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**EKLC – RM – M309 - Renovation**  
CP 004122

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ADVERTISEMENT FOR BIDS

State of Colorado
University of Colorado
Notice Number: 10-22

Project No: PR004122
Project Title: EKLC – RM M309 - Renovation
Estimated Construction Cost: $645,000.00

Project Description
Renovation of an existing fourth level attic space into a state-of-the-art optics laboratory by adding a clerestory roof on top of an historic building on the University of Colorado Boulder campus.

Project Information
1. The Principal Representative has determined that the entire project shall be substantially complete within 180 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 14 calendar days, 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 at the mandatory prebid meeting November 4, 2010 at 10:00 AM in Ekeley Sciences Building, Room M339, 1601 Central Campus Mall, Boulder, CO.

4. A $100.00 is required for each complete set of Contract Documents. Make check payable to insituedesign. 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 November 4, 2010 at 10:00 AM. in Ekeley Sciences Building, Room M339, 1601 Central Campus Mall, Boulder, CO.

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

Date & Time: November 18, 2010 2:00 PM.

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

**Point of Contact**

Name: Jim Wollum, Project Manager
Agency: University of Colorado at Boulder
Phone: 303-905-2299
Fax: 303-492-4082
Email: jwollum@earthlink@colorado.edu

*This Notice is also available on the web at www.colorado.gov/dpa/dfp/sbrep*
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 #**  
  CP 004122

- **Project Name**  
  EKLC – RM 309 - Renovation

- **Name and Address of Bidder**  
  __________________________________________________

- **Date of Opening**  
  November 18, 2010

- **Time of Opening**  
  2:00 PM

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: **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:
   a. Kiewit Building Group – brent.given@kiewit.com  
      Krische Construction, Inc. – vmpilk@krischeconstruction.com  
      Sprung Construction – tom@sprungconstruction.com  
      Sun Construction & Facilities Services, Inc. – darmstrong@sunconstruction.com

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  
      (c) Subcontract description (be specific)  
      (d) Subcontract amount  
      (e) Subcontract change orders  
      (f) Building owner representative and current telephone number  
      (g) Building architect name and current telephone number  
      (h) General contract name and current telephone number  

   (3) 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:

Jim Wollum, Project Coordinator  
Email: jwollum@earthlink.net  
Phone: 303-905-2299

11. **BID SCHEDULE:**  
Plans specification available: November 4, 2010  
Mandatory pre-bid conference: November 4, 2010 10:00 AM  
Last day for questions: November 10, 2010 2:00 PM  
Last day for substitutions/approval due: November 12, 2010 2:00 PM  
Last day for addenda issue: November 16, 2010 2:00 PM  
Bid date: November 18, 2010 2:00 PM

END
City of Boulder
Sales/Use Tax Division
303-441-3050

CONTRACTORS WORKING ON NON-CITY PERMITTED PROJECTS

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: ________________________________

A. ____________________________ B. ____________________________ C. ____________________________

Full Contract price
Multiply ‘A’ by 0.5
Multiply ‘B’ by 0.0341

“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
BID

Institution/Agency: University of Colorado at Boulder
Project No./Name: CP 004122 / EKLC – RM M309 - Renovation

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: 180 calendar days
- b. Time Period from Substantial completion to Final Acceptance: 14 calendar days
- c. Time of Completion of Entire Project (a + b): 194 calendar days

1. BID: Pursuant to the advertisement by the State of Colorado dated May 20, 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:

Company Name

ATTEST

Address (including city, state and zip)

Phone number:

Secretary

Signature

Name (Print)

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.
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

Address (including city, state and zip)

Phone number:

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

Attorney-in-Fact

SECRETARY

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.
NOTICE OF AWARD

Date of Notice: 

Institution/Agency: University of Colorado at Boulder
Project No./Name: CP004122 / EKLC – M309 - Renovation

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 Thousand, and no/100 Dollars* ($ *) is hereby accepted, pending final execution of the Agreement.

Base Bid $ 
Total Contract Amount $ *

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, and Certification and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of this Notice, the State Controller is 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 Project, or otherwise dispose thereof.

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

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative or by any other means to which the parties agree.
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

University of Colorado at Boulder

CONTRACTOR'S AGREEMENT
DESIGN/BID/BUILD
(STATE FORM SC-6.21)

CONTRACT ID NUMBER:
AGENCY IDENTIFICATION NUMBER:
PROJECT NUMBER: CP 004122
PROJECT NAME: EKLC – M309 - Renovation
PROJECT MANAGER: Jim Wollum
CONTRACTOR:

November 2010
STATE OF COLORADO
CONTRACTOR’S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

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Attachment – Notice of Award

Exhibits:

A Contractor's Bid (Form SC-6.13)
B Performance Bond (Form SC-6.22)
C Labor and Material Payment Bond (Form SC-6.221)
D Insurance Certificates
E Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work)
F Contract Management Information Construction Contractor
STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

Agency I.D. No.: ____________ Contract ID No.: ____________ Project No. CP004122

EKLC – RM 302 - Renovation

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 referred to as the
Principal Representative, and having its offices at 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 Contractor for any performance hereunder or be bound by any
provision hereof prior to the Effective Date.

WHEREAS, the Principal Representative intends to renovate an existing attic space into an
optics laboratory by adding a clerestory roof on top of an historic building, 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
Account Number CP004122, Contract Encumbrance Number TBD, and

WHEREAS, this is a phase one waived contract, waiver number 156 Contractors Agreement for Capital
Construction Form SC6.21.

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

ARTICLE 1. PERFORMANCE OF THE WORK
The Contractor shall perform all of the Work required for the complete and prompt execution of everything
described or shown in, or reasonably implied from the Contract Documents for the above referenced
Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS
The Contractor agrees to perform the Work to the highest industry standards and to the satisfaction of the
State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract
Documents.

ARTICLE 3. TIME OF COMPLETION
The Contractor agrees to Substantially Complete the Project within 180 calendar days from the date of
the Notice to Proceed, in addition, the Contractor agrees to finally complete the Project from Substantial
Completion to Final Acceptance within 14 calendar days for a total time of completion of the entire
Project of 194 calendar days. The Contractor shall perform 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 Construction
Contract SC-6.23 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 Construction Contract SC-6.23, the sum of

Hundred and 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 Construction Contract Sc-6.23, 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.”
SIGNATURE APPROVALS:
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

Project Name/Number: CP004122 / EKLC – RM 302 - Renovation
Contract ID No.: ________________________________________________________

THE CONTRACTOR

Legal Name of Contracting Entity

*Signature
By ____________________________________________
Name (print) Ronal. R. Ried, Director
Title Facilities Management Business Services
Date: ________________________________

STATE OF COLORADO, acting by and through:
The Regents of the University of Colorado
A Body Corporate

By: ____________________________________________
Date: ________________________________

APPROVED
DEPARTMENT OF PERSONNEL & ADMINISTRATION
STATE BUILDINGS PROGRAMS
State Architect (or authorized Delegate)

By: Paul M. Leef, AIA, LEED TM AP
Name (print) Campus Architect / Director, Planning, Design & Construction
Date: ________________________________

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

CRS §24-30-202 requires the State Controller to approve all State Contracts. This Contract is not valid until signed and dated below by the State Controller or delegate. Contractor is not authorized to begin performance until such time. If Contractor begins performing prior thereto, the State of Colorado is not obligated to pay Contractor for such performance or for any goods and/or services provided hereunder.

APPROVED:
STATE OF COLORADO
STATE CONTROLLER’S OFFICE State Controller (or authorized delegate)

By: Steve McNally, Associate Vice Chancellor & Controller
Date: ________________________________

APPROVED:
DEPARTMENT OF LAW
ATTORNEY GENERAL (or authorized delegate)

By: ________________________________
Date: ________________________________
STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT A – CP 004122 - EKLC – RM 302 - Renovation

CONTRACTOR’S BID (Form SBP-6.13)
PERFORMANCE BOND (Form SC-6.22)
LABOR AND MATERIAL PAYMENT BOND (Form SC-6.221)
STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT D - CP 004122 - EKLC – RM 302 - Renovation

INSURANCE CERTIFICATE(S) (attached)
Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work)  (UI-1, attached)
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: University of Colorado at Boulder  
Project No./Name: CP 004122 / EKLC – RM M309 - Renovation

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 EKLC – RM M309 - Renovation

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: PR 004122 / EKLC – RM M309 - Renovation

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 EKLC – RM M309 - Renovation

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 forebearance 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.
THE GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT
DESIGN/BID/BUILD
(STATE FORM SC-6.23)

Project Name       EKLC – M309 - Renovation
Project No.        CP 004122
Project Manager    Jim Wollum
Date               November 2010
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Note: The sections of the General Conditions indicated in *italics* (Articles 35 General and 35A, 35B, 37, 38, 46, 48B, 49 and 50) are regulatory and cannot be modified except through appropriate rule making procedures through the Division of Finance and Procurement, Department of Personnel & Administration.
General Conditions of Contract

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS
The Contract Documents consist of the following some of which are procedural documents used in the administration and performance of the Agreement:

1. Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General Conditions of the Construction Contract (SC-6.23) and if applicable, Supplementary General Conditions;
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.
7. Authorization to Bid (SBP-6.10)
8. Information for Bidders (SBP-6.12);
9. Bid (SBP-6.13);
10. Bid Bond (SBP-6.14);
11. Notice of Award (SBP-6.15);
12. Builder’s risk insurance certificates of insurance (ACORD 25-S);
13. Liability and workers’ compensation certificates of insurance;
14. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
15. Notice of Approval of Occupancy/Use (SBP-01);
16. Notice of Partial Substantial Completion (SBP-071);
17. Notice of Substantial Completion (SBP-07);
18. Notice of Partial Final Acceptance (SC-6.27);
19. Notice of Final Acceptance (SBP-6.271);
20. Notice of Partial Contractor's Settlement (SC-7.3);
21. Notice of Contractor's Settlement (SBP-7.31);
22. Application and Certificate for Contractor's Payment (SBP-7.2);
23. 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 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.

B. 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
2. 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 therefrom. The term “Contract” shall be interchangeable with this latter meaning of the term Agreement

3. 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.

4. 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.

5. 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.

6. 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.

7. 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

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.
13. OWNER. The term “Owner” shall mean the Principal Representative.

14. 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.

15. 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.

16. PRODUCT DATA. The term “Product Data” shall mean all submittals in the form of printed manufacturer’s literature, manufacturer’s specifications, and catalog cuts.

17. 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.

18. SAMPLES. The term “Samples” shall mean examples of materials or work provided to establish the standard by which the Work will be judged.

19. 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).

20. 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).

21. 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.

22. 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.

23. 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.

24. 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.

25. 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.

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

27. 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 bring 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, 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.

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<thead>
<tr>
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<th>OVERHEAD</th>
<th>PROFIT</th>
<th>COMMISSION</th>
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<tr>
<td>To the Contractor or to Subcontractors for the portion of work performed with their own forces:</td>
<td>10%</td>
<td>5%</td>
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<tr>
<td>To the Contractor or to Subcontractors for work performed by others at a tier immediately below either of them:</td>
<td>5%</td>
<td>5%</td>
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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 an Emergency Field Change Order form (SC-6.31E).

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 the Emergency 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) shall 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 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).

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 late 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 check list (SBP-05) 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 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 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 entitles 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**
Provided this Agreement can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof, provided that the Parties can continue to perform their obligations under this Agreement in accordance with its intent.
C. **SECTION HEADINGS**
   The captions and headings in this Agreement are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.

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 supersedes 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**
   All suits or actions related to this Agreement shall be filed and proceedings held in the State of Colorado and exclusive venue shall be in the City and County of Denver.

G. **NO THIRD PARTY BENEFICIARIES**
   Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to the Contract, and do not create any rights for such third parties.

H. **WAIVER**
   Waiver of any breach under a term, provision, or requirement of this Agreement, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

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 Architect/Engineer under this Contract is $100,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

   Architect/Engineer agrees to be governed, and to abide, by the provisions of CRS 24-102-205, 24-102-206, 24-103-601, 24-103.5-101, 24-105-101, and 24-105-102 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.
Architect/Engineer’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 Architect/Engineer’s performance shall be part of the normal contract administration process and Architect/Engineer’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 Architect/Engineer’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 Architect/Engineer’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. Architect/Engineer 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 Architect/Engineer 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 Principal Representative, and showing of good cause, may debar Architect/Engineer and prohibit Architect/Engineer from bidding on future contracts. Architect/Engineer 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 Architect/Engineer, by the Executive Director, upon a 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 initialed 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 ____________________________ ($           ) 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 ____________________________ ($           ) 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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</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Category</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td>General Aggregate</td>
<td>$2,000,000</td>
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<tr>
<td>Products/Completed Operations Aggregate</td>
<td>$2,000,000</td>
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<tr>
<td>Each Occurrence Limit</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Personal/Advertising Injury</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Fire Damage (Any One Fire)</td>
<td>$50,000</td>
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<tr>
<td>Medical Payments (Any One Person)</td>
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**Excess/Umbrella Liability (as required-See Coverages #3)**

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<tr>
<td>General Aggregate Limit</td>
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<tr>
<td>Products/Completed Operations Aggregate</td>
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**Automobile Liability**

<table>
<thead>
<tr>
<th>Category</th>
<th>Limit</th>
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<tbody>
<tr>
<td>Bodily Injury/Property Damage (Each Accident)</td>
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Workers’ Compensation

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

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

| Per Loss | $1,000,000 |
| Aggregate | $1,000,000 |

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 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.

Builder’s 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: CP 004122 / EKLC – M309 - Renovation
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)
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS
CHANGE ORDER PROPOSAL

Change Order Proposal No.    Date  

Reference
Change Order Bulletin No.:    Date  

Contractor
University of Colorado at Boulder

Institution or Agency
CP 004122-EKLC-M309-Renovation

Project No./Name

(Before completing this form, read instructions on reverse side.)

PART I - WORK PERFORMED BY CONTRACTOR

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Direct Labor Costs</td>
<td>$</td>
</tr>
<tr>
<td>2.</td>
<td>Labor Overhead (Direct Labor Burdens) (______% X Line 1)</td>
<td>$</td>
</tr>
<tr>
<td>3.</td>
<td>Total Contractor’s Labor Costs (Lines 1 and 2)</td>
<td>$</td>
</tr>
<tr>
<td>4.</td>
<td>Direct Materials Costs</td>
<td>$</td>
</tr>
<tr>
<td>5.</td>
<td>Materials Overhead (Delivery Costs &amp; Taxes) (______% X Line 4)</td>
<td>$</td>
</tr>
<tr>
<td>6.</td>
<td>Total Materials Costs (Lines 4 and 5)</td>
<td>$</td>
</tr>
<tr>
<td>7.</td>
<td>Total Equipment Costs</td>
<td>$</td>
</tr>
<tr>
<td>8.</td>
<td>PART I - TOTAL CONTRACTOR’S L, M &amp; E COSTS (Lines 3, 6 and 7)</td>
<td>$</td>
</tr>
</tbody>
</table>

PART II - WORK PERFORMED BY SUBCONTRACTOR

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

PART III - CONTRACTOR’S OVERHEAD & PROFIT

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

PART IV - CONTRACTOR’S MARKUP ON SUBCONTRACTOR

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

PART V - SUBTOTAL C.O. PROPOSAL (Parts I and II and III and IV)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Totals: Parts V and VI</td>
<td>$</td>
</tr>
</tbody>
</table>

PART VI - CONTRACTOR’S BOND COST

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Totals: Parts V and VI</td>
<td>$</td>
</tr>
</tbody>
</table>

PART VII - GRAND TOTAL CHANGE ORDER PROPOSAL

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Totals: Parts V and VI</td>
<td>$</td>
</tr>
</tbody>
</table>

PART VIII - CONTRACT TIME

COMPLETION DATE (IS) (IS NOT) EXTENDED ___ CALENDAR DAYS AS A RESULT OF THIS PROPOSAL.

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.

Firm: ______________________________
Name & Title: _______________________
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: _________________________

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

PRINCIPAL REPRESENTATIVE (Institution or Agency)   STATE BUILDINGS PROGRAMS (or Authorized Delegate)

_________________________   __________________________
Date: ______________________   Date: ______________________
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>= $</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<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>= $</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<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>= $</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<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.

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.
CHANGE ORDER

Change Order No: ___________________________ Date ___________________________
Contractor: ___________________________
Institution or Agency: University of Colorado at Boulder
Project No./Name: CP004122 / EKLC – M309 - Renovation

Your Change Order Proposal, dated __________ is 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 hereeto.)

This change order was originated by the Contractor □, Architect/Engineer □, State □, and / 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.

Architect/Engineer Firm ___________________________ Name and Title (print) ___________________________ Date ___________________________
Signature

Contractor (Name of Firm) ___________________________ Name and Title (print) ___________________________ Date ___________________________
Signature

University of Colorado at Boulder ___________________________ Principal Representative (Signature) ___________________________ Date ___________________________

CONTRACT STATUS

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

STATE BUILDINGS PROGRAMS
(or Authorized Delegate)
Paul M. Leef, AIA, LEED AP
Campus Architect &
Director, Planning, Design & Construction

STATE CONTROLLER
(or Authorized Delegate)
Steve McNally, Associate Vice Chancellor &
Controller

Approved ____ PM
Approved ____ PM Supervisor
10/14/09

(Verification)
REQUEST FOR INFORMATION
(RFI # 01)

Project No. Project Name: PR 004122 / EKLC – RM M309 - Renovation

Date: 
To: 
From: 
Sent Via: 

Drawing Ref.: Spec. Ref.: 

Subject: 

Proposed Solution: 

Schedule Impact: NO YES

Cost Impact: 

#1 Estimated Cost: 

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>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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></td>
<td>MY010905</td>
</tr>
</tbody>
</table>

### Follow-up required for:
- 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 occupational 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**

**Contractor Name:** Contractor  
**Phone Number:**

**Contractor Representative:** (signature) Foreman or Superintendent  
**Date Signed:**
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

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: CP004122 / EKLC – M309 - Renovation

To:

This is to advise you that your Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Affidavit Regarding Unauthorized Immigrants 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.

The completion date of the Project is ______________ (M/D/YYYY).

By ____________________________________________________________________________
State Buildings Programs
(or Authorized Delegate)
Paul M. Leef, AIA, LEED TM 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; or by any other means to which the parties agree.
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS
CERTIFICATION AND AFFIDAVIT REGARDING UNAUTHORIZED IMMIGRANTS

Institution/Agency: University of Colorado at Boulder
Project No./Name: PR 004122 / EKLC – RM M309 - Renovation

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
STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF SUBSTANTIAL COMPLETION

Date of Substantial Completion: 

Date to be inserted by the Principal Representative

Institution/Agency: University of Colorado at Boulder

Project No./Name:

TO: Jim Wollum, 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></th>
<th>DATE COMPLETED</th>
<th>A/E SIGNOFF</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Notice of Approval of Occupancy/Use has been fully executed and the Inspection Cards are completely signed-off.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>On the Pre-Acceptance Punch List (Form SBP-06) the final punch list items are noted by the Architect/Engineer.</td>
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<td>3.</td>
<td>Schedule for corrections, deficiencies, and items to be supplied are established by Contractor.</td>
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<td>4.</td>
<td>Final Change Orders are processed (must be completed prior to Notice of Acceptance).</td>
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<td>5.</td>
<td>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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<td>6.</td>
<td>Permanent keying, keys and keying instructions have been performed.</td>
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<td>7.</td>
<td>Extra materials as per specifications are delivered to Principal Representative.</td>
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<td>8.</td>
<td>As-built drawings have been submitted to Architect/Engineer.</td>
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<td>9.</td>
<td>Guarantee/Warranty documentation requirements are met.</td>
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<td>10.</td>
<td>Removal of Contractor’s temporary work including cleanup and debris removal.</td>
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<td>11.</td>
<td>State personnel are instructed in system and equipment operations as required by contract.</td>
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<td>12.</td>
<td>All Instructions, manuals, guides, and charts have been transmitted to Principal Representative.</td>
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</tbody>
</table>

Architect/Engineer:
insituesign

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
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.

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

*When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.
NOTICE OF CONTRACTOR’S SETTLEMENT

Institution/Agency: University of Colorado at Boulder
Notice Number: CP004122 / EKLC – M309 - Renovation

Notice is hereby given that on , 2010 at Department of Facilities Management, 1540 30th Street, Room 303, Campus Box 453 UCB, Boulder, CO 80309, 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 as referenced above.

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 the Authority for College, Institution, Department or Agency.

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.

Authorized Facility Manager or Authorized Individual

Name: __________________________
Approval Date: __________________
Agency: University of Colorado at Boulder
Phone: __________________________
Fax: 303-492-4082
Email: __________________________ (project manager)

MEDIA OF PUBLICATION:

PUBLICATION DATE:
First:

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.
**Notice to Contractors:**

**ENVIRONMENTAL RESPONSIBILITIES**

Given To:  
Contractor:  
Project No.:  
Signature:  
Project Name:  
/ Date:

Contractors working on the UCB campus must comply with all applicable University, City, State and Federal environmental regulations and standards.

This includes but is not limited to:

- Developing and implementing Storm Water Management Plans, obtaining associated permits (i.e. dewatering), and using erosion control techniques and Best Management Practices (BMP's) to protect drains and sewer systems from inappropriate discharges, paying special attention to preventing any contaminants from entering storm sewers or surface water collection systems.
- Properly managing and disposing of hazardous and regulated materials.
- Controlling dust, odors, vapors, debris and run-off during project activities.
- Reporting spills or releases of hazardous materials immediately! Call 911 and during weekdays report to EH&S 303-492-6025.

You are expected do your part to promote awareness and compliance. Violations can result in serious penalties and fines for contractors!

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**

| Spills and Emergencies | Post contingency/preparedness plan; prevent releases to the environment; call 911 immediately to report hazardous spills, & weekdays report to EH&S 303-492-6025 |
| Construction Waste & Debris | Keep saw-cut slurry, drywall mud, grout and mortar, paint, sediment, and all Waste other wastes and process water OUT OF GUTTERS, STREETS, STORM DRAINS, AND PARKING LOTS! Use proper BMP's to protect from run-off and discharges, see website for examples of BMP's related to project activities: http://www.bouldercolorado.gov/www/pac/government/index.html; sweep and shovel solid materials to contractor supplied 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. |
| OSHA | Follow applicable regulations for confined space entry (e.g. tunnels), 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 assessment (ESA) is required prior to beginning work--call EH&S Asbestos/Lead Unit 303-492-6168. |
| Dust Control | Use wet methods, exhaust fans, HEPA vacs, barriers, etc.; watch for fire alarms in buildings that could be activated by dusts; 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. Coordinate disposal with EH&S Haz Mat Unit 303-492-8531. |
| Odors and Vapors, IAQ | Use protective measures such as barriers, smoke eaters, exhaust fans, ventilation system controls, etc. to capture harmful odors/vapors; watch for building air intakes & coordinate work with building occupants to avoid exposures/complaints. |
| De-watering | Water must be visibly clear without a petroleum “sheen” to be discharged; solids must be settled-out or removed prior to discharge. Dewatering permits may be required from the Colorado Department of Public Health and Environment (CDPHE) - Water Quality Division 303-692-3500. |
| Utility Locates | Before digging, ALWAYS call the Utility Notification Center of Colorado (UNC) 1-800-922-1987. |
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: CP004122 / EKLC – RM M309 - Renovation

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.</td>
<td>The Notice of Substantial Completion has been issued and the Building Inspection Record is <strong>Cards are completely signed-off (or a Temporary Certificate, or Certificate, of Occupancy has been issued and copies attached)</strong>.</td>
</tr>
<tr>
<td>2a.</td>
<td>Notification has been made to the local Fire Department concerning which portion(s) of the building will be occupied and the date(s).</td>
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<tr>
<td>2b.</td>
<td>Fire alarms, smoke detection systems and building fire sprinkler systems have been fully checked and are operable.</td>
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<tr>
<td>2c.</td>
<td>The building’s fire connections must be installed and operable, if applicable.</td>
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<tr>
<td>3.</td>
<td>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>
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<td>4.</td>
<td>Sterilization of plumbing systems has been performed.</td>
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<td>5.</td>
<td>Operational test of systems and equipment has been performed as required.</td>
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<tr>
<td>6.</td>
<td>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.</td>
<td>Principal Representative furnished equipment and furnishings are coordinated and placed.</td>
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<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>
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<tr>
<td>9.</td>
<td>All restroom facilities must be fully functional and operable.</td>
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<tr>
<td>10.</td>
<td>All light fixtures must be installed and operable.</td>
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<td>11.</td>
<td>All exit lights and emergency lighting systems have been checked and are operable.</td>
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<td>12.</td>
<td>All windows have been glazed and hardware is available for ventilation purposes.</td>
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<tr>
<td>13.</td>
<td>All routes of egress must be clear of construction materials and debris at all times.</td>
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<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>
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</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  
insituidesign  

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  

Post Construction Warranty Report

Project: PR 004122 / EKLC – RM M309 - Renovation
Warranty Contractor:__________________________________________
Date Warranty Begins:_________ Date Warranty Expires:_________
Facilities Management (F/M) 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
## CONTRACTOR'S APPLICATION FOR PAYMENT

**Detail of Schedule of Values**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of Work</th>
<th>Material</th>
<th>Labor and Other (C + D)</th>
<th>Totals</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>
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**ORIGINAL CONTRACT TOTALS (SUM)**

- Material: $0.00
- Labor and Other: $0.00
- Total: $0.00

**AMENDMENTS/CHANGE ORDER DEDUCTIONS**

- $0.00

**AMENDMENTS/CHANGE ORDER ADDITIONS**

- $0.00

**PRESENT CONTRACT TOTALS**

- Material: $0.00
- Labor and Other: $0.00
- Total: $0.00

**TOTAL**

- $0.00
### Project Submittal Log

**Project** PR 004122 / EKLC - RM M309 - Renovation

<table>
<thead>
<tr>
<th>Spec. Section No.</th>
<th>Sub No.</th>
<th>Contr No.</th>
<th>Description</th>
<th>Contr/ SUB Contr</th>
<th>Submit Date</th>
<th>Date Rec From Contr</th>
<th>No. of Copies Rec</th>
<th>Date Returned to Architect</th>
<th>Action</th>
<th>Date Returned to Contractor</th>
<th>Distribution copies-Transferred</th>
<th>DAYS OUT TO Architect</th>
<th>DAYS OUT TO Contractor</th>
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**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.
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SECTION 03100 — CONCRETE FORMWORK  
SECTION 03200 — CONCRETE REINFORCEMENT  
SECTION 03300 — CAST-IN-PLACE CONCRETE  
SECTION 04100 — MORTAR AND GROUT  
SECTION 04150 — MASONRY ACCESSORIES  
SECTION 04400 — STONE  
SECTION 04460 — LIMESTONE  
SECTION 04470 — SANDSTONE  
SECTION 05120 — STRUCTURAL STEEL  
SECTION 05300 — METAL DECKING  
SECTION 05400 — COLD FORMED METAL FRAMING  
SECTION 05500 — METAL FABRICATIONS  
SECTION 06200 — FINISH CARPENTRY  
SECTION 07210 — BUILDING INSULATION  
SECTION 07270 — FIRESTOPPING  
SECTION 07530 — WATERPROOFING ROOFING  
SECTION 07600 — FLASHING AND SHEET METAL  
SECTION 07900 — JOINT SEALERS  
SECTION 08100 — METAL DOORS AND FRAMES  
SECTION 08520 — ALUMINUM WINDOWS  
SECTION 08710 — FINISH HARDWARE  
SECTION 08800 — GLAZING  
SECTION 09260 — GYPSUM BOARD SYSTEMS  
SECTION 09900 — PAINTING  
SECTION 10400 — IDENTIFYING DEVICES
SECTION 10520 — FIRE PROTECTION SPECIALTIES
SECTION 12346 — WOOD LABORATORY CASEWORK
SECTION 12348 — LABORATORY TOPS, SINKS, AND ACCESSORIES
SECTION 15010 — BASIC MECHANICAL REQUIREMENTS
SECTION 15040 — COMMON MOTOR REQUIREMENTS FOR MECHANICAL EQUIPMENT
SECTION 15041 — ENCLOSED MOTOR CONTROLLERS FOR MECHANICAL EQUIPMENT
SECTION 15100 — VALVES
SECTION 15135 — METERS AND GAUGES
SECTION 15140 — SUPPORTS AND ANCHORS
SECTION 15190 — MECHANICAL IDENTIFICATION
SECTION 15250 — MECHANICAL INSULATION
SECTION 15300 — WATER-BASED FIRE SUPPRESSION SYSTEMS
SECTION 15411 — DOMESTIC WATER PIPING
SECTION 15412 — DOMESTIC WATER PIPING SPECIALTIES
SECTION 15421 — SANITARY WASTE AND VENT PIPING
SECTION 15422 — SANITARY WASTE PIPING SPECIALTIES
SECTION 15456 — HVAC WATER TREATMENT
SECTION 15458 — ELECTRIC WATER HEATERS
SECTION 15485 — LABORATORY GAS SYSTEMS
SECTION 15510 — HYDRONIC PIPING
SECTION 15540 — HYDRONIC PUMPS
SECTION 15755 — HEAT EXCHANGERS
SECTION 15831 — CONVECTORS
SECTION 15832 — UNIT HEATERS
SECTION 15855 — MODULAR CENTRAL STATION AIR HANDLING UNITS
SECTION 15891 — METAL DUCTS
SECTION 15910 — AIR DUCT ACCESSORIES
SECTION 15911 — PARTICULATE AIR FILTRATION
SECTION 15932 — DIFFUSERS, REGISTERS AND GRILLES
SECTION 15950 — INSTRUMENTATION AND CONTROL FOR HVAC
SECTION 15975 — SEQUENCE OF OPERATION FOR HVAC CONTROLS
SECTION 15990 — TESTING, ADJUSTING AND BALANCING
SECTION 16010 — ELECTRICAL GENERAL PROVISIONS
SECTION 16110 — RACEWAYS
SECTION 16120 — CONDUCTORS
SECTION 16130 — BOXES AND FITTINGS
SECTION 16140 — WIRING DEVICES AND PLATES
SECTION 16450 — GROUNDING
SECTION 16510 — LIGHTING FIXTURES
SECTION 271800 — INTERIOR TELECOMMUNICATIONS PATHWAYS
SECTION 02070 — SELECTIVE DEMOLITION

1. GENERAL

1.1. SUMMARY:

A. Section Includes:

1. Types of Selective Demolition Work:
   a. Portions of building structure as required to accommodate new construction.
   b. Removal of interior partitions.
   c. Removal of doors and frames.
   d. Removal of built-in casework.
   e. Removal and protection of existing material to be reused. Fixtures and equipment items indicated as "salvage" or for "reuse".

2. Demolition requires the selective removal and subsequent off-site disposal of removed material, except salvaged items or items to be relocated. The disposal of all debris must be off the UCB campus. Any construction debris placed in University dumpsters will be removed at the Contractor’s expense.

B. Related Sections:

2. Section 02060 - Building Demolition.
3. Section 02080 - Asbestos Removal.

1.2. SUBMITTALS:

A. Schedule:

1. Submit schedule indicating proposed methods and sequence of operations for selective demolition work.

1.3. JOB CONDITIONS:

A. Occupancy:

1. University personnel will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Verify with CU project manager whether building will be occupied or vacated during expected work activities.

2. Conduct selective demolition work in manner that will minimize the need for disruption of normal operations if building remains occupied.

3. Provide minimum of 72 hours advance notice of demolition activities and utility outages.

B. Condition of Structures:
1. The University assumes no responsibility for actual condition of items or structures to be demolished.

2. Conditions existing at time of commencement of contract will be maintained insofar as practical. A copy of the environmental site assessment will be available for inspections at the CU project manager’s office.

C. Protection of Persons and Property:
   1. Provide temporary barricades, traffic control, and other forms of protection as required. Contractor to comply fully with OSHA requirements.

D. Traffic:
   1. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Clean-up is required daily as work progresses.

E. Explosives:
   1. Use of explosives will not be permitted.

F. Utility Services:
   1. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
   2. Coordinate utility outages with Department of Facilities Management, affected utility companies, and affected users.

G. Environmental Controls:
   1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with the Department of Environmental Health and Safety requirements pertaining to environmental protection. Comply with Colorado Department of Health requirements regarding debris control.
   2. Keep dust and dirt from migrating to occupied building areas.

2. PRODUCTS
2.1. SALVAGE:
   A. The Owner reserves first salvage rights including:
      1. Items of historic or archaeological significance or value.
      2. Construction material and products.
      3. Mechanical, electrical equipment and components.
   B. The Contractor shall notify the Owner for review of material to be stored or selected for salvage.
   C. Coordinate with the Department of Facilities Management.
1. Items indicated to be removed but of salvageable value to Contractor may be removed in a timely manner from structure as work progresses, if such items are not claimed by the Owner.

D. Transport salvaged items from site as they are removed.

E. Storage or sale of removed items on site will not be permitted.

3. EXECUTION

3.1. PREPARATION:

A. Provide interior and exterior shoring, bracing, or support, as required.

B. Cover and protect furniture, equipment and fixtures, if not removed by Owner.

C. Erect and maintain dust-proof and weatherproof partitions and closures as required.

D. Locate, identify, stub-off and disconnect utility services that are indicated to be removed.

E. Request inspection by Department of Facilities Management and applicable utility companies:
    1. When utilities are uncovered.
    2. Prior to covering-up or concealing utilities.

3.2. DEMOLITION:

A. Perform selective demolition work in a systematic manner.
   1. Demolish concrete and masonry in small, manageable sections. Do not overload structure with debris. Cut concrete and masonry using power-driven masonry saw or hand tools; do not use powder-driven impact tools in buildings.
   2. Locate demolition equipment throughout structure to avoid imposing excessive loads on supporting walls, floors or framing.
   3. Construct chutes as required to conduct debris safely to grade disposal areas. Comply with Environmental Health and Safety and Colorado Department of Health dust control and safety requirements.
   4. Do not cut or alter any structural member without authorization of the Architect.

B. REUSED MATERIALS:

1. Items for Owner Salvage:

2. Items for Reuse or Reinstallation:

C. DISPOSAL OF DEMOLISHED MATERIALS:

1. Remove debris, rubbish and other materials resulting from demolition operations from building site and off the campus.

2. Under no circumstances should the University's dumpsters be used for disposal of demolished materials.
3. Transport and dispose of materials off site in legal manner.

D. Burning of removed materials is not permitted on project site.

END OF SECTION 02070
SECTION 03100 — CONCRETE FORMWORK

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Formwork for cast-in-place concrete.
      2. Form accessories.
   B. Related Sections:
      1. Section 03200 - Concrete Reinforcement.
      2. Section 03300 - Cast-in-Place Concrete.
      3. Section 03450 - Architectural Precast Concrete.

1.2. REFERENCES:
   A. ACI 301: Specifications for Structural Concrete for Buildings.
   B. ACI 303: Guide to Cast-in-Place Architectural Concrete Practice.
   C. ACI 347: Recommended Practice for Concrete Formwork.
   D. PS 1: Construction and Industrial Plywood.

1.3. SUBMITTALS:
   A. Shop Drawings:
      1. Submit shop drawings for concrete formwork for architectural cast-in-place concrete. Include construction joints, sizes, shapes, materials, gauging information, architectural detailing, openings, clean outs, ties, and other elements affecting appearance. Review will be for general design and appearance factors only.

1.4. QUALITY ASSURANCE:
   A. Field Samples:
      1. Field samples under provisions of Section 01300 and coordinate with Section 03300.
      2. Sample formwork panel for architectural concrete surfaces.
         a. Special treatment or finish as result of formwork.
         b. Vertical and horizontal form joints.
         c. Typical rustication joints.
      3. Provide forms for field mock-ups and samples specified in Section 03300.

2. PRODUCTS

2.1. FORM MATERIALS:
A. Plywood:
   1. Douglas Fir species; select sheathing-tight face grade; sound, undamaged sheets with straight edges.
   2. "B-B Medium Density Overlayed Concrete Form", Class I as defined by PS-1.
   3. Use new plywood for the project for exposed surfaces. Do not reuse plywood more than four times. Do not use patched forms or plywood previously used on another job for exposed concrete.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surface.

C. Tubular Column: Round, of spirally wound, seamless, laminated fiber type; surface treated with release agent.

2.2. FORMWORK ACCESSORIES:

A. Form Ties: Snap-off metal of fixed length; gang form through-bolt, tapered ties -- cone type; 1-1/2 inch break back dimension; free of defects that will leave holes no larger than 1 inch diameter in concrete surface, with waterproofing washer. Gang form through-bolt or tapered tie type, free of defects that will leave holes no larger than 1 inch diameter in concrete surface.

B. Fillets for Chamfered Corners: Wood strips or rigid plastic, 45 degrees, 3/4 inch wing size; maximum possible lengths.

C. Dovetail Anchor Slots: Galvanized steel at brick, concrete block and stone work; 24 gage; foam filled; release tape sealed slots; bent tab anchors; securable to concrete formwork.

D. Flashing Reglets: Galvanized steel; 24 gage; longest possible lengths; release tape sealed slots; with alignment splines for joints; securable to concrete formwork.

E. Form Liners: Fabricated from fiberglass, elastomeric material, or urethane.

3. EXECUTION

3.1. INSTALLATION:

A. Construct formwork to maintain tolerances in accordance with ACI 301. Use Class B formwork tolerances for concrete exposed to view and Class C tolerances for unexposed concrete.

B. Chamfer Strips (ACI 301 4.2.4): Install 45 degree chamfer strips at exposed outside corners, beams, joists and columns.

C. Forms for Exposed Concrete:
   1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.
   2. Do not use metal cover plates for patching holes or defects in forms.
3. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material which will produce bow.

4. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

5. Form molding shapes, recesses and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.

3.2. TOLERANCES:

A. Finished concrete surfaces and corners must conform to Table 4.3.1, ACI 301 and ACI 117.

1. Cumulative tolerances will not be acceptable where other materials or elements related to concrete dimensions or positions will have their tolerances or normal adjustments exceeded in a manner affecting their appearance or performance.

B. In addition, architectural concrete surfaces and surfaces to receive thinset tile or other thin finishes are limited to $\pm 0.125$" in 10', with no abrupt offsets or changes in plane or other defects that would prevent the proper installation of other materials or adversely affect the finished appearance of the concrete or applied finishes.

END OF SECTION 03100
SECTION 03200 — CONCRETE REINFORCEMENT

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Reinforcing steel bars, welded steel wire fabric, fabricated steel bar or rod mats for cast-in-place concrete.
      2. Support chairs, bolsters, bar supports, and spacers, for supporting reinforcement.
   B. Related Sections:
      1. Section 02380 - Caissons.
      2. Section 02520 - Portland Cement Concrete Paving.
      3. Section 03100 - Concrete Formwork.
      4. Section 03300 - Cast-in-Place Concrete: Concrete placement.
      5. Section 03450 - Architectural Precast Concrete.
      6. Section 04200 - Unit Masonry: Reinforcement for masonry.

1.2. REFERENCES:
   A. ACI 301 - Specifications for Structural Concrete for Buildings.
   B. ACI 315 - Details and Detailing of Concrete Reinforcement.
   C. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
   D. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
   E. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   F. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
   G. AWS D1.4 - Structural Welding Code Reinforcing Steel.
   H. CRSI - Manual of Practice
      I. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.
      J. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.3. QUALITY ASSURANCE:
   A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and Documents 63 and 65.
   B. Conform to ACI 301.
   C. Submit mill test certificates of supplied concrete reinforcing, indicating physical and chemical analysis.

2. PRODUCTS
2.1. MATERIALS:
   A. Reinforcing Steel: ASTM A615 plus (S1) and ASTM A706 for bars where welding is required, Grade 60 if not otherwise specified. Finish: Plain. Epoxy coated rebars will be considered at the design engineer’s recommendation.
   C. Stirrup Steel: ASTM A82.

2.2. ACCESSORY MATERIALS:
   A. Tie Wire: Minimum 16 gage annealed type. Acceptable patented system.
   B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.
   C. Chairs, Bolsters, Bar Supports, Spacers Adjacent to Architectural Concrete Surfaces: Plastic coated or plastic tipped type; size and shape as required.

2.3. FABRICATION:
   A. Fabricate in accordance with ACI 315, providing concrete cover specified in Section 03300.
   B. Weld reinforcing bars in accordance with AWS D1.4.

3. EXECUTION

3.1. FIELD QUALITY CONTROL: A. Notify Architect 24 hours prior to placement of concrete.
SECTION 03300 — CAST-IN-PLACE CONCRETE

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      2. Concrete finishing standards.
   B. Related Sections:
      1. Section 01400 - Quality Control: Concrete testing.
      2. Section 02380 - Caissons.
      3. Section 02520 - Portland Cement Concrete Paving: Including materials, curing compounds, and deicing protection.

1.2. SUBMITTALS:
   A. Mix Designs:
      1. Submit concrete mix designs a minimum of 30 days prior to first concrete placement.
      2. For “Architectural Concrete” maintain single source “plant” of cement and quarry for sand and aggregate throughout. No substitutions to avoid change in color range.
      3. Data for each mix shall include the following:
         a. Mix identification.
         b. Intended use.
         c. Mix proportions, including admixtures.
         d. Manufacturer's data and certifications for mix materials.
         e. Wet and dry unit weight.
         f. Entrained air content.
         g. Design slump.
         h. Required average strength qualification data per ACI 301 3.9.1 and 3.9.2.
         i. Average strength qualification data (trial mix data or field test data per ACI 301 3.9.3).
         j. Field test data shall include copies of the Concrete Testing Agency's report.

1.3. QUALITY ASSURANCE:
   A. Field Constructed Samples:
1. Fabricate sample sections representative of specified finished surfaces, in locations on the site as directed by the Architect.

2. Form, reinforce, mix, cast, cure and finish sample units using selected materials and construction methods proposed for work.

3. Provide sample sections as follows:
   a. Wall Section: "L"-shaped panels, approximately 4' high x 3' each side x 6" thick. Include not less than 2 form ties, 2 form panel intersections, each typical rustication, one vertical construction joint and one horizontal construction joint.
   b. Column Section: 4' high and not less than 12" diameter for round sections and not less than 12" in least dimension for rectangular sections.
      i. Chamfer exposed edges of rectangular sample columns.
   c. Pan-formed Section: At least 2 pan form units. Set units to illustrate method of blending exposed pan joints.

4. Coordinate special finishing, such as acid etching, abrasive blasting, scoring or bush-hammering. Conduct mechanical finishing in the presence of the Architect.

5. Perform revisions and corrective work required to produce finished concrete and surfaces as required by the Architect.
   a. Construct additional sample panels as may be required if original results are not satisfactory to the Architect.

6. The continuity of color and texture for exposed concrete surfaces is of prime importance. Maintain such controls and procedures, in addition to those specified, as necessary to provide continuous match of concrete work with accepted samples.

7. Do not remove sample sections without written permission from the Architect.

2. PART 2 - PRODUCTS

2.1. CURING COMPOUND (ACI 301 12.2.1.7):
   A. Interior Slabs With Resilient Flooring, Carpet or Left Exposed:
      1. "Floor Seal VOX" by The Euclid Chemical Company.
      2. "Dress and Seal WB" by L&M.
      4. Approved substitute.
   B. All Other Interior Slabs Including Slabs to Receive Concrete Topping, Mortar Setting Beds, Cementitious Flooring and Special Flooring:
      1. Moisture curing methods only.

2.2. HARDENER (ACI 301 11.7.6):
A. Metallic Hardener: Apply hardener at the rate of 1.5 lbs. per sq. ft. Hardener shall be a mixture of specially processed and graded iron aggregate, Type I Portland Cement and necessary plasticizing agents.
   1. "Euco-Plate" by the Euclid Chemical Company.
   2. "Masterplate 200" by Master Builders.
   3. Approved substitute.

B. Mineral Aggregate Hardener: Apply hardener at 1.0 lb. per sq. ft. Hardener shall be a mixture of specially processed and graded mineral aggregate, Type I cement and necessary plasticizers.
   1. "Surflex" by the Euclid Chemical company. 2. Approved substitute.

3. PART 3 - EXECUTION

3.1. ROTATING EQUIPMENT SUPPORTS:
   A. Provide rotating equipment support bases as indicated on the detail following this section. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing the machines and equipment.

3.2. FIELD QUALITY CONTROL
   A. Inspection: Provide free access for the Architect and Consulting Engineer to locations where concrete materials are stored, proportioned or mixed.

   B. Testing: Owner will employ and pay for the services of a qualified testing laboratory to perform specified tests. Contractor is responsible for timely notification and scheduling of testing agency.

   C. Quality Control Testing During Construction:
      1. Perform sampling and testing for field quality control during the placement of concrete.
         a. For concrete having specified strength of 5000 psi or greater, one test per 50 cu. yds., but not less than one test each day such concrete is placed.
         b. For caisson concrete, one test for each 50 cu. yds. but not less than one test per caisson requiring more than one truckload and one test per truckload when used in more than one caisson.
      2. For each 100 cu. yds. of concrete of each type poured in any one day provide one set of tests minimum. The cost for early or additional tests for the Contractor's convenience shall be paid for by the Contractor.
      3. For concrete of each type poured in any one day, provide:
         a. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94. Comply with ASTM C31 for compressive strength
specimens. For concrete placed by pumping, take test specimens and concrete at the point of placement of concrete into the forms.

b. Slump: ASTM C143, one test for each set of compressive strength test specimens. Additional slump tests may be required by Architect to be provided by Contractor at no additional cost. Reject concrete where tests exceed specified limits.

c. Air Content: ASTM C231, pressure method; one test for each set of compressive test specimens, or when there is any indication of change.

d. Compression Test Specimens: ASTM C39, one set of 4 standard cylinders for each compressive strength test, unless otherwise directed.
   i. Cast and store cylinders for laboratory cured test specimens and filed cured test specimens as specified in ASTM C31.

e. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, and when 80 degree F. and above; and each time a set of compression test specimens is made.

f. Compressive Strength Tests: ASTM C39; one specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
   i. When the frequency of testing will provide less than 5 strength tests for a given mix design, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
   ii. When the total quantity of a given mix design of concrete is less than 50 cu. yds., the strength test may be waived by the Architect or the Owner if adequate evidence of satisfactory strength is provided.

4. Report test results in writing to the Architect, Engineer, Contractor, and Ready-Mix Supplier on the same day that tests are made. Include in reports of compressive strength tests, project identification, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, concrete temperature, density, slump, air-content, compressive breaking strength and type of break for both 7 day tests and 28 day tests.

D. Additional Tests:

1. Additional tests of in-place concrete will be made when test results indicate possible concrete deficiency as judged and directed by the Architect.

2. Compression tests on cored cylinders complying with ASTM C42, or load testing specified in ACI 318, or other acceptable non-destructive testing methods will be used. The Contractor shall pay for such tests conducted, and any other additional testing as may be required, whether or not concrete is accepted.
E. Evaluation of Quality Control Tests:

1. Compressive strength test for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength tests results equal or exceed the 28-day design compressive strength of the type of class of concrete; and no individual strength tests falls below the required compressive strength by more than 500 psi.

2. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such test will be considered deficient in strength and subject to additional testing as herein specified, or removal and replacement of the concrete which the test represents.

3.3. SLAB FINISHING TOLERANCES:

A. Slope to Drain: 1/4 inch per foot.

B. Scratched Finish: Class CX not exceeding 1/2" in 10' or not exceeding FF of 15 (flatness) and FL of 13 (levelness) where not sloped per ASTM E1155.
   1. Location: Slabs to receive concrete topping.

C. Floated Finish: Class BX not exceeding 5/16" in 10' or not exceeding FF of 20 (flatness) and FL of 15 (levelness) where not sloped per ASTM E1155.
   1. Location: Slabs to receive trowel finish, membrane or elastic waterproofing, or membrane or elastic roofing.

D. Trowel Finish: Class AX not exceeding 3/16" in 10' or not exceeding FF of 25-30 (flatness) and FL of 20 (levelness) where not sloped per ASTM E1155.
   1. Location: All slabs exposed to view and surfaces that are to be covered with carpet, resilient flooring, paint, or other thin-film finish coating system.

E. Trowel and Fine Broom Finish: Apply trowel finish specified above then immediately follow by slightly scarifying surface with fine brooming.
   1. Location: Surfaces to receive mortar setting beds, cementitious flooring or special flooring.

F. Non-Slip Broom Finish: Apply trowel finish specified above then slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to the main traffic route.
   1. Location: Pool decks, equipment rooms where wet conditions may occur, and Custodial Work Stations.

G. Repairs: Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Grind surface defects smooth such that defects will not telegraph through applied floor system.
H. Testing: Slabs will be considered acceptable if slabs meet specified tolerances using one of the two following methods. The Owner may require that either one of the following methods be utilized for the project.

1. ACI 117: Per required Class finish when tested with a 10' straightedge placed on the surface at not less than two different right angles.

2. ASTM E1155: Tolerances as specified.

3.4. CURING (ACI 301 12.1):

A. General: Apply specified curing compounds immediately after final finishing of slabs. Apply in quantities recommended by the manufacturer.

3.5. HARDENER (ACI 301 11.7.6):

A. Apply metallic hardener according to manufacturer's instructions. Cure with clear curing and sealing compound.

B. Apply mineral aggregate hardener according to manufacturer's instructions. Cure with clear curing and sealing compound.

END OF SECTION 03300
SECTION 04100 — MORTAR AND GROUT

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Mortar for Unit Masonry.
      3. Grout for Unit Masonry.
   B. Related Sections:
      2. Section 04150 - Masonry: Reinforcement and accessories.
      3. Section 04200 - Unit Masonry: Block and brick.
      4. Section 04400 - Stone.

1.2. SUBMITTALS:
   A. Samples: Submit colored mortar samples and provide coloring for masonry sample wall mock-up.
   B. Grout Mix Design: Prior to any masonry work, submit grout mix design in accordance with Section 01400.
   C. Test Reports: Reports of tests shall be distributed in accordance with Section 01400. Submit mortar and grout tests for proposed materials and mixes in accordance with code requirements.

1.3. QUALITY ASSURANCE:
   A. Testing Agency: Testing will be conducted by an approved testing laboratory engaged by the Owner.
   B. Sole Source Requirements: Obtain mortar materials from one manufacturer or source for each type of masonry for the project.

2. PRODUCTS

2.1. MATERIALS:
   A. Portland Cement for Unit Masonry: ASTM C150, Type I, except Type III may be used for cold weather construction.
      1. Do not use masonry cement.
      2. Colored Mortar For Brick and Block: Provide natural color or white cement as required to produce the desired color.
3. Stone Work Mortar: Provide non-staining portland cement complying with the non-staining requirements of ASTM C91 for not more than 0.03% water soluble alkali.


B. Hydrated Lime: ASTM C207, Type S.

C. Aggregates for Mortar: ASTM C144.

D. Aggregates for Grout: ASTM C404, size 1 for fine aggregate, size 8 or 89 for course.

E. Water: Clean and free from deleterious amounts of acids, alkalies or organic materials which could cause efflorescence or other impurities affecting strength or appearance.

F. Mortar Color For Brick and Block: Pre-packaged, factory mixed mineral oxide pigments.

1. Color:
   a. As selected by Architect.
   b. Match existing at patching of existing work.

G. Other Admixtures:

1. Antifreeze Compounds: Calcium chloride or other antifreeze agents not allowed.
2. The use of accelerators not allowed.
3. Latex Additive for Stone Work: Manufacturer's standard acrylic type, but not containing a retarder.

2.2. MIXES:

A. Mortar Materials and Proportions: Comply with ASTM C270.

B. Unit Masonry Setting Mortar:

1. Type S for Load-Bearing Masonry if deemed necessary by the designer: Containing Type I Portland cement, hydrated lime and aggregate. 1800 psi average compressive strength in 28 days.

2. Type N for Face Brick and Non-Load-Bearing Interior CMU: Containing Type I Portland cement, hydrated lime and aggregate. 750 psi average compressive strength in 28 days.

3. Provide colored mortar to match accepted samples at face brick.

C. Non-Staining Stone Setting Mortar:

1. Complying with ASTM C270, Type S, with three parts sand to 1 part portland cement to 1/2 part hydrated lime.

2. Add 1 pound of dark buff colored pigment to each sack of cement.

3. Add latex additive per manufacturer's instructions.
3. EXECUTION

3.1. FIELD QUALITY CONTROL:
   A. Not used

END OF SECTION 04100
SECTION 04150 — MASONRY ACCESSORIES

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Anchors and joint reinforcement.
      2. Weep holes.
      3. Through-wall or cavity flashing.
   B. Related Sections
      1. Section 04100 - Mortar and Grout.
      2. Section 04200 - Unit Masonry: Block and brick.
      3. Section 04400 - Stone.

1.2. SUBMITTALS:
   A. Product Data: Submit manufacturer's product data for each type of masonry accessory required.

2. PRODUCTS

   A. Manufacturers:
      1. Dur-O-Wal, Inc.
      2. AA Wire Products Company.
      3. Heckman Building Products, Inc.
      4. Hohmann and Barnard, Inc.
      5. Masonry Reinforcing Corporation of America.
      6. Approved substitute in accordance with Section 01600.
   B. Horizontal Reinforcement:
      1. General For CMU: Welded wire units of ASTM A82 cold-drawn steel wire, No. 9 gage, deformed continuous side rods and No. 9 gage plain cross rods. Width shall be approximately 2" less than width of wall or partition. Provide prefabricated corners, tees, and straight lengths not less than 10'. Furnish with galvanized finish, ASTM A641, Class 1 for interior walls and A153, Class B-2 for exterior walls.
      2. Brick and Stone Veneer on CMU Back-up: Same as above for CMU except adjustable veneer anchors on vertical rod shall be used. System must be capable of holding insulation (if any) tight against inside wythe.
         a. Provide Tie-HVR by Hohmann and Barnard, Inc. or approved substitute by listed manufacturer.
C. Brick and Stone Veneer Anchors on Metal Stud Back-Up:
   1. Adjustable triangular wire ties anchored through sheathing to metal studs with sheet metal screws. Provide hot-dipped galvanized finish.

D. Brick and Stone Veneer Anchors on Concrete Back-up:
   1. Dovetail anchor slots, 20 gage, with adjustable triangular wire ties. Provide hot-dipped galvanized finish.

2.2. FLASHING AND WEEP HOLES:

   A. Flexible Flashing: Hard or virgin polyvinyl chloride with plasticizers and other modifiers formed into flexible sheets not less than 20-mils thick, black color.

   B. Stainless Steel Flashing: AISI Type 302/304, 2D finish, fully annealed or dead-soft temper, 0.12" thick.

   C. Weep Holes:
      1. Dur-O-Wal No. D/A 1006 polypropylene cell vent in color as selected by Architect.
      2. 1/4" round medium density polyethylene plastic tube weep holes.

3. EXECUTION

3.1. FLASHING AND WEEP HOLES:

   A. Flashing: Install in slurry of fresh mortar as indicated. Start flashings 1/2" from outside face of wall. Set flashings in a bed of mastic. Overlap joints by at least 4" and set in mastic.

   B. Weep Holes: Install where flashing or waterproofing turns out and terminates in horizontal mortar joints. Install at 24" or 32" o.c.

END OF SECTION 04150
1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Stone masonry, general.

B. Related Sections:
   2. Section 04100 - Mortar and Grout.
   3. Section 04150 - Masonry Accessories: Reinforcement, veneer anchors and accessories.
   4. Section 04200 - Unit Masonry: Brick and block masonry.
   5. Section 04460 - Limestone.

1.2. SYSTEM DESCRIPTION:

A. Material Acquisition:
   1. Exterior walls on the main campus will generally be of native stone.
   2. Stone may be procured from independent quarries.
   3. Final trimming and splitting is done on the site.

1.3. QUALITY ASSURANCE:

A. Installer Qualifications:
   1. Installer for all stone masonry work may be pre-qualified prior to bidding on this project. Refer to bidding information for pre-qualification requirements.
   2. Engage an Installer experienced in the type of stonework required having not less than 5 years successful experience on projects of similar size and scope.

B. Fabricator Qualifications:
   1. Engage a firm which has successfully fabricated stone similar to the quality specified for a period of not less than 5 years and which is equipped to provide the quantity shown without delaying the work.

C. Mock-Up:
   1. Construct 4' x 6' cavity wall panel, matching an area on an existing building designated by the Owner, including:
      a. Corner and 2' return.
      b. Cavity wall insulation.
      c. Block backup joint reinforcement and ties or stud backup and ties.
      d. Colored mortar.
Location: As directed by Architect and the Owner.

Provide lifting eyes for transporting.

2. Mock-up panel will be used to approve color blend, pattern and technique of laying. Additional mock-up panels will be required until a panel is approved.

3. Mock-up will be reviewed for acceptance by the Owner and the Architect.


D. Standards:

1. Obtain each type of stone from one quarry with consistent color range and texture throughout the work.

2. PRODUCTS

2.1. NATIVE STONE:

A. Architect shall work with the Campus Architect in selecting and specifying the stone blend.

B. Refer to Sections 04460 - Limestone and 04470 - Sandstone.

C. Stone Anchors and Dowels:

1. In addition to those specified in Section 04150, provide type and size required to securely anchor and fasten stonework in place.

3. EXECUTION

3.1. INSTALLATION:

A. Lay native face stone work from outside face of walls.

B. Lay stones on natural flat beds in horizontal courses.

C. Shape stone to fit each other approximately. Knock off weak portions to bring stones to even bearing.

D. The general pattern for sandstone veneer is to be 2 against 1, a few 3 against 1, and some 2 against 2. No 3 against 3 will be permitted. No continuous horizontal joints to exceed 7' in length (unless specifically requested: coordinate / relief angles) nor vertical joints to exceed 12" in height. 20% of vertical joints may be angled.

E. Clip 60% of sandstone units on both ends for an average projection of 1" to 1-1/2" from face of wall. Cut stone at building corners to a straight vertical line from top to bottom of wall.

F. Grout full the void between stone and backup with slush mortar as stone is laid.

G. Joints: 1/2" to 3/4" wide. Provide both vertical and beveled head joints. Work all joints so that all joints are in the same plane.

H. Provide 4" minimum overlap in coursing.

I. Completed stone work shall match accepted mock-up panel. Do not use stone units with chips, voids, stains or other defects which might be visible in the finished work.
J. Maintain pattern consistency throughout building.

K. Built-In Items:
   1. Steel Door Jambs: Grout steel door jambs set in masonry full of mortar as wall is built.
   2. Flashings: Refer to Section 07600 to ensure that flashings are in proper place before proceeding with stone work.
   3. Accessories: Install weep holes, fabric flashing and other accessories in accordance with Section 04150.

L. Control Joints:
   1. Install vertical control joints at approximately 20' o.c. (or other spacing as recommended by the design consultant) and at column lines. Some latitude in spacing increases may be acceptable if approved by Owner/Architect/Engineer.
   2. Relate joints to building design.

M. Construction Tolerances
   1. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4” inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (10 mm in 6 m), or 1/2” inch in 40 feet (12 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4” inch in 20 feet (6 mm in 6 m) or 1/2” inch in 40 feet (12 mm in 12 m) or more.
   2. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4” inch in 20 feet (6 mm in 6 m) or 1/2” inch in 40 feet (12 mm in 12 m) or more.
   3. Variation of Linear Building Line: For position shown in plan and related portion of walls, and partitions, do not exceed 1/2” inch in 20 feet (12 mm in 6 m) or 3/4” inch in 40 feet (19 mm in 12 m) or more.
   4. Measure variation from plumb, level, and position shown in plan as the variation of the average plane of the face of each stone from a plumb, level, or dimensioned plane.

END OF SECTION 04400
SECTION 04460 — LIMESTONE

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Indiana limestone.
      2. Lueders Limestone (Texas)
   B. Related Sections:
      1. Section 04100 - Mortar and Grout.
      2. Section 04200 - Unit Masonry: Brick and block masonry.
      3. Section 04400 - Stone: Basic requirements for stone construction.
      4. Section 04470 - Sandstone
      5. Section 07900 - Joint Sealers: Caulking control joints.

1.2. SYSTEM DESCRIPTION:
   A. Refer to Section 04400.

1.3. QUALITY ASSURANCE:
   A. Refer to Section 04400.
   B. Standards:
      1. Provide stone which complies with the recommendations of the Indiana Limestone Institute (ILI).

2. PRODUCTS

2.1. MANUFACTURERS/SUPPLIERS:
   A. Colorado Stone Co., Longmont, Colorado (303-776-0674)

2.2. MATERIALS:
   A. Limestone:
      1. Indiana Oolitic Limestone complying with ASTM C568, Category II (medium density):
         a. Maximum Absorption: 7.5% per ASTM C97.
b. Cathedral Rizzo Stone, Sugarcube Light Texture mixed buff and gray (40% maximum) by Harding and Cogswell Corp.

B. Accessories:
   1. Anchors, dowels, metal support, framing and attachment devices:
      a. All miscellaneous iron, angles, anchors, fastenings, bolts, shims, setting pads, etc. required to support and attach the stone to the structural system.
      b. All miscellaneous iron, angles, channels, etc. shall be hot dipped galvanized.
      c. All toe bars and anchors entering the stone shall be stainless steel Type 302 or 304.

C. Weeps:
   1. Weeps as specified in Section 04150 shall placed in joints where moisture may accumulate such as base of cavity walls, continuous angles, flashing.

3. EXECUTION
3.1. INSTALLATION:
   A. As specified in Section 04400.

END OF SECTION 04460
1. GENERAL
1.1. SUMMARY:
A. Section Includes:
   1. Lyons sandstone.
B. Related Sections:
   1. Section 04100 - Mortar and Grout.
   2. Section 04200 - Unit Masonry: Brick and block masonry.
   3. Section 04400 - Stone: Basic requirements for stone construction.
   4. Section 04460 - Limestone.
1.2. SYSTEM DESCRIPTION:
   A. Refer to Section 04400.
1.3. QUALITY ASSURANCE:
   A. Refer to Section 04400.

2. PRODUCTS
2.1. SANDSTONE (NATIVE STONE):
   A. Lyons sandstone conforming to ASTM C616, Class II, quartzitic sandstone:
      1. Cut stone 5\" wide (tolerance of +2\" to -3/4\") to allow for 1\" to 1-1/2\" average face projection.
      2. Length: Minimum of three times the height, maximum of 7\'-0\".
      3. Color: Complete the following table in consultation with Facilities Planning and the Campus Architect

<table>
<thead>
<tr>
<th>Stone Color</th>
<th>Trade Names</th>
<th>Percent in Mix</th>
<th>Max. Height</th>
<th>Min. Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Lyons Red</td>
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<tr>
<td>Red Natural</td>
<td>Lyons Red Natural</td>
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<td>Buff</td>
<td>Loveland Buff</td>
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<td>Masonville Buff</td>
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<td>Stone Color</td>
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<td>Peach</td>
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<td>Bacon Strip</td>
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<td></td>
<td>Bacon Strip</td>
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</tbody>
</table>

4. Staining:
   a. Black staining is not acceptable.

5. Match existing, adjacent stonework where applicable.

B. Shiners: Sandstone conforming to ASTM C616, Class II, quartizitic, Lyons red quartzitic sandstone:
   1. Color range as selected by Architect and approved by the Owner.
   2. Honed or split face finish as approved by the Owner.
   3. Minimum thickness: 2.75" ± 0.25". Thickness shall be appropriate to size.

3. EXECUTION

3.1. INSTALLATION:
   A. As specified in Section 04400.

END OF SECTION 04470
Las juntas de expansión cortadas con sierra de 1/8" de espesor se cortan completamente a través de la piedra después de ser instalada.

2 a 1 típico
juntas de mortero de 3/4" a 1"
3 a 3 no permitido
traslape mínimo 4"
longitud mínima de 16" con espesor mínimo de 3/4"
cociente mínimo de la altura a la longitud
no se permiten los rellenos!
7" a 8" máxima
7'-0"
Longitud máxima entre los alineamientos
3 a 1 permitido
2 a 3 permitido
hasta 20% de las juntas deben ser inclinadas para a variedad

ELEVACION PARCIAL Y PATRÓN TIPICO
NINGUNA-ESCALA

Pared de respaldo
Cara hacia abajo!
Der ángulo a las superficies planas para lograr drenaje
La superficie del mortero es la cara de la pared. Várga las proyecciones hasta 2" de la cara del mortero
Cara hacia arriba

Todo convexo, ninguna caras cóncavas
dar ángulo a todos los bordes
4" a 6"

VISTA SUPERIOR
NINGUNA ESCALA

Corte la piedra en las esquinas a una línea vertical recta, desde abajo hasta arriba de la pared

VISTA LATERAL-CORTE A TRAVES DE LA PARED
NINGUNA ESCALA

Rev. 11/02 Arquitecto del Campus
VISTA LATERAL-CORTE A TRAVÉS LA PAREDE

ninguna escala

Rev. 11/02 Arquitecto del Campus
SECTION 05120 — STRUCTURAL STEEL

1. GENERAL

1.1. SUMMARY:

A. Section Includes:

1. Structural steel framing and support members, pipe columns, and braces complete with required braces, connection plates, welds, washers, bolts, nuts, shims, anchor bolts, and templates.

2. Base plates, cap plates, and shear stud connectors. Erecting, connecting, field welding, and adjusting for plumb and level.

3. All other work normally related to the above or specified under this section.

B. Related Sections


2. Section 03450 - Architectural Precast Concrete.


4. Section 05500 - Metal Fabrications: Loose steel angle lintels not attached to structural steel stairways.

5. Divisions 15 and 16 - Steel supports for mechanical or electrical equipment.

C. Work Furnished But Not Installed

1. Anchor bolts, anchor bolt templates, loose bearing plates and embedded items: Installed under Section 03300 Cast-in-Place Concrete or Section 04200 Unit Masonry.

1.2. SUBMITTALS:

A. Certificates:

1. Submit welder certificates to University for review and for records.

2. For all high-strength bolts, nuts and hardened washers, submit certification of domestic (U.S.) manufacture and compliance with all provisions of these specifications.

3. Alternately, for high-strength bolts, nuts and/or hardened washers of foreign manufacture, submit certified mill test reports and other pertinent data demonstrating compliance with all provisions of these specifications.

B. Shop Drawings: 1. Submit shop drawings as specified under Section 01300.

C. Design Calculations:
1. Submit design calculations, bearing the seal and signature of a Professional Engineer, employed by the Contractor and registered in the State of Colorado for the following:
   a. Connections not as indicated on the structural drawings.
   b. Request for substitution of member sizes or material grades.
   c. Modification of the strength or configuration of structural framing requested for the Contractor's convenience, erection sequence or construction equipment and materials.

D. Provide a statement from the manufacturer stating that materials provided were manufactured within a 500 mile radius of the project. Include location.

1.3. QUALITY ASSURANCE:
A. Fabricator Qualifications:
   1. A firm with not less than 5 years continuous experience in the fabrication of structural steel similar in scope as required for this project.

B. Sole Source Responsibility:
   1. Subcontract with installation of the work of this section to the same firm that performed the fabrication.

C. Testing Agency:
   1. Testing and inspection will be made by an approved testing laboratory selected and paid by the Owner. Contractor shall furnish testing agency access to work, facilities, and incidental labor required for testing and inspection. Retention by the Owner of an independent testing agency shall in no way relieve the Contractor of responsibility for performing all work in accordance with the Contract requirements.
   2. Furnish the testing agency and Architect / Engineer with the following:
      a. A complete set of shop and erection drawings.
      b. Mill test reports.
      c. Information as to time and place of all rollings and shipment of material to shops.
      d. Full and ample means and assistance for testing all material.
      e. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.

D. Welder Qualifications: Welding shall be done only by welding operators currently qualified according to AWS D1.1.

E. Codes and Standards:
   1. Comply with the provisions of the following, except as otherwise indicated:
      a. AISC "Code of Standard Practice for Steel Buildings and Bridges" except delete sentence of paragraph 4.2.1 which states: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail
configuration of connections developed by the fabricator as a part of his preparation of these shop drawings" and delete the first sentence of Section 3.3 "Discrepancies".

b. AISC Section 3.4 Legibility of Plans: In the first sentence, delete the phrase "and made to scale not less than 0.125" to the foot."

c. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including the "Commentary" and Supplements thereto as issued.

d. AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

e. AWS D1.1 "Structural Welding Code - Steel".

f. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

2. PRODUCTS

2.1. SUBSTITUTIONS:
A. Where exact sizes and weights called for are not readily available, secure the Structural Engineer's acceptance of suitable sizes in time to prevent delay due to such substitutions.

2.2. STANDARD MEMBERS:
A. Factory stamp standard members with AISC member designation or provide certification that members meet specified requirements.

2.3. BOLTS:
A. Anchor Bolts: ASTM A307, non-headed type.
B. Unfinished Bolts and Nuts: ASTM A307, Grade A, hexagonal heads and nuts.
C. High-Strength Bolts and Nuts: ASTM A325 or A490, heavy hexagonal heads and nuts and hardened washers.
   1. Direct tension indicator washers are preferred.

3. EXECUTION

3.1. FIELD QUALITY CONTROL:
A. General:
   1. Owner will engage and pay for an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
   2. Testing agency will perform tests for shop and field connections, interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom. Provide a matrix report summarizing
all connections and which connections were inadequate. Update matrix following any reinspections.

3. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.

4. Perform additional tests, at Contractor's expense, as may be necessary to show compliance of corrected work. Clearly identify reinspection costs belonging to the Contractor.

5. Inspect in accordance with AISC specifications.

6. Inspect and test during fabrication of structural steel assemblies, as follows:
   a. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

7. Perform visual inspection of all welds.

8. Perform specific tests of welds by one of the following methods:
   a. Liquid Penetrant Inspection: ASTM E165.
   b. Magnetic Particle Inspection: ASTM E109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
   c. Radiographic Inspection: ASTM E94 and E142; minimum quality level "2-2T".
   d. Ultrasonic Inspection: ASTM E164.

END OF SECTION 05120
SECTION 05300 — METAL DECKING

1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Metal decking for floor and roof applications.

B. Related Sections:
   1. Section 05120 - Structural Steel.
   2. Section 05210 - Steel Joists.
   3. Section 05400 - Cold Formed Metal Framing.
   4. Section 05500 - Metal Fabrications: Secondary support members.

1.2. SUBMITTALS:

A. Calculations:
   1. Submit calculations, bearing the seal and signature of a professional engineer registered in the State of Colorado, for each deck type, showing required metal deck section moduli and moment of inertia. In addition, for composite decks, submit calculation for each slab type showing required composite slab section moduli and moment of inertia transformed to steel.

1.3. QUALITY ASSURANCE:

A. Codes and Standards:
   1. Comply with provisions of the following codes and standards, except as otherwise indicated:
      a. AISI "Specification for the Design of Cold-Formed Steel Structural Members".
      b. AWS D1.3 "Structural Welding Code - Sheet Steel".
      c. SDI "Design Manual for Composite Decks, Form Decks, and Roof Decks", Publication No. 25.

B. Manufacturer Qualifications:
   1. Manufacturer who is regularly engaged in production of metal decking.

C. Erector Qualifications:
   1. Minimum of 5 years experience in erection of metal decking for projects of similar size and difficulty.

D. Qualification of Welding Work:
   1. Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS.
2. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing any portion of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work, at no additional cost to Owner.

E. Testing Agency:

F. Testing and inspection will be made by an approved testing agency selected and paid by the Owner. Furnish testing agency access to work, facilities, and incidental labor required for testing and inspection. Retention by the Owner of an independent testing agency will not relieve the Contractor of responsibility for performing all work in accordance with the Contract Documents.

G. Underwriter's Label:

1. Provide metal deck units listed in Underwriter's Laboratories "Fire Resistance Index", with each required deck unit bearing the UL label and marking for the specific system detailed.

2. PRODUCTS

2.1. MATERIALS

A. Steel:

1. Steel for Painted Metal Floor Deck Units: ASTM A611, Grade C as required to comply with SDI specifications.

2. Steel for Galvanized Metal Roof and Floor Deck Units: ASTM A446, Grade as required to comply with SDI specifications, ASTM A525 G60 galvanizing.

B. Galvanizing Repair:

1. Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A780.

3. EXECUTION

3.1. TOUCH-UP PAINTING:

A. After roof deck installation, wire brush, clean, and paint scarred areas, welds, and rust spots on top and bottom surfaces of roof deck, and supporting steel members.

1. Touch-up galvanized surfaces with galvanizing repair paint following manufacturer's instructions.

END OF SECTION 05300
SECTION 05400 — COLD FORMED METAL FRAMING

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Load-bearing and non-load-bearing metal stud wall framing.
      2. Anchorage, bridging and bracing.
      3. Metal joint framing with anchorage and bridging.
   B. Related Work:
      1. Section 05120 - Structural Steel.
      2. Section 05210 - Steel Joists.
      3. Section 05300 - Metal Decking.

1.2. REFERENCES:
   A. Design and Manufacturers: Meet requirements of AISC Specification for the Design of Light Gage Cold Formed Steel Structural Members, latest edition.
   B. Welding: Meet requirements of AWS D1.1.

1.3. SUBMITTALS:
   A. Product Data: Copies of manufacturer's specifications covering all materials to be used with all materials and accessories plainly identified.
   B. Detailed erection procedures.

1.4. QUALITY ASSURANCE:
   A. Erector Qualifications: Minimum of three years successful experience on comparable cold-formed metal framing work.
   B. Welder Qualifications: Currently qualified in accordance with AWS D1.1. Certification required.

2. PRODUCTS

2.1. MATERIALS
   A. Framing Members:
      1. Studs and Track: Head and sill track and header members to be unpunched track, same gage as studs or one gage heavier.
         a. All studs to be stamped or marked with ASTM standard, Grade, and gage.
2. Steel: All framing members to be formed from steel conforming to the following:
   a. 18 Gage and Lighter Galvanized: ASTM A446, Grade A.
   b. 18 Gage and Lighter Painted: ASTM A611, Grade C, 33 ksi yield.
   c. 16 Gage and Heavier, Galvanized: ASTM A446, Grade D, 50 ksi yield.
   d. 16 Gage and Heavier, Painted: ASTM A570, Grade E, 50 ksi yield.

3. Stud Bridging:
   a. 18 gage or heavier channel studs of same width as studs noted on the drawings.
   b. Continuous minimum 1-1/2" cold-rolled channels positioned through stud punch-outs.

2.2. FASTENERS:
   B. Anchorage Devices: Powder driven or powder actuated; drilled expansion bolts; screws and sleeves.
   C. Welding: Comply with AWS D1.3.

3. EXECUTION
   3.1. ERECTION:
   A. Align head and sill tracks according to wall or partition location. Secure with screws, powder driven fasteners or welding at 24" on center.
   B. Studs:
      1. Place studs 16" on center, minimum, or at tighter spacing as noted, and not more than 2" from abutting walls and at each side of openings.
      2. Provide deflection allowance below supported horizontal building framing in ceiling or head track for non-load-bearing framing.
   C. Joists: Weld all joints and connections in accordance with drawings and manufacturer's recommendations.
   D. Bridging and Diagonal Bracing: Attach all bridging and diagonal bracing by welding capable of resisting a transverse lateral load force of 500 lbs. minimum.
   E. Miscellaneous Framing and Furring:
      1. Provide all necessary framing, furring, etc., for special framing at specialty items.
      2. Attach cross studs or furring channels to studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, grab bars and other items anchored to partitions or walls.
3. Install framing between studs for attachment of electrical boxes and other mechanical and electrical items.

END OF SECTION 05400
SECTION 05500 — METAL FABRICATIONS

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Items scheduled at the end of this section.
   B. Related Sections:
      1. Section 03600 - Grout: Grouting Under Base Plates and Bearing Plates.
      2. Section 05120 - Structural Steel.
      3. Section 05210 - Steel Joists.
      4. Section 05300 - Metal Decking.
      5. Section 05400 - Cold Formed Metal Framing.

1.2. REFERENCES:
   A. Campus Open Space Development Plan, University of Colorado, Boulder (COSDP).
   D. Stairways: Meet requirements of standard construction details of "Metal Stairs Manual" of the National Association of Architectural Metal Manufacturers.
   E. All railings, stairs, and ladders shall meet requirements of OSHA, UBC, and UFAS.

1.3. DEFINITIONS:
   A. Metal Fabrications:
      1. Synonymous with miscellaneous metals.
      2. Metal fabrications for items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
   B. Architecturally Exposed Structural Steel: As used under this section, includes all metal fabrications exposed to view.

1.4. SUBMITTALS:
   A. Shop Drawings:
      1. Submit shop drawings for custom fabricated items, including:
         a. Profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories.
         b. Erection drawings, elevations and details.
c. Welded connections using standard AWS welding symbols.

B. Product Data: Submit product data for manufacturer's stock items.

C. Certifications:
   1. Submit current welder's certification qualified in accordance with AWS D1.1.
   2. Submit certification by fabricators that handrails and stairs have been designed by a structural engineer licensed in the State of Colorado.

1.5. QUALITY ASSURANCE:
   A. Fabricator Qualifications: Experienced in fabrication of miscellaneous steel.
   B. Welder Qualifications: Welding shall be done only by certified welding operators currently qualified according to AWS D1.1.
   C. Engineer Qualifications:
      1. Professional engineer licensed to practice in the State of Colorado and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this project.

D. Design Criteria:
   1. Refer to University's campus standard details, following this section.
      a. Exterior railings.
   2. Steel stairs:
      a. Minimum Uniform Load: 100 psf.
      b. Minimum Concentrated Load: 300 lbs at any point.
      c. Engineer of Record shall approve/design connections.
   3. Handrails:
      b. Minimum Concentrated Load: 200 lb at any point.
      c. Engineer of Record shall approve/design connections.

2. PRODUCTS

2.1. MANUFACTURED ITEMS:
   A. Steel Lintels:
      1. Masonry openings over 16" in width shall have steel lintels.
   B. Steel Opening Frames:
      1. Openings in metal floor and roof decks greater than 10" in any direction, shall be supported on all four sides by a steel frame spanning between steel joists or other deck supports.
   C. Steel Stairs:

2. Grate Tread Channel Stringer Stairs: Industrial-type steel tread stairs.
   a. 14 gage, 2" depth channel "Grip Strut Safety Grating" as manufactured by McNichols Co. or approved substitute.

D. Tubular Steel Railings:
   1. Size: Fabricated from 1-1/4" NPS round steel pipes with steel balusters.
   2. Railings:
      a. Balusters Set in Concrete: Pipe sleeves 6" long and 1/4 inch clear of balusters.
      b. Set balusters in sleeves, pack with non-shrink, non-metallic grout.
      c. Weld balusters to steel stringers.
   3. Brackets:
      a. Secure to walls with malleable iron wall brackets and end fittings.
      b. Brackets with 1-1/2" wall clearance. Installed railing shall conform to UFAS requirements.
      c. Space brackets 5 feet o.c., maximum, or as required to support design loads.

E. Steel Ladders:
   2. Rungs: 1-inch steel pipe at 12" o.c., minimum, welded to side rails.
   3. Width: 20-inches minimum width, spaced 7-inches minimum from wall.
   4. Maximum unbraced vertical length is 6 feet.
   5. Comply with ANSI A14.3 requirements.

F. Floor Grating:
   1. Support grating on galvanized steel angles with universal clip fastener. Clip bolt shall be galvanized.
   2. Type: Welded carbon steel grating capable of supporting 150 psf at a span to be determined by the design consultant and agreed to by the University for each particular application. Galvanize after fabrication with G90 coating per ASTM A386.

2.2. FABRICATION:
   A. General: Fabricate in accordance with details and reviewed shop drawings, all miscellaneous items of metal work indicated or as necessary to complete the work. Verify dimensions on site prior to shop fabrication.
B. Welding: Comply with latest American Welding Society standards. Miter and cope intersections and weld all around. Remove spatter, grind exposed welds to blend, and contour surfaces to match those adjacent.

2.3. SHOP PAINTING:
   A. Clean ferrous metal of scale, rust, oil, moisture, and dirt before applying paint.
      1. Paint all metal black unless otherwise noted.
   B. Apply one shop coat of Tnemec 10-99 long-oil alkyd primer or approved substitute to ferrous metals after fabrication. Apply two shop coats to ferrous metals that will be inaccessible after erection.
   C. Painting specified here does not count as a coat for finish painting.
   D. Omit shop painting on surfaces embedded in concrete or requiring field welding.

3. EXECUTION
3.1. SCHEDULE:
   A. This section includes, but is not specifically limited to metal fabrications and components listed in the following schedule:
      1. Miscellaneous anchor slots, sleeves, bolts, brackets, clips, inserts, imbeds, gratings, tubing, bar stock, plates and other items not distinctly specified under other sections.
      2. Loose steel angle lintels.
      3. Steel stairs.
      4. Handrail brackets, handrails, and guard rails.
      5. Steel ladders.
      6. Angle bracing for hollow metal door and window frames.
      7. Steel opening frames.
      8. Expansion control items.
SECTION 06200 — FINISH CARPENTRY

1. GENERAL

1.1. SUMMARY:

A. Section Includes:

1. Miscellaneous exposed wood members commonly known as "Finish Carpentry" or "Millwork".
2. Interior trim.
4. Window stools.

B. Related Sections:

1. Section 06100 - Rough Carpentry.
2. Section 06400 - Architectural Woodwork.
3. Section 06650 - Solid Polymer Fabrications.
4. Section 08100 - Metal Doors and Frames.
5. Section 08210 - Wood Doors.
6. Section 08710 - Finish Hardware.
7. Section 09260 - Gypsum Board Systems.
8. Section 10100 - Visual Display Boards.
9. Section 12304 - Plastic Laminate Faced Casework.
10. Section 12345 - Metal Laboratory Casework.
11. Section 12346 - Wood Laboratory Casework.
12. Section 12348 - Laboratory Tops, Sinks and Accessories.

1.2. REFERENCES:


1.3. SUBMITTALS:

A. Shop Drawings
1. Submit Shop Drawings for:
   a. All millwork items.
   b. Countertops.
   c. Shelving.
   d. Window stools.
   e. Other items as required.

B. Samples:
   1. Samples Required Include:
      a. Wood veneers and solid wood.
      b. Plastic laminate.
      c. Cabinet hardware.

1.4. QUALITY ASSURANCE:

A. Quality Standards: For the following types of architectural woodwork, comply with the Architectural Woodwork Institute (AWI) "Quality Standards" as applicable. In event of dispute as to performance under AWI standards, Owner may call upon AWI for an inspection and report by AWI Quality Certification Program. All parties agree to abide by AWI decisions. Costs for this service will be paid by Owner unless AWI determines that specified standards have not been met, in which cases costs will be paid by Contractor.

1. Standing and Running Trim: AWI Section 300, Custom Grade. Custom grade will be considered for special application areas with the specific consent of the university.

2. Shelving: AWI Section 600, Custom Grade.

3. Miscellaneous Work: AWI Section 700, Custom Grade.

4. Plastic Laminate Casework and Countertops: AWI Section 400, Custom Grade.

5. For remodeling work, match existing, adjacent woodwork in color, species and grade quality.

B. Grading and Marking: Lumber shall be marked on each piece, located on surfaces which will not be exposed after installation. Grade marks to be of the association under whose rules it is graded. Bundle marking or Certificate of Inspection issued by the association will be permitted in lieu of marking each individual piece.

2. PRODUCTS

2.1. PLASTIC LAMINATE MANUFACTURERS:

A. Provide plastic laminate for all laminate work, and casework manufactured by:
   1. Formica Corporation.
   2. Nevamar.
   4. Approved substitute under provisions of Section 01600.
2.2. PLASTIC LAMINATE MATERIALS:
   A. Laminated Countertops and Edges:
      1. All custom countertops (vanities, and other tops for mill-built cabinets, etc.) shall be pressure laminate.
      2. Selection, will be made from all available manufacturer's patterns, wood grains, solid colors and standard finishes.
      3. Countertops: 1" particleboard with 1/2" overhang. Finish front and sides with the countertop materials.
      4. Backsplashes shall be 3/4" thick, finished with high pressure laminated material on the front, top edge and side edges.
   B. Plastic Laminate Applications:
      1. Plastic Laminate for Horizontal Surfaces: Type 2, 0.050" thick, General-Purpose Type (high pressure).
      2. Plastic Laminate for Post-Forming: Type 3, 0.042" thick, Post-Forming Type (high pressure).
      3. Plastic Laminate for External Vertical Surfaces: Type 4, 0.028" thick, General-Purpose Type (high pressure).
      4. Plastic Laminate for Cabinet Linings: 0.020" thick, Lining Type (high pressure). At surfaces where high pressure balancing sheet is not required, 0.020" thick low pressure melamine may be used.
      5. Plastic Laminate for Concealed Panel Backing: 0.020" thick, Backer-Type (high pressure).

2.3. BOARD PRODUCTS:
   A. Particleboard: Medium density (45 lbs./cu. ft. minimum) board fabricated from wood chips and phenolic resin binders, compressed board, 3/4" thickness unless otherwise indicated complying with ANSI A208.1, Grade 1-M-1.
   B. Solid Stock: Selected for color and graining. Unless otherwise shown, provide solid material of the same species as adjacent or abutting exposed, transparent finished veneer.

2.4. WINDOW STOOLS:
   A. Renovation Work: Match existing condition.
   B. Drywall sills are not acceptable.

2.5. HANDRAILS:
   A. Wood handrails shall be designed to conform to the requirements of UFAS and ANSI A117.1 for diameter, extension and location.

2.6. INFILTRATION BARRIER:
   A. Inject grout or caulk around window and door frames where voids occur between rough opening and finished frame. Fill voids to avoid air infiltration.

3. EXECUTION
3.1. APPLICATION OF PLASTIC LAMINATE:
   A. Plastic laminate joints shall be staggered from substrate joints.
   B. Plastic laminate joints shall be hair-line, flush butt joints.
   C. Number of plastic laminate joints shall be kept to a minimum.

3.2. APPLICATION OF HARDWARE:
   A. Receive, store and be responsible for all finished hardware.
   B. Apply hardware in accordance with manufacturer's instructions and UFAS requirements.
   C. The location of hardware in connection with doors shall be as follows:
      1. Center door levers 38 inches above finished floor.
      2. Space center hinges equal distance between top and bottom hinges.

END OF SECTION 06200
SECTION 07210 — BUILDING INSULATION

1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Blanket batt insulation.
   2. Safing insulation.
   3. Rigid board insulation.

B. Related Sections:
   1. Section 04200 - Unit Masonry: Rigid and masonry fill insulation.
   2. Section 07230 - Perimeter and Underslab Insulation.
   3. Section 07270 - Firestopping.
   4. Section 07510 - Built-up Bituminous Roofing: Roof insulation.
   5. Section 07530 - Single Ply Membrane Roofing: Roof insulation.
   7. Section 15010 - Basic Mechanical Requirements: Energy conservation standards.
   8. Section 15250 - Mechanical Insulation: Pipe and duct insulation.

1.2. SUBMITTALS:

A. Provide manufacturer's written certification that insulation products meet specified requirements for the use intended.

1.3. QUALITY ASSURANCE:

A. Performance Limitations:
   1. Certain cellular plastics used in building construction, though tested in conformance under ASTM and NFPA criteria, have been considered by the Federal Trade Commission as performing differently under actual fire conditions than under test conditions. Such products, if allowed to remain exposed or unprotected, may produce rapid flame spread, quick flashover, toxic or flammable gases, dense smoke and intense and immediate heat and may present a serious fire hazard. Architects are cautioned to thoroughly investigate these materials and their installation prior to specifying insulation products.
   2. Materials used to insulate and fireproof buildings shall contain no asbestos.

B. Thermal Conductivity:
   1. Insulation values are for a thermal conductivity (k-value) measured at 75°F.
   2. Adjust thicknesses as required when using material having a different thermal conductivity or tested at a different temperature.
3. Where insulation is specified to have a specific "R" value, furnish manufacturer's standard thickness required to equal or exceed the specified value.

4. Insulation "R" Values:
   a. Walls:
      i. R = 19 minimum above grade.
      ii. R = 10 minimum below grade.
   b. Roofs: R = 30 average.
   c. Soffits: R = 19 minimum.
   d. Above-Grade Slabs over Unheated Spaces: R = 19 minimum.

1.4. DELIVERY, STORAGE AND HANDLING:
   A. Do not deliver plastic insulation materials to the project site prior to time of installation. Protect at all times against ignition. Complete the installation and concealment of plastic materials as rapidly as possible.

2. PRODUCTS
2.1. MANUFACTURERS:
   A. Batt Insulation:
      1. Owens-Corning Fiberglass.
      4. Certain Teed Corp.
   B. Rigid Insulation:
      1. Dow Chemical Co.
      2. Amoco.
      3. Celotex Corp.
      5. U.C. Industries.

2.2. MATERIALS:
   A. Foil Faced Batt Insulation:
      1. Resilient glass fibers bonded with thermosetting resin to foil facing.
      2. Batts shall have minimum R-Value of 3.0 per inch of insulation thickness.
      3. Vapor Transmission: Not more than 0.1 perms.
      4. Comply with ASTM C665, Type III.
      5. Install foil faced insulation in such a way to ensure integrity of vapor barrier. Tape all joints, penetrations, and at top and bottom of walls.
6. Where not covered with a 15 minute thermal barrier, provide batts, including vapor barrier, not exceeding a flame spread of 25 or smoke developed of 50 per ASTM E84; and rated noncombustible per ASTM E136.

B. Rigid Insulation for Above-Grade Walls and Miscellaneous Locations:

C. Safing Insulation:
   1. Conform to ASTM C612, Class 1 and 2, (melt point of over 2,000°F.). Provide USG "Thermafiber Safing Insulation", or approved substitute, thickness as required.
   2. Contract Documents must clearly show locations and detail.

D. Spandrel Glass Safing Insulation:
   1. Comply with requirements specified above for safing insulation. Provide USG "Thermafiber" curtain wall insulation with melt point of over 2,000°F. per ASTM C24.

3. EXECUTION
3.1. INSTALLATION:
   A. All exposed exterior building columns and beams shall be insulated from the interior at the same R = 19 rating as for walls.
   B. Insulate above-grade floor slabs where underside is exposed to the weather or unheated space to achieve an R = 19 rating minimum.
   C. Insulate around support and support cross-beams.

END OF SECTION 07210
1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Through-penetration firestopping in fire-rated barriers including both empty openings and openings containing cables, pipes, ducts, conduits and other penetrating items.
   2. Construction-gap firestopping at connections of the same or different materials in fire-rated construction using fire-resistant sealants.
   3. Construction-gap firestopping occurring within fire-rated walls using fire-resistant sealants.
   4. Construction-gap firestopping occurring at the top of fire-rated walls.

B. Related Sections:
   1. Section 07210 - Building Insulation: Fibrous fire safing insulation.
   2. Section 07253 - Sprayed Fireproofing.
   5. Division 16 - Electrical: Raceway seals, cable trays and manufactured electrical devices.

1.2. SYSTEM PERFORMANCE REQUIREMENTS:

A. General:
   1. Provide firestopping systems that are produced and installed to resist the spread of fire and the passage of smoke and other gases.

B. F-Rated Through-Penetration Firestop Systems:
   1. Provide through-penetration firestop systems with F ratings required, as determined per ASTM E814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

C. T-Rated Through-Penetration Firestop Systems:
   1. Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814, where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:
      a. Where firestop systems protect penetrations located outside of wall cavities.
      b. Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.
c. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

d. Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

D. Fire-Resistive Joint Sealants:
1. Provide joint sealants with fire-resistance ratings required, as determined per ASTM E119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

E. Exposed-to-View Firestopping Materials:
1. For firestopping exposed to view, traffic, moisture, UV radiation, and physical damage, provide products that do not deteriorate when exposed to these conditions.
   a. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
   b. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
   c. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

2. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke developed values of less than 450, as determined per ASTM E84.

1.3. SUBMITTALS:
A. Certifications:
1. Submit manufacturer's certification that materials supplied are in accordance with the specifications and requirements of the authorities having jurisdiction.
2. Submit certification that materials supplied are VOC compliant and are nontoxic to building occupants.

B. Test Reports:
1. Submit product test reports from, and based on tests performed by, a qualified testing and inspecting agency who is acceptable to ICBO and the University of Colorado at Boulder Department of Environmental Health and Safety evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

C. Penetrations Schedule:
1. Submit a schedule showing typical penetrations of each penetrating material type, firestopping type to be used, F ratings, T ratings, UL or other acceptable testing agency reference numbers, and other pertinent data.

1.4. QUALITY ASSURANCE

A. Fire-Test Response Characteristics:

1. Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

   a. Perform firestopping tests by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to the University of Colorado at Boulder Department of Environmental Health and Safety.

   b. Through-penetration firestop systems must be identical to those tested per ASTM E814 under conditions where positive furnace pressure differential of at least 0.01" of water is maintained at a distance of 0.78" below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

      i. Furnish products bearing classification marking of qualified testing and inspecting agency.

      ii. Furnish firestop systems corresponding to those indicated by reference to system designations listed by UL in their "Fire Resistance Directory" or by Warnock Hersey.

   c. Fire-resistive joint sealant systems must be identical to those tested for fire-response characteristics per ASTM E119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water, as measured 0.78 inch from the face exposed to furnace fire. Provide systems complying with the following requirements:

      i. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory."

      ii. Furnish joint sealants, including backing materials bearing classification marking of qualified testing and inspection agency.

B. Information on Drawings:

1. Drawings refer to specific design designations of through-penetration firestop systems intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing performance of proposed substitutions equals or exceeds that of systems they would replace and are acceptable to authorities having jurisdiction.

C. Standards:
1. Conform to applicable standards, including, but not limited to:
   b. ASTM E814 Test Method of Fire Tests of Through-Penetration Firestops.

D. Installer Qualifications:
   1. Installer who has successfully completed within the last three years at least three firestopping applications similar in type and size to that of this project.

E. Single Source for Materials:
   1. Obtain firestopping materials from a single manufacturer for each different product required.

F. Preconstruction Laboratory Tests:
   1. Submit substrate materials representative of actual joint surfaces to be sealed to the manufacturer of firestopping products for laboratory testing of firestop materials for adhesion to primed and unprimed substrate joints and for compatibility with secondary seals, if required, as indicated below:
      a. Use test methods standard with manufacturer to determine if priming and other specific substrate preparation techniques are required to obtain rapid, optimum adhesion of firestopping to substrate joints under environmental conditions that will exist during actual installation.
      b. Testing will not be required when firestopping manufacturer is able to submit preparation data required above which is based on previous testing of current firestopping products for adhesion to, and compatibility with, substrates matching those submitted.

G. Detectable Asbestos:
   1. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

1.5. WARRANTY:
   A. Submit 2 copies of written 2-year warranty agreeing to repair or replace firestopping which fails to perform as airtight and watertight joints; or fails in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.

   B. Provide warranty signed by the Installer and Contractor.

2. PRODUCTS

2.1. MANUFACTURERS:
   A. Provide products by one of the following for each different product required:
1. 3M Fire Protection Products
2. Bio-Fireshield Inc.
3. General Electric Company
4. Tremco, Inc.
5. Hilti Inc.
6. Other approved manufacturer’s offering UL listings will be considered.

2.2. MATERIALS:
A. Compatibility:
   1. Provide firestopping, joint fillers, dams and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Accessories:
   1. Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
      2. Permanent forming/damming/backing materials including the following:
         a. Semirefractory fiber (mineral wool) insulation.
         b. Ceramic fiber.
         c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
            i. Fire-rated formboard.
            ii. Joint fillers for joint sealants.
         e. Temporary forming materials.
         f. Substrate primers.
         g. Collars.
         h. Steel sleeves.

C. Applications:
   1. Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

3. EXECUTION
3.1. PENETRATION SCHEDULE:
A. General:
   1. Prepare a schedule showing typical penetrations of each penetrating material type and other information as follows:
      a. Project Name.
      b. Construction Type.
      c. Occupancy.
      d. Firestop Applicator.

B. Construction Assemblies:
   1. Gypsum Board Walls
   2. CMU and Concrete Walls
   3. Concrete Floors
   4. Floor/Ceiling Assemblies
   5. Roof/Ceiling Assemblies
   6. Shafts
   7. Chases
   8. Curtain Walls
   9. Construction Joints
  10. Expansion Joints

C. Fire Resistive Rating Requirements:
   1. Furnish the following information for each type of construction assembly listed above:
      a. Hourly fire rating.
      b. "F" Rating.
      c. "T" Rating.
      d. Qualified testing agency Design No.
      e. Penetrating item.
      f. Penetrating material and size.
      g. Minimum annular space.
      h. Maximum annular space.
      i. Architect's detail and sheet number.
      j. Shop drawing detail or sheet number.

END OF SECTION 07270
SECTION 07530 — WATERPROOFING ROOFING

1. GENERAL

1.1. SUMMARY:

A. Furnish and install a completed waterproofing assembly including surface conditioner, a monolithic, rubberized asphalt membrane, protection course, flashings, extruded polystyrene insulation (if required), drainage course (if required) and pavers (if required). To ensure total system compatibility all products must by purchased from a single-source manufacturer.

B. Related Sections:

1. Concrete [Section 03300] - Roof Deck Surface/Substrate

The coordination of this section is necessary to facilitate the successful installation of the waterproofing membrane.

Cast In Place Concrete/Composite Deck

a. Strength/density:
   - minimum 2,500 psi (17,235 kPa) compressive strength
   - minimum 115 pcf (1842 kg/m$^3$) density

b. Finish: Wood-float or wood-troweled finish. Steel troweled is not desirable.

c. Concrete Hydration (Cure):
   i. Method of Cure: Water cure, wet coverings, paper sheets, plastic sheets or approved liquid curing compound (sodium silicate preferred).
       **Contact Hydrotech for other alternatives.**
   ii. Duration of Cure/Dry:
       1. Structural Weight Concrete: recommend 28 days, minimum 14 days, prior to application of the membrane.
       2. Lightweight Structural Concrete: recommend 60 days, minimum 28 days, prior to application of membrane. Venting of the deck from the underside is recommended to facilitate drying.
       3. The above minimum cure/dry times are recommended based upon basic concrete fundamentals and experience. Depending on conditions (i.e., ambient temperature, humidity) the concrete may be dry enough to receive application of the membrane in less than the 14 day minimum recommendation. Consult Hydrotech for specifics when less than the minimum is desired.

iii. Form Release Agents: **Contact Hydrotech**
C. Section 07600 - Flashing and Sheet Metal.

1.2. REFERENCES:

A. Codes/Standards:
   1. Roof system shall comply with all I.C.B.O. requirements, match FM I-90 wind uplift resistance criteria and be compatible with application on specified deck.
   2. UL Listed Products: Provide materials which have been tested and listed by UL for Class A.
   3. Conform to Uniform Building Code Requirements for "high wind" areas. Provide ICBO approval documentation and, if necessary, design calculations for building and site conditions.
   4. Design roof system to resist wind velocities indicated on the Boulder County Wind Map. Note that wind speeds vary across the campus.

1.3. SUBMITTALS:

A. Certification from an approved independent testing laboratory experienced in testing this type material, that the material meets CGSB-37.50-M89 standard for rubberized asphalt membranes, including applicable ASTM procedures. Testing shall be done by Ortech International or other national testing laboratory acceptable to the engineer.

B. Certification showing full time quality control of production facilities and that each batch of material is tested to insure conformance with the manufacturer's published physical properties.

C. Evidence that extruded polystyrene insulation is free from CFC's

D. Certification showing that all waterproofing components are being supplied and warranted by a single-source manufacturer.

E. The plant manufacturing this type material must have ISO 9001-2000 approval as evidenced by a notarized copy of the official certificate.

1.4. QUALITY ASSURANCE

A. Refer to Section 1.3 SUBMITTALS. Include items A., B., C. & D.

B. The Waterproofing Contractor shall demonstrate qualifications to perform the work of this Section by submitting the following documentation:
   1. Certification or license by the membrane manufacturer as a locally based, authorized applicator of the product the installer intends to use, for a minimum of five (5) years.
   2. List of at least three (3) projects, satisfactorily completed within the past five (5) years, of similar scope and complexity to this project. Previous experience
submittal shall correspond to specific membrane system proposed for use by applicator.

C. Refer to Section 1.04 SYSTEM DESCRIPTION. Include single-source for all components from the manufacturer.

D. The rubberized asphalt membrane product shall contain an inert clay filler to enable the product to be resistant to acids (fertilizers, building washes and acid rain).

E. Membrane Manufacturer shall have available an in-house technical staff to assist the contractor, when necessary, in application of the products and final inspection of the assembly.

F. Membrane Manufacturer Qualification: Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
   1. Membrane Manufacturer must show evidence that the specified rubberized asphalt has been manufactured by the same source for fifteen (15) years and successfully installed on a yearly basis for a minimum of fifteen (15) years on projects of similar scope and complexity.
   2. Membrane Manufacturer must not issue warranties for terms longer than they have been manufacturing their hot fluid rubberized asphalt membrane.

G. Pre-Roofing Conference:
   1. Meet at the project site and review requirements for the work and conditions which could possibly interfere with successful performance of the work. Require every party who is concerned with the work, or required to coordinate with it or to protect it thereafter, to attend the conference.
   2. Confirm that the applicator and manufacturer accepts the roofing substrate. Coordinate with appropriate party any remedial action required to make substrate acceptable.
   3. Where roofing is required to be guaranteed by the manufacturer, require manufacturer's technical representative to participate in the conference.

1.5. WARRANTY:

A. Upon completion of the work, the contractor must supply the owner with a single-source warranty of U.S. origin direct from the manufacturer.

B. Each warranty varies in scope and terms. Contact Hydrotech for exact warranty terms and conditions to meet the specific project requirements.

C. Warranties available from the manufacturer:
   1. Material Warranties; excludes labor.
      Duration: 10-year
   2. Watertightness Warranties; includes labor and material.
      Duration: 5-years
3. **Thermal Warranties**: includes 80% retention of the original thermal value.  
   Duration 5-years

4. **Total System Warranties**: covers components of the waterproofing assembly, including membrane, flashing, insulation and pavers. Includes removal and replacement of the pavers when installed per Hydrotech's requirements.
   a. Duration of Membrane/Flashing: 5-years (watertight condition)
   b. Duration of Insulation: 5-years (80% of original thermal value)
   c. Duration of Pavers: 5-years (crack, split or disintegrate due to freeze-thaw)

2. **MATERIALS**

2.1. **MANUFACTURERS**:
   A. All components must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

   Manufacturer: American Hydrotech, Inc.
   303 East Ohio Street
   Chicago, Illinois 60611-3318
   800-877-6125 or 312-337-4998
   FAX: 312-661-0731

2.2. **MATERIALS**:
   A. Membrane

   1. Membrane shall be a hot, fluid applied, rubberized asphalt membrane meeting the following CGSB-37.50-M89 standard and other pertinent physical properties: (Edit to project requirements)
      a. American Hydrotech, Inc., Monolithic Membrane 6125
      b. American Hydrotech, Inc., Monolithic Membrane 6125-EV (25% min. post consumer recycled content) Surface Ballast:

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<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>TYPICAL RESULT</th>
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<tbody>
<tr>
<td>Flash point</td>
<td>ASTM D-92, CGSB-37.50-M89</td>
<td>502°F* (261°C)</td>
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<tr>
<td>Penetration</td>
<td>ASTM D-5329, CGSB-37.50-M89</td>
<td>98 mm @77°F (25°C), 187 mm @122°F (50°C)</td>
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<td>Flow</td>
<td>ASTM D-5329, CGSB-37.50-M89</td>
<td>1.0 mm @ 140°F (60°C)</td>
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<td>Toughness</td>
<td>CGSB-37.50-M89</td>
<td>16.0 Joules</td>
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<td>Standard/Method</td>
<td>Result/Description</td>
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<td>Ratio of Toughness to Peak Load</td>
<td>CGSB-37.50-M89</td>
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<td>Water Vapor Permeability</td>
<td>ASTM E-96, PROCEDURE E CGSB-37.50-M89</td>
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<td>Water Absorption</td>
<td>CGSB-37.50-M89</td>
<td>.11 gram weight gain</td>
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<td>Low Temperature Flexibility (-25°C)</td>
<td>CGSB-37.50-M89</td>
<td>No delamination, adhesion loss, or cracking</td>
</tr>
<tr>
<td>Low Temperature Crack Bridging Capability</td>
<td>CGSB-37.50-M89</td>
<td>No cracking, adhesion loss, or splitting</td>
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<td>Heat Stability</td>
<td>CGSB-37.50-M89</td>
<td>No change in viscosity, penetration, flow or low temperature flexibility</td>
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<td>Viscosity</td>
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<td>Water Resistance (5 days/50°C)</td>
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<td>No delamination, blistering, emulsification, or deterioration</td>
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<td>Softening Point</td>
<td>ASTM D-36</td>
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<td>Elongation</td>
<td>ASTM D-5329</td>
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<td>Resiliency</td>
<td>ASTM D-3407</td>
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<td>Bond to Concrete</td>
<td>ASTM D-3407</td>
<td>Pass 0°F (-18°C)</td>
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<tr>
<td>Acid Resistance</td>
<td>ASTM D-896 Procedure 7.1 (N-8)</td>
<td>Pass 50% Nitric Acid 50% Sulfuric Acid</td>
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<td>Resistance to Hydrostatic Pressure</td>
<td>ASTM D-08.22 Draft 2</td>
<td>100 psi (equals 231 foot of head water)</td>
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<td>Resistance to Salt Water</td>
<td>ASTM D-896 similar 20% sodium chloride sodium carbonate calcium chloride</td>
<td>No delamination, blistering, emulsification or deterioration</td>
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</table>
Resistance to Fertilizer  
ASTM D-896 similar undiluted, 15/5/5, nitrogen/phosphorus potash  
No delamination, blistering, emulsification or deterioration

Resistance to Animal Waste  
3-year exposure  
No deterioration

Solids Content  
100%-no solvents

Shelf Life  
10 years (sealed)

Specific Gravity  
1.23 + .02

*102°F more than the application temperature recommended by the manufacturer.

B. Surface Conditioner
   1. A surface conditioner for concrete surfaces.
      - American Hydrotech, Inc., Surface Conditioner

C. Flashing/Reinforcing (Edit to project requirements)
   1. 60-mil (1.5 mm) thick, uncured neoprene flashing/(heavy duty) reinforcing sheet.
      - American Hydrotech, Inc., Flex Flash UN
      - American Hydrotech, Inc., Flex Flash F

D. Adhesives/Sealant
   1. Contact adhesive to bond elastomeric flashing together.
      - American Hydrotech, Inc., Splicing Cement
   2. Contact adhesive to bond elastomeric flashing to an approved substrate.
      - American Hydrotech, Inc., Bonding Adhesive
   3. Sealant to seal elastomeric flashing seam edge.
      - American Hydrotech, Inc., Lap Sealant

E. Protection Course (Edit to project requirements)
      - American Hydrotech, Inc., Hydroflex 30
   2. Extruded polystyrene, rigid, insulating, drainage board (vertical applications only)
      - American Hydrotech, Inc., Thermaflo
   3. Extruded polystyrene, rigid, insulation board (vertical applications only)
      - STYROFOAM brand insulation as manufactured by The Dow Chemical Company, marketed by American Hydrotech, Inc., Protection Board, SM, RM

   **Certain project conditions may warrant additional protection. CONTACT Hydrotech's Technical Service Department.**

F. Prefabricated Drainage Course (if required) (Edit to project requirements)
1. A composite drainage system consisting of a three-dimensional, crush-proof, drainage core and a filter fabric meeting the following physical properties.

- American Hydrotech, Inc., Hydrodrain 300, 400, 700 or 1000 series

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORE:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressive Strength</td>
<td>ASTM D-1621</td>
<td><strong>300/302/1000</strong> - 30,000 psf (14.66 kg/cm²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>400/420</strong> - 15,000 psf (7.32 kg/cm²)</td>
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<tr>
<td></td>
<td></td>
<td><strong>700</strong> - 18,000 psf (8.79 kg/cm²)</td>
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<tr>
<td>Thickness</td>
<td>ASTM D-1777</td>
<td><strong>1000</strong> - .25 in (.64 cm)</td>
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<tr>
<td></td>
<td></td>
<td><strong>300/302</strong> - .22 in (.56 cm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>400/420/700</strong> - .40 in (1.016 cm)</td>
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<tr>
<td>Flow, Q @ 3600 psf &amp; hydraulic gradient of 1</td>
<td>ASTM D-4716</td>
<td><strong>300/1000</strong> - 7 gpm/ft width (72.00 lpmin/m width)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>302</strong> - 5.5 gpm/ft width (68.30 lpmin/m width)</td>
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<tr>
<td></td>
<td></td>
<td><strong>400/420</strong> - 15 gpm/ft width (183.3 lpmin/m width)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>700</strong> - 18 gpm/ft width (223.52 lpmin/m width)</td>
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<tr>
<td><strong>FABRIC:</strong></td>
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<td></td>
</tr>
<tr>
<td>Flow</td>
<td>ASTM D-4491</td>
<td><strong>300/302/1000</strong> - 150 gpm/ft² (6105 lpmin/m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>400/420</strong> - 150 gpm/ft² (6105 lpmin/m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>700</strong> - 110 gpm/ft² (4475 lpmin/m²)</td>
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<tr>
<td>U.V. Resistance</td>
<td>ASTM D-4355</td>
<td>Fully Stabilized</td>
</tr>
<tr>
<td>Apparent Opening Size (EOS)</td>
<td>CW-02215</td>
<td><strong>300/302/400/420/1000</strong> – 70 (.212 mm)</td>
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<tr>
<td></td>
<td></td>
<td><strong>700</strong> – 30 (.60 mm)</td>
</tr>
<tr>
<td>Grab Tensile</td>
<td>ASTM D-4632</td>
<td><strong>300/302/400/420/1000</strong> - 90 lbs. (0.4 kN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>700</strong> – 360x260 lbs. (445x355 N)</td>
</tr>
</tbody>
</table>

2. Extruded polystyrene, rigid, insulating, drainage board (vertical applications only)

- American Hydrotech, Inc., Thermaflo

G. Insulation

1. An extruded polystyrene rigid board insulation meeting the following physical properties.
-STYROFOAM Brand insulation as manufactured by The Dow Chemical Company, marketed by American Hydrotech, Inc.

a. Insulation shall meet ASTM C-578, Type VI or VII.

b. Minimum compressive strength, ASTM D-1621, 40 or 60 psi (276 or 414 kPa) (variance by type of product)

c. Maximum water absorption by volume per ASTM C-272, 0.1%

d. Water vapor permeance for 1" product per ASTM E-96, 1.0 perm (max.) (63 ng/Pa/s/m²).

e. Insulation shall have an R value of 5.0 F ft² h/Btu/in. (0.88 K m²/W) of thickness when tested at 75°F (23.9°C) mean temperature in accordance with ASTM C-518

f. Product shall be free of CFC's

Product types available: STYROFOAM Brand Plaza Deck; High Load 100; and Square Edge. CONSULT Hydrotech for recommended product type.

H. Filter Fabric Sheet

   -American Hydrotech, Inc., Filter Fabric Sheet

I. Topping Materials (Edit to project requirements)

1. Pavers
   a. Architectural Finish Pavers
      -American Hydrotech, Inc., Architectural Pavers, meeting the following physical properties:

      | PROPERTY                 | TEST METHOD | VALUES                                      |
      |--------------------------|-------------|---------------------------------------------|
      | Compressive Strength     | ASTM C140   | ≥8,500 psi average min.                     |
      | Flexural Strength        | ASTM C293   | ≥1,100 psi average min.                     |
      | Water Absorption         | ASTM C140   | Not greater than 5%                         |
      | Freeze/Thaw              | ASTM C67    | ≤1% loss/dry weight (50 Cycles)             |
      | Centerload               | -           | Min. 1,750 lbs.                             |

   b. Paver Accessories
      i. Fixed Height pedestals as recommended by American Hydrotech, Inc.
      ii. Adjustable Height pedestals as recommended by American Hydrotech, Inc.

2. Concrete Pour Topping
   Dow Chemical Company, manufacturers of STYROFOAM Brand insulation, recommends the incorporation of an air layer between the insulation and concrete.
Hydrotech suggests the use of Hydrodrain AL for this purpose. **CONTACT Hydrotech for specific recommendations.**

3. Asphalt Paving Overlay
   When asphalt paving will be placed directly over the waterproofing, **CONTACT Hydrotech for suggestions and recommendations.**

J. Architectural Precast Site Amenities (Edit to project requirements)
   - American Hydrotech, Inc., Site Pieces to compliment Architectural Pavers

3. EXECUTION

3.1. INSPECTION
   A. The waterproofing contractor shall examine all surfaces to receive the waterproofing assembly to verify it is acceptable and proper for the application of the membrane. **Refer to American Hydrotech's Pre-Installation & Application Guidelines.**
   B. The waterproofing contractor shall not proceed with the installation of the waterproof membrane assembly until all deck defects have been corrected.

3.2. PREPARATION
   A. All surfaces must be dry, smooth, free of depressions, voids, protrusions, clean and free of unapproved curing compounds, form release agents and other surface contaminants.
      1. Cast in-place concrete/Composite deck
         a. Poured in place concrete must be monolithic, smooth, free of voids, spalled areas, laitance, honeycombs, and sharp protrusions.
         b. **Refer to Section 1.02 of this specification, Division 3.**
      2. Precast concrete decks
         a. Precast units shall be mechanically secured to minimize differential movement and all joints between units shall be grouted.
      3. Retrofit/Tear-Off Application**
         a. Asphalt, coal tar pitch or other existing membrane must be removed. **CONTACT HYDROTECH.**
         b. Deck type acceptable to Hydrotech.

   **REFER TO 6125 WATERPROOFING FABRIC-REINFORCED SPECIFICATION**
   B. Substrate cleaning
      1. Thoroughly sweep the substrate which is to receive the waterproofing membrane.
      2. Substrate must also be blown clean using an air compressor to remove any remaining loose debris.
3. Final check to determine if concrete has been properly cleaned is to apply a test patch of Monolithic Membrane 6125 to the surface and check its adhesion.

3.3. INSTALLATION

A. Surface conditioner application (to concrete)
   1. Apply the surface conditioner to the concrete using a hand held sprayer evenly at a rate of 300 to 600 SF/gallon (7.4 - 14.7 m²/L) depending on surface texture. Surface conditioner should "tan" the surface, not blacken it.
   2. Allow sufficient time for the surface conditioner to thoroughly dry prior to the membrane application.

B. Membrane preparation
   1. The membrane shall be heated in double jacketed, oil bath or hot air melter with mechanical agitation, specifically designed for the preparation of a rubberized asphalt membrane.
   2. Heat membrane until membrane can be drawn-free flowing at a temperature range between 350°F (176°C) and 400°F (204°C).

C. Detailing/Flashing
   1. All detailing and flashing shall be done in accordance with the manufacturer's standard Guideline Details.
   2. All detailing and flashing shall be completed before installing the membrane over the field of the substrate.

D. Membrane Application
   1. Apply the rubberized asphalt membrane at a rate to provide a continuous, monolithic coat of 180 mil minimum (approximately 3/15", 4.6 mm), but not less than 125 mil (1/8", 3.2 mm) thickness.

3.4. SEPARATION SHEET/PROTECTION LAYER INSTALLATION

A. Protection layer shall be installed as follows:
   1. Embed the protection sheet/rigid insulation board into the membrane while it is still hot to insure a good bond.
   2. Overlap adjoining sheet edges (dry) a minimum of 2"-3" (50.8 mm - 76.2 mm) to insure complete coverage. Rigid insulation board materials are not to be overlapped.
   3. The completed membrane/protection assembly must be covered with subsequent topping materials as soon as possible, within 30 days of membrane installation.

3.5. WATER TEST
A. It is strongly recommended that the deck area or portions thereof be water tested by means of electronic testing or ponding water to a minimum depth of 2" (50.8 mm) for a period of 48 hours to check the integrity of the membrane installation.

1. Electronic beach detection testing shall be required prior to the placement of subsequent overburden in the event of excessive damage to the membrane assembly.

B. **VERIFY** that the structure can support the deadload weight of a watertest before testing.

C. If leaks should occur, the water must be drained completely and the membrane installation repaired.

3.6. DRAINAGE COURSE/INSULATION/FILTER FABRIC SHEET/PAVER PLACEMENT

A. General

1. Examine the deck area to be covered with subsequent topping materials in order to insure that all deck areas have received the membrane, the membrane is free of damage, it is properly protected, and all flashing has been properly installed, before placing the insulation.

2. It is recommended that the drainage course (if required), insulation (if required), and other subsequent topping materials be installed as each section is completed.

B. Prefabricated Drainage Course Placement (if required)

1. Install drainage course on horizontal and vertical surfaces in accordance with the manufacturer's recommendations.

2. Layout and position drainage course and allow to lay flat. Cut and fit drainage course to perimeter and penetrations.

3. Bond all geotextile overlap edges to adjacent drainage core geotextile with an acceptable adhesive to insure geotextile integrity.

4. Place subsequent topping materials as soon as possible.

** If drainage layer is installed as an AIR LAYER, placement of the drainage course follows installation of insulation (if required). CONTACT Hydrotech.**

C. Insulation Placement (if required)

1. Loose lay horizontal applications) in a staggered manner and tightly butt together all insulation boards. The maximum acceptable opening between insulation boards is 3/8" (9.5 mm). Insulation must be installed within 3/4" (19 mm) of all projections, penetrations, etc.

2. When multi-layer insulation applications are involved the bottom layer of insulation must be the thickest layer and must be a minimum of 2" thick (50.8 mm). All layers shall be installed unadhered to each other and all joints in relation to underlying layers staggered.
3. For vertical, multi-layer applications, second layer of insulation board may be spot adhered to the protection layer with appropriate adhesive or additional rubberized asphalt membrane.

D. Architectural Finish Paver Placement (if required)
   1. Install architectural finish pavers on tabs or pedestals in accordance with manufacturer's recommendations and architectural layout.

3.7. JOB COMPLETION
   A. Contractor and a representative of the membrane manufacturer shall inspect the waterproofing assembly and notify the contractor of any defects. All defects must be corrected.
   B. Clean up all debris and equipment.

END OF SECTION 07530
SECTIONS 07600 — FLASHING AND SHEET METAL

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Copings.
      2. Flashings.
      3. Counterflashings.
      4. Downspouts.
      5. Gutters.
      6. Related clips, anchors, and fasteners.
   B. Related Sections:
      1. Section 04200 - Unit Masonry.
      2. Section 04400 - Stone.
      3. Section 07320 - Roofing Tile.
      4. Section 07510 - Built-up Bituminous Roofing.
      5. Section 07530 - Single Ply Membrane Roofing.

1.2. SYSTEM DESCRIPTION:
   A. Tile Roof Flashing:
      1. All flashings between tile roofs and vertical surfaces shall be 16 ounce cold rolled copper run not less than 2" higher than the tile and covering the first roll of tile.
      2. Flashings to be lapped 6" and to be secured with 4" wide floating 20 gage stainless steel cleats at 36" on center or continuous 20 gage stainless steel cleat.
      3. Box flashings to be used along rakes. All flashings to be counterflushed.
      4. Copper edge strip to be used along all exposed sheathing edges.
      5. All flashing and counterflush- ing associated with tile roof system shall be copper.
   B. Gutters:
      1. 24-gage galvanized iron or copper (where appropriate), half round, 4" deep, 5" wide, both edges rolled over 5/8" copper coated steel rod and set at a pitch of 1/4" per 10' to drain.
      2. Hangers: Adjustable type, spaced at 24" o.c., Berger Brothers, shank type.
      3. Gutters shall be used at draining edge of all tile roofs, unless specifically approved otherwise.
      4. All joints shall be soldered.
C. Downspouts:
   1. Galvanized steel or copper (where appropriate) threaded pipe built into the wall and turned out on top about 2 ft. below gutters and fitted with a drip flange.
   2. Galvanized iron downspout shall run from gutter down and into the steel pipe, loose fit.
   3. Steel pipe shall turn out at the bottom about one foot above grade and shall finish in a heavy fitting with drip lip.
      a. Provide precast concrete splash blocks (or C.I.P .) where downspouts discharge at grade. Direct all flow away from building.
   4. No exposed downspouts shall be used except with express approval of Department of Facilities Management.
   5. Use two 45 degree sections to transfer from gutter to downspout.
   6. Provide snap-in cleanouts at each story of construction for multi-story work.

1.3. SUBMITTALS:
   A. Submit full size samples in conformance with Section 01300 including:
      1. Flashing and counterflashing.
      2. Gutter section.
      3. Downspout section.

1.4. QUALITY ASSURANCE:
   A. Except as otherwise indicated, conform to requirements and recommendations of SMACNA "Architectural Sheet Metal Manual", as applicable and including joints, seams, details and accommodation of thermal movement.
   B. Sheet metal and flashing installations shall be designed to withstand 100 mph wind uplift.
   C. Completed work must be free from water leakage under all weather conditions. 1.5

1.5. WARRANTY:
   A. Sheet metal work shall be warranted for a period of 2 years from date of the Notice of Acceptance.
   B. Warranty shall include replacement at Contractor's expense any defects which occur during the warranty period which, in the opinion of the Architect are due to defective materials, workmanship, or for failure to allow for expansion/contraction.

2. PRODUCTS
2.1. MATERIALS:
   A. Zinc-Coated Steel Sheet: Commercial quality carbon steel sheets with minimum of 0.20% copper content complying with ASTM A526 or A527 for lock-forming; hot-
dip galvanized to comply with ASTM A525, G90, mill phosphatized, 20 gage except as otherwise indicated.

B. Copper Sheet: Cold-rolled sheet copper (H00), complying with ASTM B370, except soft temper (060) where fully concealed and supported for proper performance, CDS 2B (bright) finish, 16 oz. per sq. ft. (0.0216" thick) except as otherwise indicated.

C. Stainless Steel Sheet: AISI Type 302/304 stainless steel sheet or strip complying with ASTM A167; soft; No. 2D annealed finish, 0.0250" thick (24 gage) except as otherwise indicated.

3. EXECUTION

3.1. INSTALLATION:

A. Seams:
   1. For non-moving seams provide soldered common-lock seams, except as otherwise indicated.
   2. Comply with metal producer's recommendations for tinning, soldering and cleaning the joints.
   3. Mastic sealed seams are not acceptable.

B. Expansion Provisions:
   1. Provide for thermal expansion of all exposed sheet metal work exceeding 15'-0" running length, except as otherwise indicated.
      a. Gutters: Locate where shown with 40'-0" maximum spacing, and located at high points in drainage wherever possible.
      b. Flashing and Trim: 10'-0" maximum spacing, and located 2'-0" from corners and intersections.
   2. Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges, to form a hem.

C. Flashings:
   1. Insert flashings into reglets. Anchor by mechanical means, including driven wedges of lead or other compatible metal, spaced 2'-0". Seal the joint with sealant.
   2. Provide two piece flashing wherever possible.
   3. Hem all exposed edges by fold-back on concealed side.

D. Copper:
   1. Separate copper work from dissimilar metals by a 15-mil-dry-film thickness bituminous coating, or by a heavy tinning of solder at spot-contacts.

END OF SECTION 07600
ROUTE HEAT TRACE THROUGH CONDUIT TO J-BOX ON INSIDE WALL.
(LOCATION IS PROJECT SPECIFIC)

TILE ROOF ASSEMBLY - RE: ROOF PLAN FOR SNOW GUARDS

COPPER GUTTER & DOWNSPOUTS - RE: ELEVATIONS FOR DS LOCATIONS

PROVIDE HEAT TRACE @ FULL LENGTH OF GUTTER - RE: ELECTRICAL WHERE D.S. PENETRATES WALL, EXTEND TRACE INTO WALL AS SHOWN.

DS SHOWN PENETRATING WALL (RE: ELEVATIONS) - PROVIDE COPPER Drip Ring as Shown & Backer Rod & Sealant Around Stone Penetration

CONNECTION BTWN. D.S. & ROOF DRAINAGE PIPING, BY MECH. USE PROPER METHODS & MATERIALS TO PREVENT GALVANIC ACTION.

PIPING IN STUD WALL - RE: PLUMBING

USE MFR’S ENTRANCE FTG. AT END OF CONDUIT.

NOTE: ADJUST FOR BUILDING FACADE
1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Joints between dissimilar materials
      4. Roof flashing and counterflashing.
      5. Penetrations of floors, walls and roofs.
      7. Door, window and louver frames.
   B. Related Sections:
      1. Section 03300 - Cast-in-Place Concrete.
      2. Section 03450 - Architectural Precast Concrete.
      3. Section 04200 - Unit Masonry.
      4. Section 04400 - Stone.
      5. Section 07270 - Firestopping.
      6. Section 07600 - Flashing and Sheet Metal.
      7. Section 08100 - Metal Doors and Frames.
      8. Section 08800 - Glazing.
     10. Section 09260 - Gypsum Board Systems.
     11. Section 09300 - Tile.
     12. Divisions 15 and 16.

1.2. SUBMITTALS:
   A. Submit manufacturer's surface preparation and installation instructions under provisions of Section 01300.

1.3. QUALITY ASSURANCE:
   A. Applicator Qualifications:
      1. Application shall be done by a Joint Sealant Subcontractor with five years experience. Submit documentation to the Architect and Owner.
   B. Manufacturer Technical Assistance:
      1. Materials shall be supplied by manufacturer who will provide qualified technical assistance at the project site.
1.4. **WARRANTY:**

A. Submit 2 copies of written 2-year warranty agreeing to repair or replace joint sealers which fail to perform as airtight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.

B. Provide warranty signed by the Installer and Contractor.

2. **MATERIALS**

2.1. **MANUFACTURERS:**

A. Tremco Manufacturing.
B. Dow Corning.
C. General Electric.
D. Pecora Corporation.
E. Mameco International.
F. Sika Corporation.
G. Sonneborn Building Products.

2.2. **SEALANTS:**

A. One-Component Acrylic Sealant:
   1. Acrylic emulsion sealant, one-part, mildew resistant and paintable, complying with ASTM C834, recommended by manufacturer for general use as an exposed building construction sealant, Pecora AC-20 or approved substitute.

B. Interior Silicone Rubber Sealant:
   1. Silicone rubber-based, one-part elastomeric sealant, complying with ASTM C920, Type S, Class 25, Grade NS.
   2. Use acid-type for non-porous joint surfaces, and non-acid type where one or both joint surfaces are porous.
   3. For wet areas use type compounded specifically for mildew resistance.
   4. Use for interior joints between equipment or counters and walls.

C. Two-Component Polyurethane Sealant:
   1. Polyurethane-based, 2-part elastomeric sealant, complying with ASTM C920, Type M, Class 25, Grade NS (non-sag), Tremco "Dymeric", Pecora "Dynatrol II".
   2. Optional Sealant: Contractor may, at his option, provide 1-Component Silicone Sealant, "Silpruf" by General Electric or #790 by Dow-Corning in lieu of above.
   3. For exterior and interior sidewalk and floor joints, polyurethane as above except Grade P (self-leveling), Tremco "Dymeric", Pecora "Urexpand NR-200".
D. Backer Rod: Compressible, closed cell non-gassing type compatible with required sealant.

3. EXECUTION

3.1. INSTALLATION:

A. Joints:

1. Install sealants to depths as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:

   a. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but neither more than 0.625" deep nor less than 0.375" deep.

   b. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 0.5" deep nor less than 0.25" deep.

   c. For joints sealed with non-elastomeric sealants and calking compounds, fill joints to a depth in the range of 75% to 125% of joint width.

3.2. SCHEDULE OF SEALANT APPLICATION:

A. At joints in vertical planes on exterior of building and interior face of through expansion or control joints, provide non-sag type polyurethane or silicone sealant.

B. At joints in horizontal planes on interior and exterior of building, provide self-leveling type polyurethane sealant.

C. At joints on interior of building, except as indicated in item A above, provide acrylic type sealant.

D. At perimeter of plumbing fixtures, and kitchen equipment provide silicone type sealant.

E. Set all thresholds in full bed of urethane type caulking.

F. See drawings for typical locations.

G. Humidity and temperature controlled computer rooms:

   1. All walls fully sealed to the structure top and bottom.
   2. Sealant around all electrical outlets, panel boxes, etc.
   3. Expandable foam around sides and back of all electrical outlets, panel boxes, etc.
   4. All openings, into computer room, into access floor space, and into space above ceiling shall be completely sealed.

END OF SECTION 07900
SECTION 08100 — METAL DOORS AND FRAMES

1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Fabricated non-rated and fire-rated rolled steel doors, panels and frames.
   2. Interior light, side-light and window frames.

B. Related Sections:
   1. Section 04200 - Unit Masonry: Grouting of frames in new masonry construction.
   2. Section 08210 - Wood Doors.
   3. Section 08710 - Finish Hardware.

1.2. SYSTEM DESCRIPTION:

A. Doors:
   1. Exterior Doors: Hollow metal flush doors. A moderate amount of latitude in design will be permitted in main entrance doors.
   2. Normal Door Sizes as Follows:
      a. Exterior Openings:
         i. 3'-0" x 7'-0" for single openings.
         ii. 6'-0" x 7'-0" for double openings.
      b. Interior Doors:
         i. Classrooms and Public Assembly Rooms (capacity requirements as determined by code): 3'-0" x 7'-0" for single openings and 6'-0" x 7'-0" for double openings.
         ii. Offices and Secondary Rooms (including Custodial Work Stations): 3'-0" x 7'-0".
         iii. Toilet Rooms and Service Rooms: 3'-0" x 7'-0".
         iv. Closets: 2'-8" x 7'-0".
      3. Reinforce doors for all required hardware.

B. Frames:
   1. Exterior Frames:
      a. Metal frames, 14 gage minimum. Fully weld frames with corners mitered, reinforced, and continuously welded full depth and width of frame including faces, rabbet or rebate, and fixed stops.
   2. Interior Frames:
a. Metal frames, 16 gage minimum, heavier if doors are wider than 3'. Continuously weld and grind smooth all corner joints and contact edges once joints are closed tight.

3. Anchoring: Securely anchor all frames to the floor. Minimum three wall anchors on each jamb.

4. Reinforce frames for all required hardware.

5. "Knock-down" type frames are not acceptable except when approved by the university in exceptional situations such as remodeling projects.

6. Grout: Fill with mortar all metal door frames in masonry walls.

C. Clearances:

1. Between doors and frames at head and jamb, 1/8".

2. At sill where no threshold is used, 1/2". Where threshold is used, 1/8" between door and threshold.

3. Between meeting edge of doors in pairs, 1/8".

4. Bevel edges of single acting doors 1/8" in 2".

5. Coordinate door height with floor covering thickness.

1.3. SUBMITTALS

A. Shop Drawings:

1. Submit shop drawings for the fabrication and installation of hollow metal work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections tied to a schedule.

1.4. QUALITY ASSURANCE:

A. Standards:

1. Conform to SDI 100, grade III or NAAMM Standard HMMA 861 except where more stringent requirements are specified.

B. Fire-Rated Assemblies:

1. Provide fire-rated hollow metal doors and frames that comply with NFPA 80 and tested as a fire door assembly, complete with type of fire door hardware to be used, in accordance with ASTM E152.

2. Identify each fire door and frame with either UL or Warnock Hersey labels, indicating applicable fire rating of both door and frame.

3. Temperature Rise Rating: At stairwell enclosures, provide doors which have a Temperature Rise Rating of not more than 450°F maximum to 30 minutes of fire exposure.
2. PRODUCTS

2.1. MANUFACTURERS:
   A. Gateway.
   B. Southwestern Hollow Metal.
   C. NCS Manufacturing Co.
   D. Rocky Mountain Metals.
   E. CECO.
   F. Curries.
   G. Fenestra.
   H. Kewanee.
   I. Republic
   J. Steelcraft.
   K. NCS
   L. Approved substitute.

2.2. MATERIALS:
   A. Doors:
      1. Face Sheets:
         a. Interior Doors: 18 gage minimum.
         b. Exterior Doors: 16 gage minimum.
      2. Sound-Deadening: Manufacturer's standard fiberglass insulation for all hollow metal doors.
      3. Internal Stiffeners:
         a. Support surface sheets by 22 gage "Z" or "Hat" channel, or 28 gage continuous truss members spaced 6" o.c. maximum. Spot weld "Z" or "Hat" channel to both surface sheets at 5" o.c. Spot weld continuous truss members to both surface sheets at 3" o.c.
         b. Support edges of doors by 16 gage continuous interior edge channels.
         c. Close top of exterior doors flush with continuous 16 gage channel.
      4. Seamless Construction: No visible seams along face sheets or vertical edges.
      5. Glazing Stops:
         a. 18 gage stops with all corners mitered and welded.
         b. Integral with frame on the exterior side.
         c. Interior Glazing: Anchor stops with countersunk oval head screws. For interior doors, locate stops on secure side of door.
6. Thermal-Rated Insulating Assemblies:
   a. Exterior locations and elsewhere as required.
   b. Hollow metal units fabricated as thermal insulating assemblies and tested in accordance with ASTM C236.
   c. Maximum U-factor for thermal-rated assemblies is 0.24 BTU/hr/sq. ft/degree F.

B. Frames:
   1. Minimum Gages:
      a. All exterior frames and interior frames over 36" wide: 14 gage.
      b. All other interior door and window frames: 16 gage.
      c. Loose glazing stops: 18 gage.
   2. Stops:
      a. 5/8" deep door and glazing stops.
      b. Rolled steel sections for fire-rated openings.
   3. Anchors:
      a. Fire-Rated Openings: UL rated.
      c. Steel or Wood Stud: Minimum 16 gage "Z" shape.
      d. Concrete: Minimum 12 gage "4" shape spacer and 1/4" diameter expansion anchors.

2.3. PREPARATION FOR FINISH HARDWARE:
A. Doors and Frames: Spot weld all reinforcement at the factory. Drill and tap for mortise template hardware.
B. Frame Reinforcement (Minimum):
   1. Butt Hinges: One piece 7 gage plate 12" long by full width of jamb at each hinge.
   2. Closers: 10 gage channel section 12" long and full width of frame trim.
   3. Strikes, Flush Bolts, and all Other Surface Mounted Hardware: 12 gage.
   4. Reinforce frames in direct proportion to the size and weight of door.
C. Door Reinforcement (Minimum):
   1. Butt Hinges: 7 gage plate 9" long welded to 16 gage interior edge channels at each hinge.
   2. Surface Applied Closers: 12 gage box section minimum 4" deep and 12" long.
2.4. FINISH:
   B. Interior Locations: Zinc coating complying with ASTM A525, G01.

3. EXECUTION
3.1. Not Used

END OF SECTION 08100
SECTION 08520 — ALUMINUM WINDOWS

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Operable and fixed aluminum windows
   B. Related Sections:
      1. Section 07900 - Joint Sealers
      2. Section 08410 - Aluminum Entrances and Storefronts: Storefront used for window framing
      3. Section 08800 - Glazing

1.2. SUBMITTALS:
   A. Submit two samples 12" long of specified finish on window frame sections showing range of color variation.
   B. Submit certified test reports indicating windows conform to specified performance requirements.
   C. Submit manufacturer's certified thermal performance test results (ANSI/AAMA 1502.6) showing a condensation resistance factor (CRF) of at least 45.

1.3. QUALITY ASSURANCE:
   A. Manufacturers Qualifications: Not less than five years experience in the manufacture of aluminum windows of type specified for the project.
   B. Erector Qualifications: Not less than five years experience in the installation of aluminum windows.
   C. Standards of Performance and Workmanship: ANSI/AAMA 101, and the applicable general recommendations published by AAMA and AA.
   D. Design Criteria:
      1. Specific type and model aluminum window by a single manufacturer. Equivalent windows may be provided if deviations in dimensions and profiles are minor and do not materially detract from the design concept as judged solely by the Architect.
      2. Design wind velocity at the site is 100 mph.
   E. Performance and Testing: Comply with the air infiltration tests, water resistance tests and applicable load tests specified in ANSI/AAMA 101 for the type and classification of window unit required.

2. PRODUCTS

2.1. MANUFACTURERS:
A. Custom Window
B. Kawneer
C. EFCO Corp.
D. Milco Div., Wausau Metals Corp.
E. Peerless Products
F. Approved substitute

2.2. MATERIALS:
   A. Window Units:
      2. Include mullions, covers, trim, accessories, and operating hardware.
      3. Screens (to be provided at all operable windows): Coated aluminum wire complying with FS RR-W-365.
      4. Weatherstripping: Required at all windows.
   B. Thermal-Barrier Construction:
      1. Integrally concealed thermal barrier, located between extrusions which eliminates direct metal-to-metal contact between exterior and interior
   C. Glazing Compounds: Containing no asbestos.

3. PART 3 - EXECUTION
3.1. Not Used

END OF SECTION 08520
SECTION 08710 — FINISH HARDWARE

1. GENERAL

1.1. SUMMARY:

A. Section Includes:

1. Items known commercially as finish hardware or builders hardware, required for swing, sliding, or folding doors.

2. Types of finish hardware:

a. Hinges.

b. Pivots.

c. Spring hinges.

d. Lock cylinders and keys.

e. Lock and latchsets.

f. Bolts.

g. Exit devices.

h. Push/Pull units.

i. Sliding door equipment.

j. Closers.

k. Overhead holders.

l. Miscellaneous door control devices.

m. Door trim units.

n. Protection plates.

-o. Weatherstripping for exterior doors.

p. Sound stripping for interior doors.

q. Automatic drop seals (door bottoms).

r. Astragals or meeting seals on pair of doors.

s. Thresholds.

t. Automatic door operators.

u. Electrically activated panic hardware.

B. Related Sections:

1. Section 06200 - Finish Carpentry: Installation of finish hardware.

2. Section 08100 - Metal Doors and Frames.

3. Section 08210 - Wood Doors.
4. Section 08740 - Electro-Mechanical Hardware.
5. Hardware for Special Door Units: Refer to applicable special door sections.
6. Divisions 6 and 12: Casework hardware.

1.2. REFERENCES:
B. Fire-Rated Openings:
   1. National Fire Protection Association (NFPA) Standard No. 80. This requirement takes precedence over other requirements for such hardware.
   2. Underwriters Laboratory (UL).
C. Emergency Exit Devices:
   1. Fire-Rated Doors: Provide UL or WHI label on exit devices indicating "Fire Exit Hardware".

1.3. SUBMITTALS:
A. Manufacturer's technical product data of each item of hardware.
B. Hardware Schedule:
   1. Organize hardware schedule into "hardware sets" indicating complete designations of every item.
   2. Include specific hardware directions for every door opening.
C. Templates:
   1. Hardware templates to fabricators of other work which is to receive finish hardware.

1.4. QUALITY ASSURANCE:
A. Supplier Qualifications:
   1. Recognized builders hardware supplier, with warehousing facilities, who has been furnishing hardware in the Denver-Metro area for a period of not less than 3 years.
   2. Employs an experienced AHC certified hardware consultant, available for consultation during the course of the work.

1.5. WARRANTY:
A. Mechanical failure on door closers for 5 years.
B. Blanket coverage on locksets for 5 years.
C. Failure on parts of all hardware except door closures for 2 years.
2. PRODUCTS
2.1. HINGES:
   A. Manufacturers:
      Stanley   Hager
      FBB179    BB1279
      FBB199    BB1199
      FBB168    BB1168
      Lawrence  McKinney
      BB4101    TA2714
      BB5101-A  T4B3386
      BB5101    T4B3786
   B. Five knuckle, button tip, full mortise template type with non-rising loose pins and ball
      or oilite bearings.
   C. Exterior Doors: 4 ball bearing, non-ferrous .180 or .190 gage hinges with non-
      removal pin construction or non-rising loose pin with security set screw.
      1. Doors to 36" Width: 4.5" x 4.5" hinges.
      2. Doors over 36" Width: 5" x 5" hinges.
   D. Interior Doors: Ball bearing type, wrought steel construction, with .134 or .145 gage.
      1. Doors to 36" Width: 4.5" x 4.5" hinges.
      2. Doors over 36" Width: 5" x 5" hinges.
   E. Number of Hinges:
      1. Minimum 3 hinges per door leaf for doors 84" or less in height.
      2. One additional hinge for each 24" of additional height.
2.2. LOCKS:
   A. Manufacturers: NOTE: Do not use L9080PEU Version. Reference UCB
      Standards Section 08740, Part 2.3.
      1. New Construction and Major Rekeying: Schlage L9000 Series (no substitutions)
         with the following characteristics:
         a. Non-handed case.
         b. Ability to reverse locking hub without opening case cover.
         c. Independent spindles.
      2. Minor Rekeying at Remodel Work: Match existing key system.
   B. Heavy duty mortise type.
   C. Supply all locks with construction cylinders to secure the building until replaced by
      Owner with "Medeco" cylinders at job completion. All locks must accommodate
      "Medeco" cylinders.
D. Lock Throw: 3/4" minimum throw of latch and 1" minimum throw of deadbolt.

E. Trim: Cast lever and cast escutcheon, Schlage Lock Co. #03L (no substitutions).

F. Finish:
   2. Remodel Projects: Match finish of existing hardware in adjacent areas.

2.3. DOOR CLOSERS:

   A. Manufacturer:
      1. LCN (no substitutions).
      2. Closer Series is 4040 or 4041, may be used with "CUSH" arm if required.
         a. Provide EDA arm (Extra Duty Arm) on parallel arm applications. b. Provide "CUSH" arm where required.
      3. Through bolted on all doors unless otherwise directed by Owner.
      5. Interior Doors: Delayed action and conform to UFAS requirements.

   B. Size of Units:
      1. Adjust closers to comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather, wind conditions, and anticipated frequency of use.

2.4. EXIT DEVICES:

   A. Manufacturer:
      1. V on Duprin, Inc. (no substitutions).
      2. Vertical rods shall be surface mount only.
      3. Series shall be Von Duprin #99 (or #33 if necessary).

   B. Exit Device Dogging: Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with allen-key dogging device to hold the push bar down and the latch bolt in the open position.

   C. Fire Rated Exit Devices: Provide with U.L. Label showing listing for "Fire Exit Hardware."

   D. Through-bolt on all doors including center cases, end cases, rod guides and latches.

2.5. DOOR TRIM, STOPS, AND HOLDERS:

   A. Manufacturers:
      1. Hager
      2. Trimco
      3. Rockwood
4. Quality
5. Master Manufacturers, Inc.
6. Glynn-Johnson
7. Approved substitute.

B. Door Stops:
   1. Locate in position to permit maximum door swing but not to present a hazard or obstruction.

C. Push/Pull Units and Kick Plates:
   1. Manufacturer's standard exposed fasteners.
   2. Through-bolted push/pull units for matched pairs, but not for single units.
   3. Trim Plates: .050" in thickness.
   4. Protection Plates (armor, kick, or mop): Minimum 2" less than door width on stop side and minimum 1/2" less than door width on pull side.
   5. Wheelchair Entries: Kickplates shall be a minimum 12" high.

D. Thresholds:
   1. Height and slope shall conform to ANSI A117.1 and UFAS requirements.
   2. Equip all exterior openings with flat corrugated thresholds, with abrasive surfaces.

E. Overhead Holders:
   1. Use surface mounted devices unless otherwise approved by the Owner.
   2. Through bolt mount on all doors unless otherwise approved by the Owner.
   3. Do not use devices with "hold-open" feature, electromagnetic or otherwise, for doors which are to be used for "airlock" vestibules (typically at exterior doors), or stairwells that serve as vestibules.

F. Automatic Flush Bolts and Coordinators:
   1. Do not use automatic flush bolts or coordinators unless otherwise approved by the Owner or required by Code.

2.6. DOOR STRIP UNITS:
A. Manufacturers:
   1. Pemko.
   2. Reese.
4. Master Manufacturers, Inc.
5. National Guard.
6. Approved substitute.

B. Continuous Weatherstripping:
   1. At each edge of every exterior door leaf.
   2. At each edge of computer room doors.

C. Smoke Seal Applications: As required to meet all applicable codes.
   1. Provide National Guard No. 2525 or approved substitute.

D. Fasteners:
   1. Manufacturer’s standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops, and similar units).
   2. Noncorrosive fasteners as recommended by manufacturer for application indicated.

E. Weatherstrip and Smoke Seals:
   1. Silicone rubber seal; vinyl not acceptable.

2.7. FINISHES:
   A. Match the finish of the locksets.
   B. Closers: Paint to match locksets.
   C. Thresholds and Weatherstrip Housing: Aluminum with natural aluminum finish.
   D. Coordinate all the various manufactured items furnished on this work to ensure an acceptable uniform finish.

2.8. KEYING:
   A. Final cylinders and keying shall be "Medeco" purchased by the Owner and installed by the Contractor.

2.9. AUTOMATIC DOOR OPERATORS:
   A. Manufacturer:
      1. LCN-Pneumatic only (no substitutions). Power cutoff switch. Reference UCB Standards 08740, Part 2.1, B.
   B. Handicap Accessibility Features: Design system to allow handicap access after-hours when building is secured. Provide devices which may be left turned on after-hours without causing damage or undue wear to the device or any other associated hardware.
   C. Rod and Arm Assembly Shoes: Through bolt on all doors.
   D. Wall Plate Actuators: Hard wire all actuators to electrical supply. Do not use RF (battery operated) actuators.
E. Key Switches: Must accept Owner-installed cylinders. Provide SDC 700 Series or Von Duprin 900 Series.

2.10. ELECTRICALLY ACTIVATED PANIC HARDWARE:

A. Manufacturer:

1. Von Duprin 99EL or 33EL with PS873x2 BB and PT-2 (no substitution except at certain historical locations).

3. EXECUTION

3.1. Not Used

END OF SECTION 08710
SECTION 08800 — GLAZING

1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Float glass.
   2. Safety glass.
   3. Wire glass.
   4. Tinted glass.
   5. Tempered glass.
   6. Custom mirrors.
   7. Insulating glass units.

B. Related Sections:
   1. Section 08100 - Metal Doors and Frames.
   2. Section 08210 - Wood Doors.
   3. Section 08410 - Aluminum Entrances and Storefronts.
   4. Section 08520 - Aluminum Windows.
   5. Section 10800 - Toilet and Bath Accessories: Packaged mirror units.

1.2. SUBMITTALS:

A. Submit manufacturer's product data showing thermal performance characteristics of
tinted, coated, insulating glass units, or heat mirror insulating glass units.

B. Submit two samples of each type of glass specified, 12" x 12" in size, illustrating glass, unit,
and coloration. Indicate range of variation to be expected for color and "waviness" in final
position.

1.3. QUALITY ASSURANCE:

A. Installer shall have a minimum of 5 years experience in projects of similar size and
complexity.

B. Conform to Flat Glass Marketing Association (FGMA) "Glazing Manual" and
"Sealant Manual" for glazing standards.

C. All exterior glass shall withstand a minimum of 30 psf wind load, both positive and
negative pressure. Conform to UBC wind loading requirements and the Boulder County
Wind Map.

D. Safety Glass: Comply with Colorado State Statutes, IBC and ANSI Z97.1 with certifying
label on each piece.

E. Prime (Float) Glass: ASTM C1036.

F. Fire-Resistant Glass: Tested per ASTM E163 (UL 9) and listed by UL for "Fire Re-
stance".

H. Insulating Glass: Seal Standard ASTM E774, Class A. Provide units manufactured by SIGMA member and bearing IGCC certification numbers.

I. Elastomeric Sealant Standard: Comply with ASTM C920 requirements for Type, Grade, Class and Uses.

J. Manufacturers: Provide each type of glass and primary sealant/gasket from a single manufacturer with not less than 5 years of successful experience in the production of materials similar to those required.

1.4. WARRANTY:

A. Provide insulating glass manufacturer's written warranty, agreeing to, within specified warranty period, furnish FOB project site, replacements for insulating glass units which have defective hermetic seals (excluding that due to glass breakage); defined to include intrusion of moisture or dirt, internal condensation at temperatures above -20°F, deterioration of internal glass coatings, and other visual evidence of seal failure or performance failure; provided manufacturer's instructions for handling, installation, protection and maintenance have been adhered to during warranty period.

B. Warranty shall include replacement installation costs.

C. Warranty period is 10 years after seal date permanently imprinted on unit, but not less than 9 years after the date of the Notice of Acceptance.

2. PRODUCTS

2.1. PRIME (NON-PROCESSED) GLASS:

A. Manufacturers:
   1. AFG Industries, Inc.
   2. Ford Glass Div.
   4. LOF Glass, Inc.
   5. PPG Industries, Inc.
   6. Viracon

B. Clear Float Glass:
   1. Type I, Quality q3, Class 1 clear, 1/4" thick except as otherwise required to comply with applicable codes and regulating authorities.
   2. Low-E coating is required for all exterior glazing, except doors.

C. Clear Wired Glass:
   1. Type II, Quality q8, Class 1, complying with ANSI Z97.1
   2. 1/4" thick, wired and polished both faces.
3. Use for UL label door lights, fire-rated corridor openings, stair and other UL label openings.

D. Tinted Glass:
1. Type I, Quality q3, Class 2, 1/4" thick except as otherwise required.
2. Glazing must be color-compatible with the building and building location on campus.
3. Grey is the only color permitted on the main campus.
4. Historical character of the building and adjacent buildings must be considered when selecting tinted glass color.
5. Ultra violet filtering glass is desirable.
6. No mirrored exterior glazing permitted on the main campus.
7. Low E coatings are required for exterior glazing, except doors.

2.2. PROCESSED GLASS:
A. Tempered Glass:
1. Prime glass of color and type indicated, which has been heat-treated to strengthen glass in bending to not less than 4.5 times annealed strength. Fully temper glass by horizontally heat treating with minimal waviness or distortion and with all areas free of tong marks.
2. Provide tempered and/or laminated glass where safety glass is indicated or where required by applicable laws and safety Codes.
B. Mirror Glass:
1. Clear float glass (ASTM C1036, Type 1, Class 1, Quality q2), 1/4" thick except as otherwise indicated.
2. Silver coating, copper protective coating and 2 mil thick paint coating; comply with CS 27.

2.3. FABRICATED GLASS UNITS:
A. Factory assembled and sealed units with minimum 1/2" air space.
B. Provide insulating units with an R-value of 3 minimum.

2.4. GLAZING COMPOUNDS:
A. Containing no asbestos.

3. EXECUTION
3.1. Not Used

END OF SECTION 08800
1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Metal framing required for gypsum board.
   2. Gypsum board.
   3. Acoustical insulation.
   4. Acoustical sealant.
   5. Ceramic tile substrate.
   6. Shaft wall systems.

B. Related Sections:
   1. Section 06100 - Rough Carpentry: Wood furring and blocking.
   2. Section 05400 - Cold Formed Metal Framing.
   3. Section 07210 - Building Insulation: Thermal insulation.
   4. Section 08100 - Metal Doors and Frames: Hollow metal frames.
   5. Section 09300 - Ceramic Tile.
   6. Section 09900 - Painting.

1.2. SUBMITTALS:

A. Manufacturer's Data:
   1. Certification Requirements:
      a. Certify that products furnished for this project are asbestos free.
      b. Certify that products meet or exceed specification requirements.
   2. Indicate compliance with specified fire or sound ratings.
   3. Indicate stud height limitations.

1.3. QUALITY ASSURANCE:

A. Industry Standard: Comply with applicable requirements of ASTM C840, "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer.

B. Allowable Tolerances: 1/16" offset between planes of board faces and 1/4" in 8'-0" for plumb, level, warp, and bow.

C. Manufacturer: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
D. Comply with applicable requirements of Mountain States Bureau of Lath, Plaster and Drywall, Inc.

2. PRODUCTS

2.1. MANUFACTURERS:

A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

1. Metal Support Materials:
   a. Dale Industries, Inc.
   b. Dietrich Industries, Inc.
   d. USG Interiors, Inc.

2. Direct Suspension Systems:
   a. Domtar Gypsum.
   b. Donn Corporation.
   c. National Rolling Mills Co.
   d. USG Interiors, Inc.

3. Gypsum Board and Related Products:
   a. Domtar Gypsum.
   b. Georgia-Pacific Corp.
   d. United States Gypsum Co.

B. All catalog numbers and trade names used in this Section are those of United States Gypsum, unless otherwise noted, and are to establish continuity and a standard of quality.

2.2. MATERIALS:

A. Gypsum Board:

1. 5/8" regular, tapered edge Type X gypsum board complying with ASTM C36.
2. 5/8" Type X gypsum sheathing board, square edges complying with ASTM C79.
3. 5/8" water resistant Type X, tapered edge gypsum backing board complying with ASTM C630.
4. 5/8" water resistant, tapered edge, exterior gypsum soffit board complying with ASTM C931.
5. Fire-Rated Shaft Enclosures:
   a. Fire-tested and rated assembly of "C-H" or "I" studs at 24" o.c.
b. Provide assembly having 2-hour fire rating or rating required by Applicable Code, whichever is greater.

B. Partitions:
   1. Studs: ASTM C645; 25 gage x 3.625" deep, except as otherwise indicated, or required by height. Maintain deflection of L/240 or less without gypsum board applied.
      a. Use 20 gage or heavier studs at tile backing and at door jambs. Use double studs at door jambs.
   2. Space all studs 16" o.c. maximum, unless specifically approved otherwise.
   3. Double studs to structure at doors and as needed at corners to stiffen and support.

C. Ceilings:
   1. ASTM C754. Use 1.5" steel channels, 0.475 lb. per ft., cold-rolled.

D. Furring Members: ASTM C645; 25 gage, hat-shaped or z-shaped as required.

E. Acoustical Sealant: Non-shrinking, non-drying, non-migrating and non-staining type formulated for acoustical use.

F. Use one of the following:
   1. Pecora BA-98.
   2. Tremco Acoustical Sealant.
   4. Approved substitute.

G. Sound Attenuation Blankets: ASTM C665, Type I, semi-rigid mineral or glass fiber blanket without membrane, Class 25 flame-spread. Provide 1.5" mineral fiber 3.0 lb. density or full thickness of 1.0 density glass fiber.

H. Ceramic Tile Substrate:
   1. 7/16" thick glass mesh reinforced cementitious board, "Wonderboard" as manufactured by Modulmars, Inc. or "Durock" by USG Industries, Inc.
   2. Install cementitious board substrate instead of gypsum board at ceramic tile wall locations.

I. Joint Treatment: Durabond 90 by U.S. Gypsum Co. or approved substitute. D. Accessories: ASTM C840 as follows:
   1. Provide corner beads at all external corners, CB-118 x 118.
   2. LC-58 at all termination edges exposed to view.
   3. L-58 at all termination edges abutting another material.
   4. Expansion/control joints as recommended by manufacturer to be located by Architect approved substitute to No. 093 by U.S. Gypsum.
3. EXECUTION

3.1. ACOUSTICAL SEALANT:
   A. Explain clearly where sealant is to be used.
   B. Provide sealant at all joints between drywall system and adjoining materials.

3.2. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
   A. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated for fire-resistance-rated assemblies and sound-rated assemblies.
   B. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for thin set ceramic tile, acoustical tile, and where indicated.
   C. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges. Level 3 is suitable for surfaces receiving medium or heavy textured finishes before painting of wall covering in conditions where lighting conditions are not critical.
   D. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Level 4 is suitable for surfaces receiving light-textures finish, wall coverings, and flat paints. It is generally the standard exposed finish.
   E. Level 5: Embed tape and apply separated first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface. Level 5 is suitable for surfaces receiving gloss enamels and surfaces subject to severe lighting. It is considered a high quality gypsum board finish reserved for only special applications.

3.3. ACCESSORIES:
   A. Explain clearly where gypsum drywall and accessories must allow for sealant joints.

END OF SECTION 09260
SECTION 09900 — PAINTING

1. GENERAL

1.1. SUMMARY:

A. Section Includes:
   1. Complete painting of all surfaces throughout the interior and exterior of the buildings, except as otherwise specified or indicated in the finish schedule.
   2. Field painting of exposed bare and covered pipes, conduits, hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work. Coordinate with Division 15 and 16 Installers and UCB staff for color coding.
   3. Mechanical grilles, registers, louvers (except aluminum), panel covers and frames for electrical work.
   4. Paint exterior roof, wall-mounted or ground mounted equipment including aluminum and factory finished items with color approved by UCB.

B. Work Not Included:
   1. Shop priming of ferrous metal items and fabricated components included under their respective sections.
   2. Pre-finished items.
   3. Integrally colored CMU or face brick.
   4. Metal toilet partitions.
   5. Acoustic materials.
   6. Anodized aluminum.
   7. Stainless steel.
   8. Bronze.
   9. Do not paint over any:
      a. Moving parts of operating units.
      b. Equipment identification.
      c. Performance rating data.
      d. Name or nomenclature plates.
      e. Code-required labels.

C. Related Sections:
   1. Section 02580 - Pavement Marking.
   2. Section 07180 - Water Repellents: Moisture resistant coatings for masonry.

4. Section 15190 - Mechanical Identification: Identification and stenciled painting of mechanical products specified under Division 15.
   a. 15856 packaged rooftop heating/cooling units, 15855 air handling units with coils, and 15575 breechings, chimneys, stacks and flues.

5. Section 16195 - Electrical Identification: Identification of electrical products specified under Division 16.

6. Sections 16370 medium voltage transformers (liquid filled), 16321 medium voltage transformers (dry type), 16345 medium voltage switch gears, 16620 standby power generation systems

1.2. SUBMITTALS:
   A. Submit 3 sets of samples with scheduled color product type, color formula and texture to simulate actual conditions on 12" x 12" hardboard for Architect and UCB Project Manager review.
   B. Resubmit samples, if requested, until required sheen, color and texture is achieved.
   C. On actual wood surfaces, provide 4" x 8" samples of each natural and stained wood finish.
   D. On actual wall surfaces and other building components, duplicate painted finishes of acceptable samples, as directed by UCB Staff.
   E. At beginning of project, provide a complete summary list of specific manufacturer's products, color identification numbers, manufacturer technical data sheets and MSDS Sheets that will be applied in this project. List shall compare each color number with each specified or selected color number. A copy of this list shall be given to the appropriate UCB Project Manager, and Structural Analyst in Work Management Group.

1.3. QUALITY ASSURANCE:
   A. Conform to Painting and Decorating Contractors of America "Architectural Specification Manual".
   B. All materials shall be applied free from runs, sags, wrinkles, streaks, shiners and brush marks.

   All materials shall be applied uniformly. If any reduction of the coating’s viscosity is necessary, it shall be done in accordance with the manufacturer’s label directions.

   New plaster and other masonry surfaces shall not be primed until it has been determined these substrates have dried sufficiently to safely accept paint. Unacceptable moisture content should be reported to the architect or the project
No exterior painting shall be undertaken if air or surface temperature is below 50° F nor immediately following rain or until frost, dew or condensation has evaporated.

A minimum interior temperature of 65° F shall be maintained during the actual application and drying of the paint, and until occupancy of the building occurs. Adequate ventilation shall be maintained at all time to control excessive humidity which will adversely affect the curing of coatings. The Contractor is solely responsible for maintaining suitable temperature and ventilation.

Before painting begins, all other crafts shall have completed their work, and shall have removed all dirt and debris resulting therefrom. The rooms or areas are to be left in broom clean condition.

Enamel and varnish undercoats are to be sanded smooth prior to the recoating. Tops and bottoms of doors are to be finished in the same manner as door facing, after the carpenters complete fitting of them.

1.4. MAINTENANCE:

A. Extra Materials:
   1. Leave on premises, where directed by the UCB Project Manager, not less than 1 gallon of each standard color and 1 gallon of each accent color.
   2. All material shall be in 1 gallon containers, tightly sealed and clearly marked with manufactures name, color number or formula, base number and sheen.

B. Removal
   1. Remove all trash, empty cans, solvents and all painting related materials.

2. PRODUCTS

2.1. MANUFACTURES:
   A. Benjamin Moore & Company
   B. Diamond Vogel
   C. The Glidden Company
   D. Kelly Moore
   E. KWAL-Howells, Inc.
   F. PPG Industries
   G. Sherwin-Williams Company
   H. ICI
I. Substitutions must be pre-approved by UCB project manager and UCB paint shop. Any proposed substitution must be available in the Boulder Metro area.

2.2. MATERIALS:

Materials submitted for approval may be asked to match CU’s standard off white color sample for testing. Testing shall include, but is not limited to, accurate color match, hiding capabilities, touch-up capabilities, sheen match and other performance characteristics. Materials submitted for approval by UCB staff of exterior finishes shall be weather resistant with colors approved by UCB staff.

A. Quality:

1. Provide the best quality Contractor grade or better of the various types of coatings as regularly manufactured by acceptable paint material manufacturers.

2. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.

3. If project is asking for LEED Certification, materials must comply with the Green Seal Standard, for paints, GS-11, requirements for VOC and chemical component limits. www.greenseal.org/standards/paints.html

<table>
<thead>
<tr>
<th>TYPE</th>
<th>VOC (g/l=grams/liter)</th>
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</thead>
<tbody>
<tr>
<td>Interior Non-Flat</td>
<td>150 g/l</td>
</tr>
<tr>
<td>Exterior Non-Flat</td>
<td>200 g/l</td>
</tr>
<tr>
<td>Interior Flat</td>
<td>50 g/l</td>
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<tr>
<td>Exterior Flat</td>
<td>100 g/l</td>
</tr>
<tr>
<td>All types</td>
<td>Contain not more than 1.0% by wt. of the sum total of Aromatic Compounds.</td>
</tr>
</tbody>
</table>

4. Waterborne or latex acrylic coatings shall be used unless prior approval for substitution is obtained.

5. Material Safety data sheets and technical product data sheets must be included with O&M Manuals for all products used.

2.3. VOLUME SOLID CONTENTS

A. When applied at a rate of 400SF per gallon—obtaining a MIL thickness when dry of a minimum of 1.3 MILS, the minimum acceptable Volume Solid Content must be A (see list below) minimum and angular specular sheen should be B (see list below).
- For Flat finish 38% 0-5 @ 60º
- For Eggshell or Satin finish 36% 16-32 @ 60º
- For Semi-Gloss finish 34% 30-60 @ 60º
- For Gloss finish 34% 60-80 @ 60º

These could apply to both interior and exterior products, with the possible "satin" or "pearl" addition.

3. EXECUTION

3.1. SCHEDULE:

A. Areas requiring specific paint finish are as follows:
   1. Elevator, Mechanical and Electrical Room Painting:
      a. Walls and Ceilings: Off white acrylic latex semi-gloss.
      b. Floors (Elevator and Electrical Rooms Only): Light grey waterborne floor finish.
   2. Baseboard Radiation Covers:
      a. Area Inside Metal Covers: Paint flat black or appropriate color to match.
   3. Access Flooring:
      a. Space Beneath Floor Surface: Paint flat black or appropriate color to match.
   4. Wall and Ceiling Return Air Grilles:
      a. Space Behind Grilles: Paint flat black for a distance of 24" from face of grille or appropriate color to match.
   5. Non-Galvanized Iron Pipes: Color to match background.
   6. Roof, Wall, or Ground Mounted Equipment:

      Color approved by UCB Staff.

B. For all paint finishes:
   1. New surfaces shall have 1 primer coat and 2 finish coats.
   2. Existing surfaces shall have minimum 2 finish coats.
   3. If sprayed, all walls except mechanical rooms, storage areas, closets and ceilings, must be backed rolled on final coat.
   4. All walls must be painted with a paint that meets CU’s sheen standards for the 16-32 measurement at 60º, and volume solid’s ratings.
   5. All trim is to be painted with semi-gloss paint that meets CU’s sheen and volume solids ratings.
6. Patch Painting will not be acceptable, total affected area shall be painted. Terminate painting only at corners or joints.

END OR SECTION 09900
SECTION 10400 — IDENTIFYING DEVICES

1. GENERAL
1.1. SUMMARY:
   A. Section Includes:
      1. Identifying devices including:
         a. Interior Signs
         b. Exterior Signs.
   B. Related Sections:
      1. Section 16510 - Lighting Fixtures: Illuminated exit signs.

1.2. SYSTEM DESCRIPTION:
   A. Interior Signs: Provide interior room signs to accomplish the following functions:
      1. Room number signs.
      2. Two nameplate holders per room.
      3. Directional signs.
      4. Accessibility signage.
      5. Code required signage.
      6. Maximum occupancy signage for classrooms and assembly areas.
      8. Building directory, where applicable.
   B. Exterior Signs: Provide exterior signs to accomplish the following functions:
      1. Identification Signs
         a. Building Entrance Signs
         b. Building Identification Signs
         c. Directional Signs
         d. Directory Signs
         e. Special Signs

1.3. SUBMITTALS:
   A. Product Data:
      1. Submit manufacturer's technical data and installation instructions for each type of sign required.
   B. Samples:
1. Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.
   a. Submit full-size sample unit. Acceptable units may be installed as part of the work.

C. Shop Drawings:
   1. Submit shop drawings for fabrication and erection of identifying devices. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.
      a. Furnish full-size spacing templates for individual building-mounted letters and numbers.

1.4. QUALITY ASSURANCE:
   A. Manufacturer:
      1. For each sign form and graphic image process indicated furnish products of a single manufacturer with a minimum of 3 years successful experience in the types of signs required.
   B. Standards:
      1. Provide life safety signage in compliance with applicable building codes and ADA requirements.
      2. Fabricate signs to meet ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS) as required.
      3. Fabricate signs to comply with the University of Colorado at Boulder Campus Facilities Identification System guidelines.

2. PRODUCTS
   2.1. MATERIALS:
      A. Panel Sign Materials:
         1. Provide the following materials as manufactured by New Hermes or approved substitute.
            a. General Signage: Gravoply.
            b. Raised Lettering and Braille Signage: Gravo-Tac 2-ply system.
      B. Vinyl Film:
         1. Opaque non-reflective vinyl film, 0.0035" minimum thickness, with pressure sensitive adhesive backing, suitable for exterior as well as interior applications.
      C. Other Materials:
1. Other approved materials for specific designated uses shall be approved by the Campus Architect.

D. Accessories:

1. Mounting Tape: Heavy Duty 1" x 1" Mounting Squares by 3M or approved substitute.

2. Fasteners: Use concealed fasteners wherever possible which are fabricated from metals which are non-corrosive to either sign materials or mounting surfaces.

3. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors.

4. Fabricate brackets and fittings for bracket-mounted signs from extruded aluminum to suit sign panel construction and mounting conditions.

2.2. FABRICATION OF PANEL SIGNS:

A. General:

1. Fabricate all signs to comply with requirements of referenced standards, as indicated below, or as specifically approved.

2. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of ±1/16" measured diagonally from corner to corner.

B. Interior Room Signs:

1. Fabricate white plastic room signs with edges mechanically and smoothly finished with square cut edges and 3/8" radiused corners. Sign face shall be edged with a recessed 1/8" border.
   a. Size: 6" x 6" for room number signs and directional signs.
   b. Letters shall be black in color and in the Helvetica Medium letter style raised from the background not less than 0.03125 as required by ADAAG.
   c. Provide 1.125" letter height for room numbers, centered 2” from the top of the letter to the top of the sign. Center a 1/2” wide black braille lettering panel 3/8” from the bottom of the sign.
   d. Provide raised copy and recessed braille lettering in copy thickness not less than 0.03125" thick as required by ADAAG.

2. Fabricate black anodized aluminum sleeve inserts for occupant use.
   a. Size 1” X 6” open-ended horizontal sleeve.
   b. Provide a blank white 90 pound card stock insert covered with a clear acrylic matte strip 0.625” (1/16”) thick.
   c. Where required for informational signage, provide 6”X 6” black anodized insert sleeve open at the top.
d. Provide a blank white 90 pound card stock insert covered with a clear acrylic matte strip 0.625” (1/16”) thick for 6”X 6” insert sleeve.

3. Fabricate white plastic directional signs with edges mechanically and smoothly finished with square cut edges and 3/8” radiused corners. Sign face shall be edged with a recessed 1/8” black border.
   a. Size: 6” X 6” surface-mounted signs that may be arranged one over the other, or side by side, as necessary to carry the message.
   b. Provide upper and lower case black vinyl die-cut letters in the Helvetica Medium letter style.
   c. Provide black vinyl die-cut left, right, up, or down arrows as required.

C. Provide symbol for handicapped access on signage designating those areas accessible for the handicapped in conformance with Society for Environmental Graphic Designers (SEGD) recommendations for accessible signage, most recent edition.

2.3. METAL LETTERS AND NUMBERS:
   A. Metal Letters and numbers mounted on vertical surfaces are not recommended and shall not be used without special permission from the Campus Architect.

2.4. FACTORY FINISHES:
   A. Colors and Surface Textures: Provide colors as selected by Architect and user which are acceptable to Campus Architect.
   B. Metal Finishes: Comply with NAAMM "Metal Finished Manual" for finish designations and application recommendations.
   C. Aluminum Finishes:
      1. Class II Clear Anodized Satin Finish: AA-M31C21A31 (fine satin mechanical finish; chemical etch, fine matte; 0.4 mil minimum thick anodic coating).

2.5. LIFE SAFETY SIGNAGE:
   A. Provide surface-mounted signs as specified above and as required by applicable Building Code and Fire Department regulations for life safety which may include stair and exitway doors, areas of refuge, elevator lobbies, elevators, fire command center and standpipe valve cabinets.
      1. Provide signs, 12" x 12", on stairwell side of each stairwell door at each floor for buildings four stories or more in accordance with the provisions of the 1997 Uniform Building Code.

3. EXECUTION

3.1. INSTALLATION:
   A. Install sign units level, plumb and at height indicated, with sign surfaces free from distortion or other defects of appearance.
   B. Interior Signs:
1. Surface-Mounted Units: Attach signs to wall surfaces using mounting tape squares in each corner of the sign except at each top corner and one centered at bottom of sign for 6" x 6" units.

2. Bracket-Mounted Units: Not permitted except with special permission from the Campus Architect.

3. Locate surface-mounted signs on the wall adjacent to the latch side of the door (or the nearest adjacent wall) at 60" above finished floor from the centerline of the sign (any size) and out of the swing of the door. Mount signs with right edge 4" from inside face of the door jamb.

4. Locate surface-mounted insert sleeves centered below the room sign in multiples as necessary, each spaced one (1) inch apart.

C. Vinyl Film:

1. Apply vinyl film letters without wrinkles or distortions. Provide template to establish letter spacing.

END OF SECTION 10400
SECTION 10520 — FIRE PROTECTION SPECIALTIES

1. GENERAL

1.1. SUMMARY:

   A. Section Includes:
      1. Fire extinguishers.
      2. Fire extinguisher cabinets.
      3. Hose cabinets.
      4. Fire extinguisher mounting brackets.

2. PART 2 PRODUCTS

2.1. MANUFACTURERS:

   A. J.L. Industries/Samson Products.
   B. Larsen's Manufacturing Company.
   C. Modern Metal Products by Muckle.
   D. Potter-Roemer Division of Smith Industries, Inc.

2.2. FIRE EXTINGUISHERS:

   A. Fire Extinguishers: 10 lbs., multi-purpose dry chemical, with pressure indicating gauge.
   B. Class: 4A:60B:C; UL approved.
   C. Color: Red.

2.3. FIRE EXTINGUISHER AND HOSE CABINETS:

   A. Mounting Type: Recessed or "semi-recessed" whenever possible.
   B. Style: As selected by the Architect and approved by the Owner - rounded corners preferred.
   C. Door Type: Clear acrylic glazing.
   D. Door Hardware: Pull handle with roller catch; continuous, stainless steel hinge.
   E. Finish: Manufacturer's standard white epoxy or baked enamel coating.
SECTION 12346 — WOOD LABORATORY CASEWORK

1. GENERAL

1.1. SUMMARY:

A. Related Sections:

1. Section 12345 – Metal Laboratory Casework

2. Tops, sinks, accessories and mechanical and electrical service fixtures common to laboratory casework.

3. Service fixtures are supplied as part of this work. Installation of service fixtures is included under Division 15.

1.2. DEFINITIONS:

A. The following definitions apply to wood casework units.

1. Exposed portions of casework including end panels and all surfaces visible when doors and drawers are closed, bottoms of cases more than 42" above floor, top of cases less than 72" above floor, and visible members in open cases or behind glass doors.

2. Semi-exposed portions of casework includes those surfaces behind solid doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms and the interior face of doors. Tops of cases 6'-0" or more above floor and bottom of cabinets more than 30" but less than 42" above floor shall be considered as semi-exposed.

3. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation or cabinets less than 30" above finished floor.

1.3. SUBMITTALS:

A. Product Data:

1. Submit manufacturer's data and installation instructions for each type of wood laboratory casework unit.
   a. Include independent laboratory certification that applied finish complies with specified chemical and physical resistance requirements.

2. Provide certification and chain of custody documentation showing that wood based materials came from Forest Stewardship Council certified sources. (LEED MRc7: Certified Wood)

3. Provide documentation from the manufacturer identifying VOC and chemical component limits for all wood glues and sealants. (LEED EQc4: Low-Emitting Materials)
4. Provide documentation from the manufacturer showing that all composite wood products provided do not contain urea-formaldehyde resin. (LEED EQc4: Low-Emitting Materials)

B. Shop Drawings:
   1. Submit shop drawings for wood laboratory casework showing plans, elevations, ends, cross-sections, utility run spaces, location and type of service fixtures with lines thereto. Show details and location of anchorages, blocking, and fitting to floors, walls, and base.
   2. Include layout of units with relation to surrounding walls, doors, windows, other building elements, and laboratory equipment.
   3. Coordinate shop drawings with other work involved.

C. Test Reports:
   1. Submit test reports from qualified independent testing laboratory showing compliance with laboratory casework finishes specified for chemical and physical resistance.
   2. Submit load test reports for drawers, suspension slides, and unit shelving.

1.4. QUALITY ASSURANCE:

A. General:
   1. Provide wood laboratory casework manufactured or furnished by the same company for single responsibility.

B. Manufacturer's Qualifications:
   1. Manufacturer with updated plant and proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and meeting construction schedule time restraints. Manufacturer must have a minimum of 10 years experience in manufacturer of wood laboratory casework and at least 10 successful installations of equal or greater complexity as indicated.

C. Installer's Qualifications:
   1. Installer must be certified by the manufacturer and have successfully completed at least 5 installations of wood laboratory casework of equal or greater complexity as indicated.

D. Testing Laboratory Qualifications:
   1. Independent testing laboratory must demonstrate that it has experience and qualifications to conduct testing based upon documentation according to ASTM E548.

E. Flammable Liquid Storage:
   1. Where cabinets are for solvent or flammable liquid storage, provide units that are listed and labeled as complying with the requirements of NFPA 30 for design,
construction, and capacity of storage cabinets and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

F. Chemical and Physical Resistance of Finish:
1. Submit an independent testing laboratory report certifying that the (exterior) finish of wood casework is capable of withstanding the following tests, with no change, or slight change of gloss, slight discoloration, or slight temporary softening of the film with no loss of adhesion and no loss of film protection as defined in the Performance Ratings.

G. Performance Ratings:
1. (NE) No effect: No detectable change in surface material.
2. (EX) Excellent: Slight detectable change in color or gloss, but no change to the function or life of the working surface material.
3. Good: A clearly discernable change in color or gloss, but no significant impairment of working surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or function over an extended period of time.
5. (FL) Failure: Pitting, cratering or erosion of working surface material. Obvious and significant deterioration.

H. Acids: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.
1. Acetic Acid (50% or 75%) (EX)
2. Acetic Acid, Glacial (EX)
3. Formic Acid (EX)
4. Hydrochloric Acid (37%) (NE)
5. Hydrofluoric Acid (48%) (NE)
6. Hydrogen Peroxide (30%) (NE)
7. Nitric Acid (30%) (G)
8. Phosphoric Acid (75%) (EX)
9. Sulfuric Acid (50% or 70%) (EX)

I. Solvent: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.
1. Acetone (EX)
2. Amyl Acetate (NE)
3. Butyl Alcohol (NE)
4. Ethyl Alcohol (NE)
5. Methyl Alcohol (EX)
6. Cresol (G)
7. Dimethyl Formamide (G)
8. Dioxane (NE)
9. Ethyl Acetate (NE)
10. Ethyl Ether (NE)
11. Formaldehyde (NE)
12. Furfural (EX)
13. Gasoline (NE)
14. Kerosene (NE)
15. Methyl Ethyl Ketone (EX)
16. Monochlorobenzene (NE)
17. Napthalene (NE)
18. Phenol (EX)
19. Silver Nitrate (10%) (NE)
20. Sodium Sulfide, saturated (NE)
21. Tincture of Iodine (G)
22. Toluene (NE)
23. Trichlorethylene (NE)
24. Xylene (NE)

J. Bases and Salts: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.
1. Ammonium Hydroxide (15%, 20%, or 25%) (NE)
2. Glycerine (NE)
3. Potassium Hydroxide (25%, 35%, or 45%) (NE)
4. Saturated Sodium Carbonate (NE)
5. Saturated Sodium Chloride (NE)
6. Saturated Zinc Chloride (NE)
7. Sodium Hydroxide (40% or 50%) (NE)
8. Sodium Hypochlorite, (5.25%) (NE)

K. Moisture and Heat Resistance: No visible effect when finish surface exposed to the following:
   1. Hot water at a temperature of 190° F. to 205° F., trickled down the surface at 45° angle for 5 minutes.
   2. Constant moisture using a 2" x 3" x 1" cellulose sponge, soaked with water, in contact with the surface for 100 hours.

1.5. WARRANTY:
   A. The manufacturer shall guarantee all materials and workmanship provided for a period of 1 year from date of substantial completion. Any defects due to the use of improper material or workmanship on the part of manufacturer occurring within that time shall be promptly rectified, by repair or replacement of the defective materials or correction of defective workmanship by manufacturer at his own expense, after notification by the Owner.
   1. Furnish drawer construction and drawer guides with limited lifetime warranty.

2. PRODUCTS

2.1. MANUFACTURERS:
   A. Fisher Hamilton Scientific, Inc.
   B. Kewaunee Scientific Corp.; Laboratory Division
   C. Mohon International, Inc.; Campbell Rhea

2.2. MATERIALS:
   A. General:
      1. Carefully and thoroughly air-dry all woods, then kiln dry by the laboratory casework manufacturer in humidity controlled kilns to a moisture content of 4.5%. Temper kiln dried lumber to a moisture content of 6% before use. Maintain moisture content throughout production.
      2. All wood based products must come from "FSC Certified Wood" sources certified by the Forest Stewardship Council. Materials should be designated "certified wood." (LEED MRc7: Certified Wood)
      3. All composite wood must not contain urea-formaldehyde resin binders. (LEED EQc4: Low-Emitting Materials)
      4. All wood glues and sealants must meet the VOC and chemical component limit requirements of South Coast Air Quality Management District Rule #1168 and sealants used as fillers must not exceed the limits of the Bay Area Air Quality Management District Regulation 8, Rule 51 requirements.
   B. Exposed Materials:
1. Do not use exposed faces of lighter-than-average color joined with exposed faces of darker-than-average color. Do not use two adjacent faces which are noticeably dissimilar in grain, figure, and natural character markings.
   a. Solid Wood: Clear, dry, sound, plain sawn, selected for compatible grain and color, no defects.
   b. Plywood Face Veneer: Same species as exposed solid lumber, clear, selected for grain and color compatible with exposed solid lumber, no defects. Provide HPVA HP-1, Grade AA faces at least 1/50" thick and Grade J crossbands. Provide solid crossbandings without voids using water resistant resin glue. Edge band exposed edges with 3 mm solid wood of same species as face veneer.
   c. Plywood Core: 7 ply veneer core.
   d. Glue: Water resistant resin glue

C. Semi-Exposed Materials:
   1. Solid Wood: Dry, sound, plain sawn, selected to eliminate appearance defects. Any species of hardwood of similar color and grain to exposed portions.
   2. Plywood: Hardwood, HPVA HP-1, Grade C faces and Grade J crossbands, plain sliced, any species to match color and grain of exposed members.

D. Concealed Materials:
   1. Solid Wood or Plywood: Of any species, with no defects affecting strength or utility.
   2. Hardboard: AHA A135.4, Class 1, tempered.
   3. Concealed Framing, Connectors: Manufacturer's standard.

E. Acid Storage Cabinet Lining:
   1. 1/4" thick, fiber cement board, ASTM C1186.

F. Glass:
   1. Clear Float Glass: ASTM C1036, Type I, Class 1, 0.125" or 0.25" thickness, quality q3 (glazing select).
      a. Locations:
         i. Framed glass wall and upper cases, 1/8" thickness.
         ii. Framed glass tall cases, 1/4" thickness.

2.3. FABRICATION:
A. General
2. Interior of units to be fabricated to provide a smooth flush finish. Do not offset cabinet bottom with front face frame.

3. Dowel, glue, and screw all joints, except for drawer fronts, sides and backs, using precision jigs and clamps to insure square corners and plumb vertical surfaces. For drawer fronts, sides, and backs use chuck and bore construction at 32 mm on centers.

4. Assemble units in the shop in as large components as practicable to minimize field cutting and jointing.

5. Provide scribes and fillers as required.

2.4. FINISH:

A. Finish on all wood equipment shall be in accordance with the following:

1. All surfaces to be finished shall be sanded smooth, free from dirt, defects, and mill marks resulting from machining.

2. All finishing materials shall be free from all dirt and foreign matter, of superior quality, highly chemical resistant, evenly applied under proper room temperatures. They shall be completely dried under controlled conditions before applying subsequent coats.

3. Finish for exterior and exposed portions of casework shall consist of an application of clean stain of the required color and multiple coats of highly chemical resistant acrylic urethane finish, force dried, sanded and wiped clean between coats. The resultant coating shall be a smooth, satin luster finish of not less than 1.5 mils dry film thickness.

   a. Interior finish for all cases where semi-exposed to view shall be the same as for exteriors, except 1.0 mils dry film thickness.

   b. Finish for drawer head exteriors to be three coats of chemically resistant acrylic urethane. Two coats of chemically resistant acrylic urethane to be applied to drawer sides and back. Finish drawer interior with 7 level polyester acrylic finish.

   c. Exterior finish shall be water clear and bright. Cloudy, muddy or finishes carrying tinting pigments are not acceptable.

   d. Finish, exterior and interior, shall be force dried in a dust free atmosphere.

   e. Completed finish shall be resistant to acids, alkalis, salts, and solvents in accordance with the tests specified in this section.

2.5. SPECIAL PURPOSE STORAGE CABINETS:

A. Acid Storage Cabinets:

1. Acid storage cabinets shall be completely lined with a corrosion resistant liner.

2. Cabinet is specifically designed for the storage of acids and bases.
3. Provide a full depth removable shelf of the same material as cabinet and lined with a corrosion resistant liner.

4. Provide a liquid tight pan covering on the entire bottom of the cabinet or similar devise, to provide containment for leaks and spills.

5. Hood base corrosive cabinets shall be vented through hood work surface using Manufacturer’s vent kit. When two corrosive cabinets are used, each cabinet must be vented separately through work surface. Vent duct shall terminate below lower baffle and at least 1” above work surface. Penetration between work surface and vent duct must be sealed with chemical resistant type caulk. When acid cabinets are installed below fume hoods, the doors should be louvered.

B. Solvent Storage Cabinets:

1. Specifically design solvent cabinet for the storage of flammable and combustible liquids. Base construction upon the requirements listed by UL, OSHA and NFPA No. 30.

2. Provide units with a maximum internal temperature of 325° F, when subjected to a 10-minute fire test using a standard time-temperature curve per Article 42 of NFPA No. 30.

3. Fabricate the bottom, top, sides and doors of 18-gage steel with all double panel construction and a 1.5” air space between panels. Furnish with electrical grounding connection.


5. Provide self-closing doors synchronized so that both doors will always fully close. Equip right hand door with three point latching system that automatically engages when doors close. Equip door latch system with lock. Equip each door with a fusible link hold open feature to ensure the door closes when the temperature outside of the cabinet exceeds 165° F.

6. Provide a 2” deep liquid tight pan covering on the entire bottom of the cabinet to provide containment for leaks and spills.

7. Provide a full depth, adjustable shelf and designed to allow circulation within the cabinet.

8. Vent each cabinet into building hazardous exhaust system with a 1.5” corrosion resistant rigid vent pipe. Materials used for venting must meet an NFPA Flame Spread Rating of 25 or less. Vent pipe may be increased to a larger diameter per Mechanical design. Below fume hoods, vent pipe is restricted to 1.5” diameter to make connection from back of cabinet to top of fume hood. Vent pipe may be increased to a larger diameter, once pipe extends above fume hood, per Mechanical design. Provide a minimum of 10 air changes per hour. Two such vents must be provided, one high and one low and each must have a fire baffle.

C. Vacuum Pump Cabinets:
1. Specifically designed metal cabinet to provide a means to store and vent vacuum pumps and their emissions and heat loads.

2. Vacuum pump cabinet shall have hinged doors with integral toe space without a cabinet bottom. Vacuum pump cabinet shall have removable and solid back panel(s) for utility access and visual inspection. Back panel shall incorporate an integral 2-1/2" vent hole for a separate vent assembly.

3. Vacuum pump cabinet shall incorporate acoustical insulation on the interior door panels, side, back and underside of the top panel. Insulation shall be an open cell foam of conal design.

4. Storage unit shall incorporate an integral electrical switch (120V, 20 amp) with pilot light to indicate the operational mode of the vacuum pump unit.

5. Storage unit shall have an electrical duplex outlet, located in the rear of the cabinet, for the vacuum pump plug end. Outlet to be accessible from the inside of the cabinet. Outlet shall be hard-wired to the electrical switch.

6. Separate mobile platform shall be capable of supporting 300lbs. Front two casters shall be locking/swivel models. Lipped construction shall safely contain any incidental spills or provide a 2” deep liquid tight pan covering on the entire bottom of the cabinet to provide containment for leaks and spills.

7. Optional door louvers will be incorporated when the exhaust fan is specified.

8. Switch shall be supplied with an optional 20' long, 1/2” trade size flexible metal conduit.

9. Optional variac voltage transformer (mounted in flush panel) shall be factory installed in the flush front panel to provide a variable voltage source for instrumentation. Variac shall include a metal enclosure, cover plate, toggle switch, duplex electric receptacle, fuse holder and pilot light. Electrical input 120VAC, 50/60Hz – output 140VAC, 10AMP. Variac will be supplied with a 20' long, 1/2" trade size flexible metal conduit.

10. An optional 235cfm exhaust fan will be supplied for greater heat loads. The exhaust fan assembly will be attached to the exterior of the cabinet for maximum pump storage and airflow. The fan assembly shall incorporate a 4" diameter duct collar connection. Connection to the building HVAC exhaust by others.

3. EXECUTION

3.1. EXAMINATION:

   A. Verify rough-ins for mechanical and electrical services for sizes, locations and adequacy; blocking and supports for wall mounted items and floors for compliance with specified tolerances.

3.2. PREPARATION:
A. Condition wood casework to average prevailing humidity conditions in installation areas prior to installing.

3.3. INSTALLATION:

A. General:

1. Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where wood casework abuts other finished work, scribe and cut for accurate fit. Secure with concealed fasteners. Before making cutouts, drill pilot holes at corners.

2. Adjust cabinet top-frame within 1/16" of a single plane.

3. Fasten each individual cabinet to floor at toe space, with fasteners spaced 24" o.c. Bolt continuous cabinets together. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

4. Align similar adjoining doors and drawers to a tolerance of 1/16".

B. Trim and Moldings:

1. Install in single, unjointed lengths for openings and for runs less than maximum length of material available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members. Provide matching fillers and scribe strips as indicated or required to fit cabinet runs to spaces provided.

C. Hardware:

1. Doors and drawers must operate smoothly without warp or bind.

D. Accessories:

1. Securely fasten adjustable shelving supports and pegboards to partition framing, wood blocking, or reinforcements in partitions.

2. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight and closely fitted to other work.

E. Special Purpose Storage Cabinets: Install and setup in strict compliance with manufacturer’s written installation instructions. Adjust leveling feet or other methods to ensure the unit is equally supported around the base on the floor. Install acid cabinet vent kit and coordinate the installation of venting solvent storage cabinet to fume hood exhaust system. Each cabinet shall be vented separately and with sufficient mixing distance so as not to create chemical incompatibility. Materials used for venting must meet an NFPA Flame Spread Rating of 25 or less – including all materials used in connecting the back of the cabinet to the exhaust duct. Materials used for venting must be rigid construction – flexible material will not be permitted. Any solvent cabinet vent opening which has not been vented with vent pipe must have manufacturers’ bungs secured in place. Base cabinets shall be cleaned after installation.
SECTION 12348 — LABORATORY TOPS, SINKS, AND ACCESSORIES

1. GENERAL

1.1. SUMMARY:
   A. Section Includes:
      1. Laboratory tops, sinks, and accessories.
   B. Related Sections:
      1. Sections 06400 and 12304 - Non-chemical resistant plastic laminate tops.
      2. Section 12304 - Plastic Laminate Faced Casework.
      3. Section 12345 - Metal Laboratory Casework.
      4. Section 12346 - Wood Laboratory Casework.
      5. Section 12349 - Laboratory Service Fixtures.

1.2. SUBMITTALS:
   A. Product Data:
      1. Submit manufacturer's data and installation instructions for each type of top, sink
         and accessory.
         a. Include independent laboratory certification that material complies with
            specified chemical and physical resistance requirements.
   B. Shop Drawings:
      1. Submit shop drawings for tops, sink and accessories, coordinated with
         requirements for laboratory casework. Coordinate shop drawings with other work
         involved.

1.3. QUALITY ASSURANCE:
   A. Provide laboratory tops, sinks, and accessories (for integration with laboratory
      casework and fume hoods, as required) furnished by the same supplier as for
      casework for single responsibility.
   B. Chemical and Physical Resistance:
      1. Provide an independent testing laboratory report certifying that the finish of
         laboratory tops, sinks, and accessories are capable of withstanding the specified
         chemical and physical resistance requirements.

2. PRODUCTS

2.1. MANUFACTURERS:
   A. Provide tops, sinks and accessories produced by one of the following or approved equal:
      2. Hamilton Manufacturing Co.
3. Campbell Rhea
4. Durcon Co. (epoxy resin only)
5. Epoxyn Products (epoxy resin only)
7. Just Industries (stainless steel only)
8. Hanson Lab Furniture

2.2. MATERIALS:

A. General:

1. Tops, Box Curbs, Splash Rim: Provide smooth, clean, exposed tops and edges, in uniform plane free of defects. Make exposed edges and corners uniformly rounded.

2. Top Sizes: Furnish tops in maximum practicable lengths, as follows, or longer if available.
   a. Laminated plastic: 8 ft.
   b. Stainless steel: 10 ft.
   c. Epoxy resin: 6 ft.

3. Top Thickness: Maintain 1.25" thickness with tolerance not exceeding ±1/32". Provide front and end overhang of 1" over base cabinets, formed with continuous drip groove on under surface 0.5" from edge.
   a. Epoxy resin and plastic laminate tops may be 1" thick in lieu of 1.25".

4. Tops: Provide a minimum 3/8" raised edge around cup sink cut outs, i.e., provide a 3/8" lip above work surface.

2.3. CAST EPOXY RESIN:


B. Physical Properties: Flexural strength: 4000 psi; compressive strength: 14,000 psi; hardness, Rockwell M: 197; water absorption in 24 hours: 0.05%; heat distortion point: 400° F.; highly resistant to thermal shock.

C. Chemical Resistance: Spot test of following reagents in laboratory concentrations indicated, by weight, in contact with finished top for 24 hours, effect as indicated below:

1. REAGENT
2. Hydrochloric Acid 37%  Excellent
3. Sulfuric Acid 33%  No Effect
4. Sulfuric Acid 77%  No Effect
5. Sulfuric Acid 96%  Failure
<table>
<thead>
<tr>
<th></th>
<th>Chemical Name</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Formic Acid 90%</td>
<td>Excellent</td>
</tr>
<tr>
<td>7</td>
<td>Nitric Acid 20%</td>
<td>Excellent</td>
</tr>
<tr>
<td>8</td>
<td>Nitric Acid 30%</td>
<td>Excellent</td>
</tr>
<tr>
<td>9</td>
<td>Nitric Acid 70%</td>
<td>Good</td>
</tr>
<tr>
<td>10</td>
<td>Hydrofluoric Acid 48%</td>
<td>Fair</td>
</tr>
<tr>
<td>11</td>
<td>Phosphoric Acid 85%</td>
<td>No Effect</td>
</tr>
<tr>
<td>12</td>
<td>Chromic Acid 60%</td>
<td>Failure</td>
</tr>
<tr>
<td>13</td>
<td>Acetic Acid 98%</td>
<td>Excellent</td>
</tr>
<tr>
<td>14</td>
<td>&amp; 8 Equal Parts</td>
<td>Excellent</td>
</tr>
<tr>
<td>15</td>
<td>Ammonium Hydroxide 10%</td>
<td>No Effect</td>
</tr>
<tr>
<td>16</td>
<td>Sodium Hydroxide 10%</td>
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<tr>
<td>17</td>
<td>Sodium Hydroxide 20%</td>
<td>No Effect</td>
</tr>
<tr>
<td>18</td>
<td>Sodium Hydroxide 40%</td>
<td>No Effect</td>
</tr>
<tr>
<td>19</td>
<td>Sodium Hydroxide Flake 100%</td>
<td>No Effect</td>
</tr>
<tr>
<td>20</td>
<td>Sodium Sulfide 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>21</td>
<td>Zinc Chloride 100%</td>
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</tr>
<tr>
<td>22</td>
<td>Tincture of Iodine 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>23</td>
<td>Silver Nitrate 100%</td>
<td>No Effect</td>
</tr>
<tr>
<td>24</td>
<td>Methyl Alcohol 100%</td>
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<tr>
<td>25</td>
<td>Ethyl Alcohol 100%</td>
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<tr>
<td>26</td>
<td>Butyl Alcohol 100%</td>
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<tr>
<td>27</td>
<td>Benzene 100%</td>
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<tr>
<td>28</td>
<td>Xylene 100%</td>
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<tr>
<td>29</td>
<td>Toluene 100%</td>
<td>Excellent</td>
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<tr>
<td>30</td>
<td>Gasoline 100%</td>
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<tr>
<td>31</td>
<td>Dichlor Acetic Acid 100%</td>
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<tr>
<td>32</td>
<td>DiMethyl Formamide 100%</td>
<td>Excellent</td>
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<td>33</td>
<td>Ethyl Acetate 100%</td>
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<td>34</td>
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<td>Excellent</td>
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<tr>
<td>35</td>
<td>Acetone 100%</td>
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</tr>
<tr>
<td>36</td>
<td>Chloroform 100%</td>
<td>Excellent</td>
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<tr>
<td>37</td>
<td>Carbon Tetrachloride 100%</td>
<td>No Effect</td>
</tr>
<tr>
<td>No.</td>
<td>Chemical</td>
<td>Resistance</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>38</td>
<td>Phenol 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>39</td>
<td>Cresol 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>40</td>
<td>Formaldehyde 100%</td>
<td>No Effect</td>
</tr>
<tr>
<td>41</td>
<td>Trichloroethylene 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>42</td>
<td>Ethyl Ether 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>43</td>
<td>Furfural 100%</td>
<td>Good</td>
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<tr>
<td>44</td>
<td>Methylene Chloride 100%</td>
<td>Excellent</td>
</tr>
<tr>
<td>45</td>
<td>Mono Chlor Benzene 100%</td>
<td>Good</td>
</tr>
<tr>
<td>46</td>
<td>Dioxane 100%</td>
<td>Excellent</td>
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<tr>
<td>47</td>
<td>Methyl Ethyl Ketone 100%</td>
<td>Excellent</td>
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<tr>
<td>48</td>
<td>Acid Dichromate 100%</td>
<td>Fair</td>
</tr>
<tr>
<td>49</td>
<td>Hydrogen Peroxide 100%</td>
<td>No Effect</td>
</tr>
<tr>
<td>50</td>
<td>Naphthalene 100%</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

D. Workmanship: Surfaces must be very smooth, with factory cut-outs for sinks and drip grooves. Plain butt type joints assembled with epoxy adhesive and prefitted, concealed metal spline. Provide raised marine edge around the entire perimeter of tops and counters containing sinks. Provide 4" integral backsplash with intersection coved.

2.4. PLASTIC LAMINATE:

A. Provide 0.051" thick plastic laminate sheet, Formica 840, lab grade, Wilson Art "Chem-Surf" or Pioneer Plastics "Chem-Guard H48" complying with NEMA LD-3.

B. Provide 3 mm hot melt applied PVC to exposed edges of tops and splashes to match color of top. Provide self-edging with same plastic laminate used for tops at all other openings.

C. Top and back 4" splash one piece with intersection not coved.

2.5. STAINLESS STEEL:

A. 14-gage stainless steel sheet, AISI Type 302/304 with No. 4 satin finish.

B. Weld all shop joints, grind smooth and polish to become practically invisible.

C. Provide hair-line butt jointed field joint mechanically bolted through continuous channels welded to underside at edges. Keep field jointing to a minimum.

D. Apply steel reinforcing channels to the underside of top where necessary to insure rigidity without deflection.

E. Extend top down to provide a 1.25" thickness and 0.5" return flange under frame. Sound-deaden entire under-surface with heavy build mastic coating.

F. Form with integral coved backsplash.
G. Provide a raised marine edge around the entire perimeter of tops and counters containing sinks. Pitch top surface two-ways to bowl to provide adequate drainage without channeling or grooving.

H. Where stainless steel sinks occur in stainless steel tops, assemble sinks and tops into one integral unit with all welds ground and polished.

3. EXECUTION

3.1. EXAMINATION:

A. Verify rough-ins for mechanical and electrical services for types, sizes, adequacy and locations.

3.2. INSTALLATION:

A. Field Jointing:

1. Where practicable, make in same manner as factory jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Locate field joints as shown on accepted shop drawings, factory prepared so that there is no job site processing of top and edge surfaces.

B. Fastenings:

1. Plastic Laminate and Stainless Steel: Use concealed clamping devices for field joints in countertops located within 6” of front, at back edges and at intervals not exceeding 24”. Tighten in accordance with manufacturer's instructions to exert a constant, heavy clamping pressure at joints. Secure tops to cabinets with "Z"-type fasteners or equivalent, using 2 or more fasteners at each front, end, and back.

2. Epoxy Resin: Secure to cabinets with epoxy cement applied at each corner and along with perimeter edges at not more than 48” o.c.

END OF SECTION 12348
1. GENERAL

1.1. Section Includes:
   A. Manually operated sunscreen roller shades.
   B. Manually operated room-darkening shades.
   C. Manually operated double-roller sunscreen and room-darkening shades.
   D. Electrically operated sunscreen roller shades.
   E. Electrically operated room-darkening shades.
   F. Electrically operated double-roller sunscreen and room-darkening shades.
   G. Local group and master control system for shade operation.
   H. Local group and master control system for shade operation with addressable motors.

1.2. Related Sections:
   A. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
   B. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
   C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.
   D. Division 16 - Electrical: Electric service for motor controls.

1.3. REFERENCES
   B. NFPA 70 - National Electrical Code.

1.4. SUBMITTALS
   A. Submit under provisions of Section 01300.
   B. Submit Environmental Certification and Third Party Evaluation per Section 1.5 Qualifications.
   C. Product Data: Manufacturer's data sheets on each product to be used, including:
      1. Preparation instructions and recommendations.
      2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
      3. Storage and handling requirements and recommendations.
      4. Mounting details and installation methods.
      5. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.
   D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
      1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.
   E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
F. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

H. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

F. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.

G. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

H. Recycling Characteristics: Provide documentation that the shade cloth can and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.

I. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

J. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.

1. Locate mock-up in window designated by Architect.
2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.
1.7. PROJECT CONDITIONS
   A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8. WARRANTY
   A. Roller Shade Hardware, Chain and Shadecloth (except EcoVeil™): Manufacturer's standard non-depreciating twenty-five year limited warranty.
      1. EcoVeil standard non-depreciating 10-year limited warranty.
   B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty.
   C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

2. PRODUCTS
2.1. MANUFACTURERS
   B. Substitutions: Or equal.
   C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
   D. Alternates: The following products and manufacturers may be bid as an alternate product in accordance with Section 01030. Any pricing for alternate products shall be listed separately from the base bid specified product. Any alternate pricing must include line-by-line compliance or non-compliance with the specifications. If the alternate product is acceptable to the Architect, the specified manufacturer will be given the opportunity to provide an equivalent proposal.
      1. Suburban/2 Shade System by MechoShade Systems, Inc.

2.2. APPLICATIONS/SCOPE
   A. Roller Shade Schedule:
      1. Manual operating interior, chain drive "double" solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.

2.3. SHADE CLOTH
   A. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., ThermoVeil group, single thickness non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer's available range.
      2. Dense Linear Weave: "1000 series", 3 percent open, dense linear-weave pattern.
      3. Extra - Dense Linear Weave "0900 series", 0-1 percent visually translucent linear weave pattern.
      4. Open Basket Weave: "2100 series", 10 percent open, 2 by 2 open basket-weave pattern.
      5. Dense Basket Weave: "1300 series", 5 percent open, 2 by 2 dense basket-weave pattern.
      6. Dense "3000 Satin Texture", "3200 Diamond Pastel", and "3300 Diamond Earthtone series" visually translucent, twill-weave pattern all at 2 percent open.
      7. Color: Selected from manufacturer's standard colors.
   B. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., EuroVeil "5300" or EuroTwill "6000" Series: 0.010 diameter (0.254 mm) non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm).
1. Dense Basket Weave "5300 series, 5 percent open.
2. Extra Dense Twill Weave "6000" series, 2-3 percent open.
3. Color: Selected from manufacturer's standard colors.

C. Vinyl Room Darkening Shadecloth (Single-Fabric): MechoShade Systems, Inc., "0700 series", blackout material, washable and colorfast laminated and embossed vinyl coated fabric, 0.012 inches thick (0.30 mm) blackout material and weighing 0.81 lbs. per square yard, with a minimum of 62 threads per square inch in colors selected from manufacturer's available range.

1. Color: Selected from manufacturer's standard colors.

D. Room darkening (PVC Free) Shadecloth with opaque acrylic backing: MechoShade Systems, Inc., "Equinox 0100 series", .008 inches thick (.19 mm) blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.

1. Color: Selected from manufacturer's standard colors.

E. Environmentally Certified Shadecloth: MechoShade Systems, Inc., EcoVeil group, 1350 Series, fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.030 inch (0.762 mm) thick fabric.

1. Weave: 5 percent open 2x2 basket weave.
2. Color: Selected from manufacturer's standard colors.

2.4. SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.

2. Shade band and Shade Roller Attachment:
   a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
   b. Provide for positive mechanical engagement with drive / brake mechanism.
   c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
   d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
   e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5. SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:

2. Concealed hemtube.
3. Exposed hemtube.
4. Exposed blackout hembar with light seal.
5. Exposed blackout hembar with polybond seal.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

F. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
   1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
   2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

2.6. COMPONENTS

A. Access and Material Requirements:
   1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
   2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
   3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

B. Manual Operated Chain Drive Hardware and Brackets:
   1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
   2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
   3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
   4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer’s design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
   5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
   6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.

8. Drive Bracket / Brake Assembly:
   a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
   b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
   c. The brake shall be an over-running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
   d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
   e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without affecting the roller shade limit adjustments.

C. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.7. ACCESSORIES

A. Roller Shade Pocket for recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings.
   1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
   a. Provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4 mm) diameter holes per foot allowing the solar gain to flow above the ceiling line.

B. Fascia (for Shade Type ??):
   1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
   2. Fascia shall be able to be installed across two or more shade bands in one piece.
   3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
   4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
   5. Notching of Fascia for manual chain shall not be acceptable.

C. Room Darkening Side and / or Sill Channels (for Shade Type ??):
   1. Extruded aluminum with polybond edge seals and SnapLoc-mounting brackets and with concealed fastening. Exposed fastening is not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
   a. MechoShade side channels, 1-15/16 inches (49.2 mm) wide by 1-3/16 inches (30.1 mm) deep, two-band center channels, 2-5/8 inches (66.6 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoShade side channels 2-5/8 inch (66.6 mm) may be used as center supports for ElectroShades; shadebands up to 8 high. For shadebands over 8 feet (2438 mm), provide ElectroShade side channels.
   b. ElectroShade side channels, 2-1/2 inches (63.5 mm) wide by 1-3/16 inches (30.1 mm) deep; two-band center channels 5 inches (127 mm) wide by 1-3/16 inches (30.1 mm) deep. The
2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoShade side channels 2-5/8 inches (66.6 mm) may be used as center supports for ElectroShades. Also provide for use with manually operated room darkening MechoShades over 8 feet (2438 mm) in height.

c. Color: Selected from manufacturer's standard colors.
d. Color: Custom color as selected by Architect.

3. EXECUTION

3.1. EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2. PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3. INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.
B. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
   1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
   2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
   3. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
   4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
   5. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.

C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
E. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4. PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12494
SECTION 15010 — BASIC MECHANICAL REQUIREMENTS
SECTION 15040 — COMMON MOTOR REQUIREMENTS FOR MECHANICAL EQUIPMENT
SECTION 15041 — ENCLOSED MOTOR CONTROLLERS FOR MECHANICAL EQUIPMENT
SECTION 15100 — VALVES
SECTION 15135 — METERS AND GAUGES
SECTION 15140 — SUPPORTS AND ANCHORS
SECTION 15190 — MECHANICAL IDENTIFICATION
SECTION 15250 — MECHANICAL INSULATION
SECTION 15300 — WATER-BASED FIRE SUPPRESSION SYSTEMS
SECTION 15411 — DOMESTIC WATER PIPING
SECTION 15412 — DOMESTIC WATER PIPING SPECIALTIES
SECTION 15421 — SANITARY WASTE AND VENT PIPING
SECTION 15422 — SANITARY WASTE PIPING SPECIALTIES
SECTION 15456 — HVAC WATER TREATMENT
SECTION 15458 — ELECTRIC WATER HEATERS
SECTION 15485 — LABORATORY GAS SYSTEMS
SECTION 15510 — HYDRONIC PIPING
SECTION 15540 — HYDRONIC PUMPS
SECTION 15755 — HEAT EXCHANGERS
SECTION 15831 — CONVECTORS
SECTION 15832 — UNIT HEATERS
SECTION 15855 — MODULAR CENTRAL STATION AIR HANDLING UNITS
SECTION 15891 — METAL DUCTS
SECTION 15910 — AIR DUCT ACCESSORIES
SECTION 15911 — PARTICULATE AIR FILTRATION
SECTION 15932 — DIFFUSERS, REGISTERS AND GRILLES
SECTION 15950 — INSTRUMENTATION AND CONTROL FOR HVAC
SECTION 15975 — SEQUENCE OF OPERATION FOR HVAC CONTROLS
SECTION 15990 — TESTING, ADJUSTING AND BALANCING
SECTION 16010 — ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 PROVISIONS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary Conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

1.02 DESCRIPTION

A. This project includes the remodel of an attic space in laboratory space.

B. Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on drawings and/or listed below and all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete testing of the system. It is the intent of Drawings and Specifications that all systems be complete and ready for operation.

1.03 WORK INCLUDED

A. Electrical work includes demolition, relocating existing conduits, new light fixtures, relocating existing devices (lights and AV boxes), equipment connections, fire alarm devices and new receptacles.

B. Certain labor, materials and/or equipment may be furnished under other sections, or by Owner. When such is the case, extent, source and description of these items shall be indicated on drawings or described herein. Unless otherwise noted, all labor, materials, and/or equipment for complete installation of electrical work shall be provided under this Division.

1.04 DEFINITIONS

A. Instructions such as "Provide the outlets" shall mean the same as though the words "This contractor shall" proceeded each such instruction. "Provide" shall mean "Furnish and Install." Where the words "Accepted or Acceptable" are used, such "Accepted" or "Acceptable" action by the Engineer denotes that the work or equipment item is in conformance with the design concept of the project and, in general, complies with information in the Contract Documents.

1.05 STANDARDS FOR MATERIALS
A. All materials shall conform with the current applicable industry standards and the University of Colorado Standards. Workmanship and neat appearance shall be as important as electrical and mechanical operation. Defective or damaged materials shall be replaced or repaired prior to final acceptance in a manner meeting approval of Engineer and at no additional cost to Owner.

B. The latest editions of the following standards are minimum requirements.

1. Underwriters' Laboratories, Inc. (UL)
2. National Electrical Manufacturer's Association (NEMA)
3. American National Standards Institute (ANSI)
4. Institute of Electrical and Electronic Engineers (IEEE)

1.06 SUBSTITUTION OF EQUIPMENT AND MATERIALS

A. No substitutions of equipment without written approval from the Engineer in the form of an addenda, submittals shall be received by the Engineer a minimum of 7 calendar days prior to the bid date.

1.07 CODE COMPLIANCE

A. All work and materials shall comply with latest rules, codes and regulations, including but not limited to the following: CU Standards, OSHA, National Fire Codes of National Fire Protection Association (NFPA), 2008 National Electrical Code and all other applicable State and local laws and regulations.

B. Code compliance is mandatory. The Drawings and Specifications shall not permit work that does not conform to these codes.

C. No work shall be concealed until after inspection and approval by proper authorities and design engineer. If work is concealed without inspection and approval, Contractor shall be responsible for all work required to expose and restore the concealed in addition to all required modifications.

1.08 DRAWINGS

A. Drawings indicate general arrangement of circuits and outlets, locations of switches, panelboards and other work. Drawings and specifications are complementary each to the other, and what is called for by one shall be binding as if called for by both. Data presented on drawings is as accurate as planning can determine, but accuracy is not
guaranteed and field verification of all dimensions, locations, levels, etc. to suit field conditions is directed. Review all drawings and adjust all work to conform to all conditions shown therein. Discrepancies between different drawings or between drawings and specifications or regulations and codes governing installation shall be brought to the attention of the Engineer.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. All equipment and materials installed shall be new and UL approved unless otherwise specified.

B. All major equipment components shall have manufacturer's name, address, model number and serial number permanently attached in a conspicuous location.

PART 3 - EXECUTION

3.01 CONDITIONS AT SITE

A. Visit to site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions, and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

B. Lines of other services that are damaged as a result of this work shall promptly be repaired at no expense to Owner to complete satisfaction of Engineer.

3.02 LICENSE, FEES, AND PERMITS

A. Arrange for required inspections for all license, permit and inspections. Furnish a certificate of final inspections and approval from local authority having jurisdiction over electrical installation.

3.03 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work. A journeyman to apprentice ratio of 1:1 must be maintained.

B. Provide foreman in charge of this work at all times.
C. Contractor must have been in business under the same name for a minimum of 5 years and have a manned office, full time. Also provide a current and complete financial statement for review.

D. Where specifications call for an installation to be made in accordance with Manufacturer's recommendations, a copy of such recommendations shall at all times be kept in job superintendent's office and shall be available to Engineer's and/or Owner's representative.

E. Contractors bidding this project must complete AIA Document A305-1986 "Contractor's Qualification Statement" and submit it with their proposal for information purposes.

F. In addition, the contractor must provide a statement(s) indicating they meet the following minimum requirements:

1. List a minimum of two projects completed in the last five years which were similar in size (or larger), complexity and type. For each project list:
   a) Name and location of project.
   b) Name, address and phone number of Client/Owner and owner's representative.
   c) Contract type (prime or subcontract) and contract value or subcontract value.
   d) Year in which work was performed.

2. If required, list two projects on which the Contractor acted as the prime contractor (may be the same projects listed in Item (a), if applicable.

3. The firm or its operating officers (above the level of Project Manager) shall have been involved in Electrical Contracting for at least five years.

4. List project values (or subcontract values, if applicable) which total at least $500,000 of electrical work in the last five years completed by the firm or its operating officers.

G. The bidder shall give evidence of being able to be bonded to 150% of their base bid amount. A letter shall be provided by the bonding agency assuring capability of bonding this level and associated rates.

3.04 SUBMITTALS

A. Submit shop drawings and product data in accordance with provisions of Division 1.
B. Prior to submission, shop drawings, material lists and catalog cuts or manufacturer's printed data shall be thoroughly checked for compliance with contract requirements, compatibility with equipment being furnished by the Contractor or Owner, accuracy of dimensions, coordination with work of other trades, and conformance with sound and safe practice as to erection of installation. Each submittal shall bear Contractor's signed statement evidencing such checking.

C. Clearly mark each shop drawing as follows for purposes of identification:

   Equipment Identification Used on Contract Drawings
   Date
   Name of Project
   Branch of Work
   Architect/Engineer's Name
   Contractor's Name

D. Clearly mark printed material, catalog cuts, pamphlets or specification sheets, and shop drawings with the same designation shown on the contract document schedules. Identify specific item proposed, showing catalog number, recess openings, dimensions, capacities, electrical characteristics, etc. Submittals which are incomplete will be returned to the Contractor without review.

E. Contractor agrees that submittals processed by the Architect/Engineer are not change orders; that the purpose of submittals is to demonstrate to the Architect/Engineer that the Contractor understands the design concept; and that the Contractor demonstrates this understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

F. Contractor shall be responsible for dimensions (which he shall confirm and correlate at the job site), fabrication processes and techniques of construction, and coordination of his work with that of other trades. The Contractor shall check and verify all measurements and review shop drawings before submitting them. If any deviations from the specified requirements for any item of material or equipment exist, such deviation shall be expressly stated in writing and incorporated with the submittal.

G. Maintain one copy of shop drawings at the project field office until completion of the project, and make this copy available, upon request, to representatives of the Architect/Engineer and Owner.

H. No equipment or materials shall be installed or stored at the jobsite until submittals
for such equipment or materials have been given review action permitting their use.

I. Shop drawings and manufacturer's published data shall be submitted for:

   Lighting fixtures (catalog cuts)
   Wiring devices (switches & receptacles)
   Switches and fuses

3.05 TESTS

A. The right is reserved to inspect and test any portion of the equipment and/or materials during the progress of its erection. This contractor shall test all wiring and connections (whether new or existing) for continuity and grounds before connecting any equipment.

B. The Contractor shall test the entire system in the presence of the Engineer when the work is completed to ensure that all portions are free from shorts or grounds. All equipment necessary to conduct these tests shall be furnished at the Contractor's expense.

3.06 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions for delivery and safe storage of all materials. Deliver materials to job at such stages of the work as will expedite work as a whole. Carefully mark and store all materials. Carefully check materials furnished for installation, and furnish a receipt acknowledging acceptance of delivery and condition of materials received. Thereafter assume full responsibility for safekeeping of same until final installation has been approved and accepted.

3.07 CUTTING AND PATCHING

A. Carefully lay out all work and coordinate location with architect and other trades. Where cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for proper installation, support or anchorage of raceways, outlets or other electrical equipment, this work shall be the responsibility of this Contractor. Any damage to building, piping, equipment or any defaced finish, plaster, woodwork or metalwork shall be repaired by this contractor at no additional cost to Owner. Do no cutting, channeling, chasing or drilling of unfinished masonry, tile, etc. or cutting, drilling, welding of structural members of building, etc. without first obtaining permission from Engineer. If permission is granted, perform work in a manner approved by Engineer. All penetrations through fire resistive construction must be sealed with an approved fire resistive sealant.
3.08 DIRECTORY CARDS, NAMEPLATES, AN LABELS

A. All components of electrical system shall be neatly and accurately labeled to facilitate ready identification and service. Temporary type of markings, which are visible on equipment, will not be permitted. Repaint trims, housing, etc. where such marking cannot be readily removed. Defaced finish must be refinished. All spares or spaces must be labeled in erasable pencil.

3.09 OPERATING MANUAL AND PARTS LIST AND INDOCTRINATION OF OPERATING AND MAINTENANCE PERSONNEL

A. Refer to Division 1.

3.10 CLEAN-UP

A. Remove all materials, scrap, etc. relative to electrical installation, and leave premises in a clean, orderly condition. Any costs to Owner for cleanup of site will be charged to Contractor. At completion, all equipment, lighting fixtures, etc. shall be thoroughly cleaned and all residue removed from the inside and outside surfaces.

3.11 GUARANTEE

A. Provide in accordance with the General Conditions and Division 1. Leave entire electrical system installed under this Division in proper working order. Replace, without additional charge, any work materials or equipment provided under this Division which develops defects within one year from date of final acceptance. Guarantee all materials and equipment against defects in composition, design or workmanship.

END OF SECTION 16010
SECTION 16110 — RACEWAYS

PART 1 - GENERAL

1.01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16450 Grounding.

1.02 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

PART 2 - PRODUCTS

2.01 CONDUITS

A. Rigid Steel Conduit: Rigid, threaded, thick-wall, zinc-coated on the outside and either zinc-coated or coated on the inside. ANSI C80.1.

B. Electrical Metallic Tubing (EMT): Mild steel, zinc-coated on the outside and either zinc-coated or coated with an approved corrosion-resistant coating on the inside. The use of 2" or larger EMT by UCB permission only.

C. Flexible Conduit: Commercial Greenfield, galvanized steel, with a separate grounding bond wire installed in the conduit in addition to other wires. MC and AC cable and extra flexible conduit are not acceptable.

D. PVC Conduit (schedule 40): Polyvinyl chloride.

E. Liquidtight flexible conduit: PVC coated with an inner metallic jacket.

F. Conduit Size: Minimum conduit size is 1/2-inch for lighting circuits and 3/4" for power circuits. All conduit for branch circuit receptacles, motor feeders and panelboard feeders shall be as required by the NEC for RH, RHH, and RHW insulation regardless of the type of insulation actually used.

F. Provide a pull string in all empty conduits.

G. Provide a grounding conductor with all circuits.
2.02 CONDUIT FITTINGS

A. Rigid Steel Conduit, IMC, and EMT Fittings: Iron or steel only.

B. Flexible Conduit Fittings (Commercial Greenfield): Steel only, with insulated throats, and shall be:
   1. Squeeze or clamp type with bearing surface contoured to wrap around the conduit and clamped by one or more screws.

C. Connectors and Couplings: Compression type threadless fittings for rigid steel conduit or IMC not permitted. EMT couplings and connectors shall be steel only, "Concrete-tight" or "Rain-tight" (gland and ring compression type) or steel set screw type. Connectors to have insulated throats.

D. Bushings: Insulated type, designed to prevent abrasion of wires without impairing the continuity of the conduit grounding system, for rigid steel conduit, IMC, and EMT conduit larger than 1-1/4" size. Provide grounding type bushings on all feeder conduits.

PART 3 - EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

A. Size all conduits to meet the requirements of National Electrical Code, all power or feeder conduits shall meet the requirements for RHH and RHW insulation regardless of the type of wire actually used. Minimum flexible conduit size shall be 1/2". Three-eighths inch flexible conduit is permitted if furnished as part of a manufactured equipment connection.

B. The maximum length of flexible conduit for connections to lighting equipment is 6'-0". Flexible conduit may also be used where installing new devices in existing walls and the wall or structure has to be “fished”. MC and AC cables are not acceptable.

C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping. Coordinate the proposed conduit routing with the Architect prior to installation.

D. Maintain minimum 6 inch clearance between conduit and piping. Maintain 12 inch
clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.

E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Support conduit from building structure using galvanized straps, clevis hangers, or bolted split stamped galvanized hangers. Do not support conduits from ceiling suspension wires.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used or temporary conduit support during construction, before conductors are pulled. Multi-use suspension systems for plumbing and other piping along with electrical conduits shall not be permitted unless the hangers were designed for all the piping and conduit loads and will support a minimum of 200 lbs.

3.02 CONDUIT INSTALLATION

A. Cut conduit square using a saw or pipecutter; de-burr cut ends.

B. Bring conduit to the shoulder of fittings and couplings and fasten securely.

C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

D. For all metallic conduits, provide insulated bushing or throat bushings for 1-1/4" diameter and larger. Provide grounding lug bushings where conduits enter switchboards.

E. Use conduit bodies to make sharp changes in direction, as around beams.

F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch size.

G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
I. Provide No. 12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.

J. Install expansion joints where conduit crosses building expansion joints.

K. Where conduit penetrates fire-rated walls and floors, provide mechanical fire-stop fittings with UL listed fire rating equal to wall or floor rating or seal opening around conduit with UL listed foamed silicone elastomer compound. Coordinate with Division 0 requirements.

L. Where conduit penetrates waterproofed floors or exterior walls subject to entry of moisture, provide pipe sleeves two sizes larger than conduit, suitably flashed or sealed where appropriate. Seal annular space around conduit with UL listed foamed silicone elastomer compound. For conduit penetrations through exterior foundation walls below grade, all conduit shall be sloped away from the building to prevent entry of moisture. Pipe sleeve shall be large enough to allow up to 3" of vertical movement about the conduit without damage in the event that the foundation rises.

3.03 CONDUIT INSTALLATION SCHEDULE

A. Concealed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing. Do not use EMT in concrete slabs or walls.

B. Exposed Dry Interior Locations: Rigid steel conduit from floor level to +4'-0" above finished floor where exposed to travel areas (corridors, receiving, etc.) or where likely to be damaged. Electrical metallic tubing above +4'-0" from finished floor. All surface conduit shall be painted. Wiremold shall be used in some finished areas as shown on the drawings.

C. Flexible metal conduit shall be utilized for the following:
   1. Transformer final connections.
   2. Mechanical equipment final connections.
   3. Lighting equipment final connections.
   4. Installation of devices in existing walls or ceilings to remain where rigid conduit cannot be installed.

D. Direct buried conduit: PVC schedule 40 conduit with transition to GRC with a GRC elbow before rising above grade through a floor or into a wall. No PVC shall be located inside the building.

E. Liquidtight flexible conduit: metallic type to be used below computer floors, for final
motor connections, flow and tamper switch connections and exterior final equipment connections.

END OF SECTION
SECTION 16120 — CONDUCTORS

PART 1 - GENERAL

1.01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16450 Grounding.

1.02 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary Conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

PART 2 - PRODUCTS

2.01 CONDUCTORS AND CABLES (600 VOLTS)

A. Type: Conform to the applicable UL and ICEA Standards for the use intended. Copper conductors with 600-volt insulation unless otherwise specified or noted on the drawings. All #12 conductors shall be solid with stranded conductors for No. 10 and larger.

B. Aluminum Conductors Prohibited: Aluminum conductors will not be permitted.

C. Insulation: Type THWN/THHN insulation minimum unless otherwise specified or noted on the drawings. Type THW minimum or type XHHW filled cross-linked polyethylene 90-degree C thermosetting insulation for conductors larger than No. 6 and elsewhere as required by NEC.

D. Size: No. 12 minimum unless otherwise specified or noted on the drawings. Not less than NEC requirements for the system to be installed. If the equipment to be installed requires larger conductor and equipment sizes than indicated on the drawings, the owner shall be notified.

E. Wire Color Coding:

1. Color code wires for building voltage classes as follows:

<table>
<thead>
<tr>
<th>Voltage Class</th>
<th>Phase</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/208V</td>
<td>3</td>
<td>A - Black</td>
</tr>
<tr>
<td>277/480V</td>
<td>3</td>
<td>A - Brown</td>
</tr>
</tbody>
</table>

16120-1
2.02 CONNECTORS AND LUGS

A. For copper conductors No. 10 and smaller: 3M Scotch-Lok, T&B or equal spring wire connectors.

B. For copper conductors larger than No. 10: Split bolt-type pressure connectors, properly taped or insulated.

PART 3 - EXECUTION

3.01 WIRE AND CABLE TESTS (600 VOLTS)

A. Measure the insulating resistance of service entrance conductors, feeder circuit conductors, and service ground. Measurements shall be taken between conductors and between conductors and ground. Resistance shall be 1,000,000 ohms or more when tested at 500 volts by megger without branch circuit leads. Tests and procedures shall meet the approval of the Architect/Engineer, and shall be in accordance with the applicable ICEA standards for the wires and cables to be installed. Furnish all instruments, equipment and personnel required for testing, and conduct tests in the presence of the Architect/Engineer. Submit written reports of the tests and results when requested by the Architect/Engineer.

3.02 SPLICES (480 VOLTS AND UNDER)

A. Permitted only at outlets or accessible enclosures. Conductor lengths shall be continuous from termination to termination without splices unless approved by the Architect/Engineer.

3.03 PULL WIRES

A. In each empty conduit, except underground conduits, installed a No. 14 galvanized steel pull wire or a plastic line having a tensile strength of not less than 200 pounds.

3.04 RACEWAYS

A. Install all conductors in an approved raceway system.
B. Install a ground conductor in all power & lighting circuits above 50 volts.

3.05 CABLE BENDS

A. Radius of bends shall be not less than 10 times the outer diameter of the cable.

3.06 CONDUCTOR PULL

A. Conductors shall not be pulled into conduits until after all plastering or concrete work is completed, and all conduits in which moisture has collected have been swabbed out.

3.07 CONNECTORS AND LUGS

A. Install with manufacturer's recommended tools and with the type and quantity of deformations recommended by manufacturer.

END OF SECTION
SECTION 16130 — BOXES AND FITTINGS

PART 1 - GENERAL

D..01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16450 Grounding.

1.02 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary Conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

PART 2 - PRODUCTS

2.01 OUTLET BOXES

A. Construction: Zinc-coated or cadmium-plated sheet steel boxes of a class to satisfy the condition at each outlet except where unilet or condulet bodies are required. Knockout type with knockouts removed only where necessary to accommodate the conduit entering. Square cornered, straight sided gang boxes, 4-inch octagon concrete rings and 4-inch octagon hung ceiling boxes with bars may be folded type; one-piece deep-drawn for all other boxes.

B. Size: To accommodate the required number and sizes of conduits, wires and splices in accordance with NEC requirements, but not smaller than 4" square. Standard concrete type boxes not to exceed 6 inches deep except where necessary to permit entrance of conduits into sides of boxes without interference with reinforcing bars. Special purpose boxes shall be sized for the device or application indicated.

C. Fixture Studs: 3/8-inch malleable-iron fixture stud in outlet boxes for ceiling lighting fixtures and interior bracket lighting fixtures, other than lamp receptacles and drop cords.

D. Exposed: Screw-joint type, with gasketed weatherproof covers in locations exposed to the weather.

E. Tile Boxes: Rectangular in shape with square corners and straight sides for receptacles and switches mounted in furniture cabinets or in glazed tile, concrete block, marble, brick, stone or wood walls. Install with tile rings.
F. Wall-Mounted Switch, Receptacle and Signal Boxes: Unless otherwise noted or specified, not less than 4 inches square by 1-1/2 inches deep for two devices and multi gang boxes for more than two devices. Boxes for switches and receptacles on unfinished walls may be screw-joint type with covers to fit the devices.

G. Light Fixture Boxes: 4-inch diameter by 1-1/2 inch deep minimum for ceiling and interior bracket fixtures with concealed conduits. Plaster covers for bracket fixtures to have 3-inch diameter openings. Screw-joint boxes with canopy seat for ceiling and interior bracket fixtures with exposed conduits.

PART 3 - EXECUTION

3.01 OUTLET BOXES

A. Installation: Unless otherwise specified or shown on the drawings, outlet boxes shall be flush mounted and the front edges of the boxes or plaster covers shall be flush with the finished wall or ceiling line, or if installed in walls and ceilings of incombustible construction, not more than 1/4-inch back of same. Mount boxes with the long axis of devices vertical. Boxes in plastered walls and ceilings shall be provided with plaster covers. Box extensions and/or covers will not be permitted. Install in a rigid and satisfactory manner with suitable metal bar hangers, box cleats, adjustable box hangers, etc. Use wood screws on wood, expansion shields on masonry and machine screws on steel work.

B. Mounting Heights: The mounting height of a wall-mounted outlet box shall be construed to mean the height from the finished floor to the horizontal center line of the cover plate. On exposed tile, block, or brick construction, mount outlet boxes at the nearest bed joint to the mounting height indicated. Verify with Architect.

C. Wall-Mounted Switch, Receptacle and Signal Outlets: On columns, pilasters, etc., mount so the centers of the columns are clear for future installation of partitions. Install outlet boxes near doors or windows close to the trim. Install outlet boxes near the doors on the lock sides as shown on architectural drawings, unless other locations are approved by the Architect.

D. Back-To-Back: Outlets shown on the drawings "back-to-back" are to be installed with a minimum of 6 inches lateral separation between outlets for minimum sound transmission. "Through-the-wall" type boxes are not permitted.

E. Box extensions shall be prohibited on new construction and one per existing box will be allowed on remodel work only. Install a new 6 x 6 box to cover the existing box if one extension is not sufficient to flush out the existing box. The relocated device can
then be mounted in a close nippled standard box.

F. Provide "Bell" or FS boxes for surface installations in all high traffic areas such as corridors, circulation spaces, exterior colonnades, plazas, etc.

G. Boxes mounted on metal partitions shall have back side supports.

3.02 FIXTURE CONNECTIONS

A. Recessed or surface light fixtures in lay-in or accessible ceilings shall be connected with minimum 3/8-inch flexible metallic conduit, 4 to 6 feet long, with grounding provisions.

3.03 IDENTIFICATION

A. Identify all junction and pull boxes as follows:

1. Fire Alarm - red
2. Emergency - yellow
3. Telephone - green
4. Television - violet
5. Computer & data - blue
6. 277/480V - orange

END OF SECTION
SECTION 16140 — WIRING DEVICES AND PLATES

PART 1 - GENERAL

1.01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16450 Grounding.

1.02 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary Conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

PART 2 - PRODUCTS

2.01 SNAP SWITCHES

A. Unless otherwise specified, each switch (Quiet, Quick Make & Break) shall be of the A.C specification grade type for mounting in a single-gang spacing, fully rated 20 amperes minimum at 120/277 volts, conforming to minimum requirements of the latest revision of the Federal Spec. #W-S-896E, standard Quiet Switches and further requirements herein specified. Switches shall be spec grade, heavy duty, single-pole, 3-way or 4-way, of the maintained, momentary, or lock type as indicated on the drawings with grounding screw. Switches shall operate in any position and shall be fully enclosed cup type with entire body molded phenolic, urea or melamine. Fibre, paper or similar insulating material shall not be used for body or cover, ivory color handles unless otherwise indicated on the drawings. Silver or silver alloy contacts. A.C. 120/277 volt general use snap switches shall be capable of withstanding tests as outlined in NEMA Publication, and shall be as follows unless otherwise noted:

Hubbell #1221-I, 1223-I or 1224-I.

2.02 RECEPTACLES

A. General: Configuration and requirements for all connector or outlet receptacles shall be in accordance with NEMA Publications. Fire-resistant, non-absorptive, hot-welded, phenolic composition or equal bodies and bases with metal plaster ears (integral with the supporting member) and 20 amp minimum. Single or duplex as shown or noted on drawings. Ivory color unless otherwise noted on the drawings. Double grip contacts for each prong. Receptacles shall comply with Federal Spec.
B. Grounding Type: All receptacles shall be grounding type with a green colored hexagonal equipment ground screw of adequate size to accommodate an insulated grounding jumper the same size as the phase conductor. Grounding terminals of all receptacles shall be internally connected to the receptacle mounting yoke.

C. Unless otherwise noted, receptacles shall be as follows:

Hubbell #5362-I or 5362-GF for ground fault.

2.03 DEVICE PLATES

A. General: Provide device plates for each switch, receptacle and special purpose outlet. Do no use sectional gang plates. Provide multi-gang outlet plates for multi-gang boxes. Plates shall be smooth lexan, of spec. grade, ivory color, as manufactured by Hubbell, Leviton, Arrow-Hart, Daniel Woodhead or Eagle. Each coverplate for all receptacles and switches shall be provided with an adhesive Brady label on the outside of the coverplate with the panel and circuit identified. If the existing building has metal plates (stainless steel) the new coverplates shall be the same to match.

B. Exposed: Plates for exposed jointed fittings shall match the fittings with edges of plates flush with edges of fittings. Heavy cadmium plated steel with gasket. Plates for cast type boxes at locations subject to wet or rain conditions shall be of the cast, vapor-tight type. Provide hinged lift covers for devices.

PART 3 - EXECUTION

A. Install wall switches 48 inches above floor to the center of the device, OFF position down.

B. Install convenience receptacles vertically at 18 inches above floor to the center of the device, or horizontally at 6 inches above counters, or backsplash, with grounding pole to right.

C. Install specific-use receptacles at heights shown on Contract Drawings.

D. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.

E. Install devices and wall plates flush and level.
F. Install with alignment tolerance of one-sixteenth inch and all edges in continuous contact with wall surfaces.
SECTION 16450 — GROUNDING

PART 1 - GENERAL

1.01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16110 Raceways; Section 16120 Conductors; Section 16130 Boxes and Fittings; Section 16140 Wiring Devices and Plates; Section 16470 Panelboards.

PART 2 - PRODUCTS

A. Materials, equipment, and devices related to the grounding system are specified under other sections of these specifications.

PART 3 - EXECUTION

3.01 GENERAL

A. Install grounding conductors as shown on the drawings.

B. Provide a grounding conductor in all power and lighting branch circuits above 50 volts.

3.02 EQUIPMENT GROUNDING SYSTEM

A. Ground Bar: Provide an uninsulated copper equipment ground bar, separate from any insulated neutral bar, in all switchboards, panelboards, transformers, motor control centers, starters, disconnect switches, cabinets, etc., for grounding the enclosure and for connecting other equipment ground conductors. The ground bar shall be an integrally mounted and braced bus bar in switchboards, or a separately mounted bar adequately braced or bolted to the enclosure of other types of equipment. The ground bar shall be adequately braced or bolted to the enclosure after thoroughly cleaning both surfaces to assure good contact. Provide solderless pressure connectors for all conductor terminations. Number and size of pressure connectors on equipment grounding bars as required for the termination of equipment grounding conductors. In addition to the active circuits, provide pressure connectors for all three-phase spares and spaces.

B. Conduits: Where metallic conduits terminate without mechanical connection to a
metallic housing of electrical equipment by means of lock nut and bushings provide ground bushing connected with a bare copper conductor to the ground bar in the electrical equipment. Metallic conduits containing ground wiring only shall be bonded to the grounding wire at both conduit entrance and exit. Install grounding conductor in all conduits except those used for telephone, sound, or low-voltage signals, and in all flexible conduit. Bond the conductor at both ends to the equipment grounding system.

C. Feeders and Branch Circuits: Provide a separate green insulated equipment grounding conductor for each single or three-phase feeder and each branch circuit. Install a grounding conductor in the common conduit or raceway with the related phase and/or neutral conductors and connect to the box or cabinet grounding terminal. Where there are parallel feeders installed in more than one raceway, each raceway shall have a full sized green insulated equipment ground conductor.

D. Devices: Install a minimum No. 12 green insulated equipment bonding conductor from a grounding terminal in the respective outlet or junction box to the green ground terminal of all receptacles and through flexible conduit to all light fixture housings.

E. Motors: Install a separate green insulated equipment grounding conductor from the equipment ground bar in the motor control center or separate starter through the conduit and flexible conduit to the ground terminal in the connection box mounted on the motor. Install the grounding conductor in the common conduit or raceway with the related motor circuit conductors.

3.03 GROUND CONNECTIONS

A. Clean surfaces thoroughly before applying ground lugs or clamps. If surface is coated, the coating must be removed down to the bare metal. After the coating has been removed, apply a noncorrosive approved compound to cleaned surface and install lugs or clamps. Where galvanizing is removed from metal, it shall be painted or touched up with "Galvanox", or equal.

3.04 TESTS

A. Test the completed grounding system with a megger at the service ground bar and submit a written report to the Engineer for approval. The service shall not be energized if the test shows more than 5 ohms unless approved by the Engineer.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED WORK IN OTHER SECTIONS

A. Section 16010 General Provisions; Section 16450 Grounding.

1.02 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract between the Construction Manager/General Contractor and the University of Colorado, any General and Supplementary Conditions to the Contract, provisions of applicable Subcontractor Agreements, and other Division 1 Specification sections apply to work of this section.

1.03 SUBMITTALS

A. Submit for approval complete shop drawings, catalog cuts, special installation instructions, photometric data and descriptive literature. When fixtures are proposed for substitution and prior approval has not been issued in the form of an addenda they will not be reviewed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Furnish all lighting fixtures throughout of the type indicated on the drawings, complete with lamps, sockets, wiring, fitters, hangers, plaster rings, canopies, etc., as required.

2.02 LAMPS

A. Fluorescent: 3500 degree Kelvin, energy saving, green end cap lamps, T8 as noted in the fixture schedule.

B. Incandescent: As specified on the drawings in the fixture schedule.

C. Manufacturers: General Electric, Sylvania or Philips.

2.03 BALLASTS

A. Fluorescent Ballasts - Electronic;
1. Provide rapid start electronic ballasts with series circuiting for all four foot rapid start T-5 and T-8 lamps with voltage as indicated on the plans and fixture schedule. The ballast shall deliver normal lamp life and must be interchangeable with electromagnetic ballasts. The light output shall not vary in response to an input voltage variance of less than 10% rated voltage. Drive output shall be greater than 25 KHz with lamp flicker less than 2%.

2. The ballast Total Harmonic Distortion shall be less than 20% with the third harmonic (180 Hz) distortion less than 8%.

3. The ballast shall have a power factor of 0.98 or higher and shall have a ballast efficiency of 90% or higher.

4. The ballast shall be UL listed Class P and with a sound rating better than A.

5. The manufacturer shall provide a full three year warranty beginning at time of substantial completion. The manufacturer shall replace any and all failed ballasts within 48 hours of notification. The manufacturer shall provide the labor for warranty replacements.

6. The ballasts shall be by Advance, Magna-Tek or Sylvania. All other manufacturers shall request prior approval and supply test data from an independent testing laboratory to substantiate compliance with specifications.

B. All compact fluorescent fixtures shall utilize high power factor electronic ballasts.

2.04 FLUORESCENT FIXTURES

A. All fixtures, ballasts and supports shall be quiet in operation. Louvers, shields, reflectors and all sections of the channel structure shall be securely held in position. Fixtures shall not be mounted in such a way that ballast hum will be amplified or transmitted into work areas.

2.05 FINISH

A. Bonderized or equal treatment on all steel parts prior to applying finish. Metal parts shall be aluminum, brass, copper, bronze or steel, with baked white enamel finish unless otherwise noted on the drawings.

2.06 FLUORESCENT LAMPHOLDERS

A. Designed so lamps will be held firmly in place, electrically and mechanically permitting easy insertion or removal of lamps. Provide corrosion resistant, silver-
plated lamp pin contacts.

2.07 CEILING TRIM

A. Furnish proper ceiling frames for the ceiling materials in which recessed fixtures are to be installed. Verify that the ceiling type to be installed is as noted on the fixture schedule prior to ordering the fixtures.

2.08 HOUSING

A. Not less than 20 gauge steel with baked white enamel finish applied over corrosion-resistant primer unless otherwise specifically approved.

PART 3 - EXECUTION

3.01 SUPPORTS

A. Support ceiling fixtures by anchorage to the ceiling only where the ceiling is concrete or masonry units. For ceilings of other construction, anchor ceiling fixtures to metal or wood supports provided for that purpose, of suitable strength and stability, adequately attached to and supported by joists, trusses or other structural members, unless other methods of support are specifically approved by the Architect. Where lay-in construction is used, fixtures shall be of the lay-in type. Coordinate supports for lay-in fixtures with ceiling contractor.

3.02 CEILING TRIM AN MEANS OF SUPPORT

A. The ceiling trim and means of support of recessed fixtures shall be coordinated with the type of ceiling to be installed to insure proper installation.

3.03 CLEAN-UP

A. At final inspection the fixtures and lighting equipment shall be in first class operating order, in perfect condition as to finish, free from defects, completely lamped, clean and free from dust, plaster or paint spots, and complete with the required glassware, reflectors, side panels, louvers, or other components necessary to complete the fixtures.

END OF SECTION
PART 1 – GENERAL

PART 1.1 RELATED DOCUMENTS

A. Drawings, Contract Forms, Conditions of the Contract, including Construction Manager/General Contractor (CM/GC) Agreement including Exhibits and other Division 1 Specification Sections, apply to this section.

PART 1.2 SCOPE OF WORK

A. Provide all services labor, materials, tools, and equipment required for the complete and proper installation of interior telecommunications pathways as called for in these specifications and related drawings.

B. This section includes minimum requirements and installation methods for the following:
   1. EMT Conduit and Cable Tray Systems
   2. Surface Metal Raceway Systems
   3. Wireless Access Boxes
   4. Educational Technology Cabinets for Classrooms and Lecture Halls

PART 1.3 QUALITY ASSURANCE

A. All installation work for the new interior telecommunications pathways shall be performed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated shall be subject to the control of UCB.

B. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based on the acceptable manufacturers listed. Where “approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval of UCB based on submittals provided.

C. Materials and work specified herein shall comply with the applicable requirements of:
   1. ANSI/NFPA 70 – National Electrical Code including, but not limited to, the following articles:
      a) 250 – Grounding
      b) 300 – Wiring Methods
      c) 314 – Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes
      d) 358 – Electrical Metallic Tubing: Type EMT
      e) 386 – Surface Metal Raceways
      f) 392 – Cable Trays
      g) 770 – Optical Fiber Cables and Raceways
   2. ANSI/TIA-568-C.0 – Generic Telecommunications Cabling for Customer Premises
   3. ANSI/TIA-568-C.1 – Commercial Building Telecommunications Cabling Standard
   4. ANSI/TIA-569-B – Commercial Building Standard for Telecommunications Pathways and Spaces, including applicable addendum
   5. ANSI/TIA-606 – Administration Standard for Telecommunications Infrastructure of Commercial Buildings
   6. ANSI/TIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications
   7. BICSI Telecommunications Distribution Methods Manual

PART 1.4 SUBMITTALS

A. As-built drawings
PART 2 – PRODUCTS

PART 2.1 EMT CONDUIT AND CABLE TRAY SYSTEMS

A. Electrical Metallic Tubing (EMT): Electro-galvanized steel tubing 3/4” and larger diameter per project requirements:
   1. Conduit joint couplings and connectors: steel double set screw indenter fittings
   2. Metal bushings for 3/4” and 1” conduit
   3. Insulated metallic bushings for 1-1/4” and larger conduit
   4. Insulated metallic bushings with grounding lugs as required
   5. Conduit sweeps: minimum 10 times the conduit inside diameter
   6. Include required conduit straps, and hangers, heavy-duty malleable iron or steel. Perforated pipe strap, j-hooks, bridle rings, or wire hangers are not permitted
   7. LB fittings and plastic fittings are not permitted
   8. Nipple runs from one outlet box to another outlet box are not permitted

B. Outlet boxes: Galvanized steel sheet metal 4” x 4” x 2-1/8” deep minimum with single gang mud ring

C. Pull-boxes: Minimum 14 gauge galvanized steel with screw fastened cover and trim for flush or surface mounting as required for project. Dimensions as required for project.
   1. Box extensions are prohibited for new construction however they are permitted on remodel work to extend existing installations.

D. Metal Flex Conduit (3/4”) and deep Cut-In Boxes for outlets in existing walls for remodel projects only.

E. Pull-rope: polypropylene monofilament line with a minimum pull tensile strength of 200 pounds.

F. Cable Trays in Ceiling Areas:
   1. Welded wire mesh cable system, 12” wide x 2” deep: Cope CAT2-12SL-120
   2. Include components, and compatible fittings designed and manufactured by the cable tray manufacturer as required for a fully installed electrically continuous system: Cope
   3. Include support kits, brackets, threaded rod hangers, lateral threaded rod braces, and other anchors and supports as required as specified in Section 270500.

G. Labels for conduit, pull-boxes, and cable trays: 1” x 2” yellow background with 3/8” lettering to read “TELECOM”

PART 2.2 SURFACE METAL RACEWAY SYSTEMS

A. Surface Metal Raceway Systems:
   1. Surface Raceway: Hubbell Steel Raceway with Ivory color finish
      a) 0.76” W x 0.85” D: 750 Hubbell Series HBL75010IV Single Channel One-Piece (this raceway shall only be used for installation of wireless wall boxes or voice wall jacks)
      b) 1.3” W x 0.83” D: 2000 Hubbell Series HBL2000BCIV (Base and Cover)
      c) 2.67” W x 1.47” D: 3000 Hubbell Series HBL3000BIV (Base) and HBL3000CEIV (Cover)
      d) 4.76” W x 1.62” D: 4750 Hubbell Series HBL4750B10IV (Base) and HBL4750CIV (Cover)
      e) 6.75” W x 2.12” D: 6750 Hubbell Series HBL6750B10IV (Base) and HBL6750CIV (Cover)
   2. Surface Raceway Parts and Fittings: Hubbell
      a) Deep Single-Gang Device Box for HBL2000 Raceway, 4.54” L x 2.82” W x 1.75” D: HBL2048IV
      b) Device Bracket and Cover for Outlets in HBL3000 Raceway: HBL3051LEIV
      c) Entrance End Fitting for HBL2000 Raceway: HBL2010A3IV
      d) Entrance End Fitting for HBL3000 Raceway: HBL3010CIV
e) Conduit Connector for HBL3000 Raceway to 1-1/2” Conduit: HBL3082GY
f) End Reducing Connector for HBL3000 to HBL2000 Raceway: HBL3200REDIV
g) Blank End Fitting for HBL6000 Raceway: HBL6710BIV
h) Single-Gang Box for 3000 and 4750 Series Raceway: HBL5748IV with Extension Box: HBL5760IV

3. Include all parts and components: base and cover, compatible fittings, insulated bushings, and supports designed and manufactured by the raceway manufacturer as required for a complete installation.

PART 2.3 WIRELESS ACCESS BOXES

A. Wall-Mount Enclosure for Wireless Access Equipment
   1. Vented steel closure 11” x 8” x 3”
   2. White, beige, or black finish to match wall color
   3. Continuous hinge swing down door with keyed lock
   4. Knockouts for cable entry/exit
   5. Two 1” antenna openings 5” apart on top of enclosure
   6. CPI: WA064WAP-R114 (see the attached “Wireless Security Box Instructions” for this execution)
   7. Include components and compatible fittings from the manufacturer as required for a complete installation

B. Ceiling Enclosure for Wireless Access Equipment
   1. Plenum-rated enclosure
   2. Mounts in standard 2’ x 2’ or 2’ x 4’ ceiling tile
   3. Continuous hinge swing down door with keyed lock
   4. Cable entry/exit opening with approved fire-rated foam kits
   5. CPI: WA064-CAP-R113 (see the attached “Wireless Security Box Instructions” for this execution)
   6. Include equipment mounting plate and other components and compatible fittings from the manufacturer as required for a complete installation

16720-3
PART 3 - EXECUTION

PART 3.1 INSPECTION

A. Examine areas and conditions under which the new interior telecommunications pathways are to be installed. Provide notification, in writing, of conditions detrimental to proper completion of the work.

B. Verify field measurements and pathway routing conditions are as shown on project drawings. Provide notification, in writing, of conditions deviating from drawings.

C. Beginning of telecommunications pathway installation indicates Contractor acceptance of existing conditions.

D. Post and comply with: CONSTRUCTION INSPECTION REPORT – VOICE AND DATA COMMUNICATIONS attached to Section 270100.

PART 3.2 INSIDE CONDUIT AND CABLE TRAY INSTALLATION

A. Place new inside EMT conduit and cable tray systems as shown on the project drawings.

B. Perform installation of pathways as specified in Section 270500 including anchoring and supports, grounding and bonding, firestop, etc.

C. No section of conduit shall be longer than 30 m (100 ft) between pull points (e.g., outlet boxes, telecommunications closets, or pull-boxes).

D. The inside radius of a bend in conduit shall be at least 10 times the conduit internal diameter. Bends in the conduit shall not contain any kinks or other discontinuities that may have a detrimental effect on the cable sheath during cable pulling operations.

E. No section of conduit shall contain more than two 90° bends, or equivalent bends exceeding 180° total, between pull points. If there is a reverse (U-shaped) bend in the section, a pull-box shall be installed. Of the 180° offsets, saddles and kicks shall not exceed 30 degrees.

F. Provide pull-boxes as required to accommodate wire pulling, splices, taps, equipment connections, and code compliance as required due to field conditions for each project.

G. Install pull-boxes in readily accessible locations. Equipment, piping, ducts, and the like shall not block access to the boxes. Coordinate access doors as required to provide access to pull-boxes in hard ceilings and similar inaccessible areas.

H. Collector/distribution conduit shall be 25° ± 5 between pull-boxes. Conduits and boxes shall be upsized per fill in area. Install the conduit collector/distribution system so that the electrical continuity of the system for the main feed is maintained.

I. Conduit, cable tray, and surface raceway shall be so installed, that no cable run shall exceed 290° in length from the Telecommunications Room (TR) or Equipment Room (ER) to the farthest outlet. Where building conditions prohibit meeting this requirement, additional TRs or ERs may need to be provided.

J. Conduits terminating into cable trays shall be no more than 6” away from the cable tray.

K. Provide dedicated 3/4” for each telecommunications outlet to the nearest pull-box or cable tray. Where multiple outlets serve an area, a conduit feeder system shall be used based on the attached drawing: TYPICAL TELECOMMUNICATION CONDUIT LAYOUTS. The conduit feeder
system design shall be documented in drawing form and shall be approved in writing by the UCB
ITS department prior to installation.

L. Conduit for fire alarm cable shall be separate, dedicated 3/4” conduit for the entire distance from the
outlet to the TR or ER.

M. Minimum conduit size for telecommunications shall be 3/4”

N. Stub out conduits into the TRs and ERs only enough to attach connector and bushings with
grounding lugs except conduits shall extend a minimum of 6 inches above the finished floor.

O. The ends of the metallic conduit shall be reamed and bushed using:
   1. Metal bushings for 3/4” and 1” conduit stubs to cable trays
   2. Insulated metallic bushings for 1-1/4” conduit and larger
   3. Insulated metallic bushings with grounding lugs for conduit entering TRs and ERs

P. Cut ends of metallic conduit shall be filed to remove burs.

Q. Bond all metallic raceways (conduit, cable tray, etc.) entering the TRs and ERs to the TGB or TMGB
in the same room with #6 AWG grounding wire as straight as possible.

R. Ceiling tile shall be removed as necessary for the conduit and cable tray installation and put back in
place without damaging or dirtying any of the tiles or supporting framework. Ceiling tile shall be
handled with clean hands so that no fingerprints or marks are left on the tiles. The contractor is
responsible for the cost of repair or replacement of any damaged or dirtyed tiles or ceiling hardware.

S. Support conduits above suspended ceilings from building structure by suitable straps, racks, or
hangers. Supporting conduits from ceiling suspension wires is not permitted.

T. Provide conduit support within 18” of each termination, and a maximum of 7’ between supports
along conduit.

U. Support pull-boxes independently from building construction. Do not support from conduit.

V. Provide conduit expansion fittings with external grounding straps at building expansion joints.

W. Install new pull rope in all new conduits prior to pulling cable. The pull rope shall extend three feet
from each end of the conduit and shall be knotted and secured to remain in place.

X. Do not install conduit or cable tray adjacent to hot surfaces or in wet areas.

Y. Install metal flex conduit and deep cut-in boxes for outlets in existing walls for remodel projects
only. Connect flex conduit to pull-box within 4’ of entering ceiling space from wall space. Flex
conduit and deep cut-in boxes are not allowed in new construction.

Z. Conduit and cable tray sizes and routes and pull-box sizes and locations shall be coordinated with
UCB ITS for each project.

AA. If it is necessary to burn holes through webs of beams or girders, receive written approval from UCB
as to the location and size of the hole before proceeding with work and abide with UCB standards for
this work. All holes shall be burned no larger than absolutely necessary.

BB. Support cable tray with manufacturers supports and/or using threaded, galvanized rod hangers with
rods extended through support steel and double-nutted. Size support members within load rating of
member section and without visible deflection. Cut off excess threaded rod ends flush with the
bottom of the double nut.
CC. Install cable tray level and straight to the extent possible.

DD. Where cable trays abut walls, supports shall be provided to walls.

EE. Provide cable tray supports at a minimum of 8’ on center and at all intersections and angles.

FF. A minimum 12” headroom shall be provided above all cable trays.

GG. A minimum 8” horizontal clearance shall be provided on at least one side of all cable trays.

HH. All cable tray shall be installed in compliance with clearances specified in Section 271500.

II. Install the cable tray system so that the electrical continuity of the system is maintained.

JJ. Provide body expansion connectors for cable trays at building expansion joints.

KK. Provide external grounding strap at expansion joints, sleeves, crossovers and other locations where cable tray continuity is interrupted.

LL. Support racks for telecommunications conduit and or cable tray must be dedicated for telecommunications pathways only. Multi-use suspension systems for plumbing and other piping along with electrical and telecommunications pathways are not permitted.

MM. Coordinate conduit and cable tray runs with other trades.

NN. Label all conduit and cable tray at both ends indicating TR, ER, outlet, or other location where conduit terminates and the length of the conduit. Label pull-boxes indicating destination of conduits entering and exiting.

OO. Label all conduit, pull-boxes, and cable tray with “Telecom” stickers at each end and every 75 feet.

PP. Label conduits entering TRs and ERs in accordance with ANSI/TIA-606 – Administration Standard for Telecommunications Infrastructure of Commercial Buildings

QQ. Separate dedicated pathways (conduit, cable tray, etc.) shall be provided for backbone and horizontal telecommunications cabling. Cable trays shall be clearly divided between backbone and horizontal cabling.

RR. Cable trays shall not pass through any firewall or fire-rated walls or surfaces. Cable tray shall end before the firewall and transition to the EZ Path within six (6) inches of the firewall. The cable through the EZ Path shall not exceed 60% fill, so that and 40% future fill shall remain.

SS. Firestop all pathways and core drills through walls and floors as specified in Section 270500.

PART 3.3 SURFACE METAL RACEWAY INSTALLATION

A. Place new surface metal raceway systems as shown on the project drawings.

B. For outlets in Hubbell 3000 and 4750 surface raceway, use single-gang flush-type extension adapter 5760 with shallow box 5748IV on the front of the raceway so jacks do not protrude into pathway as shown in the drawing attached at the end of this Section.

C. Perform installation of routing hardware as specified in Section 270500 including anchoring and supports, grounding and bonding, firestop, etc. Use anchors for attachment to surface. Use of adhesives is prohibited.

D. Collector/distribution surface raceway shall be 25’ ± 5 between pull-boxes. Surface raceway and boxes shall be upsized per fill in area.
E. Cut raceways square and ream ends to remove burs at raceway connections to outlets.

F. Install raceways parallel or perpendicular to building walls, floors and ceilings.

G. When installing through false ceiling, extend raceway 1” above top of ceiling grid. Notch ceiling panel to size of raceway.

H. Coordinate raceway runs with other trades.

I. Ceiling tile shall be removed as necessary for the raceway installation and put back in place without damaging or dirtying any of the tiles or supporting framework. Ceiling tile shall be handled with clean hands so that no fingerprints or marks are left on the tiles. The contractor is responsible for the cost of repair or replacement of any damaged or dirtied tiles or ceiling hardware.

J. Upon request per project and daily installs, the contractor shall coordinate finish selection with the Department of Facilities Management prior to final design and all surface raceways shall be painted to match the wall as directed by Facilities Management. All coordination and disposal cost shall be included in fixed-pricing or project bid.

K. Identify all raceway with Telecommunications labeling as directed by UCB ITS.

### PART 3.4 TELECOMMUNICATIONS OUTLETS AND WIRELESS ACCESS ENCLOSURES

A. The locations of outlet boxes and wireless access enclosures shown on project drawings are approximate. The exact location of outlet boxes and enclosures shall be governed by structural conditions, obstructions, or other equipment.

1. Unless otherwise noted, outlet boxes shall be located as follows (dimensions are above finished floor to center line of boxes):
   a) Standard telecommunications outlets: 1’6”
   b) Wall-mount telephone outlets: 4’6”
   c) ADA Wall mount telephone outlets: 4’0”

2. All ADA standards shall be met when applicable.

3. Adjust outlet box locations so that they will be symmetrically located and not interfere with other equipment.

4. Where outlets of other types are adjacent, coordinate heights to be similar where possible.

5. Where outlets are located on masonry walls, adjust box location to set in corner of block or brick.

6. Back to back outlet boxes are not permitted. Separate boxes a minimum of 6” in standard walls and a minimum of 2” in acoustical walls.

7. Where conflicts are noted for outlet box locations, coordinate with UCB ITS and Facilities Management.

8. Outlet box locations may be adjusted by UCB up to six (6) feet from the location shown on drawing with no additional cost to UCB.

B. Support outlet boxes independently from building construction. Do not support from conduit or raceways.

C. Install wall-mount and ceiling enclosures for wireless access equipment, including all accessories and firestop materials, in accordance with manufacturer’s specifications. When wireless wall boxes are installed on gypsum board (sheet rock) secure with toggle bolts. After ceiling boxes are installed per manufacturer’s specifications, place on self tapping screw to ceiling grid through each of the support arms.

D. Provide EMT conduit to within 6” of ceiling enclosures for wireless access equipment.

E. Provide EMT conduit connecting to wall-mount enclosures for wireless access equipment.
F. All wireless box installations shall comply with the “Wireless Security Box Instructions” attached to the end of this section

PART 3.5 AS-BUILT DRAWINGS

A. Mark the project drawings with notations reflecting any variations from the base specifications and drawings including as-built conduit routing.

B. Comply with Construction Drawings AS-BUILT Requirements attached to Section 270100.

END OF SECTION 271800