability as required below:

**Commercial General Liability**
- General Aggregate $2,000,000
- Products/Completed Operations Aggregate $2,000,000
- Each Occurrence Limit $1,000,000
- Personal/Advertising Injury $1,000,000
- Fire Damage (Any One Fire) $50,000
- Medical Payments (Any One Person) $5,000

**Excess/Umbrella Liability (as required-See Coverages #3)**
- General Aggregate Limit $5,000,000
- Products/Completed Operations Aggregate $5,000,000

**Automobile Liability**
- Bodily Injury/Property Damage (Each Accident) $1,000,000
Workers’ Compensation

<table>
<thead>
<tr>
<th>Coverage A (Workers’ Compensation)</th>
<th>Statutory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage B (Employers Liability)</td>
<td>$100,000 Each Accident</td>
</tr>
<tr>
<td></td>
<td>$100,000 Disease Ea. Employ</td>
</tr>
<tr>
<td></td>
<td>$500,000 Disease-Policy Limit</td>
</tr>
</tbody>
</table>

Contractors Pollution Liability (as required-See Coverages #7)

<table>
<thead>
<tr>
<th>Per Loss</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000,000</td>
<td>$1,000,000</td>
</tr>
</tbody>
</table>

Builder’s Risk (as required-See Coverages #5)

- This coverage is required for new buildings or additions to existing buildings.
- See the Builders Risk section (below) for required terms and conditions.

Installation Floater

This coverage is to cover materials and equipment to be installed in existing structures.
- Shall be written for 100% of the completed value (replacement cost basis)
- Deductible maximum is $10,000.00
- Waiver of Subrogation applies on Builders Risk

ADDITIONAL INSURANCE REQUIREMENTS

1. All insurers must be licensed or approved to do business within the State of Colorado, and unless otherwise specified, all policies must be written on a per occurrence basis.
2. The Contractor shall provide the University of Colorado a Certificate of Insurance Form evidencing all required coverages, prior to commencing work or entering University premises.
3. The Contractor shall name “The State of Colorado and The Regents of the University of Colorado, a body corporate” as an Additional Insured as respects General Liability.
4. Upon request by the University, Contractor must provide a copy of the actual insurance policy effecting coverage(s) required by the contract.
5. The University requires that all policies of insurance be written on a primary basis, non-contributory with any other insurance coverages and/or self-insurance carried by the University.
6. A Separation of Insureds Clause must be included in general liability policies.
7. The Contractor shall advise the University in the event any general aggregate or other aggregate limits are reduced below the required per occurrence limit. At their own expense, the Contractor will reinstate the aggregate limits to comply with the minimum requirements and shall furnish to the University a new certificate of insurance showing such coverage is in force.
8. Contractor’s insurance carrier should possess a minimum A.M. Best’s Insurance Guide rating of A-VI.
9. Commercial General Liability Completed Operations policies must be kept in effect for up to three (3) years after completion of the project.
10. Contractors Pollution Liability policies must be kept in effect for up to three (3) years after completion of the project.
11. Provide a minimum of thirty (30) days advance written notice to the University for cancellation, non-renewal, or material changes to policies required under the contract.
12. Certificate Holder: University of Colorado, University Risk Management, 4001 Discovery Drive, Suite 230, Campus Box 587, Boulder, CO 80303

Failure of the Contractor to fully comply with these requirements during the term of the Contract may be considered a material breach of contract and may be cause for immediate termination of the Contract at the option of the University. The University reserves the right to negotiate additional specific insurance requirements at the time of the contract award.
Non-Waiver
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, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, 24-10-101 et seq., as from time to time amended, or otherwise available to the University or its officers, employees, agents, and volunteers.

Mutual Cooperation
The University and Contractor shall cooperate with each other in the collection of any insurance proceeds which may be payable in the event of any loss, including the execution and delivery of any proof of loss or other actions required to effect recovery.

Builder’s Risk Insurance
(As required-See Coverages #5)

Unless otherwise provided, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the project is located, Builder’s Risk Insurance in the amount of the initial contract amount as well as subsequent modifications for the entire project at the site on a replacement cost basis without voluntary deductibles. Such Builder’s Risk Insurance shall be maintained, unless otherwise provided in the contract documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the University has insurable interest in the property to be covered, whichever is earlier. The Builder’s Risk insurance shall include interests of the University of Colorado, the General Contractor, subcontractors and sub-tier contractors in the project.

Builders’ Risk Coverage shall be on a Special Covered Cause of Loss Form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and debris removal including demolition, increased cost of construction, architect’s fees and expenses, flood and earthquake, and all below and above ground structures, water and sewer mains. Other coverages may be required if provided in contract documents. Coverages shall be written for 100% of the completed value (replacement cost basis) of the work being performed. At the option of the University of Colorado, the University of Colorado may include Soft Costs (including Loss of Use)/Delay in Opening Endorsement under the builder’s risk policy. The University of Colorado agrees to provide the necessary exposure base information for quotation by the Builder’s Risk carrier. The University of Colorado agrees to pay the premium associated with the Soft Costs coverage, the University of Colorado decides to purchase this coverage.

The Builder’s Risk shall also include the follow amendments/provisions:

- Waiver of Subrogation against all parties named as insured, but only to the extent the loss is covered.
- Beneficial Occupancy Clause. The policy shall specifically permit partial or beneficial occupancy at or before substantial completion or final acceptance of the entire work. Partial occupancy or use of the work shall not commence until the insurance company or companies providing insurance have consented to such partial occupancy or use. The University of Colorado and Contractor shall take reasonable steps to obtain consent of the insurance company or companies and agree to take no action, other than upon mutual written consent, with respect to occupancy or use of the work that could lead to cancellation, lapse or reduction of insurance.
- Equipment Breakdown Coverage (a.k.a. Boiler & Machinery) required by the Contract Documents or by law, which shall specifically cover insured equipment during installation and testing (including hot testing).
- Deletion of Coinsurance Provisions
- Replacement Costs Basis - including modification of the valuation clause to cover all costs needed to repair the structure or work (including overhead and profits) and will pay based on the values figured at the time of rebuilding or repairing, not at the time of loss
• Deletion of any exclusions pertaining to Law, Ordinance or Regulation
• Deletion of exclusions for design errors & omissions
• Modification of the electrical apparatus breakdown exclusions and the mechanical breakdown exclusion so that it does not apply to subsequent loss or damage
• Modify exclusion pertaining to damage to interior of building caused by an perils insured against are covered
• Resultant Damage Extension including amendment of exclusion pertaining to design error
• Settling, cracking, shrinking or expansion (including coverage for loss resulting from settling, cracking, shrinking or expansion) of foundation walls, floors, or other parts of the structure
• Other coverages may be required if provided in Contract Documents
• The deductible shall not exceed $10,000 and shall be the responsibility of the Contractor except for losses that involve all Acts of God such as flood, earthquake, windstorm, tsunami, volcano, etc.
• The Policy shall be amended to show thirty (30) days notice of cancellation. Such notice shall be given to the University of Colorado and Contractor.
• Losses in excess of $10,000 insured shall be adjusted in conjunction with the University of Colorado. Any insurance payments/proceeds shall be made payable to the University of Colorado subject to requirements of any applicable mortgagee clause. The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner.
• The University of Colorado shall have the authority to adjust and settle any losses in excess of $10,000 with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the University of Colorado exercise of this power. It is expressly agreed that nothing in this section shall be subject to arbitration and any references to arbitration are expressly deleted.

If requested, the Contractor shall file with the University of Colorado a copy of the policy that includes the insurance coverages required in this section. The policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to the Project.

If the Contractor does not intend to purchase such Builder’s Risk Insurance required by the Contract and with all of the coverages in the amount described above, the Contractor shall so inform the University of Colorado as stated in writing prior to commencement of the work. The University of Colorado may then effect insurance that will protect the interests of the University of Colorado, the General Contractor, Subcontractors and sub-tier contractors in the project. Coverages applying shall be the same as stated above including other coverages that may be required by the University of Colorado. The cost shall be charged to the Contractor. Coverage shall be written for 100% of the completed value of the work being performed, with a deductible not to exceed $10,000 per occurrence for most projects.

All deductibles will be assumed by the Contractor. Waiver of Subrogation is to apply against all parties named as insureds, but only to the extent the loss is covered, and Beneficial Occupancy Endorsements are to apply.

If the University of Colorado is damaged by the failure or neglect of the Contractor to purchase or maintain insurance as described above, without so notifying the University of Colorado, then the Contractor shall bear all reasonable costs properly attributable thereto.

Contractors engaged in modifications of existing structures are required to secure a Beneficial Occupancy Endorsement that enables the University of Colorado to occupy the facility during construction.

Revised 02/20/06
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CHANGE ORDER BULLETIN

Change Order Bulletin No: ___________________________ Date ___________________________
Contractor: ______________________________________
Institution or Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010
Description of Work: ______________________________________

This bulletin is issued to define the scope of revision in drawings and/or specifications for a contemplated change order. The work called for by these revisions shall be in accordance with the requirements of the original contract documents.

Please prepare and submit a proposal for the changes described below. For pricing use State Form SC-6.312. A formal change order State Form SC-6.31 will be issued after approval of your proposal by the Principal Representative and the Architect. Your proposal shall include a statement as to the effect this change will have on the time for completion of the project.

This bulletin is NOT an authorization to proceed.

DESCRIPTION OF CHANGE:

SPECIFICATION REVISIONS:

STATUS OF EXISTING WORK:

PREPARED BY: ________________________________
ARCHITECT/ENGINEER OR CONTRACTOR

APPROVED BY: ________________________________
PRINCIPAL REPRESENTATIVE
(INSTITUTION or AGENCY)
<table>
<thead>
<tr>
<th>PART I - WORK PERFORMED BY CONTRACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1. Direct Labor Costs: $ ............</td>
</tr>
<tr>
<td>Line 2. Labor Overhead (Direct Labor Burdens) (X Line 1) $ ............</td>
</tr>
<tr>
<td>Line 3. Total Contractor’s Labor Costs (Lines 1 and 2) $ ............</td>
</tr>
<tr>
<td>Line 4. Direct Materials Costs: $ ............</td>
</tr>
<tr>
<td>Line 5. Materials Overhead (Delivery Costs &amp; Taxes) (X Line 4) $ ............</td>
</tr>
<tr>
<td>Line 6. Total Materials Costs (Lines 4 and 5) $ ............</td>
</tr>
<tr>
<td>Line 7. Total Equipment Costs: $ ............</td>
</tr>
<tr>
<td>Line 8. PART I - TOTAL CONTRACTOR’S L, M &amp; E COSTS (Lines 3, 6 and 7) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART II - WORK PERFORMED BY SUBCONTRACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 9. Direct Labor Costs: $ ............</td>
</tr>
<tr>
<td>Line 10. Labor Overhead (Direct Labor Burdens) (X Line 9) $ ............</td>
</tr>
<tr>
<td>Line 11. Total Subcontractor’s Labor Costs (Lines 9 and 10) $ ............</td>
</tr>
<tr>
<td>Line 12. Direct Materials Costs: $ ............</td>
</tr>
<tr>
<td>Line 13. Materials Overhead (Delivery Costs &amp; Taxes) (X Line 12) $ ............</td>
</tr>
<tr>
<td>Line 14. Total Subcontractor’s Materials Costs (Lines 12 and 13) $ ............</td>
</tr>
<tr>
<td>Line 15. Total Subcontractor’s Equipment Costs: $ ............</td>
</tr>
<tr>
<td>Line 16. Total Subcontractor’s L, M &amp; E Costs (Lines 11, 14 and 15) $ ............</td>
</tr>
<tr>
<td>Line 17. Subcontractor’s Overhead (Indirect Costs), (X Line 16) $ ............</td>
</tr>
<tr>
<td>Line 18. Subcontractor’s Profit (X Line 16) or (2 ½ % Deduct) $ ............</td>
</tr>
<tr>
<td>Line 19. PART II - TOTAL SUBCONTRACTOR’S COSTS (Lines 16, 17 and 18) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART III - CONTRACTOR’S OVERHEAD &amp; PROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 20. Contractor’s Overhead (Indirect Costs), (X Part I Total) $ ............</td>
</tr>
<tr>
<td>Line 21. Contractor’s Profit (X Part I Total) $ ............</td>
</tr>
<tr>
<td>Line 22. PART III - TOTAL CONTRACTOR OVERHEAD &amp; PROFIT (Lines 20 and 21) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART IV - CONTRACTOR’S MARKUP ON SUBCONTRACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 23. Contractor’s Commission on Subcontractor (X Part II Total) $ ............</td>
</tr>
<tr>
<td>Line 24. Contractor’s Profit on Subcontractor (X Part II Total) or (2 ½ % Deduct) $ ............</td>
</tr>
<tr>
<td>Line 25. PART IV - TOTAL CONTRACTOR MARKUP ON SUBCONTRACTOR (Lines 23 &amp; 24) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART V - SUBTOTAL C.O. PROPOSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Parts I and II and III and IV) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART VI - CONTRACTOR’S BOND COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X Part V) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART VII - GRAND TOTAL CHANGE ORDER PROPOSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Sum of Totals: Parts V and VI) $ ............</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART VIII - CONTRACT TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION DATE (IS) (IS NOT) EXTENDED ____________ CALENDAR DAYS AS A RESULT OF THIS PROPOSAL.</td>
</tr>
</tbody>
</table>

CONTRACTOR’S CERTIFICATE:
This is to certify that, to the best of my knowledge and belief, the cost/price data submitted in response to the listed C.O. Bulletin, are accurate, complete and current as of 20 ____________.

Name: ____________________________
Signature: ____________________________
Date: ____________________________

*The proposal shall remain in full force and effect for a period of ____________ calendar days from date of signature.

ARCHITECT/ENGINEER’S CERTIFICATE:
This is to certify that I have analyzed the proposal and find, to the best of my knowledge and belief, that the proposal represents current, fair, factual and competitive cost/price data.

Firm: ____________________________
Name & Title: ____________________________
Signature: ____________________________
Date: ____________________________

**PRINCIPAL REPRESENTATIVE**
(Institution or Agency) ____________________________
(State or Authorized Delegate) ____________________________
Date ____________________________

State Form SC-6.312 (Rev. 9/2006)
INSTRUCTIONS FOR COMPLETING “CHANGE ORDER PROPOSAL”
COST/PRICE DATA SUMMARY (STATE FORM SC-6.312)

BULLETIN NUMBER/DATED: Insert C.O. Bulletin No. and Date Issued
LEFT HAND BOX: Fill in Contractor’s Name; State Project Number and Title
RIGHT HAND BOX: Fill in Description of Changes from Bulletin, noting exceptions that are listed in the Bulletin but are excluded; i.e., not priced on this form.

PART I - WORK PERFORMED BY CONTRACTOR:

Line 1. Direct Labor Costs: Fill in subtotal of direct labor costs, which includes base rates plus applicable fringe benefits.
   On Contractor’s letterhead/spreadsheet show costs as follows:
   
<table>
<thead>
<tr>
<th>Trade</th>
<th>Rate</th>
<th>Hours</th>
<th>Extended Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td>$</td>
<td></td>
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<td>$</td>
</tr>
</tbody>
</table>
   
   Direct Labor Costs = $  

Line 2. Labor Overhead (Direct Labor Burdens, etc.): Fill in as a percentage of Line 1.


   On letterhead/spreadsheet, show direct materials costs as follows:
   
<table>
<thead>
<tr>
<th>Materials</th>
<th>Units</th>
<th>Unit Cost</th>
<th>Extended Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
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<td>$</td>
</tr>
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<td>$</td>
</tr>
</tbody>
</table>
   
   Direct Materials Costs = $  

Line 5. Materials Overhead: Fill in as percentage cost of Line 4. Overhead costs include delivery, taxes, insurance costs, etc. (As mutually agreed upon at contract signing)

Line 6. Total Materials Costs: Fill in total of lines 4 and 5.

Line 7. Total Equipment Costs: Fill in total equipment costs including indirect overhead costs in hourly rate - except indirect labor costs.
   On letterhead/spreadsheet show total equipment costs as follows:
   
<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
<th>Hours</th>
<th>Extended Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td>$</td>
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<td>$</td>
</tr>
</tbody>
</table>
   
   Total Equipment Cost = $  


PART II - WORK PERFORMED BY SUBCONTRACTOR:

Line 9. Direct Labor Costs: Fill in subtotal of direct labor costs, which includes base rates plus applicable fringe benefits.
   On Subcontractor’s letterhead/spreadsheet show costs by trade, rate, hours and extended costs. See Instructions for line 1.

Line 10. Labor Overhead (Direct Labor Burdens, etc.): Fill in as a percentage of Line 9.


   On letterhead/spreadsheet, show direct materials costs by materials, units, unit costs and extended costs. See Instructions for line 4.

Line 13. Materials Overhead: Fill In as a percentage of line 12. Overhead costs include delivery, taxes, insurance costs, etc.


Line 15. Total Subcontractor’s Equipment Costs: Fill in total equipment costs including indirect overhead costs in hourly rate - except indirect labor costs.
   On letterhead/spreadsheet show total equipment costs by description, rate, hours and extended costs. See Instructions for line 7.

Line 16. Total Subcontractor’s Labor, Materials and Equipment (L, M & E) Costs: Fill in total of lines 11, 14 and 15.

Line 17. Subcontractor’s Overhead (Indirect Costs): Fill in as percentage cost of line 16. See Article 35 of General Conditions.


PARTS III THROUGH VIII - Self-explanatory.

CERTIFICATIONS

A. The Contractor, who prepares this proposal form, certifies the cost/price data by signing, dating, and forwarding same to the Architect/Engineer (or Consultant) for further action.

B. The Architect/Engineer (or Consultant) reviews and analyzes the cost/price data for the requirements that these are: 1) currently prevalent, 2) reasonably fair, 3) factually applicable, and 4) equivalently competitive market selling prices. The Architect/Engineer (or Consultant) may negotiate—after receipt of the cost proposal—any or all of the cost elements of the proposal to support a recommendation of acceptance to the Principal Representative. Certification by the A/E (or Consultant) of the above requirements is made upon his signature. The Architect/Engineer (or Consultant) forwards the proposal with the supporting back-up to the Agency.

C. Authority for the Institution or Agency (usually the Principal Representative) reviews the proposal, signs, dates, and forwards to State Buildings Programs or Delegate for final action.

D. State Buildings Programs or Delegate reviews the cost proposal, with all supporting back-up, for technical and procedural requirements and, if in order, signs and dates the proposal.
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CHANGE ORDER

Change Order No: ___________________________ Date ___________________________

Contractor: _______________________________________________________________

Institution or Agency: University of Colorado at Boulder

Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Your Change Order Proposal(s), dated __________ is/are hereby being designated for approval of the following work:

(Note: If more space is needed for description of work, attach additional 8-1/2” x 11” sheets hereto.)

This change order was originated by the Contractor ☐, Architect/Engineer ☐, State ☐, and I/We do hereby recommend acceptance and approval of the change to the Contractor’s Agreement Dated ______, which is by this reference, made a part hereof, and identified as Exhibit ______ with an increase ☐, a decrease ☐, no change ☐, of $________.

Contract completion date is extended _____ days ☐, is not extended ☐. New completion date is ______ (Month/Day/Year)

*Persons signing for Architect/Engineer/Contractor hereby swear and affirm that they are authorized to act on Architect/Engineer/Contractor’s behalf and acknowledge that the State is relying on their representations to that effect. Principal is not a recognized title and will not be accepted.

<table>
<thead>
<tr>
<th>Architect/Engineer Firm</th>
<th>Name and Title (print)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td>Signature</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Contractor (Name of Firm)</th>
<th>Name and Title (print)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<tr>
<td>Signature</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>University of Colorado at Boulder</th>
<th>Ronald L. Ried, Director, Business Services</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution or Agency</td>
<td>Principal Representative</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTRACT STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Contract Value $</td>
</tr>
<tr>
<td>Previous increases by CO/Amend $</td>
</tr>
<tr>
<td>Previous decreases by CO/Amend $</td>
</tr>
<tr>
<td>Value After Prior CO’s/Amend $</td>
</tr>
<tr>
<td>This CO/Amend Increases ☐ Decreases ☐ $</td>
</tr>
<tr>
<td>CURRENT CONTRACT VALUE $</td>
</tr>
</tbody>
</table>

State Form SC-6.31 Page 1 of 1
Rev. 4/2009
REQUEST FOR INFORMATION
(RFI # 01)

Project No. Project Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Date: 
To: 
From: 
Sent Via: 

Drawing Ref.: Spec. Ref.: 

Subject: 

Proposed Solution: 

<table>
<thead>
<tr>
<th>Schedule Impact</th>
<th>YES</th>
<th>#</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Impact:</td>
<td></td>
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</tbody>
</table>

Date Response Required:  
Sent Via: E-mail

Signature: 
Company: 
Response: 

Response Date:  
Sent Via: 
Person Responding: 
Signature: 

Further Action Required: 

Other Documents This RFI Refers to: 

<table>
<thead>
<tr>
<th>Letters</th>
<th>RFP</th>
<th>PCO</th>
<th>CO</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
University of Colorado at Boulder
ENVIRONMENTAL HEALTH AND SAFETY
413 UCB, (303) 492-6025, Fax (303) 492-2854

ENVIRONMENTAL SITE ASSESSMENT FORM

<table>
<thead>
<tr>
<th>Building &amp; Location</th>
<th>Job Description</th>
<th>Work Order / Project Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMP</td>
<td>Description of work that will be done</td>
<td>MY010905</td>
</tr>
</tbody>
</table>

Follow-up required for:
- SUSPECT MATERIALS
- ASBESTOS MATERIALS
- RADIOACTIVE MATERIALS
- ENVIRONMENTAL COMPLIANCE
- LEAD MATERIALS
- LASER OR X-RAY
- HAZARDOUS MATERIALS

Suspect Building Components, Materials, and Site Conditions:
Lists all suspect materials for asbestos and/or lead-based paint. Also describes any other environmental and safety conditions, e.g. laboratory, hazardous materials, radiation issues, etc. Will address other conditions of the building being worked in, e.g. classroom, offices, laboratories, or other uses.

SAMPLE REPORT ONLY

Samples / Results:
Lists all known results of suspect materials or environmental monitoring results. Where suspect materials are not known, lists these as presumed positive.

SAMPLE REPORT ONLY

REQUIRED ACTION:
Identifies any action that may be required by all parties for the project, conditions that shall be followed, and all other notations relevant to the project. Explains further steps that must be taken for the project and responsibilities of key project staff, e.g. Project Managers, Contractors, EH&S, etc.

SAMPLE REPORT ONLY

EH&S Inspector: Certified CDPHE Inspector
Date Inspected: 1/9/2005

EH&S Manager: Michael Yanker
Date Reviewed: 1/9/2005

This report based upon conditions, regulations, policies at time of inspection and is valid for 90 days. Changing scope of work requires re-inspection. If areas contain hazardous materials (asbestos, chemicals, gases, bio-hazards, radioactive materials or radiation) and/or involve laboratories, shops, haz exhausts, tanks, sewer drains or traps, storm or surface water, or other operational hazards, work must be coordinated with appropriate EH&S manager. No new materials containing asbestos may be used for any part of the construction project. Project must conform with all applicable codes & standards. Project Rep must submit to EH&S Env Compliance - comprehensive haz materials/chemical inventory used to determine additional requirements. Contractor and/or Project Rep must provide above information to employees, subcontractors and other relevant parties.

University Representative / Project Manager
Phone Number:

Contractor Name: Contractor
Phone Number:

Contractor Representative: (signature) Foreman or Superintendent
Date Signed:
Notice to Proceed (Design/Bid/Build Contract)

Date of Notice: ____________________________
Date to be inserted by the Principal Representative

Date/Description of Contract Documents:

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Attach Notice of Code Compliance from Code Review Agent/Building Official for Documents Listed Above

To:

This is to advise you that your Performance Bond, Labor and Material Payment Bond, the requisite Builder’s Risk Insurance Policy or Certificate for same, and Certificates of Insurance have been received. Our issuance of this Notice does not relieve you of responsibility to assure that the bond and insurance requirements of the Contract Documents are met for the duration of the Agreement. The Agreement dated ____________ covering the above described work has been fully executed.

You are hereby authorized and directed to proceed within ten (10) days from date of this Notice as required in the Agreement. Any liquidated damages for failure to achieve substantial completion by the date agreed that may be applicable to this contract will be calculated using the date of this Notice for the date of the commencement of the Work.

Actual on-site construction may not commence until all applicable building permits have been obtained by the Contractor.

By ________________________________________
State Buildings Programs (or Authorized Delegate)
Paul M. Leef, AIA, LEED™ AP
Campus Architect & Director, Planning, Design & Construction

By ________________________________________
Principal Representative (Institution or Agency)
Ronald L. Ried, Director Facilities Management Business Services

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.

State Form SBP-6.26
Rev. 7/2008
A. CERTIFICATION STATEMENT CRS 8-17.5-101 & 102 (HB 06-1343, SB 08-193)

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an unauthorized immigrant to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an unauthorized immigrant.

2. The Vendor certifies that it does not now knowingly employ or contract with an unauthorized immigrant who will perform work under this contract, and that it will participate in either (i) the "E-Verify Program", jointly administered by the United States Department of Homeland Security and the Social Security Administration, or (ii) the "Department Program" administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired to perform work under this contract.

3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for damages to the State.

B. AFFIDAVIT CRS 24-76.5-101 (HB 06S-1023)

4. If the Vendor is a sole proprietor, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):

[ ] I am a United States citizen, or
[ ] I am a Permanent Resident of the United States, or
[ ] I am lawfully present in the United States pursuant to Federal law.

I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq., and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of ______________, 2010.

VENDOR:

______________________________
Vendor Full Legal Name

______________________________
Signature of Authorized Representative

______________________________
Title
NOTICE OF SUBSTANTIAL COMPLETION

Date of Substantial Completion: 

Institution/Agency: University of Colorado at Boulder

Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

TO: Andy Jordan, Project Manager
University of Colorado at Boulder
Department of Facilities Management
Campus Box 453 UCB
Boulder, CO 80309-0453
(Principal Representative)

And

(Contractor)

This is to advise you that the Work has been reviewed, inspected and determined, to the best knowledge, information and belief of the Architect/Engineer, to be substantially complete as of the date noted above in accordance with the criteria outlined in Article 41 of The General Conditions of the Contract and the Specifications, including without limitation a) suitable for occupancy, b) inspected for code compliance with Building Inspection Records signed by code officials for the State, Inspection Cards completely signed-off or a Temporary Certificate, or Certificate, of Occupancy has been issued, c) determined to be fully and comfortably usable, and d) fully cleaned and appropriate for presentation to the public.

A punch list of work to be completed, work not in compliance with the Drawings or Specifications, and unsatisfactory work is attached hereto, along with the Contractor’s schedule for the completion of each and every item identified on the punch list specifying the Subcontractor or trade responsible for the work, and the dates the completion or correction will be commenced and finished within any period indicated in the Agreement for punch list completion prior to Final Acceptance.

Except as stated on the reverse side of this Notice of Substantial Completion, all manufacturers’ warranties, other special warranties and the Contractor’s one-year obligation to perform remedial work, shall commence on the Date of Substantial Completion noted above.

This Notice of Substantial Completion shall be effective and establish the Date of Substantial Completion only when fully executed on the reverse by the Contractor and the Principal Representative. The Principal Representative accepts the Work as substantially complete as of the Date of Substantial Completion herein noted. The Contractor agrees to complete or correct the Work identified on the attached punch list and to do so in accordance with attached punch list completion schedule.
The responsibilities of the Principal Representative and the Contractor for security, maintenance, heat, utilities, and insurance shall be as specified in the Contract Documents or as otherwise hereafter noted:

Exceptions, if any, to the commencement of warranties shall be:

The attached final punch list consists of __________ pages, and the attached Contractor's schedule showing the dates of commencement and completion of each punch list item consists of __________ pages.

When completely executed, this form shall be sent to the Contractor and the Principal Representative with a copy to State Buildings Programs.
After Contractor is satisfied that work is complete as per Notice of Substantial Completion Punch List, a date for final review is established. Architect/Engineer inspection is made with Contractor(s) and Principal Representative and State Buildings Programs (SBP) present. Forms are processed as required.

<table>
<thead>
<tr>
<th>Date Completed</th>
<th>A/E Signoff</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Notice of Approval of Occupancy/Use has been fully executed and the Inspection Cards are completely signed-off.</td>
<td></td>
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</tr>
<tr>
<td>2. On the Pre-Acceptance Punch List (Form SBP-06) the final punch list items are noted by the Architect/Engineer.</td>
<td></td>
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<tr>
<td>3. Schedule for corrections, deficiencies, and items to be supplied are established by Contractor.</td>
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</tr>
<tr>
<td>4. Final Change Orders are processed (must be completed prior to Notice of Acceptance).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The Principal Representative shall not authorize final payment until all items on the punch list have been completed, the Notice of Acceptance issued and the Notice of Contractor’s Settlement Date is published.</td>
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<tr>
<td>6. Permanent keying, keys and keying instructions have been performed.</td>
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<tr>
<td>7. Extra materials as per specifications are delivered to Principal Representative.</td>
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<tr>
<td>8. As-built drawings have been submitted to Architect/Engineer.</td>
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<tr>
<td>9. Guarantee/Warranty documentation requirements are met.</td>
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<tr>
<td>10. Removal of Contractor’s temporary work including cleanup and debris removal.</td>
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<tr>
<td>11. State personnel are instructed in system and equipment operations as required by contract.</td>
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</tr>
<tr>
<td>12. All Instructions, manuals, guides, and charts have been transmitted to Principal Representative.</td>
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</tbody>
</table>

Architect/Engineer: 2020 Engineering, Inc.
Contractor: 

State Buildings Programs (or Authorized Delegate)  
Paul M. Leef, AIA, LEED™ AP  
Campus Architect & Director, Planning, Design & Construction  

Principal Representative (Institution or Agency)  
Ronald L. Ried, Director  
Facilities Management Business Services  

State Form SBP-05  
Rev. 7/2008  
Page 1 of 1
STATE OF COLORADO  
OFFICE OF THE STATE ARCHITECT  
STATE BUILDINGS PROGRAMS  

PRE-ACCEPTANCE PUNCH LIST  

Institution/Agency: University of Colorado at Boulder  
Final Punch List Date  
Architect/Engineer: 2020 Engineering, Inc.  
Contractor:  
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010  

This form to be used after follow-up inspections have been made and punch list is worked down to less than ten items.  

<table>
<thead>
<tr>
<th>Final Punch List Item</th>
<th>Disposition</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
</table>

Architect/Engineer  
2020 Engineering, Inc.  
Date  
Contractor  
Date  

State Buildings Programs  
(or Authorized Delegate)  
Paul M. Leef, AIA, LEED TM AP  
Campus Architect &  
Director, Planning, Design & Construction  
Date  
Principal Representative  
(Institution or Agency)  
Ronald L. Ried, Director  
Facilities Management Business Services  
Date  

State Form SBP-06  
Rev. 7/2008
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF FINAL ACCEPTANCE

Date of Notice of Acceptance: ___________________________ Date to be inserted by A/E after consultation with the Principal Representative
Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

TO:

Notice is hereby given that the State of Colorado, acting by and through the Regents of the University of Colorado at Boulder, accepts as complete* the above numbered project.

By ___________________________ / ___________________________ / 
Paul M. Leef, AIA, LEED AP / Date Ronald L. Ried, Director
Campus Architect
Director, Planning, Design & Construction
State Buildings Programs
(Institution or Agency)

By ___________________________ / ___________________________ / 
Facilities Management Business Services
(Principal Representative)

*When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF CONTRACTOR’S SETTLEMENT

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Notice is hereby given that on the day of , 2010 at Boulder, Colorado, final settlement will be made by the STATE OF COLORADO with , hereinafter called the "CONTRACTOR", for and on account of the contract for the construction of a PROJECT described as CAMP – Smart Grid Meters 2009-2010.

1. Any person, co-partnership, association or corporation who has an unpaid claim against the said project, for or on account of the furnishing of labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies used or consumed by such Contractor or any of his subcontractors in or about the performance of said work, may at any time up to and including said time of such final settlement, file a verified statement of the amount due and unpaid on account of such claim.

2. All such claims shall be filed with Andy Jordan, Project Manager, Department of Facilities Management, Campus Box 453 UCB, Boulder, CO 80309-0453.

3. Failure on the part of a creditor to file such statement prior to such final settlement will relieve the State of Colorado from any and all liability for such claim.

Dated at Boulder, Colorado, this day of , 2010.

Paul M. Leef, AIA, LEED™ AP
Campus Architect &
Director of Planning, Design & Construction
State Buildings Programs
(or Authorized Delegate)

Ronald L. Ried, Director
Facilities Management Business Services
Principal Representative
(Institution or Agency)

MEDIA OF PUBLICATION:

PUBLICATION DATE:

NOTES TO EDITOR:

Transmit one copy of the Affidavit of Publication, and invoice, to: Marsha Slepicka, University of Colorado at Boulder, Department of Facilities Management, Campus Box 453 UCB, Boulder, CO 80309-0453

State Form SBP-7.3
Rev. 9/2006
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF APPROVAL OF OCCUPANCY/USE

Date of Occupancy: [Date to be inserted by the Architect/Engineer after consultation with Principal Representative]
Institution/Agency: University of Colorado at Boulder
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

Portion(s) of project for which occupancy is approved:

Type of Occupancy: [ ] Total or [ ] Partial

The items identified below if applicable must be completed with before Occupancy is approved.

<table>
<thead>
<tr>
<th>Date Completed</th>
<th>A/E Signoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Notice of Substantial Completion has been issued and the Building Inspection Records are completely signed-off (or a Temporary Certificate, or Certificate, of Occupancy has been issued and copies attached).</td>
<td></td>
</tr>
<tr>
<td>2a. Notification has been made to the local Fire Department concerning which portion(s) of the building will be occupied and the date(s).</td>
<td></td>
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<tr>
<td>2b. Fire alarms, smoke detection systems and building fire sprinkler systems have been fully checked and are operable.</td>
<td></td>
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<tr>
<td>2c. The building’s fire connections must be installed and operable, if applicable.</td>
<td></td>
</tr>
<tr>
<td>3. Coordination for final utility and service connections and meters (water, gas, sewer, electricity and telecommunication) has been made and systems are in full operating order.</td>
<td></td>
</tr>
<tr>
<td>4. Sterilization of plumbing systems has been performed.</td>
<td></td>
</tr>
<tr>
<td>5. Operational test of systems and equipment has been performed as required.</td>
<td></td>
</tr>
<tr>
<td>6. Systems adjustments such as balancing, equipment operations, etc., have been performed. Reports have been submitted to the Architect/Engineer for approval.</td>
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<tr>
<td>7. Principal Representative furnished equipment and furnishings are coordinated and placed.</td>
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<tr>
<td>8.</td>
<td>All elements left unfinished must be in such condition that there would be no hazard to the health or safety of the occupants.</td>
</tr>
<tr>
<td>9.</td>
<td>All restroom facilities must be fully functional and operable.</td>
</tr>
<tr>
<td>10.</td>
<td>All light fixtures must be installed and operable.</td>
</tr>
<tr>
<td>11.</td>
<td>All exit lights and emergency lighting systems have been checked and are operable.</td>
</tr>
<tr>
<td>12.</td>
<td>All windows have been glazed and hardware is available for ventilation purposes.</td>
</tr>
<tr>
<td>13.</td>
<td>All routes of egress must be clear of construction materials and debris at all times.</td>
</tr>
<tr>
<td>14.</td>
<td>There must be a means of pedestrian access to each building. Contractor must have sidewalks installed before occupancy and pedestrian barricades and other means of public protection as required.</td>
</tr>
</tbody>
</table>

Occupy does not constitute acceptance of the project as being complete. It simply provides the Principal Representative the opportunity to occupy/use the project or the applicable portion thereof prior to final completion and acceptance. Occupants can expect to be impacted by the Contractor’s efforts to complete the project. The Contractor would not repair any damage caused by the occupants.

**Architect/Engineer**  
2020 Engineering, Inc.  

**Principal Representative**  
(Institution or Agency)  
Ronald L. Ried, Director  
Facilities Management Business Services  

**State Buildings Programs**  
(or Authorized Delegate)  
Paul M. Leef, AIA, LEED TM AP  
Campus Architect & Director, Planning, Design & Construction  

**Contractor**  

**Tina Wells**  
Project Manager  
Department of Facilities Management
CLOSING-OUT CHECKLIST*

Institution or Agency: University of Colorado at Boulder
Architect/Engineer: 2020 Engineering, Inc.
Contractor:
Project No./Name: PR005303 / CAMP – Smart Grid Meters 2009-2010

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After Contractor or Construction Manager is satisfied that work is complete, a date for final review is established. Architect/Engineer inspection is made with Contractor(s) and Principal Representative and State Buildings Programs (SBP) present. Forms are processed as required.

<table>
<thead>
<tr>
<th>DATE COMPLETED</th>
<th>SIGNOFF INITIALS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Final inspections have been made and permission to occupy Project is obtained through SBP Delegate. The <strong>Building Inspection Cards are</strong> completely signed off and attached.</td>
<td></td>
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</tr>
<tr>
<td>1b. If Principal Representative wishes to occupy entire project or portions of Project before completion (Beneficial Occupancy) Project review of condition and responsibility is conducted and noted. (Fill out Form SBP-01 in addition to this form).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Notify the local fire department of the date the building will be occupied.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coordination for final utility and service connections, meters, etc., has been made (water, gas, sewer, electricity and telecommunication) and in full operating order.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Sterilization of plumbing systems has been performed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Operational tests of systems and equipment have been performed as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Systems adjustments, such as balancing, equipment operations, etc., have been performed. Reports have been submitted to Architect/Engineer and approved.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. State personnel are instructed in system and equipment operations as required by contract.</td>
<td></td>
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</tr>
<tr>
<td>8. Instructions, manuals, guides, charts, etc., are transmitted to Principal Representative.</td>
<td></td>
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<tr>
<td>9. Principal Representative furnish equipment and furnishing are coordinated and placed.</td>
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<tr>
<td>10. Review drawing, specifications, addenda, change orders, etc. for work to be done and note.</td>
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</tbody>
</table>
11. On the Contract Close-out Punch List (Form SBP-06) the final punch list items deficient or still required are made by the Architect and includes lists furnished by the consultants and promptly distributed to all parties.

12. Schedule for corrections, deficiencies, and items to be supplied is established by Contractor, Assistant Contractor and trades as to location of specific defects if necessary.

13. Final Change Orders are processed (must be completed prior to contract acceptance.

14. The Principal Representative shall not authorize final payment until all items on the punch lists have been completed, the Notice of Acceptance issued and the Notice of Contractor’s Settlement Date is published.

15. Permanent keying, keys and keying instructions have been performed.

16. Extra materials, spares, etc., are delivered to Principal Representative.

17. Record drawings (as-built) requirements have been submitted to A/E.

18. Guarantee/Warranty requirements are met.

19. All records, reports, files, documents, etc., of construction inspector are in order and turned over to Owner as arranged, and to SBP as applicable.

20. Removal of Contractor’s temporary work; cleanup and debris removal is understood and performed.

21. Post-contract maintenance conditions, such as equipment, landscaping, etc., are understood and arranged for.

* Verification, item by item, as applicable, to be submitted with Notice of Acceptance Form SC-6.27.
Institution/Agency: University of Colorado at Boulder  
Contractor:  
Project No./Name: PR005303 – CAMP – Smart Grid Meters 2009-2010

This form to be used after follow-up inspections have been made and punch list is worked down to less than ten items:

<table>
<thead>
<tr>
<th>Final Punch List Item</th>
<th>Disposition</th>
<th>Date</th>
<th>Remarks</th>
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</table>

Contractor

Architect/Engineer

Paul M. Leef, AIA, LEED™ AP  
Campus Architect &  
Director, Planning, Design &  
Construction  
State Buildings Programs  
(or Authorized Delegate)  

Ronald L. Ried, Director  
Facilities Management Business Services  
Principal Representative  
(Institution or Agency)
Post Construction Warranty Report

Project: PR005303 – CAMP – Smart Grid Meters 2009-2010
Warranty Contractor: ____________________________
Date Warranty Begins: __________________________ Date Warranty Expires: __________________________
Facilities Management FAX No. 303-492-4082 Reported By: __________________________
Campus Box 453 UCB, Boulder, CO 80309-0453 F/M Rep. Informed: __________________________

Date Reported: __________________________ Taken By: __________________________

Extended Warranty Item:

Description of Warranty Item:

Date Reported to Contractor: __________________________

Contractor Response:

Date of Resolution: __________________________

Note:

Post construction warranty rpt
GIVEN TO:  
PR 005303  
CONTRACTOR  
CAMP - Smart Grid Meters 2009-2010  
PROJECT NO.  
Signature  
PROJECT NAME  
DATE  

ENVIRONMENTAL RESPONSIBILITIES

The University of Colorado at Boulder (UCB) and the Boulder community are very sensitive to pollution issues. We endeavor to be leaders in promoting excellence in environmental stewardship and expect that all faculty, staff, students and contractors be aware of their environmental responsibilities and perform their activities in an environmentally responsible manner.

Contractors working on the UCB campus are required to comply with all applicable University, City, State and Federal environmental regulations and safety standards. Hazardous and regulated materials must be managed and disposed of properly. Work sites must control dust, debris and run-off, and pay special attention to preventing any pollutants from entering the storm sewer or surface water collection systems. These systems ultimately drain into our creeks and waterways.

Please do your part to promote awareness and compliance! On the reverse side of this flyer you will find examples of the kinds of environmental and safety issues and practices that often require attention at construction sites.

Questions, Comments or Concerns? – Please Contact: Environmental Health and Safety 303-492-6025.

Environmental & Safety REMINDERS at Construction Sites:

- Construction Waste & Debris
  - Keep saw-cut slurry, drywall mud, grout and mortar, paint, and all other wastes OUT OF GUTTERS, STREETS, TRENCHES, AND STORM DRAINS!
  - Use berms, sand bags, straw, buckets and drums; sweep and shovel to construction dumpster; allow solids to settle before pouring off water to the sanitary sewer. Identify drains in advance and designate sanitary sewer drain(s) where it's OK to dump liquids that are pre-approved by EH&S 303-492-6025.
  - Recycle (303-492-5321) construction materials wherever possible.

- OSHA
  - Confined space entry, MSDS, product identification & labeling, PPE, trenching and shoring, fall protection, welding vision screens, etc.

- Asbestos & Lead-Based Paint
  - Assume all building materials are asbestos-containing unless written report(s) indicate otherwise. A pre-construction environmental site survey is required prior to beginning work - call EH&S Asbestos / Lead Management 303-492-6168.

- Dust Control
  - Use wet methods, exhaust fans, HEPA vacs, barriers, etc.; visible emissions are not permitted.

- Hazardous Materials & Waste
  - Includes paints and solvents, oils, fuels, coolants, corrosives, cleaners, pesticides, PCB light ballasts, mercury vapor lamps, smoke detectors, rechargeable and lead acid batteries, and many other materials and products. Do not place in the trash or down the drain without approval from EH&S.

- Odors and Vapors, IAQ
  - Use barriers, smoke eaters, exhaust fans, ventilation system controls, etc.

- De-watering
  - Submit plan to Facilities Management for groundwater / stormwater / drainage controls. Discharge permits may be required from the Colorado Department of Public Health and Environment - Water Quality Division 303-692-3500.

- Spills and Emergencies
  - Post contingency/preparedness plan; prevent releases to the environment; call 911 immediately to report hazardous spills (weekdays also report to EH&S 303-492-6025).

- Utility Locates
  - Before digging, ALWAYS call the Utility Notification Center of Colorado (UNCC) 1-800-922-1987.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of Work</th>
<th>Material</th>
<th>Labor and Other</th>
<th>Totals (C + D)</th>
<th>Materials On-Site But Not In Place</th>
<th>WORK IN PLACE</th>
<th>Total Amount Due to Date (F+G+H)</th>
<th>% Complete and in Place (I / E)</th>
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# Certificate for Contractor's Payment

**State of Colorado**  
**Office of the State Architect**  
**State Buildings Programs**

## Certificate for Contractor's Payment

**Date:**

<table>
<thead>
<tr>
<th>Pay Application #:</th>
<th>From:</th>
<th>To:</th>
<th>P.O. No.:</th>
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<td>PROJECT #/TITLE:</td>
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**AMENDMENTS/CHANGE ORDER SUMMARY**

Application is made for Progress for work completed and in place and stored on site on the above Project. As indicated on the following page(s).

<table>
<thead>
<tr>
<th>Prior amendments / Change Orders</th>
<th>Deductions (L)</th>
<th>Additions (M)</th>
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**Architects/Engineer's Certification:**  
In accordance with the Contract and this Application for Payment, the above Contractor is entitled to a payment of:  

$0.00

**Institution/Agency (or Authorized Delegate):**

Date

**Contractor:**

Date

**State Buildings Programs (or Authorized Delegate):**

Date

State Form SBP-7.2  
Rev. 9/2006  
Page 1 of 1
### PROJECT SUBMITTAL LOG

**Project**  PR 005322 / W 291549 / UMC Bookstore Remodel

<table>
<thead>
<tr>
<th>SPEC. SECTION NO.</th>
<th>SUB NO.</th>
<th>CONTR NO.</th>
<th>DESCRIPTION</th>
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<th>SUBMIT DATE</th>
<th>DATE REC FROM CONTR</th>
<th>NO. OF COPIES REC</th>
<th>ACTION</th>
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<th>DATE RETURNED TO CONTRACTOR</th>
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<th>DAYS OUT TO ARCHITECT</th>
<th>DAYS OUT TO CONTRACTOR</th>
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</table>

**NOTES:**

a. The Submittal Log lists the specification section that requires submittals. It is the Contractor's responsibility to reference the appropriate subsection of the specification section for specific individual submittal requirements and to submit accordingly.

b. The Submittal Log does not necessarily list all specification sections that require submittals. The Contractor is responsible for any additional submittals that may be called for and required on drawings in the individual schedules and notes.
1.01 CONDITIONS AND REQUIREMENTS

Division 1 - General Requirements shall govern work under all Divisions of the Specifications.

1.02 SPECIFICATION LANGUAGE EXPLANATION

Specifications are of abbreviated, simplified or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall," "in conformity therewith," "shall be," "as noted on the Drawings," "a," "the" are intentional. Supply omitted words or phrases by inference in same manner as they are when "NOTE" occurs on Drawings. Supply words "shall be" or "shall" by inference when colon is used within sentences or phrases. Supply words "on the Drawings" by inference when "as indicated" is used with sentences or phrases.

Where reference is made to specifications, societies, institutes, or associations or manufacturer's directions, they are, except as may be inconsistent herewith, made part of specifications, to same extent as if written out in full herein. Use latest edition, at time of bidding, if a date is not given.

1.03 SUBMITTALS

A. Prepare data for use by the University of Colorado, Facilities Management personnel.

B. Format:
   1. Submit electronically in Portable Document Format (PDF) format as one document, OCR (Optical Character Recognition) searchable, bookmarked according to the Construction Specifications Institute (CSI) standards.

   2. Title shall be "SPECIFICATIONS", and shall include:
      a. Name of project and submittal stage and date of submittal (month, day, and year).
      b. University of Colorado Project number (Include on cover and in header or footer of each page)

1.04 CONTENT OF MANUAL

A. An electronically-written table of contents shall be provided for each volume, arranged according to CSI standards. Include the following:
   1. Name of responsible installing principal contractor, address, and telephone number.

1.05 ABBREVIATIONS

References in Contract Documents to trade associations, technical societies, recognized authorities and other institutions include following organizations, which are sometimes referred to only by corresponding abbreviations:

   AA Aluminum Association
   AAMA Architectural Aluminum Manufacturer's Association
   ACI American Concrete Institute
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIMA</td>
<td>Acoustical and Insulating Materials Association (successor to AMA and IBI)</td>
</tr>
<tr>
<td>AISC</td>
<td>American Institute of Steel Construction</td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute</td>
</tr>
<tr>
<td>AITC</td>
<td>American Institute of Timber Construction</td>
</tr>
<tr>
<td>AMA</td>
<td>Acoustical Materials Association</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute (successor to USASI and ASA)</td>
</tr>
<tr>
<td>APA</td>
<td>American Plywood Association</td>
</tr>
<tr>
<td>ASHRAE</td>
<td>American Society of Heating, Refrigerating and Air Conditioning Engineers</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing Materials</td>
</tr>
<tr>
<td>AWI</td>
<td>Architectural Woodwork Institute</td>
</tr>
<tr>
<td>AWPA</td>
<td>American Wood Preservers Association</td>
</tr>
<tr>
<td>AWS</td>
<td>American Welding Society</td>
</tr>
<tr>
<td>CDA</td>
<td>Copper Development Associations, Inc.</td>
</tr>
<tr>
<td>CM/GC</td>
<td>Construction Manager/General Contractor</td>
</tr>
<tr>
<td>CRA</td>
<td>California Redwood Association</td>
</tr>
<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
</tr>
<tr>
<td>CS</td>
<td>Commercial Standard (U.S. Department of Commerce)</td>
</tr>
<tr>
<td>DFPA</td>
<td>Douglas Fir Plywood Association</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>FGMA</td>
<td>Flat Glass Marketing Association</td>
</tr>
<tr>
<td>FIA</td>
<td>Factory Insurance Association</td>
</tr>
<tr>
<td>FM</td>
<td>Factory Mutual Engineering Division</td>
</tr>
<tr>
<td>FS</td>
<td>Federal Specification</td>
</tr>
<tr>
<td>MIA</td>
<td>Marble Institute of America</td>
</tr>
<tr>
<td>MIL</td>
<td>Military Specification</td>
</tr>
<tr>
<td>MILMA</td>
<td>Metal Lath Manufacturer's Association</td>
</tr>
<tr>
<td>NAAMM</td>
<td>The National Association of Architectural Metal Manufacturers</td>
</tr>
<tr>
<td>NBFU</td>
<td>National Board of Fire Underwriters</td>
</tr>
<tr>
<td>NBS</td>
<td>National Bureau of Standards</td>
</tr>
<tr>
<td>NCMA</td>
<td>National Concrete Masonry Association</td>
</tr>
<tr>
<td>NEC</td>
<td>National Electric Code (of NBFU)</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers' Association</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute of Occupational Safety and Health</td>
</tr>
<tr>
<td>NMWIA</td>
<td>National Mineral Wool Insulation Association</td>
</tr>
<tr>
<td>NPVLMA</td>
<td>National Paint, Varnish and Lacquer Manufacturers' Association</td>
</tr>
<tr>
<td>NTMA</td>
<td>The National Terrazzo and Mosaic Association</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>PCA</td>
<td>Portland Cement Association</td>
</tr>
<tr>
<td>PCI</td>
<td>Prestressed Concrete Institute</td>
</tr>
<tr>
<td>PEI</td>
<td>Porcelain Enamel Institute</td>
</tr>
<tr>
<td>PS</td>
<td>Product Standard (U.S. Department of Commerce)</td>
</tr>
<tr>
<td>SCPI</td>
<td>Structural Clay Products Institute</td>
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<tr>
<td>SDI</td>
<td>Steel Deck Institute</td>
</tr>
<tr>
<td>SJI</td>
<td>Steel Joist Institute</td>
</tr>
<tr>
<td>SMACNA</td>
<td>Sheet Metal and Air Conditioning Contractor's National Association</td>
</tr>
<tr>
<td>SPA</td>
<td>Southern Pine Association</td>
</tr>
<tr>
<td>SPI</td>
<td>The Society of Plastic Industry, Inc.</td>
</tr>
<tr>
<td>SPR</td>
<td>Simplified Practice Recommendation (U.S. Department of Commerce)</td>
</tr>
<tr>
<td>SSPC</td>
<td>Steel Structures Painting Council</td>
</tr>
<tr>
<td>SWI</td>
<td>Steel Window Institute</td>
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</table>
1.04 LAYING OUT WORK

The Contractor will furnish reference bench mark and maintain bench mark and all other grades, lines, and levels and dimensions as indicated in the Contract Documents. Report any errors or inconsistencies in above to Owner before commencing work.

Except as delegated by subcontract or normal trade practice, the Contractor will be responsible for all lines, elevations, and measurements of work indicated.

1.05 EXAMINATION OF SITE

Failure to visit the site will in no way relieve any Contractor from the necessity of furnishing materials or performing work that may be required to complete work in accordance with the Contract Documents without additional cost to Owner.

END OF SECTION
PART 1 - GENERAL

1.01 SCHEDULE OF DRAWINGS, SPECIFICATIONS AND ADDENDA

The following Drawings, Project Manual, and Addenda from the Contract Documents.

A. Set(s) of Drawings & project manuals dated April 2010. Drawing list is as follows:

<table>
<thead>
<tr>
<th>Sheet No. / Titled</th>
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<tbody>
<tr>
<td>DRAWING INDEX</td>
</tr>
<tr>
<td>M1.0- Mechanical title page.</td>
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<td>M1.1- Mechanical Notes</td>
</tr>
<tr>
<td>M1.2- Mechanical Notes</td>
</tr>
<tr>
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</tr>
<tr>
<td>M2.1- Mechanical- Chemistry</td>
</tr>
<tr>
<td>M2.2- Mechanical – Rec Center</td>
</tr>
<tr>
<td>M2.3- Mechanical – Rec Center</td>
</tr>
<tr>
<td>M2.4- Mechanical – Kittredge</td>
</tr>
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<td>M2.5- Mechanical – Norlin</td>
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<td>M2.6- Mechanical – Norlin</td>
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<td>M2.7- Mechanical – Norlin</td>
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<tr>
<td>M2.8- Mechanical – Norlin</td>
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<tr>
<td>M3.0 – Chilled Water meter detail</td>
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<tr>
<td>M3.1- Domestic Water meter detail</td>
</tr>
<tr>
<td>M3.2- Steam meter detail</td>
</tr>
<tr>
<td>E1.0- Electrical title page</td>
</tr>
<tr>
<td>E1.1- Electrical notes</td>
</tr>
<tr>
<td>E2.0- Electrical - Chemistry</td>
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<td>E2.2- Electrical - Kittredge</td>
</tr>
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<td>E2.3- Electrical – Norlin</td>
</tr>
<tr>
<td>E2.4- Electrical - Norlin</td>
</tr>
<tr>
<td>E3.0- Electric meter detail</td>
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C. Addenda: All Addenda issued prior to bidding.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Work covered: Work under this contract includes all materials, equipment and labor necessary to complete the work indicated on the drawings, described in specifications, addenda or reasonably inferred.

1.03 CONTRACTORS

All work will be executed under one prime construction contract between the Owner and the Contractor.

Except as indicated otherwise, all work under this contract will be under the direction of the prime contractor.
1.04 JOB CONDITIONS

A. Areas of the building immediately adjacent to areas under construction will be occupied by the public during the work of this project. Conduct the work of this project in a manner that will minimize disruption of the Owner's occupancy of adjacent areas.

B. Do not interrupt building access and use, except as permitted by the Owner.

Provide eight (8) work days notice to the Owner of construction activities which will severely impact the occupancy and use of adjacent areas.

C. Provide temporary barriers and/or partitions as required to protect the occupants of the building and the general public from injury due to the work of this project; and/or to protect adjacent areas of the building from the spread of dust and dirt caused by the work or this project.

Remove temporary barriers and partitions upon completion of the Project.
1. Temporary partitions shall be constructed of 1/2” plywood on the construction face nominal 2” X 4” wood studs and 1/2” gypsum wallboard on the public occupied face.

D. Do not interrupt power, lighting, plumbing, telephone and HVAC services to occupied areas without Owner's approval. Such interruptions must be scheduled at least eight (8) work days in advance and have Owner's approval.

1.05 PROTECTION OF WORK AND ADJACENT PROPERTY

A. Buildings and property adjacent to work included in this project may be subject to damage due to construction operations.

Prior to the start of the work included in this Contract engage the services of a photographer to record the existing condition of adjacent structures and property. Contractor shall provide one set on disk to the Owner and retain negatives and one set of prints for their records. Sufficient photos with adequate detail to thoroughly document the conditions surrounding the work shall be provided.

B. At the completion of the project, Contractor shall restore existing buildings, landscaping, parking facilities and property to same condition as prior to the start of the work.

C. In addition to the requirements of the General Conditions of the Contract for Construction, the Contractor shall:

1. Notify, in writing, the Owner of University or private property which interferes with the work and arrange with them for disposition of such property.

2. Provide and maintain proper shoring and bracing to prevent earth from caving or washing into excavation. Provide temporary protection around openings through and at floors, roofs, and other openings.

3. Provide and maintain proper shoring and bracing for existing underground utilities, sewers, etc., encountered during excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the work of this project, or can be properly back-filled upon completion of new work.

4. Weather Protection: Provide protection against rain, snow, wind, ice, storms, or heat so as to maintain work, materials, apparatus, and fixtures free from injury or damage. At the end of each day’s work, cover new work likely to be damaged.
5. Provide and maintain adequate protection of the work from damage due to freezing, especially freezing earth and soils. Risk of proceeding with the work on or with freezing or frozen materials will be the sole responsibility of the Contractor.

6. Water Protection: Provide protection from damage at all times from rain water, ground water, backing up of drains or sewers, and other water. Provide pumps and equipment enclosures to provide this protection.

7. The Contractor will maintain free of obstructions and debris, all designated corridors and emergency exits, handicap access ramps and sidewalks to building. Provide temporary directional handicapped signage for routing to the nearest accessible facilities.

1.06 EXISTING FURNITURE AND EQUIPMENT

The Owner will remove or relocate existing movable furniture and equipment from the areas in which the Contractor is working. Notify the Owner not less than three days prior to starting work in areas where furniture and equipment require moving.

1.07 CONTRACTOR'S ACCESS PARKING AND STAGING AREAS

A. Work included in this project will need to be performed within the limitations of available access at the site. The University shall limit the area available for staging and parking due to the additional number of construction projects planned during the execution of this contract. Contractor shall adjust the means and methods of construction to allow for the restrictions surrounding the site.

B. All parking on campus except for some one-hour zones on city streets and a few metered spaces is under control and authority of the Parking and Transportation Services (PTS) of the University. All University parking is by permit only.

C. Types of parking and staging are defined as follows:

General Staging Areas are approved areas adjacent to the site when available or in University designated group staging yards. General Staging Areas may be used for any purpose, including employee parking, on a space available basis, but must be coordinated through the UCB Project Manager and PTS. Vehicles may not park outside of general staging areas except in areas coordinated and approved by PTS.

Restricted Staging Areas are approved areas near the site for the construction dumpster, off-loading of equipment, contractor’s work trailer, and materials that are soon to be incorporated into the work. No vehicles shall park in a restricted staging area for more than 20 minutes between the hours of 8:00 a.m. and 5:00 p.m. weekdays.

Contractor Employee Parking are areas for workers needing parking on campus. Coordinate through UCB Project Manager and PTS.

Prohibited Parking are areas designated in the Contract Documents as No Parking areas. The contractor shall not allow any parking in areas so designated under any circumstance.

D. The restrictions in this Section are in addition to any other restrictions or rules provided by PTS. Fees shall be assessed for the use of any PTS facility for staging and construction activities.

E. The designated staging area for this project shall be determined at Pre-Construction Meeting.
F. If staging areas for this project are located in landscaped areas. The contractor shall protect all trees located within the staging areas to the drip line of the trees. Sod and planting beds within the staging areas shall be restored to a “like-new” condition upon completion of the work.

G. Vehicles parked on sidewalks or in landscape areas outside the designated staging areas cause damage to University property. The contractor shall reimburse the University $25.00 per vehicle per occurrence for vehicles parked outside the designated staging areas. This amount shall be in addition to any fines which might be levied by PTS.

1.08 OCCUPANCY REQUIREMENTS

A. Owner may occupy designated areas for the purpose of storage of furnishings and equipment and installation of equipment.

B. Execute Certificate of Substantial Completion for each designated portion of work prior to Owner occupancy. Contractor shall allow:
   1. Access for Owner personnel.
   2. Use of parking facilities.
   3. Operation of HVAC and electrical systems.

C. On occupancy, Owner will provide, for occupied areas:
   1. Operation of HVAC and electrical systems.

1.09 CONSTRUCTION AND SEQUENCE SCHEDULE:

A. In order to accommodate the uninterrupted operation of the existing building during the various phases of construction, the sequence of construction operations shall be clearly detailed on a schedule and submitted for review by the Project Manager.

1.10 TEMPORARY ELECTRIC SERVICE

A. Connect to existing power service. Power consumption shall not disrupt owners need for continuous service. Contractor to pay for power consumed. Provide power outlets for construction operations, branch wiring, distribution boxes, and flexible power cords as required.
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.02 SURVEYS, LAYOUTS, AND LEVELS

A. General: Working from lines and levels established by the existing building, and as shown in relation to the work, establish and maintain bench marks and other dependable markers to set the lines and levels for the work of construction as needed to properly locate every element of the work of the entire project. Calculate and measure required dimensions as shown (within recognized tolerances if not otherwise indicated); do not scale the drawings to determine dimensions. Continuously advise tradesmen performing the work of the marked lines and levels provided for use in the layout of work.

1.03 PROJECT RECORD DOCUMENTS

A. Maintain at job site, one copy of:
   1. Contract Drawings
   2. Specifications
   3. Addenda
   4. Reviewed Shop Drawings
   5. Change Orders
   6. Other Modifications to Contract
   7. Field Test Records
   8. As-Built Drawings

B. Maintain documents in clean, dry, legible condition and do not use record documents for construction purposes. Make documents available at all times for inspection by the Consultant and Owner.

C. Label each document "Project Record" in 1" or larger printed letters.

D. Record drawing information in colored pencil with different colors for the various systems and defined by color legend.

E. Record drawings and specifications shall include the following:
   1. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure. Location of concealed valves, dampers, controls, balancing devices, junction boxes, clean-outs, and other items requiring access or maintenance.
   2. Field changes of dimension and detail, changes made by Change Order or Field Order and details not on original contract drawings.
   3. Fire protection and alarm systems shop drawings.
F. Submit all record drawings to the Consultant at the completion of the project.

1.04 CLEANING

A. Cleaning and Protection Work: At the time each unit of work or element of the construction is completed (substantially) in each area of the Project, clean the unit or element to a condition suitable for occupancy and use (as intended), and restore minor or superficial damage. Replace units and elements which are damaged beyond successful restoration. Clean and restore adjoining surfaces and other work which was soiled or damaged (superficially) during the installation; replace other work damaged beyond successful restoration. Where the performance of subsequent work could possibly result in damage to the complete unit or element, provide protective covering or other provisions to minimize possible damage. Repeat cleaning and protection operations during remainder of construction period, wherever work might otherwise be damaged by sustained soiling or exposure.

B. During Construction: Oversee cleaning and ensure that building, grounds, and public properties are maintained free from accumulation of waste materials and rubbish. At reasonable intervals during daily progress of work, clean up site and access and dispose of waste materials, rubbish, and debris. Vacuum clean interior building areas when ready and continue vacuum cleaning on an as-needed basis until building is ready for acceptance or occupancy.

1.05 PROJECT SIGN

Erect no project sign or job-site sign of any kind, except warning signs as specified in Section 01500, without written authorization of the Owner.

1.06 COORDINATION

A. The Contractor shall coordinate the work so as not to interfere with the building custodian's normal cleanup activities.

B. The Contractor shall be responsible for coordinating all the work of the project. The Contractor shall coordinate the efforts of all subcontractor(s) and the deliveries of suppliers so that the work progresses in an orderly fashion without delay towards timely completion of a complete project in accordance with the drawings and specifications.

C. The Contractor shall note that concurrent with his work, other contractors, suppliers, and the Owner's facilities and maintenance personnel may be working in relatively close proximity. The Contractor will be solely responsible for coordinating his work with that of other contractors and will make no claims for failure to do so.

1.08 METHODS OF CONSTRUCTION

A. The procedure and method of construction is the prerogative and the responsibility of the Contractor. If professional assistance is required to safely implement method of construction, the Contractor shall, on his own, employ professional help.

END OF SECTION
PART 1 - GENERAL

1.01 GENERAL ALTERNATE REQUIREMENTS

A. General: The description for each alternate is recognized to be incomplete and abbreviated but implies that each change must be complete for the scope of work affected. Refer to applicable sections and to applicable drawings for the specific requirements of the owner, whether or not references are so noted in the description of each alternate. Modify surrounding work as required to integrate with the work of each alternate.

1.02 SPECIFIC ALTERNATES

A. Deductive Alternates:

Deduct Alternate No. 1 – Cristol Chemistry

The sum of ________________________________ and no/100 Dollars ($___________)

Deduct Alternate No. 2 - Recreation Center

The sum of ________________________________ and no/100 Dollars ($___________)

Deduct Alternate No. 3 – Kittredge West

The sum of ________________________________ and no/100 Dollars ($___________)

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. General Contractor is responsible for all of the work of this contract.
   1. Assign and subcontract portions of the work as required to assure that all work is
      constructed in compliance with these documents.
   2. Coordinate the work of the several subcontractors for the project.
   3. Coordinate work of this contract with work by separate contractors.

B. Each subcontractor shall:
   1. Coordinate work of his own employees and subcontractors.
   2. Expedite his work to assure compliance with schedules.
   3. Coordinate his work with that of other subcontractors and work by separate contractor.
   4. Comply with orders and instructions of owner.

C. Related Requirements
   1. All Division 1 Sections.

1.02 CONSTRUCTION ORGANIZATION AND START-UP

A. Establish on-site lines of authority and communications.
   1. Attend pre-construction meeting with subcontractors upon commencement of the project.
   2. Establish procedures for intra-project communications.
      a. Submittals.
      b. Reports and records.
      c. Recommendations.
      d. Coordination Drawings.
      e. Schedules.
      f. Resolution of conflicts.
      a. Consult with Architect to obtain interpretation.
      b. Assist in resolution of questions or conflicts which may arise.
      c. Transmit written interpretations to subcontractors, and to other concerned parties.
   4. Assist in obtaining permits and approvals.
      a. Obtain building permits and special permits required for work or for temporary
         facilities.
      b. Verify that subcontractors have obtained inspections for work and for temporary
         facilities.
   5. Control the use of site.
      a. Supervise field engineering and site layout.
      b. Allocate space for each subcontractor's use for field offices, sheds, work and
         storage areas.
      c. Establish access, traffic and parking allocations and regulations.
      d. Monitor use of site during construction.
1.03 CONTRACTOR DUTIES

A. Construction Schedules.
   1. Coordinate schedules with several subcontractors.
   2. Monitor schedules as work progresses.
      a. Identify potential variances between schedules and probable completion dates for each phase.
      b. Recommend adjustments in schedule to meet required completion dates.
      c. Adjust schedules of subcontractors as required.
      d. Document changes in schedule.
   3. Observe work of each subcontractor to monitor compliance with schedule.
      a. Verify that labor and equipment are adequate for the work and the schedule.
      b. Verify that product procurement schedules are adequate.
      c. Verify that product deliveries are adequate to maintain schedule.

B. Process Shop Drawings, Product Data and Samples.
   1. Review for compliance with Contract Documents.
      a. Field dimensions and clearance dimensions.
      b. Relation to available space.
      c. Relation to other trades, equipment and systems.
      d. Submit to Architect.

C. Monitor the use of temporary utilities.
   1. Verify that adequate services are provided and maintained.

D. Inspection and Testing.
   1. Inspection work to assure performance in accord with requirements of Contract Documents.
   2. Administer special testing and inspections of suspected work.
   3. Reject work which does not comply with requirements of Contract Documents.
   4. Coordinate testing laboratory services.
      a. Verify that required laboratory personnel are present.
      b. Verify that tests are made in accordance with specified standards.
      c. Review test reports for compliance with specified criteria.
      d. Recommend and administer required retesting.

E. Monitor contractor's periodic cleaning.
   1. Enforce compliance with specifications.
   2.Resolve any conflicts.

F. Coordinate changes.
   1. Recommend necessary or desirable changes.
   2. Assist owner in negotiating change orders.
   3. Promptly notify all subcontractors of pending changes.

G. Maintain Reports and Records at Job Site available to Architect and Subcontractors.
   1. Log progress of work of each subcontractor.
   2. Records
      a. Contracts.
      b. Purchase orders.
c. Materials and equipment records.
d. Applicable handbooks, codes and standards.

3. Obtain information from subcontractors and maintain file of Project Record Documents.
4. Assemble documentation for handling of claims and disputes.

H. Coordinate work of this Contract and requirements of this section with work by Separate Contract including but not limited to:
   1. Removal of asbestos containing materials by separate contract.

1.04 CONTRACT CLOSEOUT

A. Coordinate equipment start-up.
1. Provide seven days notification prior to start-up of each item.
2. Ensure that each piece of equipment or system is ready for operation.
3. Execute start-up under supervision of responsible persons in accordance with manufacturer's instructions.
4. Perform required testing and balancing.
5. Record dates of start of operation of systems and equipment. Submit written report that equipment or system has been properly installed and is functioning correctly.
6. Provide written notice of beginning of warranty period for equipment put into service.

B. Demonstration and Instructions
1. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to Substantial Completion.
2. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, seasonal operation, and shutdown of each item of equipment.

C. At completion of work of each Section, conduct an inspection to assure that
   1. Specified cleaning has been accomplished.
   2. Temporary facilities have been removed from site.

D. At completion
   1. Conduct an inspection to list work to be completed or corrected.
   2. Supervise correction and completion of work as established in Certificate of Completion.

E. When a portion of the Project is occupied prior to final completion, coordinate established responsibilities of each subcontractor.

F. Final completion.
   1. When each Subcontractor determines that work is finally complete, conduct an inspection to verify completion of work.
   2. Assist owner and architect in inspection.

G. Administer contract closeout.
   1. Receive and review Subcontractor's final submittals.
   2. Transmit to architect with recommendation for action.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Carefully coordinate the interface between Division 15 (Mechanical) and Division 16 (Electrical) before submitting any equipment for review or commencing installation.

B. Responsibility: Unless otherwise indicated, all motor and controls for Division 15 equipment shall be furnished, set in place and wired in accordance with the following schedule:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>FURNISHED UNDER</th>
<th>SET IN PLACE UNDER</th>
<th>POWER WIRING UNDER</th>
<th>CONTROL WIRING UNDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Motor</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Automatically Controlled</td>
<td></td>
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<tr>
<td>Starter/contractors:</td>
<td></td>
<td></td>
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<tr>
<td>Separate</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Factory Mounted &amp; Wired</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>In Motor Control Centers</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Manually Controlled</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Starter/Contractors:</td>
<td></td>
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<tr>
<td>Separate</td>
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<td>16</td>
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</tr>
<tr>
<td>Factory Mounted &amp; Wired</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Motor Speed Controllers</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Disconnect (Note 1) Switches</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
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<tr>
<td>Contactors</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Thermal Overload (Note 1)</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
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<tr>
<td>Switches</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Control Relays (Note 2)</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>15</td>
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<tr>
<td>Control Transformers</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
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<tr>
<td>Control Circuit Outlets</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Thermostats (Note 2)</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>15</td>
</tr>
</tbody>
</table>
### GENERAL REQUIREMENTS

**SECTION 01042**

**MECHANICAL AND ELECTRICAL COORDINATION**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>FURNISHED UNDER</th>
<th>SET IN PLACE UNDER</th>
<th>POWER WIRING UNDER</th>
<th>CONTROL WIRING UNDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Switches (Note 2) Not in Control Panel</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Push Button Stations, Pilot Lights</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Thermostats (Note 2) Controls: Integral with Equipment Directly Applied to Ducts, Pipes, etc.</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Valve Motors, Damper Motors, Solenoid Valves, etc.</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>EP Valves or Switches, P.E. Switches</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Control Circuit Outlets</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Fire Alarm Systems</td>
<td>16</td>
<td>16</td>
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</tr>
<tr>
<td>Fire Sprinkler Alarm</td>
<td>16</td>
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<td>16</td>
</tr>
<tr>
<td>Firestats</td>
<td>16</td>
<td>16</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>Smoke Detectors Including Relays for Fan Control</td>
<td>16</td>
<td>16</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>Control Air Compressor</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Refrigerated Air Dryer</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Equipment Interlocks</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Boiler and Water Heaters</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>

### NOTES:

1. If furnished as part of factory wired equipment furnished and set in place under Division 15, wiring and connections under Division 16.

2. If float switches, line thermostats, P.E. switches, time switches, or other controls carry the FULL LOAD CURRENT to any motor, they shall be furnished under Division 15, but they shall be set in place and connected under Division 16 except that where such items are an integral part of the mechanical equipment, or directly attached to ducts, piping, or other mechanical equipment, they shall be set in place under Division 15 and connected under Division 16. If they do not carry the FULL LOAD CURRENT to any motor, they shall be furnished, set in place and wired under Division 15.
C. Control Wiring: Consists of wiring in pilot circuits of contact or starters, sensors, controllers, and relays, and wiring for valve and damper operators.
   1. Connections: Connections to all controls directly attached to ducts, piping and mechanical equipment shall be made with flexible connections.

D. Starters: Provide magnetic starters for all three phase motors and equipment complete with:
   1. Control transformers.
   2. 120V holding coils.
   3. Integral hand-off-auto switch.
   4. Auxiliary contacts required for system operation plus one (1) spare.

E. Remote Switches and Push Button Stations: Provide all remote switches and/or push button stations required for manually operated equipment (if no automatic controls have been provided) complete with pilot lights of an approved type lighted by current from load side of starter.

F. Special Requirements: Motors, starters and other electrical equipment installed in moist areas or areas of special conditions, such as explosion proof, shall be designed and approved for installation in such areas with appropriate enclosure.

G. Identification: Provide identification of purpose for each switch and/or push button station furnished. Identification may be either engraved plastic sign or permanent mounting to wall below switch, or stamping on switch cover proper. All such identification signs and/or switch covers in finished areas shall match other hardware in the immediate areas.

H. Control Voltage:
   1. Maximum allowable control voltage 120V. Fully protect control circuit conductors in accordance with National Electrical Code.
   2. Provide 20A breakers in emergency panels under Division 16 as required for Building Management System Air Temperature Controls (BMS/ATC). Provide all control transformers, control wiring and connections to circuits under Section 15950 of Division 15.

I. Related Requirements
   1. Section 16480: Electric Motors
      a. Coordinate with efficiency requirements.

J. Contractor must review all concrete embedded items (including conduit) with owner prior to placement.
PART 2 - PRODUCTS

2.01 MOTOR HORSEPOWER

A. In general, all motors 1/2 HP and above shall be three phase, all motors less than 1/2 HP shall be single phase.

B. Voltage and phase of motors as scheduled on the electrical drawings shall take precedence in the case of a conflict between the mechanical and electrical drawings or General Condition 2.01 A., above.

C. Work under Division 15 includes coordinating the electrical requirements of all mechanical equipment with the requirements of the work under Division 16, before ordering the equipment. If motor horsepower is changed under the work of Division 15, without a change in duty of the motor's driven device, coordination of additional electrical work (if any) and additional payment for the work (if any) shall be provided under the section of Division 15 initiating the change. Increases or decreases in motor horsepower from that specified shall not be made without written approval from the Engineer.

PART 3 - EXECUTION

NOT USED.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: This section establishes general requirements in addition to those indicated in the General Conditions of the Contract for Construction pertaining to cutting, fitting, and patching of the work required to:
   1. Make the several parts fit properly.
   2. Uncover work to provide for installation, inspection, or both, of ill-timed work.
   3. Remove and replace work not conforming to requirements of Contract Documents.
   4. Patch new construction into existing construction.

B. Related Work:
   1. In addition to requirements specified, upon the Consultant's request, uncover work to provide for inspection of covered work, and remove samples of installed materials for testing.
   2. Do not cut or alter work performed under separate contract without the Consultant's written permission.

1.02 QUALITY ASSURANCE

A. Perform all cutting and patching in strict accordance with pertinent requirements of the Specifications and, in the event no such requirements are determined, in conformance with the Consultant's written direction.
   1. Use skilled workmen to perform all cutting and patching work.
   2. Use methods least likely to damage existing surfaces and materials to remain, while providing proper surfaces to receive installation of repair, patching, and/or new work.

B. Visual Quality:
   1. Do not cut and patch work exposed to public view, and the exterior and/or interior of the building in a manner that will result in an unacceptable appearance as determined by the Consultant.
   2. Do not cut and patch work in a manner that will result in obvious appearance that cutting and patching work was done.
   3. When cutting existing structural concrete, do not extend saw cuts beyond the corners of the required opening on either side of the opening.

1.03 EXISTING CONSTRUCTION

A. Where cutting and patching of existing construction is required; prior to start of work, inform Owner of existing construction to be disturbed. Owner will determine if elements of existing construction contain asbestos. Do not proceed with work until after Owner has examined areas to be disturbed. Refer to Exhibit A, Project Pre-Inspection for Possible Presence of Asbestos for additional information concerning the possible presence of materials containing asbestos.

1.04 SUBMITTALS

A. Submit proposed cutting and patching procedures in writing for the following categories of work prior to proceeding with this work:
SECTION 01045          CUTTING AND PATCHING

1. Cutting new openings in existing structural concrete walls, parapets, and suspended slabs.
2. Cutting new openings in existing roofs and roofing materials.

B. Submittals shall comply with Section 01300.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Except as otherwise indicated in pertinent sections of these specifications, or as directed by the Consultant, use materials which are identical to existing materials in workmanship, appearance, and performance.

B. If identical materials are not available, match existing as closely as possible, especially existing visual characteristics.

PART 3 - EXECUTION

3.01 INSPECTION

A. Before proceeding, inspect existing conditions, including elements subject to movement or damage during cutting, excavating, backfilling, and patching.

B. After uncovering the work, inspect conditions affecting installation of new work.

C. If uncovered conditions are not as anticipated or if existing construction is not as indicated on the Drawings, immediately notify the Consultant for further instructions.

3.02 PREPARATION

A. Provide shoring, bracing, and support as required to maintain structured integrity of the project.

B. Take all necessary action required to protect adjacent existing surfaces from damage due to the work of this section.

C. Take all precautions necessary to protect existing surfaces and materials, new work, and the work of this section from damage due to adverse weather conditions.

D. Provide temporary support of work to cut and adjacent work to prevent failure or damage due to the work of this section.

E. Properly prepare substrate surfaces exposed during cutting as required to receive the work of this or other sections of these specifications in strict compliance with manufacturer's recommendations and these specifications.
3.03 EXECUTION

A. Perform all required cutting and patching as required or reasonably implied under pertinent sections of these specifications.

B. Perform cutting and demolition by methods which will prevent damage to other portions of the work and will provide proper finished installation complying with the specified tolerances and finishes.

3.04 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work. Saw-cut and otherwise isolate areas to be demolished.

B. Repair or otherwise rebuild and/or construct all surfaces affected by cutting and demolition. Execute fitting and adjustment of products to provide totally finished installation to comply with tolerances, finishes, and profiles of adjacent surfaces, whether new or existing.

C. Restore work which has been cut or exposed by demolition; install new construction in compliance with specifications for type of new work to be done or as required to match existing adjacent surfaces. In no case shall any exposed existing surface be left in a raw, marred, or unfinished surface.

D. Refinish entire surfaces as necessary to provide an even finish.
   1. Continuous Surfaces: To nearest intersections.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. Section Includes:
1. General administrative requirements and procedures and related applicable codes.

1.03 APPROVAL AND RECOMMENDATION AGENCIES:

A. The University of Colorado at Boulder has jurisdiction for the interpretation and enforcement of code requirements for construction of projects.

1.04 CODES:

A. All Contractors shall comply with all applicable codes, ordinances and regulations in effect at the time of bid openings.

APPROVED STATE BUILDING CODES

The following approved building codes and standards have been adopted by State Buildings Programs (SBP) as the minimum requirements to be applied to all state-owned buildings and physical facilities including capital construction and controlled maintenance construction projects.

The 2006 edition of the International Building Code (IBC)
(as adopted by the Colorado State Buildings Program as follows: Chapters 2-35 and Appendices C and I)

The 2006 edition of the International Mechanical Code (IMC)
(as adopted by the Colorado State Buildings Program as follows: Chapters 2-15 and Appendix A)

(as adopted by the Colorado State Buildings Program)

The 2008 edition of the National Electrical Code (NEC)
(National Fire Protection Association Standard 70) (as adopted by the Colorado State Electrical Board)

The 2009 edition of the International Plumbing Code (IPC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101.2, 102, 105, 107, Chapters 2-13 and Appendices B, D, E, F, and G)

The 2009 edition of the International Fuel Gas Code (IFGC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101, 102, 105, 107, Chapters 2-8 and Appendices A, B and C)

Please consult the website www.dora.state.co.us/plumbing/index.htm for additional information on the revisions and exceptions to the IPC and IFGC and the inclusion of the new 105 and 107 sections. It is OSA/SBP’s intent to adopt the 2009 International Building Code (IBC), the 2009 International Mechanical Code (IMC), and the 2009 International Energy Conservation Code (IECC) to be implemented at the start of the fiscal year on July 1, 2010.
The National Fire Protection Association Standards (NFPA)

The 2004 edition of the ASME Boiler and Pressure Vessel Code
(as adopted by the Department of Labor and Employment/Boiler Inspection Section as follows: sections I, IV, VIII-Divisions 1 and 2 and 3, X and B31.1)

The 2004 edition of the National Boiler Inspection Code (NBIC)
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2004 edition of the Controls and Safety Devices for Automatically Fired Boilers CSD-1
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2007 edition of ASME A17.1 Safety Code for Elevators and Escalators
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2005 edition of ASME A17.3 Safety Code for Existing Elevators and Escalators
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2005 edition of ASME A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The current edition of the Rules and Regulations Governing the Sanitation of Food Service Establishments
(as adopted by the Department of Public Health and Environment/Colorado State Board of Health)

(as adopted by the Colorado General Assembly as follows: CRS 9-5-101, as amended, for accessible housing)

Note: Additional codes, standards and appendices may be adopted by the state agencies and institutions in addition to the minimum codes and standards herein adopted by State Buildings Programs.

1. The 2006 edition of the IBC became effective on July 1 of 2007. Consult the state electrical and plumbing boards and the state boiler inspector and conveyance administrator and the Division of Fire Safety for adoption of current editions and amendments to their codes.

2. Projects should be designed and plans and specifications should be reviewed based upon the approved codes at the time of A/E contract execution. If an agency prefers to design to a different code such as a newer edition of a code that State Buildings Programs has not yet adopted, the agency must contact SBP for approval and then amend the A/E contract with a revised Exhibit D, Approved State Building Codes. Please note that the state plumbing and electrical boards enforce the editions of their codes that are in effect at the time of permitting not design.
3. The state’s code review agents, or the State Buildings Programs approved agency building official, shall review all documents for compliance with the codes stipulated herein. Note: The Department of Public Health and Environment, Division of Consumer Protection will review drawings for food service related projects.

4. This policy does not prohibit the application of various life safety codes as established by each agency for specific building types and funding requirements. NFPA 101 and other standards notwithstanding, approved codes will supersede where their minimum requirements are the most restrictive in specific situations. If a conflict arises, contact State Buildings Programs for resolution.

5. It is anticipated that compliance with the federal Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) and Colorado Revised Statutes Section 9-5-101 will be met by compliance with the 2006 International Building Code and ICC/ANSI A117.1. However, each project may have unique aspects that may require individual attention to these legislated mandates.

6. The 2003 edition of the International Building Code (IBC) is to be applied to factory-built nonresidential structures as established by the Division of Housing within the Department of Local Affairs.

A. Appendices

Appendices are provided to supplement the basic provisions of the codes. Approved IBC Appendices are as follows:

1. Mandatory
   IBC Appendix Chapter C - Agricultural Buildings
   IBC Appendix Chapter I - Patio Covers

2. Optional
   Any non-mandatory appendix published in the International Building Code may be utilized at the discretion of the agency. Use of an appendix shall be indicated in the project code approach.

B. Amendments

None

C. Referenced Codes

1. While not adopted in entirety, portions of the following codes are referenced in the International Building Code (IBC), the International Mechanical Code (IMC), the International Energy Conservation Code (IECC) the International Plumbing Code (IPC), and the International Fuel Gas Code (IFGC). These following codes would be applied as reference standards.

   2006 International Fire Code (IFC)
   2006 International Existing Building Code (IEBC)

D. Referenced Standards

The IBC, IMC, IECC, IPC and IFGC standards shall be utilized to provide specific, or prescriptive, requirements on how to achieve the requirements established in the code. These standards may be
unique to the code or may be derived from other established industry standards. Recognized standards may also be used to show compliance with the standard of duty established by the code.

GENERAL REQUIREMENTS

SECTION 01060

REGULATORY REQUIREMENTS

1.05 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA):

A. The Contractor shall have sole responsibility for compliance on the job site to all applicable portions of the Occupational Safety and Health Act. The Contractor is responsible for other regulatory requirements as they relate to occupational Health and Safety requirements. For example, NIOSH, ANSI, and MSA.

B. Protection of life, health and public welfare as it relates to the execution of the construction contract is the responsibility of the Contractor. The Owner’s Representative may, at their discretion, observe, inspect, or comment on plans, procedures, or actions employed at the project as they relate to safety of life, health or public welfare. If conditions are imposed by the Owner which interfere with, or imply actions detrimental to safety, written notice shall be returned to the Owner for action prior to affecting any unsafe conditions.

C. Contractors shall use OSHA Lock Out / Tag Out procedures when working with energized equipment.

D. All contractors entering confined spaces owned by CU or while conducting work under contract with CU shall develop a written program and utilize procedures that, at a minimum, comply with all federal, state and local confined space standards and all applicable regulatory requirements. Contractors shall, independent of the University, monitor the space to obtain their own data to ensure a safe entry and exit. Any data generated by a contractor’s confined space entry, should be provided to the Facilities Management confined Space Program Manager.

E. When contractors perform work that may involve Facilities Management controlled permit required confined spaces, Facilities Management will:
   1. Inform contractors of permit required confined spaces and that entry is allowed only after compliance with the confined space entry standard;
   2. Require contractors planning to enter a confined space to provide the Facilities Management Confined Space Program Manager in charge of that space, 48-hour advance notice of such planned entry. The contractor’s entry will be in accordance with the current Occupational Safety and Health Administration confined space entry standard and a signed document stating such, shall be provided to the FM Confined Space Program Manager prior to entry.

F. The FM Confined Space Program Manager, following receipt of notice of contractor planned entry, will:
   1. Apprise contractor of the hazards identified in the confined space and of any prior experience that is documented on the space;
   2. Appraise the contractor of any precautions or procedures that CU has implemented for the protection of workers in or near the confined space;
   3. Coordinate entry operations with the contractor when both Facilities Management and contractor personnel are working in or around the confined space;
   4. Debrief the contractor at the end of the entry operations regarding hazards confronted or created.

1.06 HOT WORK PERMITS

A. All contractors shall be required to obtained a Hot Work Permit, three (3) working days in advance, for work that involves welding, heat treating, grinding, thawing pipe, hot riveting, soldering and brazing, power driven fasteners and similar activities involving spark, flame or heat. Compliance with the requirements of the applicable fire code, the International Building Code, and NFPA Standard 51B are mandatory and all contractors performing hot work activities shall
read and understand these code requirements. To obtain a current Hot Work Permit, go to website:

http://fm.colorado.edu/firesafety/hotwork.html
B. Contractors shall read and comply with the procedures and requirements for Fire Watch, Fire Alarm Interruption and Fire Suppression Interruption as found on the following websites:

Fire Watch Procedures:  
http://fm.colorado.edu/firesafety/firewatch.html

Fire Alarm and Detection System Interruption/Outage:  
http://fm.colorado.edu/firesafety/firealarmdetectsys.htm

Fire Suppression System Interruption/Outage:  
http://fm.colorado.edu/firesafety/firesupressionsystems.html

C. No hot work shall be conducted in any campus facility without a hot work permit. Any person or firm who conducts hot work without a permit shall be fined one thousand dollars ($1,000) for each occurrence and their non-permitted activities shall be stopped immediately until they obtain a hot work permit. Contractor shall be responsible for any damages caused as a result of improper hot work activities or the work stoppage.

D. Individuals or firms who obtain a permit shall fully read, understand and implement the requirements of the permit. Any person or firm who conducts hot work without the full implementation of the permit requirements shall be fined five hundred dollars ($500) the first time and one thousand dollars ($1,000) for subsequent occurrences. When the requirements of the hot work permit are not being implemented, the improper activities shall be stopped immediately until a hot work permit is obtained. Contractor shall be responsible for any damages caused as a result of improper hot work activities or the work stoppage. Any contractor who is found to be in non-compliance a third time, will not be allowed to work on campus until further notice by Facilities Management.

E. The campus inspectors, project managers and fire marshal shall have the authority to stop improper or non-permitted hot work activities.

F. The Contractor shall notify the CU Fire Alarm Supervisor to deactivate all smoke alarms in the vicinity of the work prior to any demolition and construction work activity. Failure of the Contractor to comply with the smoke alarm deactivation requirement and cause a false alarm and arrival of the Boulder Fire Department shall be a $400 fine per occurrence.

1.07 PERMITS

A. The contractor must obtain a no fee building permit prior to starting work from Office Manager, Facilities Management at (303) 492-2904 in the Planning, Design and Construction Office, Research Laboratory No. 2, 1540 30th Street, Boulder, Colorado. Building permits are required on all projects except the following:
1. Fences not over 6 feet high & general landscape work
2. Retaining walls which are not over 4 feet in height, unless supporting a surcharge of impounding Class I, II or III-A liquids
3. Platforms, walks and driveways not more than 30 inches above grade and not over any basement or story below.
4. Painting, papering, and similar finish work that meet the requirements of chapter 8 of UBC. (Uniform Building Code).
5. Temporary motion picture, television and theater stage sets and scenery. Review for fire-safety issues is required.

B. The contractor must post the permit(s) in a prominent location at the jobsite including all inspection reports. The contractor shall have an updated set of contract documents available at the jobsite for all inspections.
1.08 INSPECTIONS

A. The Contractor must schedule all required inspections 48 hours in advance by calling (303) 492-2922. CU or their designated inspectors will complete these inspections within 48 hours with the exception of weekends and state holidays.

B. The contractor is required to arrange for the following inspections:
   1. Required inspections: General. Reinforcing steel or structural framework of any part of any building of structure shall not be covered or concealed without first obtaining the approval of the building official.
   2. Lath or gypsum board inspection: To be made after lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.
   3. Final inspection: To be made after finish grading and the building is completed and ready for occupancy.
   4. Special inspection: Special inspection may be required on special projects and special types of construction.
   5. Re-inspections: A re-inspection fee may be assessed for each inspection or reinspection when such portion of work for which inspection is called is not complete or when corrections called for are not made.

C. The Contractor will be responsible for all cost related to re-inspections and will be billed at a rate of $50.00 per hour for CU re-inspections and at the testing agency bill-out rate for other re-inspections.

1.09 UNIVERSITY OF COLORADO SEXUAL HARASSMENT POLICY

A. Contractors should be aware of and review the University of Colorado at Boulder’s policies that prohibit discrimination and harassment on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation or veteran status. These policies are located on the web at: [http://www.colorado.edu/odh/](http://www.colorado.edu/odh/) Contractor personnel must adhere to these policies and conduct themselves in a manner that does not discriminate or harass as a result of interacting with an around the University of Colorado faculty, staff and students and visitors.

1.10 FIRE ALARM INTERRUPTION

A. Contractor shall contact CU Fire Alarm Systems Supervisor at 303-492-0633 prior to all interruptions or shutdowns of fire alarm systems. Interruptions or shutdowns shall be scheduled three (3) working days in advance with CU Fire Alarm Systems Shop, CU Project Manager and building proctor. Contractor shall provide a fire watch as directed by CU Fire Alarm Systems Shop during interruption or shutdown.

B. The Contractor shall be responsible for preventing nuisance alarm due to activities at their work site. Common sources of nuisance alarms are:
   1. Smoke (soldering, welding, cooking, etc.)
   2. Grinding
   3. Dust (drilling, sweeping, canister vacuums, sand blasting, etc.)
   4. Water leaking (plumbing leaks, overflows)
   5. Water sprayed on or near detectors (pressure washing or cleaning with water)
   6. Popcorn or other food burning in microwaves
   7. Static electricity (covering or uncovering detectors)
   8. Changing filters on air handling units (dust)
   9. Steam (leaks, pressure pop-offs)
   10. Broken or frozen sprinkler heads
   11. Sprinkler drain valves turned by mistake
12. Vandalism
Precautions to prevent nuisance alarms are:
1. During construction projects, treat all buildings, except totally new construction, as though they were occupied buildings with live systems.
2. Do not assume that all detectors are in plain sight. Contact University personnel for verification.
3. Maintain dust control measures per UCB Standards:
   a. Maintaining barriers
   b. Covering air returns
   c. Asking CU personnel to cap or disable smoke detectors (Note any capping or disabling of fire safety devices is to be done ONLY by CU personnel, not contractors.)
   d. Avoiding recirculation of dust or smoke through the building air handling system.
4. Follow campus hot work procedures. Refer to specification Section 01060, paragraph 1.06.
3. Do not expose fire alarm devices to water or extreme temperatures.
4. Contact Fire Systems Group for any actions that affect fire detection, alarm, and suppression systems.

1.11 STORMWATER MANAGEMENT PLAN (SWMP)

A. Stormwater Management Plan (SWMP): Prior to any construction activity disturbing one acre of land or more, an approved SWMP and a Stormwater Permit for Construction Activity application from the Colorado Department of Public Health and Environment (CDPHE) are required. The SWMP shall be prepared in accordance with the CDPHE requirements for "Contents of the Stormwater Management Plan" and the UDFCD's Urban Storm Drainage Criteria Manual, Volume 3, "Best Management Practices" (UDFCD Drainage Criteria Manual). Stormwater quality management and erosion control measures are to be constructed and maintained in accordance with the SWMP and the UDFCD Drainage Criteria Manual.

1.12 UTILITY LOCATES

Contractor MUST CALL 811 (or 1-800-922-1987) for utility locates BEFORE DIGGING on any project at the University of Colorado at Boulder. This includes even small projects such as, but not limited to, planting trees or shrubs, sidewalk removal/installation or fence post installation. Digging without calling can disrupt service to the campus or surrounding neighborhoods and potentially result in fines and repair costs.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Specification system format.
   2. Grammar (syntax) description.

1.02 DESCRIPTION

A. These specifications have been derived from automated specification systems, and include minor deviations from format and traditional writing forms. Such deviations must be recognized as a normal result of this production technique, and no other meaning will be implied or permitted.

B. Imperative language of the technical sections is directed to the Contractor. The term "provide" used repeatedly in the text is defined to mean..."furnish and install, complete, in place and ready for operation and use unless specifically indicated otherwise."

C. Specifications are of abbreviated, simplified or streamlined type and include incomplete sentences. Omissions of work or phrases such as "the Contractor shall", "in conformity therewith," "shall be," "as noted on the Drawings", "A", "The", are intentional. Supply omitted words or phrases by inference in same manner as they are when "Note" occurs on Drawings. Supply words "on the Drawings" by inference when "as indicated" is used with sentences or phrases.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Remodel Work scheduling.
   2. Construction sequence scheduling.

B. Related Sections:
   1. Section 01500 - Temporary Facilities and Controls.

1.02 SYSTEM DESCRIPTION

A. An essential condition of this Contract shall be the scheduling and conduct of all phases of
construction operations in such a manner that the Owner's operations and use of the existing
buildings and campus shall be uninterrupted at all times, except for such limited interruption as is
required and approved by the owner.

B. Contractor shall repair at his own expense all damage done to Owner's property, unknown
utilities and adjoining public property as a result of Contractor's construction activities.

1.03 PROJECT/SITE CONDITIONS

A. Access and use of site:
   1. Contractor shall use the designated site access for construction offices and material
      storage in such a manner that access to existing buildings and campus remain
      accessible at all times for use.
   2. Confine operations to as limited a use of the existing building and campus as possible.
      A route of access to and from the work for employees shall be agreed upon and it shall
      be the Contractor's responsibility to see that the agreed route is maintained in order to
      prevent unwarranted or unnecessary traffic through the existing buildings or site.

B. Owner notice and approval:
   1. All arrangements and scheduling in connection with the work of this Contract shall be
      made with and subject to the approval of the Consultant and the Owner.
   2. All work under this Contract which will require interruption of service of the existing
      building shall be scheduled to suit the need and convenience of the Owner's operation,
      and arrangements shall be made with the Owner and the Architect at least eight (8)
      working days in advance of the start of such work.

PART 2 - PRODUCTS

Not Used
PART 3 - EXECUTION

3.01 REMODELING

A. Construction activities of all areas to be constructed in existing facilities shall be completely separated from the rest of the building by dust-proof enclosures erected by Contractor.

B. All surfaces in existing facilities not indicated to be remodeled, or removal of existing items by any Contractor, shall be repaired by the responsible Contractor to match existing adjoining similar surfaces.

3.02 CLEAN-UP

A. All areas within existing facilities, which are not within enclosed areas to be constructed used for access to work areas shall be completely cleaned of all debris and made "broom-clean" at the end of each day's work.

B. Dust, which permeates areas of existing facilities because of improperly constructed dust-proof barriers, shall be the responsibility of the Contractor. The Contractor shall employ the services of a professional cleaning company to clean any area outside of the designated construction dust barriers that are contaminated by Contractor’s operations. Completely clean all such areas to the satisfaction of the Owner at no additional cost.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED DOCUMENTS:
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 - Specification sections, apply to work of this section.

1.02 SUMMARY:
A. Section Includes:
   1. General administrative requirements and procedures for Hazardous Communication Program.
B. Related Sections:
   1. Summary of Work: Section 01010.

1.03 WORK BY OWNER:
A. Asbestos:
   1. The Owner has completed an Environmental Site Assessment to identify asbestos containing materials and other immediate Health and Safety items. Do not begin work until Form Exhibit A (copy following the Supplementary General Conditions) has been executed. Where asbestos materials or other hazardous conditions are known to exist in locations affected by this project, remediation measures will be taken by the Owner under separate contract. The Contractor shall coordinate his sequence and schedule with that of the environmental remediation work.
   2. In the event that the Contractor encounters any material on the site which is reasonably believed hazardous, which has not been rendered harmless, the Contractor shall:
      a. Stop work immediately in affected areas.
      b. Report the condition in writing to the Department of Facilities Management Project Administrator.
      c. Report the condition in writing to the Architect.
      d. Resume work only under the provisions of this section.

1.04 SUBMITTALS:
A. Material Safety Data Sheets (MSDS):
   1. Copies of all material safety data sheets for all applicable products, including but not limited to; paint, adhesives, mastics, solvents, and finishes, etc., shall be retained on site by the Contractor for all applicable products used during the construction and/or remodeling work. Furnish copies of all MSDS’s to the Owner and Architect and include in the Project Record Document submittal.

1.05 QUALITY ASSURANCE:
A. Asbestos containing materials may exist within the general project area where such materials are not expected to be disturbed during the work. The Contractor shall review the Environmental Health and Safety Environmental Site Assessment Form at the project site and become familiar with known asbestos and hazardous containing materials in the work areas.
1.06  PROJECT/SITE CONDITIONS:

A.  Hazard Communication Requirements:

1. All Contractors are responsible for compliance with mandatory federal rules and regulations concerning Hazard Communication, including, but not limited to those regulations contained in 29 CFR 1910.1200 Hazard Communication, 1910.146 Confined Space, 1910.147 Lock-out Tag-out, 1910.1101 Asbestos, and 1926.62 Lead. Contractor and all subcontractors working at sites under the control of the Owner shall make available to the Architect, upon request, copies of the Hazard Communication Program used by their firm. In addition to this requirement, all regulations related to Multi-employer workplaces shall be adhered to. These regulations are found in 29 CFR 1910.1200, (e) (2) (I) through (e) (4) specifically:

(e) (2) Multi-employer workplaces. Employers who produce, use, or store hazardous chemicals at workplace in such a way that employees of other employer(s) may be exposed (for example, employees of a construction contractor working on site) shall additionally ensure that the hazard communication programs developed and implemented under paragraph (e) include the following:

(e) (2) (i) The methods the employer will use to provide the other employer(s) with a copy of the material safety data sheet, or to make it available at a central location in the workplace, for each hazardous chemical the other employer(s)' employees may be exposed to while working;

(e) (2) (ii) The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace’s normal operating conditions and in foreseeable emergencies; and,

(e) (2) (iii) The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace

(e) (3) The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).

(e) (4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with requirements of 29 CFR 1910.20 (e).

2. The referenced regulations were excerpted from 29 CFR 1910.1200. This excerpt shall not be relied upon for compliance with mandatory federal, state and local regulations. The Contractor shall comply with all such regulations and shall be solely liable for insuring that all requirements under applicable regulations are met.
suspected materials prove to contain asbestos or hazardous materials, the Owner will arrange to have the materials abated in a timely manner.

3.02 HAZARDOUS MATERIALS/EQUIPMENT REMOVAL:

A. Definition:

   1. Removal of hazardous materials/equipment is extremely dangerous. Hazardous materials/equipment is defined to include, but not limited to the following:
      a. Fume hoods
      b. Hood exhaust duct work
      c. Exhaust fans
      d. Laboratory casework and equipment
      e. PCB ballast's
      f. Mercury and Sodium Vapor Lights
      g. Adjacent material that could come in contact with workers or public.

B. Protection:

   1. Hazardous materials/equipment removal shall include the protection of personnel, material, environment and safe legal disposal of the equipment; and further includes the following:
      a. Notification of Project Administrator and appropriate Environmental Health and Safety Unit
      b. Proper protective clothing for personnel involved in the removal.
      c. Appropriate emergency and first aid facilities.
      d. Removal procedures shall be accomplished during minimal occupancy of the remainder of the building on the weekends or at night.

C. Disposal:

   1. All equipment related to the use, storage or processing of hazardous materials/equipment shall be removed and properly disposed of under the direct, full-time supervision of a qualified Laboratory Specialist fully conversant with the chemistry and properties of the material/equipment involved. Certification is required. Contractors are responsible for the removal of all hazardous materials/equipment and chemicals from the work site as well as proper disposal of all hazardous waste generated by their project.

   2. Hazardous waste disposal must include prior notification to the Department of Environmental Health and Safety in order to verify that the appropriate procedures and documentation are used. Copies of all paper work for shipping and disposing of these materials (hazardous waste manifests, land disposal restrictions, etc.) will be provided by the Contractor to the Department of Environmental Health & Safety (303) 492-6025. Where appropriate, the Main Campus EPF ID COD007431505 will be used for these shipments.

   3. Hazardous chemicals, waste, and other pollutants may not be discharged to the sanitary or storm sewer systems at anytime. Releases to the environment must be reported to CUPD/EH&S immediately.

3.03 ENVIRONMENTAL RESPONSIBILITIES

A. Environmental and Safety Issues and Practices.

Contractors working on the UCB campus are required to comply with all applicable University, City, State and Federal environmental regulations and safety standards. Hazardous and regulated materials must be managed and disposed of properly. Work sites must control dust,
debris and run-off, and pay special attention to preventing any pollutants from entering the storm sewer or surface water collection systems. These systems ultimately drain into our creeks and waterways.
B. Contractor will be required to sign an Environmental Responsibilities form. The contractor is responsible for notifying all subcontractors of the responsibilities identified on the form. A copy of this form must be posted, throughout the duration of the project, in a visible area for all workers to see.
PART 1 - GENERAL

1.01 REQUIREMENTS

A. The types and minimum requirements for project meetings are included but are not necessarily limited to the following categories:

Pre-construction meeting
Progress and Coordination meetings
Specially called meetings

B. The pre-construction meeting will be scheduled within fifteen days after date of Notice to Proceed, at a central site location designated by the Owner and convenient for all parties.

   1. Attendance:
      a. Owner's Representative
      b. Consultant and his sub-consultants, as applicable
      c. Contractor's Superintendent
      d. Major Subcontractor(s)
      e. Others as appropriate

   2. Suggested Agenda:
      a. Distribution and discussion of:
         - List of major subcontractors and suppliers
         - Projected construction schedules
         - Critical work sequencing
         - Major equipment deliveries and priorities
         - Project Coordination
         - Designation of responsible personnel
      b. Procedures and processing of:
         - Field decisions
         - Proposal requests
         - Submittals
         - Change Orders
         - Applications for Payment
      c. Adequacy of Distribution of Contract Documents
      d. Procedure for Maintaining Record Documents
      e. Inspections
      f. Stormwater Management Plan (SWMP)

C. The Architect/Engineer will: Record the minutes; including significant proceedings and decisions.

D. The Contractor shall schedule and administer subcontractor and vendor pre-construction meetings throughout progress of the work. He will:

   1. Prepare agenda for meetings.
   2. Distribute written notice of each meeting four days in advance of meeting date.
   3. Make physical arrangements for meetings.
   4. Preside at meeting.
   5. Record the minutes; including significant proceedings and decisions.
   6. Representatives of Contractors, Subcontractors, and Suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
7. **Use of Premises:**
   - Office, work, staging and storage areas
   - Owner’s requirements

8. **Temporary construction Facilities, Utilities, Controls and Construction Aids**

9. **Safety, First-aid, Security and Housekeeping Procedures**

10. **Administrative Procedures and Documents as Required by Owner**

### 1.02 PROGRESS AND COORDINATION MEETING

The Contractor will schedule and administer job progress and coordination meeting at the site.

**A. Attendance:**
1. Owner as needed
2. Consultant and his sub-consultants as needed
3. Subcontractor as appropriate to the agenda
4. Suppliers as appropriate to the agenda
5. Others

**B. Suggested Agenda:**
1. Review of work progress since previous meeting.
2. Field observations, problems and conflicts.
3. Problems which impede Construction Schedule.
4. Review of off-site fabrication and delivery schedules.
5. Corrective measures and procedures to regain projected schedule.
6. Revisions to Construction Schedule.
7. Coordination of schedules.
8. Progress and schedule during succeeding work period.
9. Review submittal schedules and expedite as required.
11. Pending changes and substitutions.
12. Review proposed changes for:
   a. Effect on Construction Schedule and on completion date.
   b. Effect on other contracts of the Project.

**C.** The Architect/Engineer shall record and distribute the minutes of all progress meetings throughout the construction period and shall visit the site a minimum of once every two weeks. The Architect/Engineer shall average one visit per week during construction.

The structural engineer shall visit the site immediately prior to every major structural concrete slab pour; every major foundation wall pour; at least twice for each major segment of work [i.e., caissons, columns, steel roof joists, etc].

**END OF SECTION**
PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Submit shop drawings, product data and samples as required by various sections of the specifications.

1.02 QUALITY ASSURANCE

A. Shop Drawings:

1. Drawings shall be presented in a clear and thorough manner.
2. Details shall be identified by reference to sheet, detail, schedule, or room numbers shown on drawings.

B. Product Data:

1. Preparation:
   a. Clearly mark each copy to identify pertinent products or models.
   b. Show performance characteristics and capabilities.
   c. Show dimensions and clearances required.
   d. Show wiring or piping diagrams and controls.
2. Manufacturer's standard schematic drawings and diagrams.
   a. Modify drawings and diagrams to delete information that is not applicable to the work.
   b. Supplement Standard information to provide information specifically applicable to the work.

C. Samples:

1. Office samples shall be of sufficient size and quantity to clearly illustrate:
   a. Functional characteristics of the product with integrally related parts and attachment devices.
   b. Full range of color, texture and pattern

D. Mock-ups:

1. Provide complete mock-up of exterior materials to be incorporated into the work.
   a. Mock-up shall include a sample of all materials used in exterior construction, whether specified elsewhere or not in these documents, including but not limited to, masonry, stone, window systems, precast concrete, roof systems, flashing, sealants, masonry paving, paint and other readily visible materials.
   b. Secure Owner approval of mock-ups prior to ordering and placement of materials. Modify mock-ups as directed by the Architect or Owner until acceptable.
   c. Confirm exact mock-up(s) required by Owner prior to fabrication of mock-up(s).
2. Remove mock-up(s) required by Owner prior to fabrication of mock-up(s).
   a. Restore or finish site to finish condition indicated on the Drawings.

E. Responsibilities of the Contractor:

1. Review shop drawings, product data, samples and project record drawings for specification performance prior to submission.
2. Determine and Verify:
   a. Field measurements
   b. Field construction criteria
   c. Catalog numbers and similar data
   d. Conformance with specifications
3. Coordinate each submittal with requirements of the work and of the Contract Documents.
4. Notify the Consultant in writing, at the time of submission, of any deviations in the submittals for requirements of the Contract Documents.
5. Begin no fabrication or work that requires submittals until return of submittals with Consultant's acceptance.
6. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Consultant's review of submittals.
7. Contractor shall stamp, sign or initial, and date each submittal to show compliance with the Contract Documents prior to submittal to the Consultant.

1.03 SUBMITTALS

A. Make submittals promptly in accordance with approved schedule and in such sequence as to cause no delay in the work.

B. Number of Submittals Required:
   1. Shop Drawings: Submit one reproducible transparency and four opaque reproductions. Three copies will be retained by the Consultant.
   2. Product Data: Submit seven copies, three of which will be retained by the Consultant.
   3. Samples: Submit the number stated in each specification section.

C. Submittals shall contain:
   1. Date of the submission and dates of any previous submissions.
   2. Project title and number.
   4. Names of:
      a. Contractor and Subcontractor(s), if applicable.
      b. Supplier
      c. Manufacturer
   5. Identification of product with the specification section number.
   6. Field dimensions, clearly identified as such.
   7. Relation to adjacent or critical features of the work or materials.
   8. Applicable standards, such as ASTM or Federal specification numbers.
   10. Identification of revisions on resubmittals.
   11. An 8"x3" blank space in lower right-hand corner for review stamps.

D. Resubmission Requirements:
   1. Make any corrections or changes in the submittals required by the Consultant and resubmit until accepted.
   2. Shop drawings and product data:
      a. Revise initial drawings or data and resubmit as specified for initial submittal.
      b. Indicate any changes that have been made, other than those requested by the Consultant.
3. Samples: Submit new samples as required for initial submittal.

E. Distribution:
1. Distribute reproductions of approved shop drawings and copies of product data to affected subcontractors and retain one copy for use at the job-site.
2. Distribute approved samples as directed.

F. Consultant's Duties:
1. Review submittals with reasonable promptness and in accordance with schedule.
2. Review of separate item does not constitute review of an assembly in which item functions.
3. Affix stamp and initials or signature, and indicate requirements for resubmittal or acceptance of submittal.
4. Return submittals to the Contractor for distribution or for resubmission.

G. Schedule of Values and pay applications:
1. Submit typed schedule on State Form SC7.2; Contractor's standard form or media-driven printout will be considered on request.
2. Format: Table of Contents of this Project Manual.
3. Include in each line item a directly proportional amount of Contractor's overhead and profit.

H. Schedule of Submittals: The Contractor shall submit the submittals required by the specifications. The Contractor shall develop a submittal schedule that confirms the submittals and the time frame for review by the consultants.

I. Construction Schedule:
1. The Contractor shall submit a critical-path method (CPM) construction schedule prior to start of construction activities. The CPM schedule shall include notice to proceed, submittal activities, construction activities, change order work (when applicable), close-out, testing, demonstration, and acceptance. The CPM shall correlate specifically to the schedule of values line items and be cost loaded.

Float, slack time, or contingency within the schedule (i.e., the difference in time between the project's early completion date and the required contract completion date), and total float within the overall schedule, is not for the exclusive use of either the principal representative or the Contractor, but is jointly owned by both and is a resource available to and shared by both parties as needed to meet contract milestones and the contract completion date.

The Contractor will be required to submit an as-built progress CPM schedule with each progress billing. This CPM schedule will be the basis for making progress payments. The level of detail and quantity of work activities in the CPM schedule should be negotiated with the principal representative prior to starting construction.

J. Progress Photos
1. The Contractor shall submit up to 12 - 3x4 inch progress photos with each progress payment. The photos should demonstrate the work in place and be dated with a short description of the photographed item.
K. Coordination Drawings:
   1. The Contractor shall submit coordination drawings with all mechanical, electrical, fire protection, and building monitoring systems prior to the Consultant review of any shop drawings or submittals for work in those trades. Approval of required shops and submittals must be obtained prior to starting work, and must be obtained prior to approval of pay applications of the work. The drawings shall be created to include all trades on a particular level of the building on one drawing. Identify conflicts between the systems or between the systems and architectural elements such as ceiling heights, ceiling types, or walls. Conduit routing for electrical, mechanical, energy management system, and security trades shall be included. Identify potential solutions to the conflicts for the Consultant and Owner to review during the submittal process. Revise the coordination drawings to show any comments made during the submittal review process, and reissue for use by all affected trades, Owner and Consultant.
   2. The Coordination drawings shall include sectional coordination documents. Identify elevations of systems A.F.F. (above finish floor) and component dimensions. Show elevations whenever component changes height.

L. Daily Reports
   1. The contractor shall submit daily reports, due by 5 p.m. the following day. The report should include weather, equipment, manpower count, subcontractors on site, short description of work for that day, inspections, visitors, items that may affect progress or quality of project.

M. Request for Information (RFI):
   1. The Contractor will be responsible for submitting RFIs on AIA form G716 or similar. The RFI should identify in writing any unclear, inconsistent, or conflicting item in the documents that could not be answered by thorough review by the Contractor or subcontractors. The RFI should include a description of the item and a proposed solution. The RFI should indicate schedule or cost impact, if any. Contractor shall be required to submit cost or schedule impact within seven days of receipt of the RFI response. Each RFI shall be numbered in sequence.

N. Weekly Logs:
   1. The Contractor shall provide an updated RFI, change request, and submittal logs at weekly construction meetings. Contractor shall provide a 2-week detailed construction schedule at the weekly construction meeting.

PART 2 - MATERIALS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION
PART 1 - GENERAL

1.01 SUPPLEMENTAL TESTING

If required, the following testing shall be performed at the expense of the contractor installing the material being tested:

A. Material Substitution: Any tests of basic material or fabrication equipment offered as a substitute for specified item on which a test may be required in order to prove its compliance with the specifications.

B. Mechanical/Electrical: Tests on mechanical and electrical systems required to insure their proper installation and operation.

C. Any test that fails shall be paid for by the installing contractor subject to the following conditions:
   1. Quantity and nature of tests will be determined by the Consultant.
   2. All test shall be done in the presence of the Owner or his representative.
   3. Proof of noncompliance will make the installing contractor liable for any corrective action which the Owner feels is prudent including complete removal and replacement of defective material.

Nothing contained herein is intended to imply that the installing contractor does not have the right to have tests performed on any material at any time for his own information and job control so long as the Consultant or Owner does not assume responsibility for costs or for giving them consideration when appraising quality of materials.

D. The Consultant shall determine the type and number of tests to be performed on the project.

1.02 TEST REPORTS

Reports of all tests made by testing laboratories shall distributed by the testing laboratory as follows:
   1 copy - Contractor
   1 copy - Applicable supplier or subcontractor
   1 copy - Owner
   1 copy - Consultant
   Other copies - as directed

1.03 QUALITY CONTROL SYSTEM

A. General: The contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of all subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. This control shall be established for all construction except where the Contract Documents provide for specific compliance tests by testing laboratories or Consultants employed by the Owner.

The quality control system is the means by which the Contractor assures that construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations and should be keyed to the proposed construction schedule.
B. The Contractor shall designate a quality control representative on staff to review the work to insure compliance with the contract documents by weekly jobsite visits for observation. The designated employee shall not be involved in the performance of the work. The quality control representative shall review the work and make necessary corrections to bring the work into compliance prior to scheduling the Architect for the final punchlist review.

C. Records: The Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instruction received from the Owner and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective action taken. The Contractor shall document inspections and tests as required by each Section of the Specifications.

1.04 INDEPENDENT TESTING AGENCY SERVICES

A. The Owner will employ and pay for the services of an independent Testing Agency to perform the Inspections, special inspections, tests and other services when required by sections of the specification. Services shall be performed in accordance with requirements of governing authorities and with specified standards.

1. Contractor shall cooperate with Testing Agency personnel and shall furnish tools, sample of materials, design mixes, equipment and assistance as requested.

2. Contractor shall provide and maintain, for the sole use of the Testing Agency, adequate facilities for the safe storage and proper curing of concrete testing cylinders on the project site for the first 24 hours after casting as required by ASTM C 31, Method of Making and Curing Concrete Test Specimens in the field.

3. Contractor shall notify Testing Agency sufficiently in advance of operations to allow for completion of initial tests and proper assignment of inspection personnel.

4. Contractor shall notify the testing agency sufficiently in advance of cancellation of required testing operations. The Contractor shall assume responsibility for costs incurred due to the failure to provide such notice.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF REQUIREMENTS

A. This section of the General Requirements outlines the basic requirements for temporary services, utilities, and facilities which will indirectly enable adequate construction progress and processes, and will accommodate other necessary activities at the project site except as otherwise indicated, the costs of providing and using temporary services are included in the Contract Sum.

1.03 QUALITY ASSURANCE

A. Comply with governing regulations and utility company regulations and recommendations for the construction of temporary facilities, including but not necessarily limited to, code compliance, permits, inspections, testing, and health and safety compliance.

1.04 SITE CONDITIONS

A. Provide Temporary facilities and services at the time first needed at the site and maintain, expand, and modify the facilities as needed throughout the construction period and do not remove until no longer needed.

PART 2 - EXECUTION

2.01 GENERAL

A. Use qualified tradesmen for the installation of temporary facilities. Locate facilities where they will serve the total project construction work adequately and result in minimum interference with performance of the work. Relocate, modify, and extend facilities as required during the course of the work to properly accommodate the entire work of the project.

2.02 TEMPORARY FACILITIES

A. Temporary Water: Connect to existing water source as designated by the Owner for construction operations.

B. Temporary Telephone: Provide, maintain and pay for telephone service to field office at time of project mobilization. If a mobile phone is designated as the field office phone then it shall be a local number.

C. Sanitary Facilities: Comply with governing regulations, including safety and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install sanitary facilities in available locations which will best serve the needs of personnel at the project site. Toilet rooms in existing buildings or in new construction may not be used without written approval of the Owner.
D. Temporary Heat and Ventilation: Provide such OSHA approved heat and fuel, heating units, equipment as necessary to provide the required environmental conditions and to protect the work from damage due to cold. Maintain equipment in a clean, safe condition.

E. Fire Extinguisher:
1. Except as otherwise indicated or required, comply with the applicable recommendations of NFPA No. 10 "Portable Fire Extinguisher" for each area of each construction activity whenever combustible materials, flammable liquids, and similar exposures to possible fires are present.
2. Locate extinguisher where most convenient and effective for the intended purposes. Store combustible materials in recognized fire-safe locations and containers.

F. Protection
1. Barricades, Warning Signs, and lights: Comply with recognized standards and code requirements for the erection of substantial and structurally adequate barricades wherever needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the general public where exposure exists of the hazard being protected. Provide lighting where appropriate and needed for the recognition of the facility, including flashing red lights where appropriate.

G. Temporary Enclosure: Wherever required, provide temporary enclosure of materials, equipment, work in progress, and completed portions of work, so as to afford protection for both the work and employees.

H. Miscellaneous Facilities:
1. Provide ladders, ramps, and temporary stairs for access to all levels of the construction for general access by all trades, Individual contractors and subcontractors shall furnish their own stepladders, scaffolds, staging, work platforms, and other facilities for use of their workmen and as necessary for safety of all personnel.

I. Field Office:
1. The Contractor shall provide and maintain a suitable temporary field office for his own use. Offices and all other temporary structures shall be removed from the site upon completion of the work.
2. Temporary structures or storage used for storage and offices for contractors shall be located on the site in an orderly manner as determined by the Owner.

2.03 OPERATIONS AND TERMINATIONS

A. Supervision: Enforce strict discipline in the use of temporary facilities at the project site. Limit availability of facilities to essential and intended uses, so as to minimize waste and possibility of abuses and the resulting unsanitary and hazardous or dangerous conditions.
B. Maintenance: Operate and maintain temporary facilities in good operating condition through the time of use and until removal is authorized. Protect from damage by freezing temperatures and similar elements at the site.

C. Termination and removal: At the time the need has ended for each temporary facility, or when it has been replaced by authorized use of a permanent facility, or at the time of Substantial completion, promptly remove the facility unless requested by the Consultant to be retained for a longer period of time. Complete or restore permanent work which may have been delayed or otherwise affected by the temporary facility. Replace work which cannot be satisfactorily restored. Except as otherwise indicated, the materials and equipment of temporary facilities remain the property of the contractors.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Products.
   2. Transportation and Handling.
   4. Manufacturer's Instructions.
   5. Product Options.
   6. Products List.
   7. Substitutions.

B. Related Sections:
   1. Section 01400 - Quality Control.
   2. Section 01730 - Operation and Maintenance Data.

1.02 QUALITY ASSURANCE

A. Conform to applicable specifications and standards.

B. Comply with size, make, type and quality specified, or as specifically approved in writing by the Consultant.

C. Manufactured and Fabricated Products:
   1. Two or more items of the same kind shall be identical, by the same manufacturer.
   2. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

1.03 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

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

1.04 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instruction, with seals and labels intact and legible.

B. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.05 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including one copy to the Consultant and one copy to the Contractor.
B. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.06 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

C. Consultant will review requests for substitutions with reasonable promptness, and notify, by Addendum, of the decision to accept or reject the requested substitution.

1.07 PRODUCT LIST

A. Within 15 days after signing of agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.08 SUBSTITUTIONS

A. Will only be considered prior to bid or in the event that Equipment is not available.

1.09 SYSTEMS DEMONSTRATION

A. Prior to final inspection, demonstrate operation of each system to Consultant and Owner.

B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION
PART 1 - GENERAL

1.01 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

A. The Contractor shall comply with procedures stated in the General Conditions of the Contract for Notice of Completion, Final Inspection, Notice of Substantial Completion and Notice of Acceptance.

B. Should the Architect/Engineer or the Principle Representative determine that the work is not substantially complete, or the punch list items exceed 25, he will immediately notify the Contractor, in writing, stating reasons. After Contractor completes work, he shall resubmit certification and request for final inspection. The Contractor will be responsible for all costs beyond two Architect/Engineer walk-throughs.

C. Owner may occupy designated portions of the Project under provisions stated in the General Conditions of the Contract.

1.02 CLOSE-OUT FORMS

The Architect/Engineer will complete the Notice of Approval of Beneficial Occupancy, Closing-out Checklist and Contract Close-out forms and forward them to the Contractor. Comply with procedures stated in General Conditions of the Contract.

1.03 FINAL SETTLEMENT AND PAYMENT

A. Contractor shall comply with procedures stated in the General Conditions of the Contract before final settlement and payment are made.

B. The Contractor shall also submit the following prior to the final application for payment:
   1. Contractor’s Affidavit of Payment of Debit and Claims: AIA G706.
   2. Contractor’s Affidavit of Release of Liens (claims): AIA G706A, with:
      a. Consent of Surety to final payment: AIA G707
      b. Contractor’s release of waivers of claims.
      c. Separate release of waivers of claims for subcontractors, suppliers and others with claim rights, against property of owner, together with list of those parties.

1.04 GUARANTEE INSPECTION

A. The Contractor shall comply with procedures stated in the General Conditions of the Contract for Guarantee Inspections after completion of the work.

1.05 WARRANTIES AND SPECIAL GUARANTEES

The Contractor shall comply with procedures and criteria outlined in the General Conditions of the Contract for all warranties and special guarantees of the work.

1.06 OPERATING AND MAINTENANCE DATA

A. Refer to Section 01730 - Operating and Maintenance.

B. Mechanical - By Mechanical Contractor: See Division 15.
C. Electrical - By Electrical Contractor: See Division 16.

1.07 DEMONSTRATIONS

A. Refer to Section 01730 - Operating and Maintenance

B. Mechanical - By Mechanical Contractor: See Division 15

C. Electrical - By Electrical Contractor: See Division 16.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of work. Coordinate with Owner, deliver to Project site and obtain receipt prior to final payment.

B. At the completion of the project, all loose keys for hose bibs; adjustment keys and wrenches for door closers and panic hardware; and keys for electric switches, electrical panels, etc., shall be accounted for by the Contractor and turned over to the Owner.

END OF SECTION
PART 1 - GENERAL

1.01 CLEANING

A. Clean-up During Construction: Each contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by his employees or work, and at the completion of his work he shall remove all such surplus material, waste material, dirt and rubbish, as well as his tools, equipment and scaffolding, and shall leave his work clean and spotless, unless more exact requirements are specified. In case of dispute, the owner may remove all such items and charge the cost of such removal to the contractor.

Each sub-contractor shall perform his clean-up daily and shall transport his rubbish to an on-site location designated by the Contractor who will arrange for its removal.

B. Cleaners: With the exception of clean-up of the site and cleaning specifically assigned to Contractors under various sections of the specifications, all final clean-up of exterior and interior of the building shall be done by professional cleaners.

C. Final Clean-up:

1. Exterior: In addition to items specified below, any new surfaces on exterior, concrete, metal, etc., shall be carefully and thoroughly cleaned.

2. Glass: Both sides of all glass in work areas shall be carefully and thoroughly cleaned by professional window cleaners and left absolutely clean and free from paint, grease, dirt, etc.

3. Hardware: Clean and polish all hardware and leave clean and free from paint, grease, dirt, etc.

4. Plumbing: Clean and polish all plumbing fixtures, fittings, and exposed plated piping. Leave clean and free from paint, grease, dirt, etc. Remove all labels.

5. Electrical: Clean and polish all electric fixtures, including glassware, switch plates, etc. and leave clean and free from paint, grease, dirt, etc.

6. Equipment: Carefully and thoroughly clean all items of equipment, mechanical, electrical, cabinets, ductwork, etc.

7. Floors: Thoroughly clean all floors. Vacuum and clean carpeting. Shampooing of pre-existing carpet is required once project is complete. Contractor is responsible for this.
   a. Contractors are responsible for cleaning (stripping floors if necessary) then applying the required two coats of sealer and three coats of finish before releasing the building for occupancy. Facilities Management will provide a contact person for help concerning campus standards free of charge. Or Custodial floor care services may be sub-contracted out through Facilities Management's work order system.
   b. Facilities Management Approved Sealers and Finishes for Vinyl Tile Flooring:

CU requires floor care products to be from the same product line. (Different brands may interact disastrously).

All of these products may be ordered through Construction Stores, but these products not stocked at Stores, please place orders at least two weeks in advance.
Strippers: JohnsWax Freedom Butchers: Time Buster Airkeim: Air Strip

Sealers: Over & Under Iron Stone Laser, Gemini Technique

Finishes: Show Place MainStay Laser, Gemini Above

Campus safety standards require at least TWO (2) coats of Sealer be applied to a cleaned floor, and at least THREE (3) coats of Finish must be applied on top of the sealer.

c. Floor Cleaning Procedures:
   1. Sweep floor clean of debris
   2. Cord off area if necessary
   3. Put up Caution signs
   4. Mix Stripper or Cleaning solution according to label
   5. Apply solution to floor
   6. Start setting up equipment
   7. Place RED abrasive pad on buffer (buffer less than 300 rpms)
   8. Begin stripping or cleaning floor working with buffer moving it side to side across the floor.
   9. Use HEPA filtered water vacuum to begin to suck up slurry*
      *use of HEPA filtered water vacuum is required on existing floor tile which contains asbestos.
   10. Apply additional coats of water and re-vacuum up floor
   11. Mop floor with clean water, change rinse water often
   12. Mop floor a second time
   13. Mop floor to dry completely
   14. Clean up equipment
   15. Wash red pad with clean water.

d. Sealing Procedures:
   1. Using a new mop head or clean wax mop and clean bucket, apply first coat of approved sealer to floor
   2. Allow floor to dry completely (at least 20 minutes)
   3. Apply second coat of sealer
   4. Allow floor to dry


e. Finishing (Waxing) Procedures:
   1. Using a clean wax mop and bucket apply first coat of approved finish (wax)
   2. Allow floor to dry completely (at least 20 minutes)
   3. Apply second coat of finish (wax)
   4. Allow floor to dry completely (at least 20 minutes)
   5. Apply third coat of finish (wax)
   6. Allow floor to dry completely (at least 30 minutes)
   7. Wash mop and bucket with clean water
   8. If floor is dry - remove caution signs and open area up
f. Burnishing Procedures:
The next working day
1. Sweep floor clean of debris
2. Spot mop floor to remove spots and dirt
3. Set up High Speed Burnisher to make for a safe environment
4. Start Burnishing. Walk forward in a straight line
5. At end of row, turn around and start forward again
6. Repeat steps 5 & 6 until finished
7. Clean up equipment and pad.

E. Completion: The entire work inside and out, and the entire premises shall be in first-class, clean condition upon completion before being accepted by the Owner.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY
A. This section describes the definitions, recording and maintenance requirements and the submittal requirements for record documents.

1.02 DEFINITIONS
A. The Project Record Documents are intended to indicate all changes and deviations from the original contract documents and permanently record the “as-built” condition of material, equipment and structure. The project record documents shall include the contract drawings, project manual, addenda, change orders, modifications and clarifications, field directives, approved shop drawings, approved product data, manufacturer’s certificates and project test results.

1.03 SUBMITTALS
A. Submit the project record documents in conformance with Section 01700 and prior to the final applications for payment. The final application for payment will not be approved prior to the submittal of record documents.

1.04 QUALITY ASSURANCE
A. The project record documents shall be updated at a minimum on a weekly basis and shall be readily available for inspection by the owner and consultants. Maintain a separate set of complete documents for exclusive use of record documents and protect the documents from damage in a clean, dry location. Note: Progress applications for payment will not be approved if record documents are not current.

B. The record documents shall contain a clear, legible record of all detail and dimensional changes and locate all concealed work including, but not limited to:
1. Interior and Exterior Utilities
2. Valves
3. Dampers
4. Controls
5. Junction Boxes
6. Clean-outs
7. Access Doors

C. The project manual (specifications) shall indicate all manufacturers’ products complete with catalogue number and trade name of products installed. All changes and corrections to the project manual shall be clearly indicated.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Compile product data and related information appropriate for the University of Colorado's maintenance and operation of products furnished.

B. Prepare operating and maintenance data as specified in this section and as referenced in other pertinent sections of specifications.

C. Instruct the University of Colorado, Facilities Management personnel in the maintenance of PRODUCTS and in the operation of equipment and systems.

1.02 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:
   1. Trained and experienced in maintenance and operation of the described products.
   2. Completely familiar with requirements of this section.
   3. Skilled as a technical writer to the extent required to communicate essential data.
   4. Skilled as a draftsman competent to prepare required drawings.

1.03 SUBMITTALS

A. Prepare data in the form of an instructional manual for use by the University of Colorado, Facilities Management personnel. Quantities are listed in Part 1.07.

B. Format:
   1. Submit electronically in Portable Document Format (PDF) format as one document, OCR (Optical Character Recognition) searchable, bookmarked according to the Construction Specifications Institute (CSI) standards.
   2. Title shall be "OPERATING AND MAINTENANCE INSTRUCTIONS", and shall include:
      a. Name of project and date of completion (month and year).
      b. Project number.
      c. Identify of general subject matter covered in the manual (e.g., Architectural, Mechanical, Electrical and/or Civil).

1.04 CONTENT OF MANUAL

A. An electronically-written table of contents shall be provided for each volume, arranged according to CSI standards.
   Include the following:
   1. Name of responsible installing principal contractor, address, and telephone number.
   2. A list of each product being included, indexed to the content of the volume.
   3. List with each product, the name, address, and telephone number of:
      a. Maintenance contractor, as appropriate.
      b. Identity of the area of responsibility of each.
   4. Identify each product by product name and other identifying symbols.
B. Product Data:
1. Local source of supply for parts and replacement.
2. Include only those sheets that are pertinent to the specific product, with the following information.
   a. Clearly identify the specific product or part installed.
   b. Clearly identify the data applicable to the installation.
   c. Delete references to inapplicable information.

C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate:
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.
2. Coordinate drawings with information in project record drawings to ensure correct illustration of completed installation.
3. Do not use project record drawings as maintenance drawings.

D. Provide written text, as required, to supplement product data for the particular installation:
1. Organize in a consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.

E. Provide a copy of each warranty, bond, and service contract issued. Provide information sheets for the University of Colorado, Facilities Management's personnel and give:
1. Proper procedures in the event of failure.
2. Instances that might affect the validity of warranties or bonds.

1.05 MANUALS FOR ARCHITECTURAL MATERIAL AND FINISHES

A. Submit copies (per schedule shown in paragraph 1.07) of complete manual in final form.

B. Content for architectural products include applied materials and finishes.
1. Manufacturer's data, giving full information on products.
   a. Catalog number, size, and composition.
   b. Color and texture designations.
   c. Information required for reordering special manufactured products.
2. Instructions for care and maintenance:
   a. Manufacturer's recommendation for types of cleaning agents and methods.
   b. Cautions against cleaning agents and methods that are detrimental to the product.
   c. Recommended schedule for cleaning and maintenance.

C. Content for moisture-protection and weather-exposed products:
1. Provide manufacturer's data, giving fully information on products.
   a. Applicable standards
   b. Chemical composition
   c. Details of installation
2. Provide instructions for inspection, maintenance, and repair.
1.06 MANUAL FOR NON-ARCHITECTURAL EQUIPMENT AND SYSTEMS

A. Submit copies (per schedule) of complete manual in final form.

B. Content for each unit of equipment and system, as appropriate shall contain:
   1. Description of unit and component parts (Consultant-approved submittals).
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data, and tests.
      c. Complete nomenclature and Commercial number of all replaceable parts.
   2. Operating Procedures:
      a. Start-up, break-in, routine, and normal operating instructions.
      b. Regulation, control, stopping, shutdown, and emergency instructions.
      c. Summer and winter operating instructions.
      d. Special operating instructions.
   3. Maintenance Procedures:
      a. Routine operations.
      c. Disassembly, repair, and reassembly.
      d. Alignment, adjustment, and checking.
   4. Servicing and Lubrication Schedule, including a list of lubricants required.
   5. Manufacturer's operating and maintenance instructions.
   6. Description of sequence of operation by control manufacturer.
   7. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance and replacement.
      a. Predicted life of parts subject to wear.
      b. Items recommended to be stocked as spare parts.
   8. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Content for each electric and electronic system, as appropriate, shall contain:
   1. Description of system and component parts:
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data, and tests.
      c. Complete nomenclature and Commercial number of replaceable parts.
   2. Operating Procedures:
      a. Routing and normal operating instructions.
      b. Sequences required.
      c. Special operating instructions.
   3. Maintenance Procedures:
      a. Routing operations.
      c. Disassembly, repair, and reassembly.
      d. Adjustment and checking.
      e. Manufacturer's printed operating and maintenance instructions.
      f. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

D. Prepare and include additional data when the need for such data becomes apparent during instruction of the University of Colorado, Facilities Management's personnel.
1.07 OPERATION & MAINTENANCE MANUAL
   A. Operations and Maintenance Manuals – all disciplines – submit electronically in Portable Document Format (PDF) format as one document, OCR (Optical Character Recognition) searchable, bookmarked according to the Construction Specifications Institute (CSI) standards.

1.08 SUBMITTAL SCHEDULE
   A. Submit one electronic copy to the Consultants and one to the University of draft of proposed formats and outlines of contents upon completion of the submittal process. The Consultants and the University staff will review the draft and will submit comments through the consultants.

   B. Submit electronic copies of complete manual(s) in final form 15 days prior to final inspection or acceptance. Comments will be submitted after final inspection.

   C. Submit specified number of CDs or DVDs of approved data in final form prior to acceptance.

1.09 INSTRUCTION OF UNIVERSITY OF COLORADO, FACILITIES MANAGEMENT PERSONNEL
   A. Fully instruct the University of Colorado, Facilities Management personnel's designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems as required elsewhere in the specification.

   B. Operating and Maintenance manual may be required as the basis of instruction.

PART 2 - MATERIAL

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Prepare commissioning process based on the Commissioning Checklists found in the UCB Standards website:

http://fm.colorado.edu/construction/standards/

B. Coordinate the requirements of Project Closeout and Operating and maintenance sections that are part of Division 1.

C. Schedule the required commissioning activities with the University of Colorado Facilities Department and their consultants at least 72 hours prior to conducting Commissioning activities.

PART 2 - MATERIALS

Not Used.

PART 3 - EXECUTION

NOT USED
PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:
   1. Construction Storm Water Requirements
   2. Post-Construction Storm Water Requirements

B. Related Sections
   1. Section 02200 - Earthwork
   2. Section 02221 – Trenching, Backfilling, Compaction

1.02 QUALITY ASSURANCE

A. All construction sites
   1. All construction sites that disturb any land must take appropriate erosion control and
      stormwater detention measures to contain water run-off from site.

B. Construction sites – one acre and larger
   1. All construction sites that are one acre and larger must prepare and submit a Storm
      Water Management Plan (SWMP) for approval before any work begins. The SWMP
      must conform to all the requirements contained herein.

1.03 SUBMITTALS

A. Storm Water Management Plan (SWMP)

   Storm Water Management Plan (SWMP): Prior to any construction activity disturbing one acre
   of land or more, an approved SWMP and a Stormwater Permit for Construction Activity application
   from the Colorado Department of Public Health and Environment (CDPHE) are required. The
   SWMP shall be prepared in accordance with the CDPHE requirements for “Contents of the
   Stormwater Management Plan” and the UDFCD’s Urban Storm Drainage Criteria Manual,
   management and erosion control measures are to be constructed and maintained in accordance
   with the SWMP and the UDFCD Drainage Criteria Manual.

PART 2 – MATERIALS

2.01 Storm Water Management Plan

A. Preparation Standards: Design of the SWMP and the Storm Water Quality and Erosion Control
   Plan shall include the following elements:
   1. Protection for adjacent properties (including public right-of-way) from erosion and/or
      sediment deposition.
   2. Protection for public streets from the deposit of sediment from run-off or vehicles tracking
      mud at construction access routes.
   3. Stabilization for all disturbed areas as defined in the UDFCD Drainage Criteria Manual.
4. Protection for all storm sewer inlets from the entry of sediment-laden water.
5. Long-term stability of cut and fill slopes and the successful establishment of permanent vegetative cover on exposed soil.
6. The following standard notes:
   a. “All temporary erosion control facilities shall be installed before any construction activities take place”.
   b. “Solid waste, industrial waste, yard waste and any other pollutants or waste on any construction site shall be controlled through the use of BMP’s. Waste and/or recycling containers shall be provided and maintained by the owner or contractor on construction sites where there is the potential for release of waste. Uncontained waster that may blow, wash or otherwise be released from the site is prohibited. Sanitary waste facilities shall be provided and maintained by the owner or contractor”.
   c. “Ready-mixed concrete, or any materials resulting from the cleaning of vehicles or equipment containing or used in transporting or applying it, shall be contained on construction sites for proper disposal. Release of these materials is prohibited”.
   d. “Cover shall be applied within 14 days to inactive soil stockpiles, and shall be maintained for stockpiles that are proposed to remain in place longer than 30 calendar days”.
   e. “BMP’s shall be implemented to prevent the release of sediment from construction sites. Vehicle tracking of mud shall not be allowed to enter the MS4 or waters of the State. Sediment tracked onto public streets shall be removed immediately”.
   f. “Techniques shall be used to prevent dust, sediment or debris blowing from the site”.
   g. “Stormwater discharges from construction activities shall not cause or threaten to cause pollution, contamination or degradation of waters of the State”.
   h. “All earth disturbances shall be designed, constructed and completed to limit the exposed area of any disturbed land to the shortest possible period of time”.
   i. “Bulk storage structures for petroleum products and other chemicals shall have adequate protection so as to contain all spills and prevent any spilled material from entering the MS4 or waters of the State”.
   j. Any disturbance to temporary and permanent BMP’s resulting from construction activity shall be repaired or replaced within 48 hours.

PART 3 – EXECUTION

3.1 PERMITTING

A. Contractor shall develop the SWMP in accordance with all of the requirements herein and utilizing the most recent SWMP guidance document prepared by the CDPHE and good engineering hydrologic and pollution control practices and submit to the University for approval.

B. Contractor shall apply for and obtain a CDPHE storm water general permit for construction activities. Provide copies of the permit to the University prior to the start of construction operations.
3.2 CONSTRUCTION

A. The Contractor will be required to have the SWMP on site at all times and shall be prepared to respond to maintenance of specific BMP’s.

B. The Contractor shall inspect all BMP’s at least every 14 days and within 24 hours after any precipitation or snow melt event that causes surface run-off. Inspections of BMP’s shall be conducted by an individual who has successfully completed formal training in erosion and sediment control by an organization acceptable to the University. A certification of successful completion of such training shall be provided upon request.

C. The Contractor shall amend the SWMP whenever there is a change in design, construction, operation, or maintenance, which has an effect on the potential for discharge of pollutants to the MS4 or receiving waters, or if the SWMP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activities.

D. Records of inspection are to be maintained on site with the SWMP. Inspection records are to be available at the project site at all times and shall be made available to the University upon request.

E. Prior to commencement of work, all general contractors, subcontractors and utility agencies shall obtain and comply with the approved, current SWMP for the project.

3.3 POST CONSTRUCTION

At the conclusion of all construction activities and as a part of construction close-out, contractor shall remove all temporary BMP’s and inactivate the stormwater permit.

END OF SECTION
DIVISION 15 MECHANICAL

1) 15050 - Basic Materials and Methods
2) 15060 - Hangers and Supports
3) 15071 - Sound and Vibration
4) 15075 - Mechanical Identification
5) 15080 - Mechanical Insulation
6) 15110 - Valves
7) 15120 - Piping Specialties
8) 15145 - Plumbing Piping Systems
9) 15180 - Heating and Cooling Piping
10) 15181 - Steam and Condensate Piping Systems and Specialties
11) 15185 - Water Treatment
12) 15900 - Controls and Instrumentation
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Grout.
6. Mechanical demolition.
7. Equipment installation requirements common to equipment sections.
8. Supports and anchorages.

1.2 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, crawlspace, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

A. Refer to individual Division 15 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.


2.3 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Not acceptable by UCB standards.
D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

2.4 MECHANICAL SLEEVE SEALS

A. Pipes penetrating exterior walls are to be sealed and supported by Link Seal or approved equal. Size and type of link seal to be selected based on the type of pipe and the application.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
   1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.


G. Molded PE: Reusable, PE, tapered-cup shaped and smooth-outer surface with nailing flange for attaching to wooden forms.

2.6 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
   2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Refer to Division 1 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect and safe off existing mechanical systems as indicated for mass demo by others.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using mechanical Link Seals or similar approved equal. Select sleeve size and material based on manufacturer’s guidelines.
O. Underground, Exterior-Wall Pipe Penetrations: Seal pipe penetrations using mechanical sleeve seals such as Link Seal or approved equal. Select sleeve material and size based on seal manufacturer’s guidelines.

P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

Q. Verify final equipment locations for roughing-in.

R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

S. Floor Sleeve Heights:
   1. Rooms with floor drains: Extend floor drains 2” above floor (including sleeves within walls surrounding the room with a floor drain).
   2. Kitchens and mechanical rooms: Extend sleeves 4” above the floor.
   3. All other exposed areas: Extend sleeve ¼” above the finished floor material.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.

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 B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.


F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric waterways to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.
3.8 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 15050
SECTION 15060 - HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes hangers and supports for mechanical system piping and equipment.

B. See Division 15 Section "Mechanical Sound and Vibration" for vibration isolation supports and hangers.

1.2 DEFINITIONS

1.3 PERFORMANCE REQUIREMENTS

A. Design channel support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. Design heavy-duty steel trapezes for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

C. Design seismic-restraint hangers and supports for piping and equipment.

D. Design and obtain approval from authorities having jurisdiction for seismic-restraint hangers and supports for piping and equipment.

1.4 SUBMITTALS

A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.

B. Shop Drawings: Signed and sealed by a qualified professional engineer for multiple piping supports and trapeze hangers. Include design calculations and indicate size and characteristics of components and fabrication details.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

B. Engineering Responsibility: Design and preparation of Shop Drawings and calculations for each multiple pipe support by a qualified professional engineer.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components.

1. Manufacturers:
   a. B-Line Systems, Inc.
   b. Grinnell Corp.
   c. Michigan Hanger Co., Inc.
   d. PHD Manufacturing, Inc.
   e. Approved equal

2. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
3. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

1. Manufacturers:
   a. B-Line Systems, Inc.
   b. Grinnell Corp.
   c. Michigan Hanger Co., Inc.
   d. Thomas & Betts Corp.
   e. Unistrut Corp.
   f. Approved equal

2. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
3. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

C. Thermal-Hanger Shield Inserts: 100-psi (690-kPa) minimum compressive-strength insulation, encased in sheet metal shield.

1. Manufacturers:
   a. Carpenter & Patterson, Inc.
b. Michigan Hanger Co., Inc.
c. Pipe Shields, Inc.
d. Value Engineered Products, Inc.
e. Approved equal.

2. Material for Cold Piping: ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate with vapor barrier.
3. Material for Hot Piping: ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate.
4. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.
5. For Clevis or Band Hanger: Insert and shield cover lower 180 degrees of pipe.
6. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.3 MISCELLANEOUS MATERIALS

A. Powder-Actuated Drive-Pin Fasteners: Powder-actuated-type, drive-pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.
   1. Manufacturers:
      a. Hilti, Inc.
      b. ITW Ramset/Red Head
      c. Masterset Fastening Systems, Inc.
      d. Approved equal.

B. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

D. Grout: ASTM C 1107, Grade B, factory-mixed and -packaged, nonshrink and nonmetallic, dry, hydraulic-cement grout.
   1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
   3. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
4. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
5. U-Bolts (MSS Type 24): For support of heavy pipe, NPS 1/2 to NPS 30.
6. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
7. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
8. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
9. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes 2-1/2” to 20” from single rod if horizontal movement from expansion and contraction might occur.
10. Adjustable Swivel Split or Solid Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, ¾” to 8”.
11. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, ½” to 2”.
12. Adjustable Swivel Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, ½” to 2”.
13. Split Pipe Ring with or without Turnbuckle Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, 3/8” to 8”.

D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

E. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Malleable Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

F. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.

3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.

6. C-Clamps (MSS Type 23): For structural shapes.

7. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
   a. Light (MSS Type 31): 750 lb.
   b. Medium (MSS Type 32): 1500 lb.
   c. Heavy (MSS Type 33): 3000 lb.

8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

G. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.

3. Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100-psi (690-kPa) minimum compressive-strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

H. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.

2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.

3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.

3.2 INSTALLATION

A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Hanger Spacing:
   1. Hanger spacing and rod size shall be per MSS SP-69 or local codes, whichever is most stringent.
2. Hanger spacing must be reduced to compensate for any valves and/or fittings installed in the pipe run.
3. Alternate span calculations may be used with a maximum deflection of 0.1 inch between hangers.
4. Maximum spacing for plumbing piping shall be per 2006 International plumbing code requirements or MSS SP-69, whichever is more stringent.
5. Hanger spacing must be reduced if thermal hanger shield insert cannot support full span.

C. Channel Support System Installation:
1. Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems.
2. Field assemble and install according to manufacturer's written instructions.

D. Heavy-Duty Steel Trapeze Installation:
1. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated, heavy-duty trapezes.
2. Support pipes of various sizes together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
3. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

E. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

F. Install powder-actuated drive-pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

G. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.

L. Insulated Piping: Comply with the following:
1. Attach clamps and spacers to piping.
a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits according to ASME B31.9.

2. Install MSS SP-58, Type 39 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.
   c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
   d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
   e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS
   A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.
   B. Place grout under supports for equipment and make smooth bearing surface.

3.4 METAL FABRICATION
   A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.
   B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.
   C. Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
      1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
      2. Obtain fusion without undercut or overlap.
      3. Remove welding flux immediately.
      4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.
3.5 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

A. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.3.1

END OF SECTION 15060
SECTION 15071 - MECHANICAL SOUND AND VIBRATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: This section covers vibration isolators and vibration isolation bases

1.2 SUBMITTALS

A. Refer to Division 1 and Section 15050, “Basic Mechanical Materials and Methods,” for general requirements.

B. Product Data: Include load deflection curves for each vibration isolation device indicated.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Refer to section 15050, “Basic Mechanical Materials and Methods,” for general code, standard and regulatory requirements.

B. Coordination:
   1. Coordinate layout and installation of vibration isolation devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire suppression system components, and partition assemblies.
   2. Coordinate size and location of concrete housekeeping and vibration isolation bases. Concrete reinforcement and formwork requirements are specified in Division 3.
   3. All equipment installed on housekeeping pads shall be anchored with anchors which extend through the pad into the floor.

C. Acoustical Criteria:
   1. Noise levels due to equipment and ductwork to permit attaining sound pressure levels in all 8-octave bands in occupied spaces conforming to NC curves:
      a. All spaces NC-35.
   2. Exceptions:
      a. Spaces within 15 foot radius from supply and return ducts from shafts NC-40.
      b. Lobbies, toilets, and commercial areas NC-40.
      c. Kitchens NC-45-50.
      d. Mechanical Rooms NC-50-60.
PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Approved Manufacturers:
   1. Amber/Booth Company, Inc.
   2. Korfund
   3. Mason Industries, Inc.
   4. Metraflex
   5. Vibration Mountings & Controls
   6. Vibrex

B. +Double Deflection Neoprene Mountings.

C. +Spring Isolator Mountings.

D. +Restraint Spring Isolator Mountings.

E. +Vibration Hangers.

F. +Integral Structural Steel Bases.

G. +Steel Cradle Bases.

H. +Concrete Inertia Bases.

I. Flexible Butyl Hose Pipe Connectors.

J. Flexible Neoprene Sphere Pipe Connectors.

K. Braided Flexible Pipe Connectors.

L. Acoustical Pipe Riser Anchors.

+These are not required when equipment is solid mounted.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Isolation: Unless noted otherwise, all rotating equipment, with the exception of base mounted and vertical inline pumps, shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflection. Base mounted pumps shall be mounted directly on housekeeping pads.
B. Flexible Pipe Connections:
   1. All equipment supported by or mounted on vibration isolators shall be equipped with flexible connections.

3.2 ADJUSTING

A. Adjust isolators after piping systems have been filled and equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.

D. Adjust air spring leveling mechanism.

E. Adjust active height of spring isolators.

3.3 ADHESIVE SEALER:

A. Manufacturers:
   1. No preference

B. In conformance with NFPA 90A.

3.4 NON HARDENING CAUKING:

A. Manufacturers:
   1. No preference

B. Guaranteed to be permanently elastic.

END OF SECTION 15071
SECTION 15075 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes identification of mechanical products installed under division 15.

1.2 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

1.3 DESIGN REQUIREMENTS

A. Assignment of unit identification numbers to operating units of equipment within a class or subclass will be made during the design phase of new buildings, additions, or remodeling of existing structures.

   A class, subclass list will be provided to the Facilities Management Preventative Maintenance coordinator, indicating codes to use for the assignment of unit identification numbers.

B. In new structures, the numbering system will start in the basement with 01, within a class or subclass, and continue on in ascending order up to and including the equipment that may be located on a roof.

C. When new operating equipment is to be added to an existing structure, the numbering of any new units of equipment will be fit in with the existing numbering scheme.

D. All equipment, including motors, shall be stenciled with the proper class-subclass code and correct unit identification as indicated in the contract documents, using a contrasting color.

E. Labels shall identify location of valves and terminal units above ceilings, as noted below in this section.

F. Drawings shall indicate unique numbers for all terminal units (e.g. VAV boxes). Contractor shall label the units accordingly, including the space being served.

G. Install engraved plates on split systems; indicating the other unit(s) a device serves, for example condensing units and fan-coil unit, chiller and cooling tower, etc…
1.4 DEFINITIONS (Excerpts from ANSI A13.1 – 1981)

A. Materials Inherently Hazardous:
   1. Flammable or Explosive:
      a. Materials which are easily ignited, including materials known as fire producers or those creating an explosive atmosphere.
   
   2. Chemically Active or Toxic:
      a. Materials which are corrosive or are in themselves toxic or productive of poisonous gases.
   
   3. At Temperatures or Pressures:
      a. Materials which when released from the piping, would have a potential for inflicting injury, or property damage by burns, impingement, or flashing to vapor state.
   
   4. Radioactive:
      a. Materials which emit ionizing radiation.

B. Materials of Inherently Low Hazard:

   1. All materials which are not hazardous by nature, and are near enough to ambient Pressure and temperature that people working on systems carrying these materials run Little risk through their release.

PART 2-PRODUCTS

2.01 IDENTIFICATION MATERIALS FOR PIPING AND EQUIPMENT

A. Metal tags:
   
   1. Round brass discs, minimum 1-1/2” diameter with edges ground smooth.
   
   2. Each tag punched and provided with brass chain for installation.

B. Engraved Nameplates:
   
   1. Laminated three-layer plastic with engraved black letters on light contrasting Background color.

C: Pressure Sensitive Markers: Brady Type 350 Flexible vinyl film identification markers and tape with legend, size and color coding per ANSI A13.1.

D. Semi-rigid Plastic Identification Pipe Markers: Seton Setmark with legend size and color coding per ANSI A13.1. Direction of flow arrows are to be included on each marker, unless otherwise specified.

   1. Setmark Type SNA markers to be used on diameters ½” thru 5”
2. Setmark Type STR markers to be used on diameters 6" or larger.

PART 3-EXECUTION

3.01 IDENTIFICATION OF PIPING AND EQUIPMENT

A. General:

1. Provide pipe identification, stencils, or engraved name plates to clearly identify the mechanical equipment piping and controls of the various mechanical systems and direction of flow in piping. Valve tags are not required.

B. Methods for identification as follows:

1. Metal Tags:
   a. Stamp tags with letter prefixed to indicate service, followed by a number for location in system.

2. Engraved Nameplates:
   a. Attached nameplates with brass screws.
   b. Pressure-sensitive embossed labels are not acceptable
   c. Nameplates shall bear the same identifying legend used on the Contract Documents.

3. Pressure Sensitive Markers: Apply pressure sensitive markers in accordance with manufacturer’s recommendations with complete wrap around. Markers adhesion will be tested for permanence. Any markers showing dog ears, bubbles or other failings shall be replaced.

4. Semi-Rigid Plastic Identification Markers: Seton Setmark pre-molded (not pressure Sensitive) identification markers may be used a Contractor’s option on service piping which is accessible for maintenance operations, (but not on piping in finished spaces). This type marker shall not be installed on bare pipe when surface temperature exceeds 180 deg. F unless a 1” thick insulation band is first provided under marker for protection from the hot pipe.

C. Classification of Hazards of Materials, Designation of Colors and University Legend:

<table>
<thead>
<tr>
<th>Color of Classification</th>
<th>Color of Field</th>
<th>University Letters</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials Inherently Hazardous:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammable or Explosive:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Yellow</td>
<td>Black</td>
<td>NG</td>
</tr>
<tr>
<td>Chemically Active or Toxic</td>
<td>Yellow</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>Acid Waste</td>
<td>Yellow</td>
<td>Black</td>
<td>AW</td>
</tr>
</tbody>
</table>
Chlorine: Yellow Black C
Extreme Temperatures or Pressures: Yellow Black
Boiler Feed Water: Yellow Black BFW
Chilled-Water Supply/with Glycol: Orange Black CWS/G
Chilled-Water Return/with Glycol: Orange Black CWR/G
Distilled Water: Orange Black DW
Domestic Hot Water: Orange Black HW
Domestic Hot Water Circulation: Orange Black HWC
180 deg. Domestic Hot Water: Yellow Black HHW
180 deg. Domestic Hot Water Circulation: Yellow Black HHWC
Heating Water Supply/with Glycol: Yellow Black HWS/G
Heating Water Return/with Glycol: Yellow Black HWR/G
Low –Pressure Steam: Yellow Black LPS
Low-Pressure Steam: Yellow Black LPSC
Condensate
High-Pressure Steam: Yellow Black HPS
High Pressure Steam: Yellow Black HPSC
Condensate
Sanitary Sewer: Orange Black SAN
Storm Sewer: Orange Black SS
Tower-Water Supply: Orange Black TWS
Tower-Water Return: Orange Black TWR
Waste Vent: Orange Black V
High Pressure Compressed Air (over 90 psig): Yellow Black CA
Refrigerant: Yellow Black REF

Materials of Inherently Low Hazard:
Liquid or Liquid Admixture:
Chilled-Water Supply: Green White CWS
Chilled-Water Return: Green White CWR
Domestic Cold Water: Green White W
Gas or Gaseous Admixture:
Medium Pressure Compressed Air (30 to 90 psig): Blue White CA
Low Pressure Compressed Air (less than 30 psig): Blue White CA
Vacuum: Blue White VAC

D. Piping:

1. Identify all piping accessible for maintenance in crawl spaces above ceilings. And access spaces as well as exposed to view utilizing stenciled markings According to the following procedures:

a. Use an arrow marker for each pipe-content legend. The arrow shall always point away from the pipe legend and in the direction of flow: color and height of arrow to be same as content legend lettering.

b. If flow can be in both directions, use a double-headed arrow indication.
c. Apply pip legend and arrow indication at every point of pip entry or exit where line goes through wall or ceiling cut.

d. Apply pipe legend and arrow indication within 3” of each valve to show proper identification of pipe contents and direction of flow.

e. The Legend shall be applied to the pipe so that lettering is in the most Legible position. For the overhead piping, apply legend on the lower half of the pipe where view is unobstructed, so the legend can be read at a glance from floor level.

f. For pipes under ¾” O.D., fasten brass tags securely at specified legend locations.

g. Legend on steam piping, condensate return, compressed air, gas and vacuum systems shall include working pressure or vacuum.

E. Controls:

1. Magnetic starters and relays, shall have nameplates or be stenciled to identify connecting or controlled equipment.

2. Manual operating switches, fused disconnect switches and thermal over-load switches which have not been specified as furnished with indexed faceplates shall also have nameplates or be stenciled as to “connected” or “controlled” equipment.

3. Automatic controls, control panels, zone valves, pressure electric, electric pressure switches, relays and starters shall be clearly identified.

F. Lift-Out Ceilings & Access Doors:

1. Provide Kroy type adhesive labels on ceiling tee or access door to identify concealed valves, air terminal units. Fire/smoke and fire dampers, or similar concealed mechanical equipment which is directly above nameplate in ceiling space.

   a. Use the following colors for specified labels:

      1. Fire-protection devices, including dampers: 3/8” white letters on red background.

      2. Air-handling terminal devices: 3/8” black letters on transparent background.

      3. Plumbing devices and piping 3/8” white letters on green background.

2. Label shall be installed oriented to read towards the ceiling tile that needs to be removed for access.

END OF SECTION 15075
SECTION 15080 - MECHANICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section covers mechanical insulation for piping, ductwork, and equipment.

B. Related Sections: Drawings and general provisions of the contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 15050, “Basic Mechanical Materials and Methods,” apply to this section.

1. Division 15 piping and equipment sections for reference to specific insulation requirements for piping applications.
2. Section 15050, “Basic Mechanical Materials and Methods,” for basic materials and methods for mechanical work.

1.2 DEFINITIONS

A. The word “concealed” as used in this section refers to insulation in ceiling plenums, furred spaces, mechanical rooms, pipe and duct shafts, unheated spaces immediately below roof, unexcavated spaces, and crawl spaces. The word “exposed” refers to insulation in all other areas.

1.3 SYSTEMS DESCRIPTION

A. Systems to be insulated: All portions of the following systems, equipment, and accessories shall be insulated, except where noted otherwise or furnished by OEM as part of equipment.

1. Cold Piping Systems:
   a. Domestic cold water
   b. HVAC chilled water – supply and return
   c. Exposed cooling coil headers and manifolds
   d. Condensate drain pans (unless pre-insulated)
   e. Condensate drain lines (first 10 feet)
   f. Fittings, valves, strainers and check valves

2. Hot Piping Systems:
a. Domestic hot water – supply and recirculation
b. HVAC hot water – supply and return
c. All steam and condensate lines, including steam vent piping
e. Fittings, valves, strainers, and check valves
f. Removable insulation jackets for selected steam system components.

3. Cold Equipment:
   a. Chilled water pump housings (removable jackets)

4. Hot Equipment
   a. Hot water heaters (unless pre-insulated)
   b. Heat exchangers including heat exchanger heads
   c. Condensate receivers and flash tanks

5. Items that need not be insulated:
   a. Flexible connectors, air chambers, drain lines from water coolers, and condensate drains after 10 feet from drain pan
d. Hot water pump housings
c. Factory pre-insulated equipment

B. Fire Hazard Classification: All components of the insulation system including insulation facings, mastics, and adhesives (with the exception of the elastomeric material specified elsewhere) shall not exceed the following hazard ratings as determined by NFPA 255, or ASTM E84 (NFPA 225), and UL 723:

<table>
<thead>
<tr>
<th></th>
<th>Piper and Equipment Coverings</th>
<th>Duct Coverings and/or Linings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame spread rating</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Fuel contributed</td>
<td>25</td>
<td>--</td>
</tr>
<tr>
<td>Smoke developed</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

1.4 SUBMITTLAS

A. Refer to Division 1 and Section 15050, “Basic Mechanical Materials and Methods,” for general code, standard, and regulatory requirements.

B. Product Data: Submit manufacturer’s technical product data, installation instructions, and maintenance data for each type of mechanical insulation, including fittings and adhesives. Include a pip and duct insulation thickness schedule.
1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Refer to Section 15050, “Basic Mechanical Materials and Methods,” for general code, standard, and regulatory requirements.

B. Installer qualifications: Three years minimum successful installation experience on projects with mechanical insulation similar in scope and nature to that required for the project.

C. Requirements for energy conservation: All insulation shall be in accordance with ASHRAE Standard 90A.

1.6 DELIVER, STORAGE, AND HANDLING

A. Storage and Protection: Protect insulation against dirt, water, chemical, or mechanical damage before, during, and after installation. Any such insulation or covering damaged prior to final acceptance of the work shall be satisfactorily repaired or replaced.

B. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.7 WARRANTY

A. Refer to Section 15050, “Basic Mechanical Materials and Methods,” for general warranty requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Approved manufactures for insulation products are Aramflex, Armstrong World Industries, CertainTeed, CSG, Knauf Fiber Glass, Manson, Nomaco, Owens-Corning, and Johns Manville Products.

B. Approved manufacturers for adhesives, sealants, and coatings are Foster and Childers Product Co.

2.2 PIPE INSULATION

A. Preformed fiberglass conforming to ASHRAE 90.1-2007 and ASTM C-547, Class I or II, with “K” factor of 0.23 maximum at 75 Deg F mean temperature. See schedule for thickness.

B. Jacket shall be factory – applied ASJ/SSL type, ASTM C921, or C1136, Type I with vapor barrier for cold piping (below ambient), or Type II for hot piping (above ambient). Type I may be used for both at Contractor’s option. Factory-applied flap adhesive (SSL) or conventional staple and tape seal at Contractor’s option.
C. Pipe Insulation Thickness Schedule: ASHRAE 90.1 – 2007 & 2006 IECC TABLE 6.8.3

<table>
<thead>
<tr>
<th>Piping System Type</th>
<th>Runouts up to 1&quot;</th>
<th>Up to 1-1/4&quot;</th>
<th>1-1/2&quot; - 2&quot;</th>
<th>2-1/2&quot; - 4&quot;</th>
<th>5&quot; - 6&quot;</th>
<th>8&quot; &amp; up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Domestic cold water</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2. Domestic hot water, including recirculating loop (140 Deg F &amp; less)</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>3. Heating hot water supply &amp; return up to 200 Deg F</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>4. Chilled water supply &amp; return</td>
<td>1.0</td>
<td>1.0</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>5. Steam, steam vent &amp; condensate return (15 psi or less) 212 Deg F</td>
<td>1.5</td>
<td>1.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>6. Steam, steam vent and condensate up to 350 Deg F</td>
<td>1.5</td>
<td>2.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>7. Condenser Water</td>
<td>0.5</td>
<td>0.5</td>
<td>0.75</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Note: Runout piping is the piping extending to individual terminal units from mains, maximum length 12 feet.

D. Fittings and valves shall be covered with premolded one-piece PVC-insulated covers. This product is not to be installed in locations where its use is prohibited by local codes.

1. Furnish Teflon-coated, Velcro closure, removable insulation jackets for steam and condensate equipment applications including manual and control valves, expansion joints, strainers, condensate pumps, and pressure regulators.

E. All insulation on exterior piping exposed to the weather shall be protected with weatherproof metal jacket. Jacket shall be 0.016-inch thick aluminum with laminated vapor barrier. Jacket will have “Z” groove to assure watertight seal. Each joint will be sealed with snap straps containing permanently plastic sealing compound and secured by ½-inch-wide stainless steel bands.
1. Fitting covers shall be white, preformed, 30-mil PVC, suitable for outdoor use, CEEL-CO 550PVC Series insulated or Engineer-approved equal. Covers shall be sealed with adhesive as recommended by the manufacturer.

F. Cover all exposed piping inside occupied spaces with Zeston 2000 PVC or equal jacketing, factory cut and curled to size. Do not provide PVC jacketing inside baseboard covers.

2.3 EQUIPMENT INSULATION

A. Specification “A”: 2-inch-thick fiberglass board equal to CSG Group IB600. The board insulation shall be preformed, flat, rectangle, rigid material with a minimum density of 6 lb./cu. Ft. and a maximum “K” value of 0.22 at 75 Deg F mean temperature.

B. Specification “B”: 2-inch-thick fiberglass equal to CSG Group IB600. The board insulation shall be preformed flat, rectangular, rigid material with a minimum density of 6 lbs./cu. Ft. and a maximum “K” value of 0.22 at 75 Deg F meant temperature. The insulation board shall have a factory-applied FSK vapor barrier facing laminate of aluminum foil and Kraft paper reinforced with fiberglass scrim.

C. Equipment Insulation Schedule:

1. Chilled water air purger Spec B
2. Heating water air purger Spec A
3. Chilled water Equipment Spec B
4. Heat exchangers, flash tanks, condensate receiver Spec A
5. Chilled water pump housings* Spec *

* Provide removable insulation jacket made from Armaflex insulation.

2.4 JACKETING MATERIAL FOR EQUIPMENT INSULATION

A. Provide pre-sized glass cloth jacketing material, not less than 7.8 ounces per square yard, or metal jacket at installer’s option, except as otherwise indicated.

2.5 REMOVABLE INSULATED JACKETS

A. Shell of the jackets shall be constructed from custom-sized, Teflon coated, fiberglass cloth jacketing material. Jacketing material not less than 7.8 ounces per square yard.

B. Insulate jackets with 2” of BFJ Temp-Mat insulation.

C. Closing hardware shall consist of stainless steel D-rings and other metal connectors, Velcro tabs, and Nomex draw cords.

D. Cover the following steam and condensate piping system components:

1. Pressure-powered condensate pump housings
2. Pressure regulating valves
3. Traps with 1” and larger connecting pipe sizes
4. All shutoff/isolation valves 2” and larger
5. Strainers 2” and larger

E. Size the jackets for the specific product being covered. The jacket shall be large enough to fully cover the body of the unit, with a minimum of four inches of overlap, as well as connecting flanges.

F. Manufacturers: Shannon Enterprises, Insultech Model, or approved equal.

PART 3 – EXECUTION

3.1 INSTALLAION

A. General:

1. Apply full-length units of insulation on clean, dry surfaces free of any foreign matter. Apply only after tests and approvals required by the specification have been completed.

2. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation.

3. All raw edges shall be finished with finishing cement.

B. Pipe Insulation:

1. Pipe insulation shall be continuous through walls and floor openings except where walls and floors are required to be fire-stopped or required to have a fire-resistance rating. Where this occurs, the open space remaining between the sleeve and pipe shall be filled with fire-stop insulation. Where this occurs in wall, no sleeves are required; however, calcium-silicate insulation shall be used (in lieu of fiberglass) and extend 1” beyond the wall. The cal-sil insulation thickness shall match the required pipe insulation thickness. The perimeter of the cal-sil shall be fire caulked at the wall.

2. Butt all joints firmly together and smoothly, secure all self-sealing jacket laps and joint strips with monel staples at 6-inch O.C. and cover with lap adhesive or factory (SSL) adhesive.

3. Ends of cold pipe insulation shall be sealed off with a vapor barrier coating at all fittings and valves and at intervals of 21 feet on continuous runs of pipe.

4. Insulated cold pipes shall be insulated continuously through hangers. Rigid insulation inserts are to be provided at all pip hangers and supports per Section 15060, “Hangers and Supports.” Pipe insulation shall abut the rigid insulation insert. Apply a wet coat of vapor barrier lap cement on all butt joints and seal the joins with –inch-wide vapor barrier tap or band. Coat staples with heavy coat of brushed on vapor barrier lap cement.
C. Insulation of Fittings and Valves:

1. Where the factory premolded one-piece PVC insulated fitting covers are to be used, the proper factory precut insulation shall be applied to the fitting using two layers for pipe temperatures above 250 Deg F or below 35 Deg F, single layer insulation is suitable between 35 Deg F and 250 Deg F. The ends of the insulation shall be tucked snugly into the throat of the fitting and the edges adjacent to the pipe covering, tufted and tucked in, fully insulating the pipe fitting. Covers shall overlap the adjoining pipe insulation and jackets and on cold pipes shall be sealed at all seam edges with vapor barrier adhesive. The circumferential edges of all covers shall be sealed with pressure sensitive tape. The tape shall overlap the jacket and the cover at least 1 inch.

2. At locations where the PVC covers are prohibited, the Contractor may use as an alternate one of the following methods: one-coat insulation cement, premolded fiberglass fitting covers, or mitered segments of pipe insulation. Finish shall be glass fabric embedded in fire-retardant mastic. Mastic shall be vinyl acrylic mastic Childers CP-10/11 or equal for hot piping and shall be Childers CP-30 or Fosters 30-35 for cold piping.

3. Removable covers on steam piping equipment per Item 2.2-D.1.

4. Valves may be insulated with sections of Fiberglass pipe insulation complete with All Service Jacket. Raw ends shall be coated with vinyl acrylic mastic CP-10/11 for hot piping or shall be coated with vapor barrier mastic (CP-30 or Fosters 30-35) for cold piping.

D. Pipe Insulation Exposed to Weather:

1. Install metal jacket using waterproof sealant as recommended by manufacturer, and secure with ½-inch-wide stainless steel bands. Fittings shall be insulated with preformed or mitered sections of insulation material, covered with metal jacket, sealed, and secured with stainless steel bands.

E. Hot Equipment Insulation:

1. Insulation board shall be cut and mitered to fit the contour of the vessel and shall be applied with edges tightly butted, joints staggered where two or more layers are necessary (due to available thickness of insulation) and secured with ½” X 0.015” galvanized steel bands on 12-inch centers or with weld pins or stick clips with washers on 18-inch centers.

2. Over the insulation, 1-inch galvanized wire mesh shall be tightly stretched in place with edges tied together and finished with two coats of insulating cement troweled to hard finish.

F. Cold Equipment Insulation:

1. Insulation board shall be cut and mitered to fit the contour of the vessel and shall be applied with edges tightly butted, joints staggered where two or more layers are necessary (due to available thickness of insulation) and secured with ½” X 0.15” galvanized steel bands on 12-inch centers or with weld pins or stick clips with washers on 18-inch centers.
2. Seal all joints, breaks, and punctures in facing with fire-retardant vapor barrier adhesive over which 4-inch-wide tape similar to that of acing material shall be placed.

3. Removable covers for chilled water pumps per 2.4-C

G. Other Requirements

1. Do not insulate equipment handholds, cleanouts, ASME stamp, and manufacture’s nameplate. Provide neatly beveled edge at interruptions of insulation.

2. Provide removable insulation sections to cover parts of equipment that must be opened periodically for maintenance; include metal vessel covers, fasteners, flanges, frames, and accessories.

3. Repair damaged sections of existing mechanical insulation, both previously damaged or damaged during this construction period. Use insulation of same thickness as existing insulation; install new jacket lapping and seal over existing.

4. Replace damaged insulation that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

END OF SECTION 15080
SECTION 15110 - VALVES

1) GENERAL

a) SUMMARY

i) Section Includes: This section covers general requirements for valves and specialties that are used with piping systems as specified elsewhere in Division 15.

ii) Related Sections: Drawings and general provisions of the contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 15050, "Basic Mechanical Materials and Methods," apply to this section.

(1) Division 15 sections for piping system specification and specialty valves related to systems.
(2) Section 15050, "Basic Mechanical Materials and Methods," for basic materials and methods and piping installation.
(3) Section 15120, "Piping Specialties," for piping specialties including flow measuring devices with integral valves and pressure relief valves.
(4) Section 15181, "Steam and Condensate Piping Systems and Specialties" for steam and condensate piping valves.

b) SUBMITTALS

i) Refer to Division 1 and Section 15050, "Basic Mechanical Materials and Methods," for general requirements.

ii) Submit product data sheets for all types of valves being furnished.

(1) Submit valve schedules for all manual valves. Schedules shall include:
   (a) Plan Code (BV, BFV, CV, DV, etc.)
   (b) Body Style/Type
   (c) Make
   (d) Model
   (e) Pressure Rating
   (f) Size Range
   (g) Connections (Flanged, Screwed, Weld, etc.)
   (h) Actuator (Petcock, Lever, Lever with Memory Stop, Hand Wheel, etc.)

iii) Closeout Submittals: Submit operating instructions and maintenance data for all valves.

c) QUALITY CONTROL

i) Regulatory Requirements:

(1) Refer to Section 15050, "Basic Mechanical Materials and Methods," for general code, standard, and regulatory requirements.

(2) Standards: Chemical and physical properties of materials, performance characteristics, and methods of construction shall be in accordance with applicable sections of the following references and standards of current editions in effect 90 days prior to receipt of bids:
(a) American Welding Society (AWS)
(b) Commercial Standards, National Bureau of Standards
(c) (CS) Compressed Gas Association (CGA)
(d) Copper Development Association (CDA)
(e) Federal Specifications (FS)
(f) Manufacturers Standardization Society (MSS)

d) WARRANTY

i) Refer to Section 15050, "Basic Mechanical Materials and Methods," for general warranty requirements.

2) PRODUCTS

a) VALVES AND CHECK VALVES

i) All valves of any one kind, except as otherwise specified in detail specifications, shall be of one manufacturer, and where possible, all valves shall be of one manufacturer and are to be manufactured in accordance with the Manufacturers' Standardization Society (MSS) of the Valves and Fittings Industry Standards wherever applicable.

ii) Gate valves shall only be used for specified steam service.

iii) Provide extended handles or chain wheel operators for all valves that are located more than 7'-0" above the floor.

iv) Provide valve handle extensions for all valves in insulated systems.

v) Butterfly Valves (water only):
(1) Acceptable Manufacturers:
   (a) Crane
   (b) Keystone
   (c) DeZurik
   (d) Milwaukee
   (e) Fisher
   (f) Grinell
   (g) Posi-Seal
   (h) Jamesbury
   (i) Victaulic

(2) 2 inches and smaller - Use full port ball valve.

(3) 2-1/2 inches and larger - Full-lug type 200 psi non-shock WOG, MSS SP-67, extended neck, cast or ductile iron body, aluminum bronze disc or nickel plated ductile iron, stainless steel shaft, EPDM seat and seal, 10-position lever locking handle through 6 inches, worm gear actuator for 8 inches and larger valves. Valves shall be capable for use as isolation valves and be recommended by the manufacturer for dead-end service at the full-rated
operating pressure, without the need for downstream blind flanges. Keystone Fig. 222, Milwaukee ML-133-E, NIBCO LD2000 or equal.

(4) 2-1/2 inches and larger, grooved joint - 200 psi non-shock WOG, MSS SP-67, extended neck, EPDM or polymer coated cast or ductile iron body, aluminum bronze disc or EPDM coated ductile iron disk, stainless steel shaft, EPDM seat and seal, 10-position lever locking handle through 6 inches, worm gear actuator for 8 inches and larger valves. Valves shall be capable for use as isolation valves and be recommended by the manufacturer for dead-end service at the full-rated operating pressure, without the need for downstream blind flanges. Victaulic Series 700/709 or equal.

vi) Ball Valves:
(1) Acceptable Manufacturers:
(a) Apollo  
(b) Conbraco  
(c) Hammond  
(d) Jamesbury  
(e) Milwaukee  
(f) Dynaquip  
(g) Victaulic  
(h) Watts

(2) Water:
(a) 2 inches and smaller: Cast bronze; full port; two-piece body design; stainless steel, solid ball; stainless steel trim; gland nut; reinforced Teflon seats. 150 SWP, non-shock 600 WOG, MSS SP-110. Stem packing shall be adjustable for wear with adjusting screw.  
   (i) Screwed ends - Apollo 77-140 Series, Jomar T-100-SSN.  
   (ii) Solder ends - Apollo 77-240 Series, Jornar S-100-SSN.  
   (iii) Grooved joint - Victaulic Series 721  
(b) Bronze valve material composition shall meet ASTM-B-584.

vii) Eccentric and Plug Valves:
(1) Acceptable Manufacturers:
(a) DeZurik  
(b) Keystone  
(c) Milliken

(2) Balancing Service: Corrosion-resistant, permanently lubricated plug-type or multi-turn hand wheel with suitable seals for intended service, lever or multi-turn operator for valves through 6 inches, worm gear or multi-turn actuator for 8 inches and larger valves, adjustable memory stops all sizes.  
   (a) 2 inches and smaller - 250 psi SWP DeZurik Fig. 425 screwed or Milliken MILLCENTRIC Class 250.  
   (b) 2-1/2 inches and larger - Class 125 or 250 flanged, DeZurik Fig. 118, Milliken MILLCENTRIC Class 125 or equal by Keystone  
   (c) Grooved joint - Milliken MILLCENTRIC Class 125 or 250.

(3) Shutoff Service: Corrosion-resistant square head plug with double seal; bronze to 2-1/2 inches, C.I. to 4 inches. UL listed, DeZurik Fig. 425, screwed, flanged, or victaulic, ANSI 125 psi. Equal by Milliken.
(4) See Section 15120 for combination flow measuring and balancing valves.

viii) Silent Spring-Loaded Check Valves:
(1) Class 125 wafer-type, center-guided, bronze or cast iron body, aluminum bronze disc, EPDM seats. Monel or stainless steel springs. Milwaukee Series 1400, Nibco W910, Metraflex, Streamflow CT 125, Technocheck 5050, or Valmatic.

(2) Class 150, 300 psi WOG grooved joint, single disc, spring-assisted, bronze or cast iron body, aluminum bronze disc, EPDM seats. Monel or stainless steel springs. Victaulic Series 716 or Metraflex Style 900G.

ix) Swing Check Valves:
(1) Water (Class 150 and 125):
   (a) 2 inches and smaller - Class 150 bronze swing check, renewable bronze disc, 150 psi SWP, 300 psi non-shock WOG, MSS SP-80.
       (i) Screwed ends - Nibco T-433 or Milwaukee 510T, Stockham B-321.
       (ii) Solder ends - Nibco S-433 or Milwaukee 1510T
   (b) 2-1/2 inches and larger - Class 125 iron body, bronze trim swing check, 125 psi SWP, 200 psi non-shock WOG, MSS SP-71 Type
       (i) Flanged ends - Nibco F-918-B or Milwaukee F2974, Stockham G-931
       (ii) Grooved joint - Victaulic Series 712

3) EXECUTION

   a) INSTALLATION

   i) General: Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. Maintain maximum headroom and space conditions at all points. Include manufacturers recommended lubrication.

   ii) Utilize appropriate pressure rating for system pressure. Refer to specific Division 15 sections for specific requirements.

   iii) Valves:
       (1) All valves shall be installed so the stem position is not more than 90-degrees from the vertical up position.
       (2) All valves shall be installed so they are accessible and serviceable, and such that full length operating handles may be used without interference from structure or other pipes and/or equipment.
       (3) Isolation valves shall be installed:
           (a) In piping at each and every piece of equipment
           (b) In piping whenever said pipe enters or leaves an equipment room
           (c) At all branch take-offs from mains
           (d) Where shown on Drawings
       (4) Where butterfly valves are located five pipe diameters or less from an elbow, install the valve with its shaft parallel to the plane of the elbow.

   iv) Accessibility: Locate all equipment that must be serviced, operated, or maintained in fully accessible positions. Equipment shall include, but not be limited to, valves, traps, cleanouts, motors, controllers, switchgear, and drain points. If required for
better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility.

END OF SECTION 15110
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes hydronic specialties for hot-water heating, and chilled-water cooling systems and condensate drain piping.

B. See Division 15 Section "Basic Mechanical Materials and Methods" for general piping materials and installation requirements.

C. See Division 15 Section "HVAC Instrumentation and Controls" for temperature-control valves and sensors.

1.2 SUBMITTALS

A. Product Data: For each type of special-duty valve indicated. Include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves.

1.3 QUALITY ASSURANCE

A. Welding: Qualify processes and operators according to the ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 HYDRONIC SPECIALTIES

A. Manual Air Vent:
   1. Bronze body and nonferrous internal parts; 150-psig working pressure; 225 deg F operating temperature; manually operated with screwdriver or thumbscrew; with NPS 1/8 discharge connection and NPS 1/2 inlet connection.
B. Automatic Air Vent:
   1. Designed to vent automatically with float principle; bronze body and nonferrous internal parts; 150-psig working pressure; 240 deg F operating temperature; with NPS 1/4 discharge connection and NPS ½ inlet connection.

C. Pressure & Temperature Test Plugs:
   1. Manufacturers:
      a. Petersen equipment No 710 or 710-XL
      b. Universal Controls No 45 PT-N
      c. Sisco BNO Series
      d. Equivalent by Fairfax or Terise
   2. Brass body with Nordel core, gasketed cap

D. Permanent Thermometers:
   1. Approved Manufacturers:
      a. Weiss & Miljoco
   2. Vari angle digital type 40 to 300 deg F with LCD readout (no batteries). Weiss Instruments Model DVU 35
   3. Stem length shall be sufficient for 40% to 60% insertion. Accuracy 1% full scale or better.

E. Pressure Gauges:
   1. Manufacturers:
      a. Crosby, Dwyer,
      b. H.O. Trerice,
      c. Ametek,
      d. Marshalltown,
      e. Weksler,
      f. Weiss
   2. Single input, ¼ NPT, 4-1/2” Dial, with suitable range. Trerice model 600C or approved equal.
   3. Differential pressure gauges; Dwyer 4000 series with ASF. Model 4635B for flat plate drops.

F. Hyrdonic Flow Measuring Devices:
   1. Line sizes shown on drawings
   2. 2” and smaller:
      a. Manufacturers:
         1) Gerand series 200,
         2) Flowset Accusetter
         3) Presso B Plus series.
         4) Griswold quickset
         5) Nexus
         6) Nibco
      b. Bronze or brass with thread or sweat ends. Rated at 250 SWP at 250 degrees F
      c. Full port ball valve with chrome plated bass and blowout proof stem with Teflon seals and packing. 100% shut off rated pressure.
      d. Quick connect type color coded fittings for flow measurement. Both fittings on one side of the valve.
e. Tamper resistant memory stop adjustment.

3. 2-1/2” and larger:
   a. Manufacturers:
      1) Barco
      2) Gerand
      3) Flowset
      4) Presso model B or V
      5) Victaulic style 733
   b. May be cast steel with weld ends, machined steel for butt welding or groove joint type.
   c. Venturi shall include manual shut off valves and quick disconnect fittings.

G. Inhibited Glycol:
   1. Dow Chemical
   2. Dowtherm 4000 Ethylene glycol for heating systems
   3. Dowtherm SR-1 for chilled water systems

H. High Volume Air Vents: Amtrol 720, B&G 107, equal by Taco, Armstrong or Spirotherm.

I. Automatic Fill and Pressure Regulating Valves:
   1. Automatic Fill Valves:
      a. Pressure reducing, fast fill, bronze body, monel screen, integral check valve, inlet pressure up to 75 psi, fill pressure adjustable 8 to 25 psi.
      b. Manufacturers:
         1) Amtrol 10F or 11F
         2) B&G FB-3
         3) Taco 335
         4) Equal by Armstrong, Conbraco, or Watts.
   2. High Pressure Water Regulating Valve:
      a. Bronze body, up to 200 psi inlet pressure, diaphragm type with replaceable seat, cleanable monel strainer, 50 psi no-flow pressure.
      b. Manufacturers:
         1) Amtrol S series
         2) Watts U5 series
         3) Equal by B&G, Taco, Waston McDaniel, Armstrong

J. ASME Pressure Relief Valves:
   1. Bronze or iron body, ASME safety type labeled for 125 psi maximum pressure, relief pressure selectable from 30 to 100 psi (see plans for relief pressure settings).
   2. Manufacturers:
      a. B&G models 790, 1170, 3301, or 4100
      b. Equal by Kunkle, McDonnel Miller, Watts

K. Y-Pattern Strainers (water):
   1. 2” and Smaller: Bronze body with stainless steel 20 mesh screen. Threaded or sweat 400 psi WOG, Equal to Conbraco series 59, Sarco, or Steamflow T250.
   2. 2-1/2” and Larger: Cast iron flanged, class 125, or 200 psi non-shock WOG with 3/64 perforated screen. Equal to Conbraco F-1, Sarco CI-125, or Steamflow YF-125.
   3. 2-1/2” and larger: Groove joint, class 150, 300 psi WOG, cast iron with #6 mesh 304 stainless screen. Victaulic style 730 tee type for horizontal pipe runs only.
4. Provide threaded fitting for blow down valve.

L. Chilled water meter:
1. Approved manufacturer Onicon or approved equal.
2. Insertion electromagnetic flow meter, 0.25 ft/s to 20 ft/s flow range (80:1 turndown), 316 stainless steel wetted metal components, polypropylene sensing head and 4-20 mA selectable output signal.
3. 15 to 250 F degree liquid temperature range, -5 to 150 F degree ambient temperature range and 400 psi maximum operating pressure.
4. Scalable pulse output, isolated solid state dry contact, contact rating of 50 VDC at 100 mA maximum and pulse duration of 0.5, 1, 2 or 6 seconds.
5. Provide manufacturer recommended straight pipe inlet and outlet spool pieces.

PART 3 - EXECUTION

3.1 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.

1. Install automatic air vents in mechanical equipment rooms only at high points of system piping, at heat-transfer coils, and elsewhere as required for system air venting.
2. Install in-line air separators in pump suction lines. Install piping to compression tank with a 2 percent upward slope toward tank. Install drain valve on units NPS 2 and larger.
3. Install combination air separator and strainer in pump suction lines. Install piping to compression tank with a 2 percent upward slope toward tank. Install blowdown piping with ball valve; extend to nearest drain.
4. Install bypass chemical feeders in each hydronic system where indicated, in upright position with top of funnel not more than 48 inches (1200 mm) above floor. Install feeder in bypass line, off main, using globe valves on each side of feeder and in the main between bypass connections. Pipe drain, with ball valve, to nearest equipment drain.

3.2 ADJUSTING

A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. Perform these adjustments before operating the system:

1. Open valves to fully open position. Close coil bypass valves.
2. Check pump for proper direction of rotation.
3. Set automatic fill valves for required system pressure.
4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Check operation of automatic bypass valves.
7. Check and set operating temperatures of boilers, chillers, and cooling towers to design requirements.
8. Lubricate motors and bearings.

END OF SECTION 15120
SECTION 15145 – PLUMBING PIPING SYSTEMS

1) SUMMARY

a) Services Included: Provide complete water service and distribution systems as indicated on the drawings and as specified herein.

b) Related Sections: Drawings and general provisions of the contract, including General and Supplementary Conditions, Division 1 Section 15050 apply to this section.
   i) Division 15 piping sections for specific system requirements.
   ii) Section 15050, “Basic Mechanical Materials and Methods,” for materials and methods, motors and electrical equipment and piping and equipment installation.
   iii) Section 15060, “Hangers and Supports.”
   iv) Section 15080,” Mechanical Insulation,” for plumbing system insulation systems.
   v) Section 15110, “Valves,” for plumbing systems.
   vi) Section 15120” Piping Specialties
   vii) Section 15185, “Water Treatment,” for sterilizing domestic water systems.

2) SYSTEM DESCRIPTION

a) Water Service: Water service is to be supplied from local water distribution system.

3) SUBMITTALS

a) Refer to Division 1 and Section 15050 for general requirements.

b) Product Data: Provide submittals on all items furnished under this section excluding pipe and fittings.

c) Certificates: Submit reduced pressure backflow preventer certification of test and approval.

4) QUALITY ASSURANCE

a) Regulatory Requirements:
   i) Refer to Section 15050, “Basic Mechanical Materials and Methods,” for general code, standard, and regulatory requirements.
   ii) Standards: Chemical and physical properties of materials, performance characteristics, and methods of construction shall be in accordance with applicable sections of the following references and standards of current editions in effect 90 days prior to receipt of bids:
       (1) American Welding Society (AWS)
       (2) Commercial Standards, National Bureau of Standards (CS)
       (3) Cast-Iron Soil Pipe Institute (CISPI)
       (4) Copper Development Association (CDA)
       (5) Federal Specifications (FS)
       (6) Manufacturers Standardization Society (MSS)
       (7) National Certified Pipe Welding Bureau (NCPWB)
       (8) Plastic Pipe Institute (PPI)

   iii) Codes: All work, materials, and equipment shall comply with the rules and regulations of the following codes and the state electrical and plumbing authorities. Such codes, where applicable, shall take precedence over these plans and specifications. As a minimum, the installation shall comply with the following codes:
b) Qualifications: All plumbing piping and fixtures shall be installed under the direct, on-site supervision of a journeyman plumber licensed by the State of Colorado. The ratio of plumbing apprentice_helpers shall not exceed two apprentice Helpers for each journeyman.

5) PRODUCTS

a) DOMESTIC WATER PIPE, TUBE, FITTINGS, AND JOINTS
i) Domestic Water Piping
   (1) Copper Pipe:
      (a) Above Grade Pipe: ASTM B88, Type K drawn temper seamless copper tube.
      (b) Below Grade Pipe: ASTM B88, Type K annealed temper, seamless copper tube.
      (c) Fittings: ASME B16.22 wrought copper of ASME B16.18 cast-copper alloy.
      (d) Flanges: ASME B16.24, Class 150 cast bronze flanges with solder joint ends.
      (e) Unions: ASME B16.18 cast-copper alloy, hexagonal stock body with ball-and-socket joint, metal-to-metal seating surfaces, and solder joint and/or threaded ends.
      (f) Solder Filler: ASTM B32, Alloy Sn95, Sn94 or E; lead free, shear strength 10,000 psi or greater, All State “Aquasafe” or approved equal for piping less than 2” diameter.
      (g) Piping 2” and larger to be brazed with 15% silver solder.

b) WATER METERS
   i) Approved manufacturers are Onicon or approved equal.
   ii) In-line electromagnetic flow meter, single 4-20 mA output for flow rate, 304 stainless steel internal flow tube and ANSI 150 class flanges.
   iii) Two programmable open collector pulse outputs. Outputs may be programmed to provide:
       (1) An indication of low direction.
       (2) A scaled pulse for totalizing flow.
       (3) A high resolution frequency output to drive peripheral devices.
       (4) An indication of an alarm condition.

c) PRESSURE TEMPERATURE RELIEF VALVES
   i) Approved manufacturers are Kunkle and Watts.

6) EXECUTION

a) PREPERATION
   i) General:
      (1) Verify existing grades, inverts, utilities, obstacles, and topographical conditions prior installation.
      (2) Examine wall, floors, roofs, and plumbing chases for suitable conditions where piping and specialties are to be installed.
      (3) Do not proceed until unsatisfactory conditions have been corrected.
ii) Domestic Water Service:
   (1) Make arrangements with the local water authorities, including the agency that has
   jurisdictional control over the area within which the construction site is located, for
   connecting into the water distribution system and installing the water service as indicated
   on the drawings.
   (2) Provide a temporary water service for construction purposes. Water service shall be ¾
   inch in size and shall terminate in a ¼-inch hose bibb. Proper provisions shall be made
to prevent freezing. Hose bibb shall be located as directed by the general contractor.

b) INSTALLATION

i) General:
   (1) Provide bedding, anchors, thrust restraints/anchors, and restraints as appropriate and in
   accordance with manufacturer’s recommendations based on type of pipe, fittings, joints,
   and bury depth using final finished grading as the basis.
   (2) Examine rough-in requirements for plumbing fixtures and other equipment having to
   verify actual locations of piping connections prior to installation.
   (3) Examine walls, floors, roofs, and plumbing chases for suitable conditions where piping
   and specialties are to be installed.
   (4) Piping shall be run true, plumb, and straight, with all restraints adjusted to carry their
   proportional load and locked to prevent pipe “wag,” misalignment, movement, shear, or
   sagging.
   (5) Use fittings for all changes in direction and all branch connections.
   (6) Install exposed piping at right angles or parallel to building wall. Diagonal runs are not
   permitted unless expressly indicated.
   (7) Install piping free of sags or bends and with ample space between piping to permit proper
   insulation applications.
   (8) Piping hanger spacing and supports shall be per Code requirements (minimum) or per
   Section 15060, “Hangers and Supports,” which ever is more stringent.
   (9) Reference Section 15080, “Mechanical Insulation,” for piping systems to be insulated.
   Provide extended handles for valves on lines that are insulated as required in Section
   15080, “Mechanical Insulation”
   (10) Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings,
   below grade or floors unless indicated to be exposed to view.
   (11) Install piping tight to slabs, beams, joists, columns, walls, and other permanent
   elements of the building. Allow sufficient space above removable ceiling panels to allow
   for panel removal.
   (12) Exterior Wall Penetrations: Seal pipe penetrations through exterior walls using
   sleeves and mechanical sleeve seals.
   (13) Fire Barrier Penetrations: Where pipes pass through fire-rated walls, partitions,
   ceilings, and floors, maintain the fire-rated integrity. Use fire-stop caulking materials at
   all fire-rated wall penetration.
   (14) Provide for pipe expansion and seismic braces as required by the contract documents
   and/or jurisdictional authority.
   (15) All copper tube and fitting shall be reamed and buffed prior to soldering or brazing.
   (16) The use of solder containing lead is prohibited.
   (17) Refer and conform to the “Copper Development Association” instruction for proper
   preparation and actual installation practice for all soldered and brazed joints.
   (18) Provide 10 mil PVC tape (Scotchwrap No. 50 or equal) for all piping and fittings that
   are enclosed in concrete or masonry walls.
   (19) Provide manufacturer recommended straight pipe inlet and outlet spool pieces.
ii) Domestic Water Service
   (1) Water service shall be laid at least 1’-0” below frost line.

iii) Water Meter:
   (1) Install water meter as required by the local authorities.
   (2) Coordinate remote input with the controls contractor.

c) FIELD QUALITY CONTROL

i) General Testing Procedures:
   (1) All piping systems shall be tested and proven tight prior to concealment. The test shall
       be witnessed by the Architect/Engineer, plumbing inspector, or the Owner’s
       representative.
   (2) Insure that the test pressure that might damage fixtures or equipment does not reach such
       units by valving them off or otherwise isolating them during the test.
   (3) When job site conditions do not permit the use of water, air testing may be used in lieu of
       water.

ii) Domestic Water Pipe Testing:
   (1) Open and close all system valves at least once while system is pressurized to test valve
       packing. Tighten as required.
   (2) Test procedures shall be as follows:
       (a) Domestic Hot and Cold Water: 150 psig hydrostatic test. (200 psig on water service
           when serving a fire line.)
       (b) All hydrostatic tests shall be held for a minimum of eight hours without loss of
           pressure. All air tests shall be held for a minimum of 1 hour without loss of pressure.

d) CLEANING

i) Sterilization:
   (1) Prior to placing the potable water system in operation, but after all testing has been
       completed, sterilize the entire or sectionalized piping system following the procedure in
       Section 15185 Water Treatment.
   (2) Water samples shall be taken and tested by an independent laboratory. The system must
       be free of all bacteriological contamination. If the system shows any contamination, it
       shall be re-chlorinated until it is free of bacteriological contamination.
1.1 SUMMARY

A. Section Includes: Work under this section shall include furnishing and installing HVAC piping systems as shown on the drawings and as specified herinafter. System shall include:
   1. HVAC Heating water piping
   2. HVAC Chilled water piping
   3. Condensate drain piping

B. Related Sections: Drawings and general provisions of the contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 15050, “Basic Mechanical Material and Methods,” apply to this section.
   1. Section 15050, “Basic Mechanical Materials and Methods,” for basic materials and methods and piping and equipment installation, and welding and joining.
   2. Section 15060, “Hangers and Supports,” for pipe supports, product description, and installation requirements.
   5. Section 15090, “Mechanical Identification”, for pipe labeling.
   7. Section 15145, “Plumbing Piping Systems and Specialties,” for makeup water piping.

1.2 SUBMITTALS

A. Refer to Division 1 and Section 15050, “Basic Mechanical Materials and Methods,” for general requirements.

B. Product Data: Submit Product data on piping materials, methods, and specialties.

C. Shop Drawings:
   1. Submit shop drawings on piping materials and fittings.
   2. Provide a $\frac{1}{4}'' = 1'\cdot0''$ scale shop drawing of the heating and cooling systems mechanical room showing all equipment piping, panels, ductwork, and miscellaneous components.

D. Quality Assurance/Control Submittals: Welding certifications (refer to Section 15050, “Basic Mechanical Materials and Methods”).

1.3 QUALITY ASSURANCE

A. Qualifications: Welding shall be by certified welders only.
B. Regulatory Requirements:

1. Refer to Section 15050, “Basic Mechanical Materials and Methods,” for general code, standard and regulatory requirements.

2. Standards: Materials and methods shall conform to the Building Services Piping (ASME/ANSI B31.9) section of the ASME Code for Pressure Piping.

C. Certifications: All safety valves and pressure vessels shall bear the appropriate ASME label and stamp.

PART 2 – PRODUCTS

2.1 PIPING

A. Specification A:

1. Pipe: ASTM B88, Type L drawn temper seamless copper tube.


5. Solder Filler: ASTM B 32, Alloy Sn95, Sn 94 or E; lead-free.

6. Brazing Filler Metal: AWS A5.8 BcuP, copper phosphorus or Bag 15% silver classification.

B. Specification B:

1. Pipe: ASTM B88, Type M drawn temper seamless copper tube.


4. Unions: ASME B 16.18, cast copper alloy, hexagonal stock body with ball and socket joint, metal to metal seating surfaces, solder joint and/or threaded ends.

5. Solder Filler: ASTM B 32, Alloy Sn95, Sn 94 or E; lead-free.

6. Brazing Filler Metal: AWS A5.8 BcuP, copper phosphorus or Bag 15% silver classification.

C. Specification C:

1. Pipe: ASTM A53 Type E (ERW) Grade B weight carbon steel pipe.

   a. ½” and smaller: Schedule 80
b. ¾” to 10”: Schedule 40

c. 12” and larger: Standard weight

2. Fittings:
   a. 2” and smaller: Class 125 cast iron/Class 150 malleable iron threaded
   b. 2-1/2” and larger: Standard weight carbon steel butt weld.

3. Unions: Class 150 forged steel ground joint.

4. Flanges: Class 150 carbon steel raised face

D. Specification D:

1. Pipe: ASTM A106 Type S Grade B weight seamless carbon steel pipe.
   a. ½” and smaller: Schedule 80
   b. ¾” to 10”: Schedule 40
   c. 12” and larger: Standard weight

2. Fittings:
   a. 2” and smaller: Class 250 cast iron/Class 300 malleable iron threaded
   b. 2-1/2” and larger: Standard weight carbon steel butt weld.

3. Unions: Class 300 forged steel ground joint.

4. Flanges: Class 300 carbon steel raised face

E. Specification E:

1. Pipe: ASTM A106 Type S Grade B seamless carbon steel pipe with grooved ends.
   a. 2-1/2” to 10”: Schedule 40
   b. 12” and larger: Standard weight

2. Mechanical Grooved Fittings:
   a. Grooved mechanical joint fittings. Victaulic or equal
   b. Grooved mechanical joint couplings: Victaulic or equal.
PART 3  EXECUTION

3.1 PIPING APPLICATIONS:

A. Heating water:
   a. 2” and smaller. Piping specification A
   b. 2-1/2” and larger: Piping specification C

B. Chilled Water:
   a. 2” and smaller. Piping specification A
   b. 2-1/2” and larger: Piping specification C

C. Coil Condensate:
   a. 2” and smaller. Piping specification A
   b. 2-1/2” and larger: Piping specification C galvanized pipe.

D. Mechanical Grooved Piping System: Pipe specification E is an acceptable substitute for chilled water pipe specification C applications within mechanical rooms, at outdoor locations, main risers and main distribution pipe only.

3.2 INSTALLATION

A. Piping installation – General:
   a. Support piping at pumps so there is no strain on pump flanges.
   b. Pitch piping to obtain required air relief and drainage.
   c. Make allowance for expansion in the installation of piping.
d. Provide unions or flanges at each piece of equipment.

B. Condensate Drain Piping:

a. Provide condensate drain piping where required for mechanical equipment.

b. Pitch drain at 1/8” per foot toward drain location.

c. Daylight condensate to nearest floor drain or service sink, or as shown on plans.

3.3 FIELD QUALITY CONTROL:

A. Pipe testing:

a. Hydrostatic tests shall be held for a minimum of 4 hrs without a loss in system pressure.

b. When jobsite conditions do not permit the use of water, air may be used.

c. Test pressures shall be as follows:

i. Hot water/chilled water: 100 psig hydrostatic or 1.5 times operating pressure whichever is greater.

ii. Condensate drain: Plug outlet and fill pipe with water to inlet and visually inspect for leaks.

END OF SECTION 15180
1) GENERAL

a) SUMMARY

i) Section Includes: Work under this section shall include furnishing and installing steam and condensate piping systems and associated steam-using equipment and specialties as shown on the drawings and as specified hereinafter. Systems shall include:
   (1) Low pressure steam (15 psi or less) and condensate piping
   (2) High pressure steam (16 to 140 psi) and condensate piping
   (3) Steam domestic water heaters
   (4) Condensate pumps
   (5) Steam specialties
   (6) Steam and condensate valves

b) SUBMITTALS

i) Refer to Division 1 and Section 15050, "Basic Mechanical Materials and Methods," for general requirements.

ii) Product Data: Submit product data on piping materials, methods, equipment and specialties.

iii) Quality Assurance/Control Submittals: Welding certifications (refer to Section 15050, "Basic Mechanical Materials and Methods").

iv) Engineered drawings for all buried piping systems.

v) Engineered drawings covering the expansion compensation methods to be used, where called for on the plans. The drawings shall show all piping supports, guides, anchors, expansion loops and expansion joints for the piping. The submittal shall include an isometric drawing of the piping network and calculations for expected expansion length and anchor forces.

c) QUALITY ASSURANCE

i) Qualifications: Welding shall be by certified welders only.

ii) Regulatory Requirements:
   (1) Refer to Section 15050, "Basic Mechanical Materials and Methods," for general code, standard and regulatory requirements.

   (2) Standards: Materials and methods shall conform to the Building Services Piping (ASME/ANSI B31.9) section of the ASME Code for Pressure Piping.
(3) Certifications: All safety valves and pressure vessels shall bear the appropriate ASME label and stamp.

2) PRODUCTS

a) PIPING

i) Specification A:
   (1) Pipe: ASTM A 106, seamless, Grade B weight carbon steel pipe
       (a) 2 inches and smaller: Schedule 80
   (2) Fittings:
       (a) 2 inches and smaller: ASME B 16.4, Class 2000 forged steel threaded fittings.
   (3) Unions:
       (a) 2 inches and smaller: Class 300 malleable iron with brass seats, ground joint.
   (4) Flanges:
       (a) Pressures less than or equal to 100 psig: ASME B 16.5, Class 150, ASTM 181 Gr. II, carbon steel, raised face
       (b) Pressures greater than 100 psig: ASME B 16.5, Class 300, ASTM 181 Gr. H, carbon steel, raised face
       (c) Flange bolts shall be hex head, Grade 5 or better.

ii) Specification B:
   (1) Pipe: ASTM A 106, seamless, Grade B weight carbon steel pipe
       (a) 2-1/2 inch to 10 inches: Schedule 40
       (b) 12 inches and larger: Standard weight
   (2) Fittings:
       (a) 2-1/2 inches and larger: ASTM A 234, Grade WPB, butt weld standard weight forged carbon steel
   (3) Unions: use welded flanges
   (4) Flanges:
       (a) Pressures less than or equal to 100 psig: ASME B 16.5, Class 150, ASTM 181 Gr. H, carbon steel, raised face
       (b) Pressures greater than 100 psig: ASME B 16.5, Class 300, ASTM 181 Gr. H, carbon steel, raised face
       (c) Flange bolts shall be hex head, Grade 5 or better.

iii) Specification C:
   (1) Pipe: ASTM A 106, seamless, Grade B weight carbon steel pipe
       (a) 2 inches and smaller: Schedule 80
   (2) Fittings:
       (a) 2 inches and smaller: ASME B 16.4, Class 2000 forged steel threaded fittings.
   (3) Unions:
       (a) 2 inches and smaller: Class 300 malleable iron with brass seats, ground joint.
   (4) Flanges:
       (a) Pressures less than or equal to 100 psig: ASME B 16.5, Class 150, ASTM 181 Gr. II, carbon steel, raised face
       (b) Pressures greater than 100 psig: ASME B 16.5, Class 300, ASTM 181 Gr. H, carbon steel, raised face
       (c) Flange bolts shall be hex head, Grade 5 or better.
iv) Specification D:
   (1) Pipe: ASTM A 106, seamless, Grade B weight carbon steel pipe
       (a) 2-1/2 inches to 10 inches: Schedule 80
       (b) 12 inches and larger: Extra strong
   (2) Fittings:
       (a) 2-1/2 inches and larger: ASTM A 234, Grade WPB, butt weld standard
           weight forged carbon steel
   (3) Unions: use welded flanges
   (4) Flanges:
       (a) Pressures less than or equal to 100 psig: ASME B 16.5, Class 150,
           ASTM181 Gr. II, carbon steel, raised face
       (b) Pressures greater than 100 psig: ASME B 16.5, Class 300,,ASTM 181 Gr. H, carbon
           steel, raised face
       (c) Flange bolts shall be hex head, Grade 5 or better.

b) GASKETS
   i) Steam and condensate piping: Spiral-wound using Type 304 stainless steel windings and non-
      asbestos filler and carbon steel outer ring (gauge ring). No exceptions.
   ii) Manufacturers: Flexitallic, Garlock, or Lamons.

c) VALVES AND CHECK VALVES

   i) All valves of any one kind, except as otherwise specified in detail specifications,
      shall be of one manufacturer, and where possible, all valves shall be of one
      manufacturer and are to be manufactured in accordance with the Manufacturers' Standardization Society (MSS) of the Valves and Fittings Industry Standards wherever applicable.

   ii) Provide extended handles or chain wheel operators for all valves that are located
       more than 7'-0" above the floor.

   iii) Provide valve handle extensions for all valves in insulated systems.

iv) Butterfly Valves:
   (1) Acceptable Manufacturers:
       (a) Keystone
       (b) Jamesbury
       (c) DeZurik
       (d) Vanessa
   (2) 2 inches and smaller - Use gate valve.
   (3) 2-1/2 inches and larger - Full-lug type, steam rated, worm gear actuator for all
       sizes. Valves shall be capable for use as isolation valves and be recommended
       by the manufacturer for dead-end service at the full-rated operating pressure.
       Keystone Fig. 362, Class 150, Trim 158 for steam pressures less than 100 psig
       and Keystone Fig. 372, Class 300, Trim 158 for steam pressure greater than 100
       psig.
(4) Applications: Shutoff valves for steam and condensate piping for line sizes 2-1/2" and larger.

v) Ball Valves:
   (1) Acceptable Manufacturers:
       (a) Apollo, Spirax/Sarco
   (2) Low and high-pressure steam and condensate:
       (a) 1/2 inch to 2 inches - Forged carbon steel, full port, three-piece body design, stainless steel blowout-proof stem with extension, stainless steel ball, MTFE seats and packing, stem packing shall be adjustable for wear with adjusting screw, 250 SWP, non-shock 1500 WOG. Apollo 73A-140-64.
   (3) Applications: Use only as shutoff/isolation valves on blowdown piping, gauge and instrumentation branches, and test ports.

vi) Gate Valves:
    (1) Acceptable Manufacturers: Anvil, Bonney Forge, and Vogt
    (2) Steam and condensate, 2 inches and smaller - Forged steel, Class 800, rising stem, O.S.&Y., spiral-wound top gasket.
    (3) Applications: Shutoff valves for steam and condensate piping for line sizes 2" and smaller.

vii) Globe Valves:
    (1) Acceptable Manufacturers: Anvil, Bonney Forge, and Vogt
    (2) Steam, all sizes - Forged steel, Class 800, O.S.&Y., spiral-wound top gasket.
    (3) Applications: steam flow modulation where shown on the drawings.

viii) Swing Check Valves:
    (1) Acceptable Manufacturers: Crane, Mueller, Milwaukee, and Stockham
    (2) Steam and condensate, all sizes and pressures, bronze bodies, Class 300, bronze disc, stainless steel hinge pin

ix) Spring Check Valves:
    (1) Acceptable Manufacturers: Armstrong BTU Max, and Durabla.
    (2) Steam and condensate, all sizes and pressures, all stainless steel construction, Class 300. Durabla Model SCV - 500 WSP

x) Wafer Spring Check Valves:
    (2) Steam and condensate, all sizes and pressures, all stainless steel construction (body, disc, spring and spring retainer), Class 300, opening pressure less than 1/2 psi. Spirax/Sarco Model DCV 4.

xi) Pressure Relief Valves:
    (1) Acceptable Manufacturers: Leslie Fig. 31 Series, Kunkle Models 6252 or 6253, Spirax/Sarco Model SV-73 Series.
    (2) Steam rated, cast iron body, bolted bonnet, dual control rings, bronze semi-nozzle or stainless steel trim, seats lapped to optical flatness.
d) PRESSURE GAUGES

i) Steam Pressure Gauges: 4-1/2" diameter face, 1% accuracy, dry, stainless steel case and internal parts, 1/8" MPT connection with anti-siphon "pigtail", stainless steel snubber and ball valve for isolation. Mount isolation valve upstream of pigtail.

ii) Ranges as follows:
   (1) Steam 7 psig or less – Gauge 0-15 psi
   (2) Steam 8 psig to 15 psig – Gauge 0-30 psi
   (3) Steam 16 psig to 30 psig – Gauge 0-60 psi
   (4) Steam 31 psig to 50 psig – Gauge 0-100 psi
   (5) Steam 51 or higher – Gauge 0-200 psi

iii) Acceptable Manufacturers: Trerice 700SS series; or equal.

e) LOW-PRESSURE (15 PSI MAX.) STEAM SPECIALTIES

i) Thermostatic Steam Radiator Traps:
   (1) Balanced pressure, thermostatic bellows type with semi-steel or cast or forge brass body, screwed top, and renewable stainless steel valve head and seat.
   (2) Provide bronze or model thermostatic element. Adjustable discharge temperature.
   (3) Acceptable manufacturers: Armstrong model TS-2, Nicholson model N-125, or Sterlco model 70 or 77.

ii) Float And Thermostatic Steam Traps:
   (1) Fully modulating type with ASTM A126 cast iron, Class 125 body and cover, suitable for continuous operation at 15 prig.
   (2) Stainless steel float; balanced pressure, thermostatic air vent; stainless steel seat and valve mechanism.
   (3) Armstrong series 15B, 15J, or 50K only (15J and 50K are high capacity traps).

iii) Inverted Bucket Steam Traps:
   (1) Greater than 600 lbs/hr.
      (a) Inverted bucket type with ASTM A278 cast iron, Class 125 body and cover, suitable for intermittent operation. Non-asbestos gasket and auxiliary air vent.
      (b) Stainless steel bucket, seat, and operating mechanism.
      (c) Options to include: large vent, trap alert.
      (d) Armstrong only, 800-813 or 814-816 Series.
   (2) 600 lbs/hr or less:
      (a) Stainless steel body and all components.
      (b) Separate in-line swivel converter.
      (c) Options to include: trap alert.
      (d) Armstrong Model 2011 p.c.

iv) Steam Trap Sizing:
   (1) Coils, absorption chillers and heat exchangers with modulated steam pressure:
      Size to handle a minimum of twice the maximum condensate load of the apparatus served at a differential pressure of 1/2 psi, or as noted on the drawings.
   (2) Steam mains and branch line drains: Size to handle a minimum of three times the maximum condensate load, or as noted on the drawings.
(a) Minimum size of traps used to drain steam mains and branches: \( \frac{3}{4} \) inch.
(3) For applications not listed, follow the guidelines in the Armstrong Steam Conservation Guidelines for Condensate Drainage Manual.

v) Steam Air Vents:
   (1) Automatic, thermostatic balanced pressure type, with brass or semi-steel bodies, and renewable stainless steel head and seat.
   (2) Stainless steel, thermostatic bellows, liquid filled.
   (3) Spirax/Sarco Models T202, VS204 or VS206; or equals by Armstrong or Hoffman ITT.

vi) Vacuum Breakers:
   (1) Brass or stainless steel body, tight-closing, spring-loaded SS ball type with EPR resilient seat and SS retainer tube.
   (2) Spirax/Sarco Model VB 14 (up to 100 psig) or VB 21, or equal by Johnson or Armstrong.

vii) Strainers:
   (1) Same as for High Pressure Steam Specialties.

f) HIGH PRESSURE (16 TO 140 psi) STEAM SPECIALTIES

i) Inverted Bucket Steam Traps:
   (1) Greater than 600 lbs/hr.
      (a) Inverted bucket type with ASTM A278 cast iron, Class 125 body and cover, suitable for intermittent operation. Non-asbestos gasket and auxiliary air vent.
      (b) Stainless steel bucket, seat, and operating mechanism.
      (c) Options to include: large vent, trap alert.
      (d) Armstrong only, 811-813 or 814-816 Series.
   (2) 600 lbs/hr or less:
      (a) Stainless steel body and all components.
      (b) Separate in-line swivel converter.
      (c) Options to include: trap alert.
      (d) Armstrong Model 2011.

ii) Steam Trap Sizing:
   (1) Steam mains and branch line drains: Size to handle a minimum of three times the maximum condensate load, or as noted on the drawings.
      (a) Minimum size of traps used to drain steam mains and branches: \( \frac{3}{4} \) inch.
   (2) For applications not listed, follow the guidelines in the Armstrong Steam Conservation Guidelines for Condensate Drainage Manual.

iii) Steam Air Vents:
   (1) Automatic, thermostatic balanced pressure type, with brass or semi-steel bodies, and renewable stainless steel head and seat.
   (2) Stainless steel, thermostatic bellows, liquid filled.
   (3) Spirax/Sarco Models T202 (up to 100 psig), VS204 or VS206; or equals by Armstrong or Hoffman ITT.
iv) Vacuum Breakers:
   (1) Brass or stainless steel body, tight-closing, spring-loaded SS ball type with
       EPR resilient seat and SS retainer tube.
   (2) Spirax/Sarco Model VB14 (up to 100 prig) or VB 21, or equal by
       Johnson or Armstrong.

v) Strainers:
   (1) 2" and smaller shall be screwed, cast iron, Y-type, 20-mesh stainless steel
       screen, 250 psi SWP. Spirax/Sarco IT, or equal by Leslie, Armstrong or
       Keckley.
   (2) 2-1/2 inches and larger shall be flanged, cast steel, Y-type, 1/32-inch
       perforated stainless steel screen for sizes up to 3", 1/8-inch perforated
       stainless steel screen for sizes up to 8".
       (a) Pressures 100 prig or less: Class 150, Sirax/Sarco Fig. 34, or equal by
           Leslie, Armstrong or Keckley.
       (b) Pressures greater than 100 psig: Class 300, Sirax/Sarco Fig. 34, or equal by
           Leslie, Armstrong or Keckley.
   (3) Provide threaded fitting for blow-down valve.

vi) Steam Pressure (or Temperature) Regulating Stations:
   (1) Pressure reducing valves with valved bypass, shutoff valve, strainer, and pressure gauge
       on upstream side; ASME pressure relief valve, control tube, pressure gauge, and shutoff
       valve on the downstream side.
   (2) Diaphragm operated pressure reducing valves with ASTM A126-71, Class B cast iron,
       Class 250 bodies, balanced design, stainless steel trim, and pilot operator.
   (3) Connections:
       (a) 2" or less, threaded.
       (b) 2-1/2" or greater, flanged, Class 250.
   (4) Furnish silencer/diffuser when necessary to reduce radiated noise to 75 dba (or
       less) 5 feet from valve.
   (5) Provide with Leslie Airmate Model AG-2 air pressure regulator for the valve
       pilot, with an integral pressure gauge. Pressure range 2-30 psig.
   (6) Leslie Controls Model GPK air loaded regulator only.

g) STEAM AND CONDENSATE METERS
   i) For line sizes 2" through 12" : inline differential pressure steam meter.
      (1) Provide meter with dual-transmitter Verabar field flow system with optional
          RTD.
      (2) Provide both 4 to 20 mA and pulse output signals, and a Kessler Ellis Products #ES-762
          flow computer only.
      (3) Connections:
          (a) For steam pressures greater than 100 psi: Class 300 flanges.
          (4) Manufacturer: Flanged dual transmitter Accelabar by Veris, Inc. only

h) EXPANSION JOINTS
   i) Design
      (1) The expansion joint shall be designed for 150 psig for low-pressure service
or 300 psig for high-pressure service at 500 °F for steam or condensate service.

(2) Expansion joint shall be (single/double) slip design and furnished with an anchor base. The ends of the slop and body shall be furnished with raised face flanges, rated for 150 lb. for low-pressure service or 300 lb. for high-pressure service.

(3) The stuffing box shall have integral and external guide surfaces. The guide shall have low friction, non-metallic inserts.

(4) The expansion joint shall have 2' minimum diameter packing cylinders welded in place to allow packing to be injected under full line pressure. The packing cylinder tip shall incorporate a "check valve effect" tip design to prevent the blow back of packing while adding packing to the expansion joint at full line pressure.

(5) The packing friction force of the expansion joint shall not exceed 1,000 psi of expansion joint nominal diameter.

(6) All circumferential body welds shall be of the butt weld type.

ii) Materials

(1) The stuffing box and body shall be machined from A106 or equivalent, heavy wall, seamless pipe.

(2) The slip shall be machined from A106, schedule 80 seamless pipe. All slips are to be machined and ground to achieve a 16RMS finish before plating. Plating shall consist of 1 mil. minimum of industrial hard chrome over 1 mil. minimum of crack-free hard chrome.

(3) Expansion joint shall be factory packed for the intended service with Flake Graphite Injectable Packing. The stuffing box packing area in contact with the slip shall be at least 15 times the nominal diameter of the expansion joint. Spare packing plugs are to be furnished with each expansion joint supplied.

iii) Insulation Blankets

(1) A two piece removable reusable insulation blanket is to be provided with the expansion joint to cover the expansion joint body and slip, and is to incorporate access to the packing cylinders without removal of the body portion of the blanket.

(2) The inner and outer covers are to be made from Silicone Impregnated Nomex Cloth. An Inconel wire mesh liner is to be attached to the inner cover.

iv) Approved Manufacturers

(1) Advanced Thermal Systems, or UCB approved equal.

i) PIPE GUIDES

i) All pipe guides shall be fabricated by a supplier regularly engaged in the manufacture of these items.

ii) Pipe guides shall utilize $\frac{1}{2}$" thick low friction graphite on both the upper and lower backing plates of each assembly. The guides shall have sufficient contact surface between the upper and lower assemblies to ensure the loading does not exceed 300
iii) Steel components shall be fabricated from ASTM A36 steel, or equivalent.

iv) Pipe guides shall accommodate, as a minimum, the insulation thickness specified for the mating pipe.

v) The upper assembly shall be attached to the pipeline by field welding. The lower assembly shall be attached to the structural support by field welding or bolting as shown on the plans.

vi) All guides shall be constructed to allow a minimum 8" of axial movement and maximum +/- 1/16" of lateral and 1/8" vertical-up movement.

vii) The graphite shall be epoxy bonded to the backing plate for all applications. If service conditions exceed 350 °F the graphite shall be both epoxy bonded and mechanically attached.

viii) Approved Manufacturers

(1) Advanced Thermal Systems, or UCB approved equal.

j) PIPE ANCHORS

i) Pipe anchors shall prevent axial movement of the pipe.

(1) Anchors shall consist of a flat base which can be welded or bolted to an immobile surface.

(2) The anchor shall be welded along the axial dimension of the pipe and also be welded radially to the pipe at each end of the anchor assembly.

(3) The anchor shall be constructed of carbon steel.

(4) Minimum resisting force of the anchor.

   (a) 2” Pipe size – 12,000 min anchor force.
   (b) 3” Pipe size – 15,000 min anchor force.
   (c) 4” Pipe size – 18,000 min anchor force.
   (d) 6” Pipe size – 18,000 min anchor force.
   (e) 8” Pipe size – 24,000 min anchor force.
   (f) 10” Pipe size – 29,000 min anchor force.
   (g) 12” Pipe size – 30,000 min anchor force.

(5) Acceptable Manufacturers:

   (a) Pipe Technology and Products, Fig. 100, T-Bar Cradle, or equal.

k) LOW-FRICTION PIPE SUPPORTS

i) All low-friction pipe supports shall be fabricated by a supplier regularly engaged in the manufacture of such items.
ii) Pipe guides shall utilize \( \frac{1}{2} \)" thick low friction graphite on both the upper and lower backing plates of each assembly. The guides shall have sufficient contact surface between the upper and lower assemblies to ensure the loading does not exceed 300 psi.

iii) Steel components shall be fabricated from ASTM A36 steel, or equivalent.

iv) Pipe guides shall accommodate, as a minimum, the insulation thickness specified for the mating pipe.

v) The upper assembly shall be attached to the pipeline by field welding. The lower assembly shall be attached to the structural support by field welding or bolting as shown on the plans.

vi) All guides shall be constructed to allow a minimum 8" of axial movement and +/- 3" of lateral movement.

vii) The graphite shall be epoxy bonded to the backing plate for all applications. If service conditions exceed 350 °F the graphite shall be both epoxy bonded and mechanically attached.

viii) Approved Manufacturers
   (1) Advanced Thermal Systems Fig. 200 or 201, or UCB approved equal.

3) EXECUTION

a) PIPING APPLICATIONS
   i) Low Pressure Steam:
      (1) 2 inches and smaller: Pipe specification A
      (2) 2-1/2 inches and larger: Pipe specification B

   ii) High Pressure Steam:
      (1) 2 inches and smaller: Pipe specification A
      (2) 2-1/2 inches and larger: Pipe specification B

   iii) Condensate:
      (1) 2 inches and smaller: Pipe specification C
      (2) 2-1/2 inches and larger: Pipe specification D

b) INSTALLATION
   i) Piping Installation - General:
      (1) Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of piping systems. Locations and arrangements of piping take into consideration pipe sizing and friction loss, expansion, pump sizing, other design considerations. So far as practical, install piping as indicated.
      (2) Provide a complete piping installation, including connections to equipment and
installation of automatic control valves furnished by the Temperature Control Contractor. Install control valves with a minimum length equivalent to four pipe diameters of straight pipe entering valve and with the stem upright.

3) Support piping at connections to pumps so there is no strain on pump flanges.

4) Pitch piping to obtain required air relief and drainage.

5) Make an allowance for expansion in the installation of piping so the variation in temperature will not cause undue stress at any point. Securely anchor pipes where necessary to properly distribute expansion stresses. Support branch mains and risers in a way that will permit expansion and contraction of risers and to relieve runouts of all weight.

6) Provide unions or flanges at each control valve and at each piece of equipment.

7) Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.

8) Refer to Section 15060, "Hangers and Supports," for hanger spring and additional installation requirements.

9) Pipe Cleaning:
   a) Clean interior of all piping before installation. Remove any fugitive dust, dirt, and/or threading debris.
   b) Flush sediment out of all completed piping systems. Refer to Section 15050, "Basic Mechanical Materials and Methods," for cleaning and flushing requirements.

10) Install pipe penetration seals on all piping at exterior wall penetrations.

11) Coat threads on all flanged fittings with Permatex, metal-based, 200°F rated, anti-seize compound.

ii) Threaded Piping: All threaded fittings shall be sealed with virgin Teflon tape. No pipe dope sealant shall be allowed.

iii) Steam Supply and Condensate Return Pipe Installation:
   1) Install steam supply and return lines with straight side of eccentric fittings at bottom of pipe.
   2) All steam lines shall pitch 1 inch per 40 feet in the direction of flow.
   3) Return piping shall pitch down 1 inch per 30 feet in the direction of flow.
   4) Runouts from steam mains to risers shall be pitched back to the main with a fall of not less than \( \frac{1}{2} \) inch per foot.
   5) Connect condensate and steam branch lines to the top of mains.

iv) Steam Specialties:
   1) Install steam specialties of types and sizes as shown and/or scheduled on the plans.
   2) Install vacuum breakers at all air handling equipment coils and heat exchangers and at other locations as shown and/or scheduled on the plans.

c) EXPANSION COMPENSATION

i) A Where noted on the drawings, provide expansion compensation hardware to limit the expansion of the steam and condensate piping between the anchors shown, so that piping stress limits are kept within accepted safety limits.
ii) Provide expansion joints, piping alignment guides, anchors and supports as called for in the engineered expansion compensation submittal.
   (1) Provide low-friction piping supports at points where lateral motion of the piping is allowed as part of the expansion compensation system.
   (2) Space the piping alignment guides and supports as called for in the submittal.

d) FIELD QUALITY CONTROL

i) Pipe Testing:
   (1) All piping systems shall be tested and proven tight prior to insulation or concealment. The tests shall be witnessed by the Owner's Representative or his designee.
   (2) Ensure that the test pressure, which might damage equipment, does not reach such units by valving them off or otherwise isolating them during the test.
   (3) Open and close all system valves at least once while system is pressurized to test valve packing. Tighten as required.
   (4) All hydrostatic tests shall be held for a minimum of four hours without loss of system pressure. All air tests shall be held for a minimum of twelve hour without loss of air pressure.
   (5) When job site conditions do not permit the use of water, air may be used in lieu of water.
   (6) Test pressures shall be as follows:
      (a) Low-pressure Steam and Condensate Piping: 100 psig hydrostatic or 1.5 times operating pressure, whichever is greater
      (b) Medium and High Pressure Steam and Condensate Piping: 250 psig hydrostatic or 1.5 times operating pressure, whichever is greater.
SECTION 15185 – WATER TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hot water heating
   2. Domestic and Chilled Water

B. Related sections:
   1. 15050 – Basic Materials and Methods
   2. 15110 - Valves
   3. 15120 – Piping specialties
   4. 15145 – Plumbing Piping Systems
   5. 15180 – Heating and cooling specialties

1.2 SUBMITTALS:

A. Refer to section 15050 for general requirements

B. Product data: Manufacturers product data

C. Chemicals: Submit data on all chemical including MSDS sheet.

D. Shop drawings: Manufacturers assembly drawings

E. Wiring diagrams: Manufacturers diagrams

F. Closeout submittals: O&M’s

1.3 QUALITY ASSURANCE:

A. Qualifications:
   1. Single water treatment company responsible for all services.
   2. Company active in field of commercial/industrial industrial water treatment for min 10
      years with full time personnel on staff
   3. Submit list of references and satisfied customers for review.

B. Regulatory requirements:
   1. All chemicals furnished must be acceptable to the EPA and all government agencies
      having jurisdiction.
   2. Standards: Materials and methods must conform to applicable ASME sections.
1.4 TRAINING:
   A. Train University personnel. Minimum (2) 4 hour sessions.

1.5 WARRANTY:
   A. Refer to 15050 for general requirements.

PART 2 – PRODUCTS

2.1 CHEMICALS:
   A. Supplier:
      a. Drew Industrial Division

2.2 CHEMICAL FEED PUMPS:
   A. Features:
      a. Electronically activated diaphragm pump
      b. Non-corrosive construction – polypropylene, Teflon, ceramic components
      c. 110 Volts
   B. Manufacturer:
      a. LMI, Model A151-392SI

2.3 WATER METERS:
   A. Manufacturers:
      a. Badger
      b. LMI
      c. Seametrics

2.4 CONTROLLERS:
   A. Manufacturer:
      a. LMI, Model DC4500-111A, 110V

2.5 WYE STRAINERS:
   A. Must have stainless screens 40 to 60 mesh
2.6 CHEMICAL TREATMENT

A. Closed water systems: A buffered corrosion inhibitor shall be provided to initially treat the closed system listed above. This treatment must contain steel and copper corrosion inhibitors and a polymer dispersant/scale inhibitor.

B. Glycol:
   a. A solution of water an inhibited ethylene glycol shall be provided for the closed systems as listed herein.
   b. The glycol percentage provided is 40% by volume for makeup air unit combination heating/cooling coil systems. Each system is isolated from the building system by a heat exchanger.
   c. Reference UCB standards for proper ethylene glycol to be used.

C. Cleaning:
   a. Provide heavy duty cleaning materials as necessary to remove dirt and/or oil deposits from all new piping systems and equipment.

2.7 FILTER POT FEEDER

A. Provide bypass type pot feeders with ¾” NPT pipe connections and 3-1/2” quick opening top with o-ring seat. Capacity as specified herein, rated for 200 psig working pressure at a temperature up to 240 deg F. Provide replaceable 5 micron filter with type 304 stainless steel strainer basket with 1/8” perforations, Sage Equipment Model WC-32299.

2.8 GLYCOL FEED

A. Provide a means of glycol fill as indicated in the drawings.

2.9 COUPON HOLDER

A. A 2-stage coupon holder rack is to be provided with isolation valves in all water systems that are to be treated.
   1. The coupon holder rack shall be assembled using 1” PVC Schedule 80 pipe and fittings for all systems, except heating water systems. For heating water systems, use 1” schedule 80 steel pipe.
   2. Assembly shall be rated for 125 psig working pressure at 125 deg F ambient for chilled water and 250 deg F for heating.
   3. Provide a flow control ball valve with memory stop.
   4. Provide visual flow meter in the rack assembly.
   5. Mount rack so the hottest water in the system flows through it.
B. The water treatment contractor shall install both copper and steel coupons in the rack as required and shall submit written reports to the owner and engineer at the end of each 90 days during the warranty period.

PART 3 – EXECUTION

3.1 INSTALLATION
   A. Pot feeders shall be mounted so the top is no more than 36” above the floor.
   B. Install wye strainers upstream of all sensors.

3.2 PIPE SYSTEM FLUSHING AND CLEANING
   A. Clean and flush new and modified piping before use.
   B. Clean closed systems with Drew Flushout 624L or equal.
   C. Once system is flushed add the closed system inhibitors.

3.3 DOMESTIC WATER STERILIZATION
   A. Provide 10% bleach solution for sterilization
   B. Inject the bleach solution into the main water supply serving the facility.
      a. Run all domestic water supply faucets at ¼ to ½ gallon per minute
   C. Begin pumping bleach and adjust the bleach injection rate such that a 1.0 to 2.0 ppm free CL2 residual is attained at all faucets.
   D. Maintain the listed flow rates and free chlorine residuals at each faucet for a 4 to 6 hour period.
   E. Cease bleach injection. Monitor free CL2 residuals at faucets and note when the free CL2 residual drops below 2.0 ppm. Run all faucets for an additional 2 hours at a ¼ to ½ gpm rate.

END OF SECTION 15185
SECTION 15900 - HVAC INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

B. See Division 15 Section "Sequence of Operation" for requirements that relate to this Section.

1.2 SUBMITTALS

A. Product Data: Include manufacturer's technical literature for each control device indicated, labeled with setting or adjustable range of control. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
2. Wiring Diagrams: Power, signal, and control wiring.
3. Details of control panel faces, including controls, instruments, and labeling.
4. Schedule of dampers including size, leakage, and flow characteristics.
5. Schedule of valves including leakage and flow characteristics.

C. Field quality-control test reports.

D. Operation and maintenance data.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is an approved installer of the automatic control system manufacturer for both installation and maintenance of units required for this Project.

B. 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.

C. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilation Systems."
D. Year-2000 Compliant: Computer hardware and software shall be capable of accurately processing, providing, and receiving date data from, into, and between the twentieth and twenty-first centuries, including leap-year calculations.

1.4 COORDINATION

A. Coordinate location of exposed control sensors with plans and room details before installation.

B. Coordinate equipment with Division 16 Section "Motor-Control Centers" to achieve compatibility with motor starters and annunciation devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Monitor Corp.
2. Atkomatic Valve Company, Inc.
3. BEC Controls Corp.
4. Belimo Aircontrols (USA), Inc.
5. CEA Instruments Inc.
6. Channel Products Inc.
7. Condyne Technology, Inc.
8. Delta Controls Inc.
9. DGH Systems, LLC.
10. Diversified Electronics, Inc.
11. Ebtron, Inc.
13. Enerstat Corp.
14. Erie Controls.
15. Functional Devices Inc.
17. General Eastern Instruments, Inc.
19. Hayward Industrial Products, Inc.
20. Heat-Timer Corp.
22. HyCal Sensing Products.
23. ICM Corp.
24. Intec Controls Corp.
27. KMC Controls/Kreuter Manufacturing Company.
28. Landis & Staefa, Inc.
29. Leslie Controls, Inc.
30. Magnatrol Valve Corporation.
32. Paragon Electric Co., Inc.
33. Parker Hannifin Corp.; Skinner Valve Division.
34. RAM Electronics Corp.
35. RDF Corporation.
36. Sauter Controls Corporation.
37. Sensidyne, Inc.
38. Sherwood Products, Inc.
40. SSAC Inc.
41. TCS/BASYS Controls; HVAC Sensors & Transducers Division.
42. Texas Instruments, Inc.; Commercial Sensors & Controls.
43. Thunder Scientific Corporation.
44. Time Mark Corporation.
45. Tour & Andersson Control, Inc.; HVAC Sensors & Transducers Div.
46. TSI Inc.; Environmental Measurements & Controls Div.
47. Uni-Line North America; Robertshaw Division.
48. Vaisala, Inc.
49. Valvcon Corporation.
50. Vent Products Co., Inc.

2.2 CONTROL PANELS

A. Central (Master) Control Panels: Fully enclosed, steel-rack-type cabinet with locking doors or locking removable backs. Match finish of panels and provide multicolor graphic displays, schematically showing system being controlled.

B. Local Control Panels: Unitized cabinet with suitable brackets for wall or floor mounting, located adjacent to each system under automatic control. Provide common keying for all panels.

1. Fabricate panels of 0.06-inch- (1.5-mm-) thick, furniture-quality steel, or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock and with manufacturer's standard shop-painted finish.
3. Door-Mounted Equipment: Flush-mount (on hinged door) manual switches, including damper-positioning switches, changeover switches, thermometers, and gages.
4. Graphics: Color-coded graphic, laminated-plastic displays on doors, schematically showing system being controlled, with protective, clear plastic sheet bonded to entire door.

C. Alarm Panels: Indicating light for each alarm point, single horn, acknowledge switch, and test switch, mounted in hinged-cover enclosure.

1. Alarm Condition: Indicating light flashes and horn sounds.
2. Acknowledge Switch: Horn is silent and indicating light is steady.
3. Second Alarm: Horn sounds and indicating light is steady.
4. Alarm Condition Cleared: System is reset and indicating light is extinguished.
5. Contacts in alarm panel allow remote monitoring by independent alarm company.

2.3 SENSORS

A. Electronic Sensors: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

   a. 100 Ohm DIN RTD
   b. Wire: Three wire lead compensation.
   c. 1mA Excitation current with reverse polarity protection.
   d. Temperature resolution: 0.01C.
   e. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches (64 mm).

2.4 CONTROL CABLE

A. Electronic Cable for Control Wiring: As specified in Division 16 Section "Control/Signal Transmission Media."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment level and plumb.
B. Install labels and nameplates to identify control components according to Division 15 Section "Basic Mechanical Materials and Methods, Mechanical Identification."
C. Install hydronic instrument wells, valves, and other accessories according to Division 15 Section "Hydronic Piping."
D. Install electronic cables according to Division 16 Section "Control/Signal Transmission Media."

3.2 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Division 16 Section "Raceways and Boxes."
B. Install building wire and cable according to Division 16 Section "Conductors and Cables."
C. Install signal and communication cable according to Division 16 Section "Control/Signal Transmission Media."
1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
2. Install exposed cable in raceway.
3. Install concealed cable in raceway.
4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.

3.3 CONNECTIONS

A. Install piping adjacent to machine to allow service and maintenance.

B. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

C. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

D. Ground equipment.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove malfunctioning units, replace with new units, and retest.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment, and retest.
3. Calibration test controllers by disconnecting input sensors and stimulating operation with compatible signal generator.

B. Engage a factory-authorized service representative to perform startup service.

C. Replace damaged or malfunctioning controls and equipment.

1. Start, test, and adjust control systems.
2. Demonstrate compliance with requirements, including calibration and testing, and control sequences.
3. Adjust, calibrate, and fine tune circuits and equipment to achieve sequence of operation specified.

3.5 DEMONSTRATION
A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls

3.6 ON-SITE ASSISTANCE

A. Occupancy Adjustments: Within one year of date of Substantial Completion, provide up to three Project-site visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting sensors and controls to suit actual conditions.

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SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

PART I - GENERAL

1.1 EXECUTION OF THE WORK

A. These specifications call out certain duties of the Contractor and his Subcontractors. They are not intended as a material list of items required by the Contract.

B. Provide all items and work indicated on the Drawings and all items and work called for in this division of the specification in accordance with the conditions of Division One - General Requirements, of the Contract Documents. This includes all incidentals, equipment, appliances, services, hoisting, scaffolding, supports, tools, supervision, labor, consumable items, fees, licenses, etc., necessary to provide complete systems. Perform start-up and checkout on each item and system to provide fully operable systems.

C. Examine and compare the Electrical Drawings and Specifications with the Drawings and Specifications of other trades, and report any discrepancies between them to the Architect/Engineer and obtain from him written instructions for changes necessary in the work. At time of bid the most stringent requirements must be included in said bid. Install and coordinate the electrical work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner approved by the Architect/Engineer. All changes required in the work of the Contractor, caused by his neglect to do so, to be made by him at his own expense.

D. It is the intent of the Drawings and Specifications to provide a complete workable system ready for the Owner's operation. Any item not specifically shown on the Drawings or called for in the Specifications, but normally required to conform with the intent, are to be considered a part of the Contract.

E. These Specifications are basically equipment and performance Specifications. Actual installations shall be as shown on the Drawings. Installations and details shown on the Drawings shall govern where these differ from the Specifications.

F. All materials furnished by the Contractor shall be new and unused and free from defects. All materials used shall bear the Underwriters' Laboratory, Inc. label provided a standard has been established for the material in question.

G. No exclusion from, or limitation in, the symbolism used on the Drawings for electrical work or the languages used in the Specifications for electrical work shall be interpreted as a reason for omitting the accessories necessary to complete any required system or item of equipment.

1.2 COORDINATION OF THE WORK

A. Certain materials will be provided by other trades. Examine the Contract Documents to ascertain these requirements.
B. Carefully check space requirements with other trades and the physical confines of the area to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings. Make modifications thereto as required and approved.

C. Transmit to other trades all information required for work to be provided under their respective Sections in ample time for installation.

D. Wherever work interconnects with work of other trades, coordinate with other trades to insure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the ceiling trade will know where to install access doors and panels.

E. Consult with other trades regarding equipment so that motor controls are of the same manufacture.

F. Due to the type of the installation, a fixed sequence of operation is required to properly install the complete system. Coordinate, project and schedule work with other trades in accordance with the construction sequence.

G. The locations of meters, controllers, outlets, panels and other equipment indicated on the Drawings are approximately correct, but they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in consequence of increase or reduction of the number of outlets, or in order to meet field conditions or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.

1.3 EXAMINATION OF SITE

A. Prior to the submitting of bids, the Contractor shall visit the site of the job and shall familiarize himself with all conditions affecting the proposed installation and shall make provisions as to the cost thereof. Failure to comply with the intent of this paragraph will in no way relieve the contractor of performing all necessary work shown on the Drawings.

1.4 PROGRESS OF WORK

A. The Contractor shall order the progress of his work so as to conform to the progress of the work of other trades and shall complete the entire installation as soon as the conditions of the building will permit. Any cost resulting from the defective or ill-timed work performed under this section shall be borne by the Contractor.

1.5 SHOP DRAWINGS

A. Prepare and submit detailed shop drawings for materials, systems and equipment as listed herein, including clearly identified manufacturer catalog numbers.
B. The work described in any shop drawing submission shall be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. Each submitted shop drawing shall include a certification that all related job conditions have been checked and that no conflict exists.

C. All drawings shall be submitted sufficiently in advance of field requirements to allow ample time for checking and resubmitting as may be required. All submittals shall be complete and contain all required and detailed information.

D. Acceptance of any submitted data or shop drawings for material, equipment apparatus, devices, arrangement and layout shall not relieve Contractors from responsibility of furnishing same of proper dimensions and weight, capabilities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Contract. Such acceptance shall not relieve Contractor from responsibility for errors, omissions or inadequacies of any sort on submitted data or shop drawings.

E. Each shop drawing shall contain job title and reference to the applicable drawing and specification article.

F. Individual shop drawing submittals shall be provided for each specific material, system or equipment as identified herein. Submittals provided in other than this manner will be returned without review.

G. Each equipment submittal shall substantiate conformance to the specification by supplying a document indicating equipment submitted meets or exceeds each line item in the specification or exception taken. Submittals provided without this information will be returned without review.

H. Shop Drawing Submittals shall be provided for the applicable equipment.
   1. Wire and Cable (16120)

1.6 EQUIPMENT ACCESSORIES

A. Provide supports, hangers and auxiliary structural members required for support of the work.

B. Furnish and set all sleeves for passage of raceways through structural, masonry and concrete walls and floors and elsewhere as will be required for the proper protection of each raceway and bus duct passing through building surfaces.

C. Wall mounted equipment may be directly secured to wall by means of steel bolts. Groups or arrays of equipment may be mounted on adequately sized steel angles, channels, or bars. Prefabricated steel channels providing a high degree of mounting flexibility, such as those manufactured by Kindorf, Globe-Strutt and Unistrut, may be used for mounting arrays of equipment.
1.7 CUTTING, PATCHING, ETC.

A. The work shall be carefully laid out in advance. Where cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support or anchorage of raceway, outlets or other equipment, the work shall be carefully done. Any damage to the building, piping, equipment or defaced finish plaster, woodwork, metalwork, etc. shall be repaired by skilled mechanics of the trades involved at no additional cost to the Owner.

B. The Contractor shall do no cutting, channeling, chasing or drilling of unfinished masonry, tile, etc., unless he first obtains permission from the Owner. If permission is granted, the Contractor shall perform this work in a manner approved by the Owner.

C. Where conduits, outlet, junction or pull boxes are mounted on a painted surface, or a surface to be painted, they shall be painted to match the surface. Wherever support channels are cut, the bare metal shall be cold galvanized.

D. Slots, chases, openings and recesses through floors, walls, ceilings, and roofs will be provided by the various trades in their respective materials. The trade requiring them to properly locate such openings shall be responsible for any cutting and patching caused by the neglect to do so.

1.8 DEMOLITION AND CONTINUANCE OF EXISTING SERVICES

A. All existing electrical services not specifically indicated to be removed or altered shall remain as they presently exist.

B. Should any existing services, etc., interfere with new construction, the Contractor shall (after obtaining written approval from the Owner) alter or reroute such existing equipment to facilitate new construction.

C. Under no circumstances shall existing services, etc., be terminated or altered unless deemed necessary by the Owner or specified herein; also, prior to altering any existing situation, the Contractor shall notify the Owner in writing giving two (2) weeks advance notice of planned alteration.

D. It shall be solely the Contractor's responsibility to guarantee continuity of present facilities (with respect to damage or alteration due to new construction) and any unauthorized alteration to existing equipment shall be corrected by the Contractor to the Owner's satisfaction at the Contractor's expense.

1.9 CLEANING UP

A. Contractor shall take care to avoid accumulation of debris, boxes, crates, etc., resulting from the installation of his work. Contractor shall remove from the premises each day all debris,
boxes, etc., and keep the premises clean, subject to the Architect/Engineer's instructions, which shall be promptly carried out.

1.10 SUPPORTS

A. Support work in accordance with the best industry practice and the following.

B. Include supporting frames and racks extending from floor slab to ceiling slab for work indicated as being supported from walls where the walls are incapable of supporting the weight. In particular, provide such frames or racks in electric closets.

C. Include supporting frames or racks for equipment, intended for vertical mounting, which is required in a free standing position.

D. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

E. Nothing, (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways, or cables for support, except that threaded hub type fittings having a gross volume not in excess of 100 cubic inches may be supported by heavy wall conduit, where the conduit in turn is securely supported from the structure within five inches of the fittings on two opposite sides.

F. Nothing shall rest on, or depend for support on, suspended ceiling media (tiles, lath, plaster, as well as splines, runners, bars and the like in the plane of the ceiling).

G. Provide required supports and hangers for conduit, equipment, etc., so that loading will not exceed allowable loadings of structure.

1.11 FASTENINGS

A. Fasten electrical equipment and devices to building structure in accordance with the best industry practice and the following.

B. As a minimum procedure, where weight applied to the attachment points is 100 pounds or less, fasten to building elements of:
   1. Wood - with wood screws.
   2. Concrete and solid masonry - with bolts and expansion shields.
   3. Hollow construction - with toggle bolts.
   4. Solid metal - with machine screws in tapped holes or with welded studs.
C. For items which are shown as being ceiling mounted at locations where fastening to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to the building structural elements.

PART 2 - PRODUCTS

2.1 If products and materials are specified or indicated on the Drawings for a specific item or system, use those products or materials. If products and materials are not listed in either of the above, use first class products and materials, subject to approval of Shop Drawings where Shop Drawings are required or as approved in writing where Shop Drawings are not required.

2.2 All equipment capacities, etc., are listed for job site operating conditions. All equipment sensitive to altitudes or ambient temperatures to be derated and method of derating shown on Shop Drawings. Where operating conditions shown differ from the laboratory test conditions, the equipment to be derated and the method of derating shown on Shop Drawings.

PART 3 - EXECUTION

3.1 Follow manufacturer's instructions for installing, connecting and adjusting all equipment. Provide one copy of such instructions to the Architect/Engineer before installing any equipment. Provide a copy of such instructions at the equipment during any work on the equipment. Provide all special supports, connections, wiring, accessories, etc.

3.2 Use mechanics skilled in their trade for all work.

3.3 Keep all items protected before and after installation. Clean up all debris.

3.4 Perform all tests required by local authorities in addition to tests specified herein, such as life safety systems.

3.5 Applicable equipment and materials to be listed by Underwriters' Laboratories and Manufactured in accordance with ASME, NEMA, ANSI or IEEE standards and as approved by the Owner.

3.6 Before commencing work, examine all adjoining, underlying, etc., work on which this work is in any way dependent for perfect workmanship and report any condition which prevents performance of first class work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.

END OF SECTION
SECTION 16060 - IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. General: Provide fixed identification of all distribution equipment and conductors in accordance with the Contract Documents.

B. Related Work Specified in Division 16000
   1. Wiring Devices – Section 16141

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest recommendations of the following.
   1. Industry standards shall apply.

PART 2 - PRODUCTS

2.1 Lettering heights unless otherwise noted must be as follows:

<table>
<thead>
<tr>
<th>Items</th>
<th>Lettering Height</th>
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<tbody>
<tr>
<td>Switches and Receptacles</td>
<td>1/8&quot;</td>
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2.2 Labeling shall be made with an electronic label printer, similar to Dymo. White tape with black lettering.

2.3 The Engineer reserves the right to request additional nameplates at time of review of shop drawings and upon site observations. These shall be furnished at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 SWITCHES AND RECEPTACLES

A. Electronic tape or neatly written in permanent ink on the inside face

3.2 PULL AND JUNCTION BOX COLOR CODING

A. All junction box and pull box covers are to be color coded as follows:
   Computer Data – Blue
   277/480V Systems - Orange

END OF SECTION
SECTION 16110 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 DESCRIPTION
   A. General: Provide raceways in accordance with the Contract Documents.

1.1 STANDARDS
   A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:
      1. Electrical Metallic Tubing
         a. UL Standard UL-797.
         b. ANSI C80-3
         c. Federal Specification WW-C-563
      2. Wireways and Auxiliary Gutters
         a. U.L. Standard UL-870

1.2 SUBMITTALS
   A. Provide listing of manufacturers proposed in the submittal list identified in Section 16035 of these specifications.
   B. Where wireways and/or auxiliary gutters are employed full erection drawings must be submitted. Drawings to include plan views, elevations, size of wireways, type and quantity of conductors proposed to be installed therein, etc.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS
   A. Electric Metallic Tubing – Allied, Wheatland, AFC Cable Systems, or approved equal.
   B. Wireways & Auxiliary Cutters - Square D, Cooper B-Line, Hoffman, or approved equal.
   C. Outlet, Junction & Pull Boxes – Thomas & Betts, Hubbell Inc., Cooper Crouse-Hinds, or approved equal.
2.2 RACEWAY TYPES

A. Electric Metallic Tubing
   1. Continuous, seamless tubing galvanized or sheradized on the exterior coated on the interior with a smooth hard finish of lacquer, varnish or enamel.
   2. All couplings, connectors, etc., used in conjunction with this raceway which are 2 inch in size and smaller may be steel set screw type. Conduits of 2-1/2 inch in size and larger must employ steel compression gland fittings, "Tomic" tap-on or "Tomic" compression type or set screw type.

A. Wireways and Auxiliary Gutters
   1. Of sizes and shapes indicated on the Drawings and as required.
   2. Provide all necessary elbows, tees, connectors, adaptors, etc.
   3. Hinged cover secured with captive screws.
   4. Wire retainers not less than 12 inches on center.
   5. Steel with factory applied paint finish or natural brushed or stainless steel finish. Coordinate finish selection with Department of Facilities Management.

2.3 OUTLET, JUNCTION AND PULL BOXES

A. Provide zinc-coated or cadmium-plated sheet steel outlet boxes not less than 4 inches octagonal or square, unless otherwise noted. Equip fixture outlet boxes with 3/8 inch no-bolt fixture studs where required. Where fixtures are mounted on or in an accessible type ceiling, provide a junction box and extend flexible conduit to each fixture. Fit outlet boxes in finished ceiling or walls with appropriate covers, set flush with the finished surface. Where more than one switch or device is located at one point, use gang boxes and covers unless otherwise indicated. Sectional switch boxes or utility boxes will not be permitted. Provide Series "GW" (Steel City) tile box, or as accepted, or a 4 inch square box with tile ring in masonry walls which will not be plastered or furred. Where drywall material is utilized provide plaster ring. Provide outlet boxes of the type and size suitable for the specific application. Where outlet boxes contain 2 or more 277 volt devices, or where devices occur of different applied voltages, or where normal and emergency devices occur in same box, provide suitable barrier.

B. Construct junction or pull boxes not over 150 cubic inches in size as standard outlet boxes, and those over 150 cubic inches the same as "cabinets", with screw covers of the same gauge metal.
C. Plug any open knockouts not utilized.

PART 3 - EXECUTION

3.1 APPLICATION OF RACEWAYS

A. The following applications must be adhered to except as otherwise required by Code. Raceways not conforming to this listing must be removed by this Contractor and replaced with the specified material at this Contractor's expense.

B. Raceway Types

<table>
<thead>
<tr>
<th>Raceway Types</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.M.T.</td>
<td>Application: Interior partitions, above ceilings, exterior walls, above grade, prohibited in the following: hazardous or corrosive areas, concrete slabs or walls, below grade.</td>
</tr>
<tr>
<td>Wireways/Gutter</td>
<td>Application: Where indicated on the Drawings and as otherwise specifically approved.</td>
</tr>
</tbody>
</table>

C. The use of MC and AC cable is not permitted in any part of the facility.

3.2 RACEWAY SYSTEMS IN GENERAL

A. The minimum size conduits shall be 3/4 inch.

B. Provide raceways for all wiring systems, 277/480 volt wiring must be kept independent of 120/208 volt wiring. All types of raceways (metallic and nonmetallic) shall have ground conductors. The grounding conductor shall be considered an insulated conductor when sizing raceway. Minimum size 3/4 inch for home runs and 1 inch minimum for power distribution. Wiring of each type and system must be installed in separate raceways.

C. Install capped bushings on raceways as soon as installed and remove only when wires are pulled. Securely tie embedded raceway in place.

D. Locate raceways so that the strength of structural members is unaffected and they do not conflict with the services of other trades. Install 1-inch or larger raceways in or through structural members (beams, slabs, etc.) only when and in the manner accepted by the Owner. Draw up couplings and fittings full and tight. Protect threads from corrosion with one (1) coat red lead and zinc chromate after installation.

E. Raceways in hung ceilings shall be run on and secure to slab or primary structural members of ceiling, not to latching channels or T-bars, Z-bars or other elements which are the direct supports of the ceiling panels. Secure conduit firmly to steel by clips and fittings designed for that purpose. Install as high as but not less than 1'-0" above hung ceilings.
F. Exposed raceways shall be run parallel or at right angles with building lines. Secure raceway clamps or supports to masonry materials to toggle bolts, expansion bolts, or steel inserts. Install raceway on steel construction with approved clamps which do not depend on friction or set-screw pressure alone.

G. Clear raceway of all obstructions and dirt prior to pulling in wires or cables. This shall be done with ball mandrel (diameter approximately 85% of conduit inside diameter) followed by close fitting wire brush and wad of felt or similar material. This assembly may be pulled in together with, but ahead of the cable being installed. All empty raceways shall be similarly cleaned. Clear any raceway which rejects ball mandrel.

H. Support less than 2" trade size, vertically run, raceways at intervals no greater than eight feet. Support such raceways, 2" trade size or larger, at intervals no greater than the story height, or fifteen feet, whichever is smaller.

I. Support less than 1" trade size, horizontally run, raceways at intervals no greater than seven feet. Support such raceways, 1" trade size or larger, at intervals no greater than ten feet.

1.3 WIREWAYS AND AUXILIARY GUTTER

A. Wireways installed in hung ceilings shall be placed such that the cover will hinge upward from the side.

B. 12" clear shall be provided from wireway cover when it is in the open position.

3.4 OUTLET, JUNCTION AND PULL BOXES

A. Provide outlet, junction, and pull boxes as indicated on the Drawings and as required for the complete installation of the various electrical systems, and to facilitate proper pulling of wires and cables. Junction boxes and pull boxes shall be sized per N.E.C. minimum.

B. The exact location of outlets and equipment is governed by structural conditions and obstructions, or other equipment items. When necessary, relocate outlets so that when fixtures or equipment are installed, they will be symmetrically located according to the room layout and will not interfere with other work or equipment. Verify final location of outlets, panel equipment, etc., with Architect.

C. Back-to-back outlets in the same wall, or "thru-wall" type boxes not permitted. Provide 16-inch (minimum) spacing for outlets shown on opposite sides of a common wall to minimize sound transmission.

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION

A. General: Provide 600 volt wire and cable in accordance with the Contract Documents.

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:

1. Conductors
   a. ASTM
   b. NEMA WC 5

2. Terminal Blocks
   a. UL-1059

1.3 SUBMITTALS

A. Provide listing of manufacturers proposed in the submittal list identified in Section 16035 of these specifications.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Wire and Cable

1. Power - General Electric, Triangle, General Cable, Okonite, Simplex, South Wire, Kerite, Rome.


B. Connectors

1. Hand Applied
   a. "Wing Nut" (Ideal Industries), "Piggy" (Thomas & Betts) or "Scotchlok"

2. Tool Applied
a. Manufacturer: "Scotchlok" S-11, S-31 (3M Company), "Stakon" (Thomas & Betts), "Number 410 Crimp Connector" (Ideal Industries), or "Wrap-Cap" (Buchanan).

C. Electric Tape
   1. Johns-Manville or 3M Company

2.2 WIRE AND CABLE

A. General
   1. Provide wire with a minimum insulating rating of 600 volts, except for wire used in 50 volts or below applications for control of signal systems use 300 volt minimum or 600 volt where permitted to be incorporated with other wiring systems.

B. Conductor
   1. Electrical grade, annealed copper, tinned if rubber insulated, and fabricated in accordance with ASTM standards. Minimum size number 12 for branch circuits; number 14 for control wiring.
   2. All conductors are copper.

C. Stranding and Number of Conductors
   1. Cables larger than number 10, stranded in accordance with ASTM Class B stranding designations.
   2. Control wires stranded in accordance with ASTM Q Class B stranding designations.

D. Insulation
   1. Type THW or THWN-Thermoplastic insulation suitable for use in wet locations up to 75 degrees centigrade. Use for lighting, receptacle and motor circuits and for panel and equipment feeders.
   2. Type THHN - Flame retardant: Heat-resistant thermoplastic insulation, nylon jacket rated for 90 degrees centigrade operation. Use for lighting branch circuit wiring installed and passing through the ballast channels of fluorescent fixtures, wiring in metal roof decks in or near roof insulation, in attic or joist spaces, or in raceways exposed to the sun.
   3. Consult equipment manufacturer for insulation type when installation requires an insulation rating above 90 degrees centigrade.
E. Color Coding

1. Provide consistent color coding of all feeders, sub feeders, motor circuits and the like as follows:

<table>
<thead>
<tr>
<th>120/208 Volts Code</th>
<th>277/480 Volts Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase A – Black</td>
<td>Phase A - Brown</td>
</tr>
<tr>
<td>Phase B – Red</td>
<td>Phase B - Orange</td>
</tr>
<tr>
<td>Phase C – Blue</td>
<td>Phase C - Yellow</td>
</tr>
<tr>
<td>Neutral – White</td>
<td>Neutral - Grey</td>
</tr>
<tr>
<td>Ground – Green</td>
<td>Ground – Green</td>
</tr>
</tbody>
</table>

2. Color-code wiring for control systems installed in conjunction with mechanical and/or miscellaneous equipment in accordance with the wiring diagrams furnished with the equipment. Factory color code wire number 8 and smaller. Wire number 6 and larger may be color coded by color tapping of the entire length of the exposed ends.

2.3 CONNECTORS

A. Make connections, splices, taps and joints with solderless devices, mechanically and electrically secure. Protect exposed wires and connecting devices with electrical tape or insulation to provide not less than that of the conductor.

B. Branch Circuit wires (Number 10 and smaller): Use any of the following types of terminals and connecting devices:

1. Hand applied
   a. Coiled tapered, spring wound devices with a conducting corrosion-resistant coating over the spring steel and a plastic cover and skirt providing full insulation for splice and wired ends. Screw connector on by hand.

2. Tool applied
   a. Steel cap, with conduction and corrosion resistant metallic plating, open at both ends, fitted around the twisted ends of the wire and compressed or crimped by means of a special die designed for the purpose. Specifically fitted plastic or rubber insulating cover wrap over each connector.

2.4 ELECTRICAL TAPE

A. Specifically designed for use as insulating tape.
2.5 LUBRICANT

A. Use lubricant only where the possibility of damage to conductors exists. Use only a lubricant approved by the cable manufacturer and one which is inert to cable and raceways.

PART 3 - EXECUTION

3.1 WIRE AND CABLE

A. Provide a complete system of conductors in raceway system. Mount wiring through a specified raceway, regardless of voltage application.

B. Drawings do not indicate size of all branch circuit wiring. For branch circuits whose length from panel to furthest outlet exceeds 100 feet for 120-volt circuits or 200 feet for 277-volt circuits, use number 10 or larger. Voltage drop of branch circuiting shall be within three (3) percent of system voltage. Conductor sizing shall adhere to the following tables.

C. Do not install wire in incomplete conduit runs nor until after the concrete work and plastering is completed and moisture is swabbed from conduits. Eliminate splices wherever possible. Where necessary, splice in readily accessible pull, junction, or outlet box.

D. Provide cable supports for all vertical risers where required by code not to exceed the following:

<table>
<thead>
<tr>
<th>Minimum Conductor Size</th>
<th>Vertical Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>Copper</td>
</tr>
<tr>
<td>No. 18 AWG to No. 8 AWG</td>
<td>100 ft</td>
</tr>
<tr>
<td>No. 6 AWG to No. 0 AWG</td>
<td>200 ft</td>
</tr>
<tr>
<td>No. 00 AWG to No. 0000 AWG</td>
<td>180 ft</td>
</tr>
<tr>
<td>211,601 CM to 350,000 CM</td>
<td>135 ft</td>
</tr>
<tr>
<td>350,001 CM to 500,000 CM</td>
<td>120 ft</td>
</tr>
<tr>
<td>500,001 CM to 750,000 CM</td>
<td>95 ft</td>
</tr>
</tbody>
</table>

E. Flashover or insulation value of joints to be equal to the of the conductor. Provide Underwriters' Laboratories listed connectors rated at 600 volts for general use and 1000 volts for use between ballasts and lamps or gaseous discharge fixtures.

F. Use terminating fittings, connectors, etc., of a type suitable for the specified cable furnished. Make bends in cable at termination prior to installing compression device. Make fittings tight.

G. Install wire in raceways and make up terminations in accordance with manufacturer's recommendations using special washers, nuts, etc., as required. Use an accepted wire-pulling lubricant equivalent to "Yellow" (Ideal) for all wire number 4 and larger. Strip insulation so as to avoid nicking of wire.

H. Extend wire sizing for the entire length of a circuit, feeder, etc. unless specifically noted otherwise.
END OF SECTION
SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

A. General: Provide wiring devices in accordance with the Contract Documents.

B. Related work Specified in Division 16000
   1. Electrical General Provisions (Mounting Heights) - Section 16010
   2. Identification - Section 16060
   3. Raceways and Boxes - Section 16110
   4. Wire and Cable - Section 16120

C. Related Work Specified in Other Divisions of these Specifications
   1. Finish painting

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:

   1. Receptacles
      a. N.E.M.A. Standard WD-1, 3.02 through 3.10

1.3 SUBMITTALS

A. Submit manufacturer's catalog cuts and specifications for all wiring devices and plates.

B. Switches and receptacles shall be of the same manufacturer.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Duplex Convenience Receptacles
1. Hubbell - 5362
2. Pass & Seymour - Approved equal
3. Leviton - Approved equal

B. Faceplates
   1. Nylon: Hubbell P Series or approved equal
      Stainless: Hubbell S Series or approved equal

2.1 DUPLEX CONVENIENCE RECEPTACLES


B. All devices connected to the emergency system are to be red in color.

C. Color of normal devices as selected by Architect.

2.2 FACEPLATES

A. Provide cover plates for wall receptacles, outlets, and switches of nylon to match device finish, unless otherwise noted. When two or more switches or devices are shown in one location, mount under a common plate.

PART 3 - EXECUTION

3.1 RECEPTACLES

A. Unless otherwise noted, mount receptacle vertically with U-shaped ground position at bottom.

B. Prior to final closeout replace broken faceplates, switches and receptacles.

END OF SECTION
SECTION 16430 – ELECTRICITY METERING

PART 1- GENERAL

1.1 DESCRIPTION

A. General: Provide metering equipment for service entrance and feeders.

1.1 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and recommendations of the following:

1. Underwriters Laboratories (UL) listed equipment, assemblies and materials.


1.2 SUBMITTALS

A. With each metering location, the following is required. Submittals failing to meet this criteria will be returned without a review or acceptance.

1. Data sheets for metering equipment, terminal blocks, current transformers, and all other components necessary for a complete and operational system.

2. Refer to Section 16035 concerning the procedure and additional documents for submittals.

3. Drawings show in dimensions and mounting arrangements of enclosures, and must note the manufacturer's name and catalog number of all significant components such as circuit breakers. The short circuit rating of complete modular meter centers shall be indicated.

4. Field wiring and connection diagrams.

5. Description and/or diagrams of field modifications.

1.3 QUALITY ASSURANCE

A. Qualifications

1. The company producing the equipment of this section shall have a minimum of ten years experience in work of similar scope and nature to that specified.

PART 2 - PRODUCTS

ELECTRICITY METERING 16430-1
2.1 APPROVED MANUFACTURERS:

A. Meters:
   1. Main service entrance meter: Powerlogic Ion8600.
   2. Sub meter: Powerlogic Ion8400

2.2 Instrument Transformer:

A. Potential Transformer:

1. Metering Potential Transformers:
   a. Potential transformers are to be installed with all kWH meters on systems above 120/208 volts.
   b. .3 metering accuracy class.
   c. Placed in the switch gear and protected by fusing and a disconnect.
   d. All metering is presently 3 phase 4 wire systems.
   e. Land on (terminated at) a terminal block in the switch gear.

2. Current Transformers: (ANSI/IEEE C57.13 & C37.20)
   a. Provide a four point shorting terminal strip for the C.T. wiring in the switch gear.
   b. Rating factor of 4.0 @ 30 degree centigrade and 3.0 @ 55 degrees to allow for greater thermal capacity under loads at levels above 5 amps for greater billing accuracy.
   c. .3 accuracy class.
   d. Size the current transformers according to the following power transformer sizes:

<table>
<thead>
<tr>
<th>Transformer Size</th>
<th>277/480V</th>
<th>120/208V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000KVA</td>
<td>500:5</td>
<td>1200:5</td>
</tr>
<tr>
<td>750KVA</td>
<td>400:5</td>
<td>1000:5</td>
</tr>
<tr>
<td>500KVA</td>
<td>300:5</td>
<td>600:5</td>
</tr>
<tr>
<td>300KVA</td>
<td>200:5</td>
<td>400:5</td>
</tr>
<tr>
<td>225KVA</td>
<td>100:5</td>
<td>300:5</td>
</tr>
<tr>
<td>150KVA</td>
<td>75:5</td>
<td>200:5</td>
</tr>
</tbody>
</table>

PART 3- EXECUTION

3.1 INSTALLATION

A. Provide potential transformer, ratio, and polarity tests and wiring checks.
B. Provide current transformer, ratio and polarity tests and wiring checks.
C. Provide Modbus connections to each meter back to Andover Cx controller panel as designated by the Owner.
D. Metering and test switch must be installed and accepted before permanent power will be established to the facility.

E. Provide a 6¼” hole at 72” AFF or less at eye level, in the main switch gear to CU’s standard meter and a 3¼” by 8” rectangular hole for a meter test switch. Meters will be installed by CU’s Utilities Generation and Distribution High Voltage Department. No other meter will be placed in the switch gear.

F. For all electric meter applications and installations (i.e. sub-meters), contact Utilities Generation and Distribution for details.

END OF SECTION