ADDENDUM NO. 2 - OUTLINE AND SUMMARY INFORMATION

Project Name: Renne Library Testing Center Expansion  
PPA No.: 18-2089  
Location: Bozeman, Montana  
Date: 2/28/19

To: All Plan Holders of Record

The Plans and Specifications prepared by Hip and Humble Architecture dated February 15, 2019 shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.

The Bidders are to acknowledge the receipt of this Addendum by inserting its number and date into their Bid Forms. Failure to acknowledge may subject the Bidder to disqualification and rejection of the bid. This Addendum forms part of the Contract Documents as if bound therein and modifies them as follows:

I. PRIOR APPROVALS
   A. ….NONE

II. AMENDMENTS TO THE PROJECT MANUAL
   A. …. Table of Contents Revised and Addendum 2 from Three Rivers Engineering with additional specifications that were missing in originally published Project Manual.

III. AMENDMENTS TO THE DRAWINGS
   B. ….NONE

IV. GENERAL INFORMATION
   C. ….Addendum #1 had wrong PPA on the cover template it should have read PPA 18-2089.

V. ATTACHMENTS
   D. …. See attached all in ONE (1) pdf file: Table of Contents Revised and Three Rivers Engineering Addendum No. 2 to the Contract Documents for Renne Library Testing Center Expansion dated 2/28/19 inclusive of additional specifications.
# TABLE OF CONTENTS

## BIDDING REQUIREMENTS
- Permit Notice
- Invitation To Bid
- Instructions to Bidders
- Bid Proposal, Form 098

## CONTRACT DOCUMENTS

### Included in this Project Manual:
- Sample Standard Form of Contract, Form 110
- MSU Supplemental Conditions
- State of Montana General Conditions
- Montana Prevailing Wage Rates

The following documents are included in electronic versions but not included in the printed project manual:
- Substitution Request, Form 99
- Schedule of Values for Payment, Form 100
- Periodic Estimate for Partial Payment, Form 101
- Acknowledgement of Subcontractors, Form 102
- Consent of Surety to Final Payment, Form 103
- Contract Change Order, Form 104
- Contractor’s Affidavit, Form 106
- Certificate of Substantial Completion, Form 107
- Construction Change Directive, Form 109
- Request for Information, Form 111
- Performance Bond, Form 112
- Labor and Material Payment Bond, Form 113
- Certificate of Final Acceptance, Form 118

Additionally these can be downloaded from our website: [http://www.montana.edu/pdc/contract-documents.html](http://www.montana.edu/pdc/contract-documents.html) – or will be provided upon request.

## TECHNICAL SPECIFICATIONS

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- Construction Dates ....................................................................................... 012000
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- Selective Demolition ...................................................................................... 024119

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### DIVISION 06 WOOD, PLASTICS AND COMPOSITES
- SECTION 06 1000 – ROUGH CARPENTRY
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SECTION 210000 – FIRE SUPPRESSION

DIVISION 23 HVAC

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SECTION 233207 – DUCTWORK AND ACCESSORIES
SECTION 235536 – ELECTRIC HEATERS
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SECTION 265810 - OCCUPANCY SENSORS
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A0-2 CODE AND WALL INFORMATION
A1-1 KEY PLAN AND DEMO PLANS
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M1-1 MECHANICAL DEMOLITION
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E1-1 POWER/DATA DEMOLITION
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ADDENDUM NO. 2
TO CONTRACT DOCUMENTS

Project: Renne Library Testing Center Expansion #18-2089

Architect: Hip & Humble Architecture

418 South 5th Avenue
Bozeman, MT 59715

Pages: 31 Date: 2/28/2019

• The additions, omissions, corrections and clarifications contained in this addendum shall be included as part of the contract documents as provided under the General Conditions of the Contract.
• This addendum is a contract document and may apply to any or all contracts and sub-contracts. Unless otherwise specified herein, all work required by this addendum shall be in complete accord with the contract documents and subsequent addendum thereto.
• This addendum shall become part of the bid. The bidder shall acknowledge the receipt of this addendum in the proposal form.

Specification Changes:
Make the following specification changes as noted. (Strikethrough = remove, Underline = add)

Add the following to SECTION 230000 – GENERAL PROVISIONS FOR HVAC WORK

Part 1 General, 1.1 Related Documents,
A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections including the Related Sections listed below, apply to this Section.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>012500</td>
<td>Substitution Procedures</td>
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<tr>
<td>013000</td>
<td>Submittals</td>
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<td>Project Record Documents</td>
</tr>
<tr>
<td>017900</td>
<td>Demonstrations and Training</td>
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</table>

Adjust footer for SECTION 230946 – TEMPERATURE CONTROL SYSTEM (DDC) 23000 to be re-labelled as 230946

Rename SECTION 232300 – REFRIGERATION SYSTEM to be SECTION 236000 – REFRIGERATION SYSTEM. Footer for same section should be adjusted from 232300 to be 236000.

Add SECTION 238224 – HEAT RECOVERY VENTILATORS specification information

Add SECTION 260000 – GENERAL PROVISIONS FOR ELECTRICAL WORK specification information
Add SECTION 260114 – COMMUNICATION AND DATA specification information
Add SECTION 260130 – BOXES specification information
Add SECTION 260140 – WIRING DEVICES - COMMERCIAL specification information
Add SECTION 260450 – GROUNDING specification information
Add SECTION 260519 – CONDUCTORS specification information
Add SECTION 260530 – RACEWAYS AND FITTINGS specification information
Add SECTION 262800 – DISCONNECTS specification information
Add SECTION 265000 – LIGHTING FIXTURES specification information
Add SECTION 265810 – OCCUPANCY SENSORS specification information
Add SECTION 267230 – DIGITAL FIRE ALARM SYSTEM specification information
SECTION 238224 – HEAT RECOVERY VENTILATORS

PART 1   GENERAL

1.1  SYSTEM DESCRIPTION
A. Packaged heat recovery ventilators manufactured by American Aldes or equal.
B. Flat plate heat exchanger to be factory installed in unit.

1.2  QUALITY ASSURANCE
A. Unit shall be constructed in accordance with CSA C22.2 and UL 1812 and shall carry the ETL and (C)ETL label of approval.
B. Insulation shall comply with NFPA 90A requirements for flame spread and smoke generation.
C. Airflow data shall comply with AMCA 210 method of testing.
D. All units shall be tested 100% prior to shipment.

1.3  DELIVERY, STORAGE, AND HANDLING
A. Unit shall be stored and handled per unit manufacturer’s recommendations.

1.4  WARRANTY
A. Unit shall have 2 year warranty on all parts not including the flat plate heat exchanger.
B. Flat plate heat exchanger shall have a 15 year warranty. Manufacturers without a 15 year warranty shall supply an extra flat plate heat exchanger for the entire unit. Flat plate heat exchanger to be turned over to the owner at the time of delivery for stocking purposes.

PART 2   PRODUCTS

2.1  EQUIPMENT
A. General
1. Packaged indoor or outdoor heat recovery ventilator consisting of a flat plate heat exchanger, ventilation air fan, exhaust air fan, necessary dampers, temperature sensors and controls.
B. Unit Cabinet
1. Cabinet shall be constructed of 20 gauge G90 galvanized steel with 12 gauge galvanized frame.
2. Cabinet shall be insulated throughout with a minimum 1” (25mm) foil faced fire retardant material.
3. Access to all components that require servicing shall be provided through sealed and easily removable access panels.
4. Flat plate heat exchanger sections shall be easily removable from the unit.
5. Connect copper drain piping to drain pan connections and route to 2” AFF. Slope no less than 1/8” per foot for horizontal sections of piping. Trap piping per manufacturers’ installation instructions.
C. Blowers
1. Fan ratings are based on tests made in accordance with AMCA Standard 210.
2. Blowers must be selected to operate on a stable, efficient part of the fan curve when delivering air quantities scheduled against static of the system.
3. Fan blades shall be statically and dynamically balanced and tested prior to shipment.
4. Fan shall be provided with internal vibration isolation mounts.
5. Fan discharge shall be as noted on the plans.

D. Motors
1. Motors shall be continuous duty, permanently lubricated and matched to the fan loads.

E. Electrical Requirements
1. Unit shall have single point plug-in power connection.
2. All internal controls shall be factory mounted and wired, requiring only field installation of remote sensing devices and wiring to unit mounted terminal strips.
3. Unit shall have 24 VAC (30VA) terminal for field installed sensing devices, etc.

F. Flat Plate Heat Exchanger
1. Aluminum heat exchanger
2. Energy recovery performance for component shall be rated in accordance with ARI Standard 1060-2000 and certified to ARI. Actual performance in packaged equipment may vary.

2.2 CONTROLS
A. General
1. Unit shall be provided with factory mounted and factory wired microprocessor control.
2. All service connectors shall be quick disconnect type.
3. Controls shall include provisions for damper actuation and auxiliary electric heating coil.

2.3 OPTIONS
A. Defrost
1. Recirculating air defrost cycle to prevent frost from forming on the flat plate heat exchanger.

B. Filtration
1. Unit shall include disposable medium efficiency filters (MEF) to filter outside air and exhaust air prior to passing through the heat exchanger.

PART 3 EXECUTION
3.1 INSTALLATION
A. Install units as noted and shown on the drawings and in strict accordance with manufacturer’s written instructions. Suspend unit from ceiling with spring vibration isolation, Mason Industries model 30N, or equal.

B. Startup and Testing and Instructions
1. Startup and testing to be performed by a factory authorized startup agency.
2. Units to checked out, lubricated, balanced, fan belts tightened before putting unit into service. Provide a written report of startup, listing complete procedure and noting any irregularities.
3. Contractor to provide all incidental items and personnel and shall coordinate startup with other trades and subcontractors.
4. Provide complete operating, troubleshooting instructions to owner-designated operating personnel. Provide names and individual check-off initial to indicate acceptance of training.
5. Provide complete operating demonstration to owner-designated personnel, demonstrating performance, safety cutouts, alarms. Contractor to schedule the demonstration with the owner at least five days in advance of demonstration date. Demonstration to be done after the system is fully operational.

C. Cleaning
1. All equipment to be cleaned, inside and out.
2. Provide unit with new filters at time of final acceptance.

D. Spare Parts
1. Deliver spare parts such as filters, special tools, etc., to owner’s designed representative.

E. Balancing
1. Unit air balance to be as specified in Section 230593: SYSTEMS TESTING AND PERFORMANCE TESTING.
2. Contractor to provide drive changes or replacement as necessary to balance units to air volumes and static pressures required.

END OF SECTION 238224
DIVISION 26 – ELECTRICAL

SECTION 260000 - GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1   GENERAL

1.1    BIDDING

A. The Contractor shall provide labor, materials, equipment, items, articles, operations and methods listed, shown, scheduled, or mentioned on the drawings, and/or specified, including all incidentals required for their completion.

B. The Contractor shall refer to the General part of these specifications, such as Instructions to Bidders, Special Conditions and DIVISION 1 for restrictions covering time that work can be performed in certain areas, noisy and dusty operations, sequence of work, access to restricted areas and similar type of work and operations.

1.2    RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections including the Related Sections listed below, apply to this Section.

   Section 012500   Substitution Procedures
   Section 013000   Submittals
   Section 017700   Project Closeout
   Section 017823   Operations and Maintenance Manuals
   Section 017839   Project Record Documents
   Section 017900   Demonstrations and Training

1.3    SUBSTITUTIONS

A. Most items in this DIVISION are eligible for substitution in accordance with the General Conditions and Supplements hereto. Where a proprietary specification is written for a particular item, then only that item may be used. All items eligible for substitution require submission of request for substitution 10 days prior to bid date. This submittal shall include specific models and capacities of equipment and not just manufacturers literature.

B. When the Engineer deems it necessary, to assure satisfactory installation and compatibility with other equipment, piping, ductwork, electrical provisions and other appurtenances, the Contractor shall prepare scale drawings of the substitute item showing proposed location, connections, relation to other equipment and other pertinent data such as maintenance space requirements, electrical requirements, height and weight. Drawings must receive Engineer's approval before the substitution is made.

C. It is the Contractor’s responsibility that the substitute item shall fit into the space allocated and that the item can be installed and function as intended. Should changes in the work of any Contractor become necessary as a result of any substitute item under this DIVISION, such changes shall be arranged and paid for by this Contractor.

D. Capacities of substitute items shall not be less than that of the specified item.
E. The performance of the factory representative and supplier on past work will be a consideration in the approval process of substitute items.

F. The final decision as to acceptability rests with the Engineer.

1.4 CODES, REGULATIONS AND PERMITS

A. All materials and equipment shall be new, approved by Underwriters’ Laboratories, Inc., or by the local inspection authority, and be in new, undamaged condition when installed.

B. Comply with the National Electrical Code, National Electrical Safety Code, International Building Code, and all other applicable Federal, State, City and County codes, regulations and ordinances.

C. Obtain and arrange for all permits and approvals required for the execution of the work.

1.5 INTENT OF DRAWINGS

A. Riser diagrams and other diagrams are schematic only and not to scale. They are intended only to indicate sizes or relative arrangement of conduit and equipment shown elsewhere in plan view.

1.6 WORKMANSHEIPTH

A. Work to be accomplished by workmen skilled in the particular trade, in conformance with best practices and to meet all applicable codes.

B. The Engineer decides where work is satisfactory. This Contractor shall replace materials or equipment not properly installed or finished, without increase in payment received.

1.7 RESPONSIBILITY

A. The Contractor is responsible for installation of satisfactory and complete piece of work in accordance with true intent of drawings and specifications.

B. Consult all drawings for project to predetermine that work and equipment will fit as planned.

C. Location of conduit, panels, outlets, equipment, switches, etc., checked to determine it clears openings, structural members, cabinets, heating units, ducts, piping and equipment having fixed locations. This shall be accomplished prior to rough-in.

D. If, at any time, and in case, change in location of conduit, outlets fixtures, switches, panels, equipment, etc., become necessary due to obstacles or installation of other trades shown on any of the project drawings, such required changes made by Contractor at no extra cost. These changes shall be recorded on the project drawings.

1.8 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions which are acceptable to the Owner and Engineer for delivery and storage of materials.

B. Make provisions for introduction into the building of equipment furnished under this DIVISION.
C. Refer to DIVISION 1 for additional provisions to allow equipment passage into the building.

1.9 MANUFACTURER'S DIRECTIONS
A. Manufactured materials and equipment applied, installed, connected, erected, used, cleaned and conditioned as directed by manufacturer unless noted otherwise herein or on the drawings.

1.10 CUTTING, PATCHING, REPAIRING
A. Cutting, patching and repairing required by the work of this DIVISION shall be the responsibility of this Contractor.
B. Work shall be performed in accordance with DIVISION 1 of these specifications.
C. The performance of this work shall not weaken the structural integrity of the building.
D. Any abrasion or disfigurement of the finished work or any portion of the building where any such abrasion or disfigurement is caused by the activities of the Contractor shall be repaired, and neatly refinished to match the adjacent work.

1.11 OPENINGS IN RACEWAYS AND BOXES
A. Openings in conduit, boxes, etc., shall be kept closed during progress of work.
B. The Contractor required to clean new systems found dirty to satisfaction of Engineer at no additional cost.

1.12 CLEANUP
A. Upon completion of work, remove materials, scraps, etc., relative to this work and leave premises in clean and orderly condition. This applies equally to finished, unfinished and concealed spaces.
B. Clean equipment of dirt and debris, including interior of panels, outlet boxes, lighting fixtures, and fixture lenses.

1.13 SAMPLES
A. The Contractor shall submit actual production samples on any material or equipment requested if, in the Engineer's opinion, it is necessary in order to determine the quality, workmanship, operation, etc. of the item.
B. Samples will be returned to the Contractor. Approved samples may be used on the job.
C. Costs incurred in providing and returning samples will be the responsibility of the Contractor.

1.14 TEMPORARY SERVICES
A. See DIVISION 1 - GENERAL REQUIREMENTS for Temporary Facilities.

1.15 FIRE PROTECTION
A. Pipe penetrations of all fire partitions, walls and floors shall be effectively fire-stopped using materials and methods UL approved for this purpose. One such material is Carborundum bulk “Fiberfrax” fiber packing for filling the annular space between pipe and sleeve packing and Fiberfrax LDS moldable caulking for sealing in the fiber packing. Another acceptable material is Dow Corning 3-6548 Silicon RTV foam firestop system.
1.16 COMPLETION AND TESTS

A. Complete and test each system and leave in proper operation. Submit all reports and complete the Project Completion checklist in PART 3 of this section. Leave all systems in proper operation.

B. At the time of finalizing the Project, a completion system test shall be performed in the presence of the Owner's designated representative. During the test the contractor shall demonstrate that all systems perform in the manner described in the specifications and indicated on the drawings. Test procedure and the results shall be recorded and delivered to the Owner. Tests shall be repeated after any corrections are made as a result of initial testing of correctional work under guaranteed provisions.

1.17 OPERATING INSTRUCTIONS

A. The Contractor shall provide qualified personnel to instruct the Owner's maintenance people in the operation and maintenance of the system.

B. Written operation and maintenance instructions, as produced by the manufacturer, shall be provided for all equipment. These instructions shall be bound and submitted as described in this Section.

1.18 REMODELING WORK

A. Whenever existing wire, conduit, controls, circuits, etc. are cut into, removed or interrupted, as a result of the contract work, all such items that serve areas or equipment that remain shall be replaced, rerouted, extended, relocated, etc. as necessary to maintain operation of equipment and services.

B. Downtime shall be held to a minimum. Outages shall be scheduled at a time acceptable to and approved by the Owner. Consult with in sufficient time for him to make necessary preparations for the outage.

C. Demolition

1. Refer to the drawings for execution of demolition.

2. All existing equipment and material removed and not scheduled for reinstallation shall remain the property of the Owner and shall be delivered to a designated stockpile area on the site by the Contractor. Materials not wanted by the Owner shall be removed from the site by the Contractor.

D. Asbestos Awareness

1. If suspect asbestos materials are encountered, the contractor shall cease work in that area and inform the owner of his suspicions and will not proceed with work until such time that a determination can be make on how to proceed.

E. Site Investigation

1. The Contractor shall be cognizant that this is a remodeling project and as such, certain items cannot be fully illustrated nor explained without field observation. Before submitting his proposal, the Contractor should examine the site and building as it pertains to this Project and make allowances in this proposal for all conditions.
that will affect the word indicated in the project manual and contract documents. This would include hidden and other discovered obstacles such as existing pipes, ducts, and equipment not necessarily shown on the project drawings.

F. Building access may be arranged by contacting the Owner.

1.20 RECORD DRAWINGS

A. Maintain a separate set of electrical drawings at the job site at all times to be used as record drawings. This set shall be kept up to date with all changes and/or additions in the construction and/or electrical systems, and shall be delivered to the Engineer at the completion of this job. This set of drawings shall be kept clean and protected at all times.

PART 2 SUBMITTALS AND BROCHURES OF EQUIPMENT

2.1 GENERAL

A. The literature required to be submitted and approved in order to fulfill the requirements of this DIVISION falls into two general categories. These are the “Submittals” and “Brochures of Equipment”.

B. “Submittals” is a general term for informational literature which must be supplied to and approved by the Contractor prior to installing, receiving and ordering equipment. The normal required types of submittals include shop drawings, manufacturer's literature, installation and operation instructions (from the manufacturer) and wiring diagrams. Each Section of this DIVISION may contain special or more specific requirements for expanded or additional types of submittal literature. These shall be provided as required by each Section.

C. The “Brochures of Equipment”, as the name implies, shall contain all pertinent information for all equipment installed. This information is required to be submitted to the Owner and approved before final payment is authorized. Special training for certain equipment may require the use of this book at an earlier stage of project completion.

In general, information in the approved submittals shall be included in the Brochures of Equipment. These books shall also include complete operation and maintenance literature for each piece of equipment such as may be packaged with the equipment for OEM components. They will be used by the Owner's personnel as the primary source of information for operating and maintaining the installed systems and as such, they shall exhibit a high degree of clarity, thoroughness and be arranged to be useful throughout the life of the installed systems.

D. All information is desired in electronic format. PDF files or similar format are acceptable. Information shall be indexed by specification section and identified accordingly. Organize information clearly. Information shall be emailed to the architect/engineer.

2.2 SUBMITTALS

A. The contractor shall procure manufacturer's literature and/or certified prints for all items of equipment, materials or systems on the job. Shop drawings and literature shall be complete and marked showing name of job, item used, size, dimensions, capacity, rough-in, etc., as required for complete check and installation. Any exceptions of the equipment being furnished from that specified shall be clearly defined. Specific requirements of submittals may be expanded in individual specification sections. Minimum requirements shall include the following:

18-2089 26 0000 - 6 GENERAL CONDITIONS FOR ELECTRICAL WORK
1. Submit actual installation layout drawings on floor plans showing conduit runs, conduit and conductor sizes, color coding, number of conductors and location of devices and equipment. Provide such drawings for systems such as fire alarm, clock and program and P.A. systems.

2. Manufacturer’s literature shall include any and all restrictions on the application and installed service limitations of the product.

B. All shop drawings shall be reviewed, approved and stamped by the Contractor before ordering.

1. All items of equipment and systems which are to be installed as specified or are not otherwise designated as requiring Owner’s or Engineer’s approval, will require a letter of compliance by the Contractor stating that these items or system will be provided as specified and will be reviewed and stamped by the contractor.

2. Approval of submittals and literature by the owner or Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, nor shall it relieve him from responsibility for errors in shop drawings or other submittal literature.

2.3 BROCHURES OF EQUIPMENT

A. The Contractor shall submit information for all equipment containing all required submittal data for construction materials and for each piece of equipment. Operation and maintenance literature shall also be included for each piece of equipment. Maintenance information shall be complete in every respect and shall include parts lists and assembly drawings wherever applicable. Manuals, catalogs, etc., shall be as supplied by the factory in electronic form and not photocopied.

B. All literature shall clearly indicate the equipment it represents or supplies protection for and shall be labeled with the equipment identification abbreviation found on the drawings, e.g. EF-1, etc. All information which is not applicable to the particular model and size supplied shall be clearly crossed out with heavy black marker or other suitable means. This includes dimensional drawings, maintenance information, parts lists, wiring diagrams, etc. Only the information applicable to the particular equipment supplied shall remain and it shall be easy to follow.

C. Authorization for final payment shall not be made prior to final acceptance of the Brochures of Equipment.
SECTION 260114 – COMMUNICATION AND DATA

PART 1  GENERAL

1.1  WORK INCLUDED
   A. The work included in this Section is the conduit system, j-hooks and boxes as required for data, telephone and CCTV systems.
   B. Provide conduit, j-hooks and boxes for all telecommunications/CCTV stations shown.

1.2  GENERAL INSTRUCTION
   A. All data station locations shall be individually home run to the server located in the directors office 019H.
   B. Provide j-hooks at a maximum 4’ o.c. in locations indicated on the drawings. Hooks shall be large enough for all required conductors.
   C. Daisy chaining and junction boxes will not be permitted.
   D. Pull cords are required in all conduits.
   E. Bushings shall be provided on each end of all conduits.
   F. See drawings for project specific locations of equipment, stations, and installation details.

1.3  WORK EXCLUDED
   A. The conductors, termination devices and wall plates for all systems shall be provided by others under a separate contract.

PART 2  PRODUCTS

2.1  MATERIALS PROVIDED BY THE CONTRACTOR
   A. Conduit and boxes shall be as specified in the applicable Sections of these specifications.
   B. Boxes shall be provided as required to accept the data/telephone equipment. The Contractor shall provide extension rings, trim plates and adapter plates as required by the particular installation.
   C. At each communication outlet location provide a single or double gang electrical or surface box. All conduit and surface raceway boxes at each workstation outlet shall be “deep” models.

2.2  TELECOMMUNICATIONS HORIZONTAL CABLE AND SUPPORT STRUCTURE
   A. The horizontal cabling is the portion of the telecommunications cabling system that extends from the server/telecommunications room to the work area telecommunications outlet. The horizontal cabling shall be installed in a home run, star topology.
   B. Where conduit runs are required a minimum 1” conduit shall be run to each jack; daisy-chaining jacks is not acceptable.
C. Locate J-hooks in ceiling, spaced every 4 feet, for distribution of small cable bundles above suspended ceiling spaces. J-hooks shall extend from server/telecommunications room to room outlet locations.

D. J-hooks shall be attached to building members with fasteners appropriate for the material. Wood screws or lag bolts shall be used for wood, screws with plastic or lead anchors shall be used for plaster and concrete, self-taping screws shall be used for sheet metal. Attachment to drywall alone should be avoided.

E. Hooks shall be mounted no more than four (4) feet apart. Closer spacing may be necessary in areas where cables are routed around corners or are in close proximity to other mechanical or electrical systems.

F. Where raceway, cable tray and conduit are used it shall be sized according to the list below. The minimum size for raceway and conduit is 1 inch diameter or equivalent. Use Flextray or B-Line cable tray products. No more than two 90 degree bends are allowed between horizontal cable pull points, although no 90 degree bends is preferred. Use sweeping bend products when 90’s are required. The number of cables that can be installed in a conduit is limited by the allowed maximum pulling tension of the cables. A maximum fill of 40% is preferred to allow for future additions of cable.

G. Surface Raceway, Cable Tray and EMT Conduit

<table>
<thead>
<tr>
<th>EMT Conduit Size</th>
<th>Maximum Cables</th>
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<td>2 Inch</td>
<td>14</td>
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<tr>
<td>2-1/2 Inch</td>
<td>17</td>
</tr>
<tr>
<td>3 Inch</td>
<td>20</td>
</tr>
</tbody>
</table>

H. Flexible conduit (metal or plastic) is not permitted.

I. Surface raceway systems shall not force cable into a bend radius less than 1.21 inches under condition of maximum fill.

J. When a conduit and surface raceway box is used as both a jack and pull box, the minimum box depth shall be 3-1/8”.

PART 3 EXECUTION

3.1 COOPERATION

A. The Contractor shall complete his work promptly and expeditiously as permitted by general construction progress.

B. Cooperate with the data/telephone system/CCTV Contractor in the installation of their equipment.

3.2 INSTALLATION
A. Provide phone/data/CCTV stations as indicated on drawings.

B. Station locations in the office/classroom areas should be located approximately sixteen inches (16") from the floor to the center of the box.

C. Provide with ¾ inch conduit extending from the termination location to the telecommunications/data location.
   
   1. In areas with lay-in or open unfinished ceilings, conduit shall be installed from the termination location to the ceiling space.

End of Section
SECTION 260130 - BOXES

PART 1  GENERAL

1.1  COORDINATION

A. It is the Contractor’s responsibility to verify door swings on the job before roughing-in for switches at doors. Locate on lock side of door.

1.2  CIRCUIT IDENTIFICATION

A. Each junction box shall have all circuit numbers in that particular box noted on the cover. On exposed galvanized boxes with galvanized covers, such as above accessible ceilings and in unfinished spaces, the circuit numbers shall be on the outside of the cover. On flush boxes in finished spaces the numbers shall be noted on the inside of the cover. Use Seton style NLO vinyl cloth markers, 5/8” letters on 9/16” x 3/4” marker.

PART 2  PRODUCTS

2.1  MATERIALS

A. Zinc-coated or cadmium-plated Code gauge sheet steel, minimum depth 2-1/8” except at structural restrictions. Sizes to be in accord with the National Electrical Code.

B. Boxes for metallic raceways, 4-inch by 4-inch nominal size and smaller shall be of the cast-metal hub type when located in normally wet locations, when surface mounted on outside of exterior surfaces, when located in hazardous areas, or when installed exposed up to 7 feet above interior floors and walkways.

C. Junction or pull boxes which are less than 150 cubic inches in size, shall be the same as outlet boxes.

D. Octagon or square boxes shall be not less than 4” size.

E. Note any special light fixture mounting requirements and provide for same.

F. Boxes in masonry walls shall be set in the corner of the masonry unit nearest height and location requirements. Outlet boxes shall consist of a 4” square box with a 2” x 4” rectangular cut tile wall extension cover. "Thru-Wall" boxes are not acceptable.

G. Special boxes as required to be used for special systems as specified, noted on the drawings or as required.

H. Appropriate factory boxes used with surface raceways, such as Wiremold.

I. Covers on flush boxes in finished spaces shall have cover plates matching adjacent device plates.

1. Plaster rings shall be provided on all outlet boxes in plaster walls or ceilings and elsewhere as required.

PART 3  EXECUTION

18-2089  26 0130 - 1  BOXES
Renne Library Testing Center
3.1 INSTALLATION

A. All metallic boxes to be effectively grounded.

B. Check other drawings, shop drawings, etc., to determine that switches and outlets are not concealed behind cabinet work, doors, heating units, etc.

C. It is this Contractor's responsibility to see that boxes in walls are straight, level, plumb and flush with finished surfaces. Use box extensions where box is set too deep.

D. Open junction boxes are not acceptable. All boxes shall have an appropriate cover for the location.

E. Mounting heights from finished floor to center of outlet.
   1. General wall switches - 4'-0" (unless otherwise noted on the drawings).
   2. Convenience outlets - 16" (except at cabinets, counters, etc., or as noted on the drawings).
   3. Special systems devices - as required and/or as noted on drawings.

3.2 NOISE TRANSMISSION

A. Where boxes are mounted in a common wall, they shall, where possible, be offset horizontally so that they are not mounted back-to-back. Connect offset boxes with flexible conduit not to exceed 18" in length. Where it is not practical to offset boxes, with permission they may be mounted back-to-back with a minimum clearance of 1/4" between boxes and with a sheet of high density fiberglass between boxes. Connect boxes with flexible conduit. Do not nipple boxes mounted back-to-back.
SECTION 260140 - WIRING DEVICES - COMMERCIAL

PART 1   GENERAL

1.1    SELECTION OF DEVICES

A. Various switches, outlets and devices are to be selected from the "List of Acceptable Wiring Devices" included herein and as determined from the legend on the drawings (all devices listed are not necessarily used on this job). All like devices to be of the same manufacturer.

B. Color of devices shall match existing.

1.2    IDENTIFICATION

A. Note on the inside of each plate the circuit number to which the device is connected. Use a Seton vinyl cloth markers.

B. Special controls for lighting such as time clocks or photocells shall have laminated plates indicating load and "Hand-Off-Auto" on selector switches.

PART 2   PRODUCTS

2.1    MATERIALS

A. Plates

1. Commercial Quality.

B. Device Colors

1. Match existing.

C. Duplex Receptacles

1. 15-amp and 20-amp receptacles are listed in the schedule of wiring devices. In general, the 15-amp receptacle is to be used; however, the 20-amp receptacle shall be used when so indicated on the drawings and/or where required by Code, such as the only outlet on a 20-amp circuit.

2.2    LIST OF ACCEPTABLE WIRING DEVICES

A. All devices shall be commercial quality.

PART 3   EXECUTION

3.1    INSTALLATION

A. Plates shall be plumb and fit tight to wall.

B. Receptacles

1. On any system where more than one circuit is run through an outlet box with a single, duplex or combination receptacle, the receptacle shall be "pigtailed" and connected to its respective circuit with solderless connectors. Binding screws shall be used for attaching the pigtails, push-in back wiring terminals shall not be used.
C. Grounding

1. Bond receptacle grounding terminals to the raceway system in accordance with the National Electrical Code.
SECTION 260450 - GROUNDING

PART 1   GENERAL

1.1 DESCRIPTION:
   A. This section specified general grounding and bonding.

1.2 DRAWINGS AND OTHER SPECIFICATION SECTIONS HAVE ADDITIONAL REQUIREMENTS.

PART 2   PRODUCTS

2.1 GROUNDING WIRES
   A. General Purpose: UL and NEC approved types, copper with TW, THW, XHHW, or dual rated THHN-THWN insulation color identified green.

PART 3   EXECUTION

3.1 INSTALLATION
   A. Ground in accordance with the NEC as shown, and as hereinafter specified or indicated on drawings.
   B. System Grounding
      1. Secondary service neutrals ground at the supply side of the secondary disconnecting means.
   C. Equipment Grounding:
      1. Metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be grounded for personnel safety and to provide a low impedance path for possible ground fault currents.

3.2 SECONDARY EQUIPMENT AND CIRCUITS:
   A. Conduit Systems:
      1. Ground all metallic conduit systems.
      2. Non-metallic conduit systems shall contain a grounding conductor.
      3. Conduit provided for mechanical protection containing only a grounding conductor, bond to that conductor at the entrance and exit from the conduit.
   B. Feeders and Branch Circuits: Install green grounding conductors with feeders and branch circuits as follows:
      1. Feeders.
      2. Receptacle outlets.
      3. Motors and motor controllers.
4. Light fixtures.
5. Items of equipment where the final connection is made with flexible metal conduit shall have a grounding wire.
6. Additional locations and systems as shown.

C. Boxes, Cabinets, Enclosures, and Panelboards:
1. Bond the grounding wires to each pullbox, junction box, outlet box, cabinets, and other enclosures through which the ground wires pass.
2. Provide lugs in each box and enclosure for ground wire termination.

D. Motors and Starters:
1. Provide lugs in motor terminal box and starter housing for ground wire termination.

E. Ground receptacles with a ground wire from green ground terminal on the receptacle to the outlet box ground screw.

F. Ground lighting fixtures to the green grounding conductor of the wiring system. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
SECTION 260519 - CONDUCTORS

PART 1   GENERAL

1.1    QUALITY ASSURANCE

A. Conductors shall be of American manufacture and made in accordance with the requirements of the National Electrical Code and the Underwriters Laboratories.

B. Conductors shall be copper or Aluminum as noted.

PART 2   PRODUCTS

2.1    MATERIALS

A. Type THW or THWN conductors shall be used in wet or dry locations unless otherwise indicated on the drawings. Type THHN may be used in dry locations.

B. Connectors

1. Cable size #6 or larger, use lugs or approved connectors.

2. Conductors #8 and smaller, use one of the following solderless connections or approved equal:

   Ideal Industries "Wing Nut"
   3M Co. "Scotchlok"
   Buchanan steel splice cap with nylon insulator

C. Note any special wiring of auxiliary systems as specified elsewhere or noted on the drawings.

PART 3   EXECUTION

3.1    INSTALLATION

A. All conductors installed in raceways.

B. Conductors to be sized in accord with the National Electrical Code except minimum size #12 AWG gauge unless otherwise specified, noted or approved.

C. Color coded in accord with the following table:

<table>
<thead>
<tr>
<th>System Voltage</th>
<th>ØA</th>
<th>ØB</th>
<th>ØC</th>
<th>Neutral</th>
<th>Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/208 Wye</td>
<td>Black</td>
<td>Red</td>
<td>Blue</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>120/240 Delta</td>
<td>Black</td>
<td>Orange</td>
<td>Red</td>
<td>(Wild)White</td>
<td>Green</td>
</tr>
<tr>
<td>270/480 Wye</td>
<td>Brown</td>
<td>Yellow</td>
<td>Purple</td>
<td>Gray</td>
<td>Green</td>
</tr>
</tbody>
</table>

1. Auxiliary systems shall each have their own color coding throughout the respective systems.
SECTION 260530 - RACEWAYS AND FITTINGS

PART 1   GENERAL

1.1 WORK INCLUDED

A. The work in this Section includes conduit systems required for power, lighting and telecommunications other systems requiring raceways.

B. Systems included, but not limited to, are alarm, telephone, CCTV, communication and others noted on the drawings.

C. Work includes surface mounted raceway where noted or required by solid walls. Surface mounted raceway at testing stations shall be dual channel for power/data.

PART 2   PRODUCTS

2.1 MATERIALS

A. Rigid conduit shall be galvanized rigid steel conforming to Federal Specification No. WW-C-581.

   1. Conduit run underground shall be galvanized rigid steel as listed above, and shall be asphalt-coated or PVC-coated.

B. Intermediate metal conduit may be used only as permitted by the National Electric Code.

C. EMT shall be galvanized steel conforming to Federal Specification No. WW-C-563. May only be used where rigid steel is not called for or required by Code.

   1. Connectors and fittings up through 2” size to be steel compression type (cast metal is not acceptable). Setscrew type is not acceptable up through 2” size.

   2. Connectors and fittings shall be watertight in wet locations and concrete tight in concrete and masonry.

D. Flexible conduit shall be galvanized flexible steel conduit conforming to Federal Specification No. WW-C-566. Use polyvinyl and Neoprene-covered, waterproof type with waterproof connectors for exterior use and wet areas.

E. Insulated bushings shall be O-Z/Gedney Type B, SB or SBT as required.

F. Surface raceways to be Wiremold where noted on the drawings, or equal. Factory finish or field painted to match surface it is mounted on.

PART 3   EXECUTION

3.1 INSTALLATION

A. Raceways used throughout construction for all conductors unless otherwise specifically indicated. Separate raceway systems shall be used for each auxiliary system such as telephone, exit lights, fire alarm, communication or signal system.

B. Flexible metal conduit shall be used for connections to motors and equipment. Minimum length of 12”. Maximum length for connections to motor driven equipment - 36”, maximum
C. All conduits shall be provided with locknuts and insulated throat connectors.

D. Conduit shall be concealed in finished spaces, unless otherwise indicated.

E. Installation of raceways to be coordinated with installation of other trades, in particular, ductwork and piping. Location of mechanical equipment and systems to take precedence over raceways location. Installation shall not restrict equipment maintenance space or access thereto.

F. Hanging of raceways done in first-class manner using conduit clamps, Unistrut brackets, racks, etc., or other approved methods. Hanging off suspended ceiling support wires or resting on ceiling support system or ceiling material is not permitted. Installation shall not interfere with removable ceiling panels or access openings.

G. Surface raceways such as Wiremold and exposed conduit shall be run parallel and/or perpendicular with walls. Use appropriate factory fittings on Wiremold for changes in direction, terminations and connections.

H. Annular openings around conduit penetrating fire barriers such as floors, fire rated walls and fire rated ceilings shall be fire-stopped as specified in Section 16000.

3.2 GROUNDING RACEWAY SYSTEM

A. All noncurrent-carrying metallic parts of electrical equipment and all raceway systems shall be grounded.

B. Ground raceway systems and cabinets for auxiliary systems by bonding or by conduit interconnection with the electrical system or as otherwise specifically indicated on the drawings.

C. Run a ground wire with all conduit properly connected at each end with approved fittings with binding screw.
SECTION 262800 - DISCONNECTS

PART 1   GENERAL

1.1    WORK INCLUDED

A. This Section covers furnishing and installing disconnects and other motor protective equipment and control devices as noted on the drawings.

B. Motor starter heater elements of the proper size in accord with motor nameplate data shall be installed in the starters.

1.2    CODE REQUIREMENTS

A. All units shall have disconnects to meet the requirements of the National Electrical Code.

1.3 SUBMITTALS

A. Shop Drawings

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.

2. Include electrical ratings, dimensions, mounting, materials, running overcurrent protection, branch circuit overcurrent protection, wiring diagrams, starting characteristics, interlocking, and accessories. Provide bussing diagrams and layout drawings for motor control centers.

3. Provide manufacturer's literature and wiring diagrams for variable frequency drives. List features, operation, and all installation cautions.

B. Manuals

1. Complete operating and maintenance manuals shall be provided including technical data sheets, wiring diagrams, and information for ordering replacement parts. Deliver four copies of the above data to the Engineer prior to final inspection.

   a. Wiring diagrams shall have their terminal identified to facilitate installation, operation, and maintenance.

   b. Wiring diagrams shall indicate internal wiring for each item of equipment and interconnections between the items of equipment.

   c. Elementary schematic diagrams shall be provided for clarity of operation.

PART 2   PRODUCTS

2.1    QUALITY ASSURANCE

A. For conventional starters and disconnect, equivalent products to those specified as manufactured by Square-D, General Electric, Westinghouse, Siemens, Cutler-Hammer, and Allen Bradley are acceptable.

B. The horsepower ratings indicated on electrical plans are for guidance only and do not limit the equipment size. When electrically driven equipment furnished under other sections of
these specifications materially differs from the contemplated design, the Contractor shall
make the necessary adjustments to the wiring, disconnect devices and branch-circuit
protection to accommodate the equipment actually installed.

2.2 MATERIALS

A. Starters

1. Type and size as indicated on the drawings. NEMA enclosure to suit location. Provide control devices, switches, pilots and interlocks as required.

2. Protection for all ungrounded legs required. Relays sized for the actual motor connected thereto.

3. Starters shall be fully NEMA rated and shall have 120-volt coils. Provide a transformer in the starter when necessary to obtain 120 volts.

B. Disconnects

1. Type and size as indicated on the drawings and/or as required by Code. NEMA enclosure to suit location.

2. Safety switch type: Heavy duty type with number of blades, poles as required by the service. Switches to be fusible, unless noted otherwise, and with Buss fusetrons as required by equipment served.

3. Fustat and toggle switch type: Buss No. SSU fustat and single-pole switch unit. Provide fustats as required by equipment served.

C. Fuses

1. Provide fuses in the motor disconnect means and protective devices for motor short circuit current protection in accord with Article 430 of the National Electrical Code.

PART 3 EXECUTION

3.1 INSTALLATION

A. Rough-in for and connect up all electrical equipment.

B. Provide starters and motor protection for equipment as noted on the drawings.

C. Make connections to motors and equipment with flexible conduit. Refer to Section 16110.

D. Ground noncurrent carrying parts of mechanical equipment.

E. Refer to notes on the drawings and to the Specifications to determine equipment, starters, devices, etc., to be furnished by the respective suppliers and contractors.

1. Mount starters and other electrical devices shipped loose with equipment and connect up. Make provisions for and connect up "packaged" equipment when it is assembled on the job.
SECTION 265000 - LIGHTING FIXTURES

PART 1   GENERAL

1.1   QUALITY ASSURANCE

A. Fixtures and components to be UL listed and labeled.

B. Fixtures shall be furnished complete in all respects including canopies, stems, hickeys, casings, sockets, holders, reflectors, ballasts, lens, frames, boxes, plaster frames, lamps, etc., for complete fixture. Provide the components required for complete and satisfactory installation, whether or not called out specifically.

C. Guarantee, Warranty

1. All lighting and lighting components shall be fully warranted for one year including parts and labor from date of approved substantial completion.

1.2   COORDINATION

A. Prior to releasing fixtures for shipment, the Contractor shall coordinate fixture types with ceiling types and make to ascertain compatibility of fixtures and ceilings. Any inconsistencies shall be promptly brought to the attention of the Engineer.

PART 2   PRODUCTS

2.1   LIGHTING FIXTURES

A. Refer to notes on the drawings and/or the Lighting Fixture Schedule for basic fixture designations.

B. Suspended fixtures shall include mounting assembly for mounting to box support, not box alone.

PART 3   EXECUTION

3.1   INSTALLATION

A. Wiring to be in strict accord with the National Electrical Code and manufacturer's recommendations.

B. Conductors used in conjunction with light fixtures shall be in accord with the National

C. Set true, free of light leaks, warpage, dents, etc.

D. Noisy or defective ballasts, lamps, etc., replaced.

E. Use flexible conduit for connecting to "lay-in" fixtures, as noted on the drawings and as required. Run ground wire with flex, end-to-end, and connect for continuous and reliable ground.
SECTION 265810 - OCCUPANCY SENSORS

PART 1 GENERAL

1.1 DESCRIPTION
This section specifies the furnishing, installation and connection of the occupancy sensors for the interior lighting systems.

1.2 WORK INCLUDED
A. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit and fixtures.

1.3 EQUIPMENT QUALIFICATION
A. Products supplied shall be from a single manufacturer that has been continuously involved in manufacturing of occupancy sensors for a minimum of five (5) years. Mixing of manufacturers shall not be allowed.
B. All components shall be U.L. listed, offer a five (5) year warranty and meet all state and local applicable code requirements.

1.4 SYSTEM DESCRIPTION
A. The objective of this section is to ensure the proper installation of the occupancy sensors so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.

1.5 SUBMITTALS
A. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.

1.6 SYSTEM OPERATION
A. It shall be the contractor's responsibility to make all proper adjustments to assure Owner's satisfaction with the occupancy system.

PART 2 SPECIFIC REQUIREMENTS

2.1 ACCEPTABLE MANUFACTURERS
A. WattStopper or approved substitute.

2.2 PRODUCTS
A. All products shall be Watt Stopper product numbers:
   1. Wall switch sensors with dimming control: PW-101D-W
   2. Ceiling sensors; Dual Technology, DT-300
B. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
C. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.
D. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
E. All sensors shall have UL rated, 94V-0 plastic enclosures.
SECTION 267230 - DIGITAL FIRE ALARM SYSTEM

PART 1   GENERAL

1.1 WORK INCLUDED

A. Work includes modifications to the existing fire alarm system.
B. Modify system as indicated on electrical drawings. All new devices shall be as permitted by existing system manufacturers written requirements.
C. Contractor may reuse existing fire alarm equipment as allowed per code.
D. All new devices shall match existing as close as possible.

1.2 SYSTEM REQUIREMENTS

A. The building fire alarm system shall be maintained in operable condition at all times throughout construction.
B. All modifications shall be complete and fully functioning as required by code and as specified herein and as indicated on the drawings.
C. Provide additional items as necessary for a fully complete and operational system. The fire alarm system is required to comply with all governing codes and regulations including NFPA, IBC and IFC.
D. If required by code, contractor shall be responsible for preparation of fully complete shop drawings and equipment submittals designed by a fire alarm certified NICET professional. Shop drawings shall be completed using a digital drafting program, hand drawings are not acceptable.
G. Any items and equipment shown on the drawings are the minimum requirements of the system intended to show the intent of the fire alarm system. The final design of fire alarm systems shall be completed by the contractor.

PART 2   PRODUCTS

2.1 MATERIALS

A. Provide all materials and equipment for a fully complete and operational fire alarm system.

PART 3. EXECUTION

3.1 INSTALLATION

A. The Contractor shall drill all holes in the floors using a core drill, hammers will not be permitted.
B. The Contractor shall make all repairs to the existing surfaces as required due to installation of his work.

C. All installed equipment and material shall be properly supported.

3.2 GUARANTEES

A. The fire alarm contractor shall provide a full 2-year warranty on all labor and parts.

END OF SECTION 267230