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Moorhead Area Public Schools Improvements
Probstfield Elementary School Addition
Moorhead, MN

Project No. 13-040
Date: April 3, 2014

BID DATE & TIME: Thursday, April 10, 2014 at 2:00 pm

ADDENDUM NUMBER 1

The following additions, clarifications, deletions and/or changes shall be made to the SPECIFICATIONS:

Section 00 1100 - Advertisement for Bids

1. Delete reference to separate envelopes for the bidders bond and bid proposal forms. The state of Minnesota only requires one sealed envelope that includes both the bid form and bid bond.

Section 04 2000 -Unit Masonry

1. Paragraph 2.01.A.2. Add Use double scored standard units at exposed finish locations for base bid as indicated on the Room Finish Schedule and the interior elevations.
2. Paragraph 2.01.A.6.a.1) delete the sentence and replace with “All units shall be double-scored.

Section 08 4313 - Aluminum-Framed Storefronts

1. Delete sentence 1.01.B. Infill panels of metal and glass.
2. Delete paragraph 2.03.C. Infill panels.

Section 08 7100 - Door Hardware

1. Add the door hardware section attached to this addendum.

Section 08 8000 - Glazing

1. Paragraph 2.01.B.2. should read Outboard lite ¼” (6mm) clear tempered and the inboard lite ¼” (6mm) clear heat strengthened glass.
2. Paragraph 2.01.B.7. should read Visible Light Transmittance: 58%.

The following additions, deletions and/or changes shall be made to the DRAWINGS:

Drawing ACover - Index of Drawings

1. Under the Mechanical list of drawings add “M8.1 -Control Sequences” to the list.

Drawing A0.1 -Code Plan

1. Add the code plan drawing into the set which is attached to this addendum.

Drawing A3.2 -Media Center Plan & Schedules

1. On the door schedule in the remarks column add the following:
   a. Door C02 add "Note: 2,4"
   b. Door S01.1 add "Note: 2"
   c. Door 35 add "Note: 2,4"
   d. Door 44 add "Note: 2"
2. Delete details 1 and 2/A3.2 and replace with revised details 1and 2 attached to this addendum.
3. Delete all references to "SINGLE SCORE CMU QUARTER BOND" on the Room Finish Schedule's Note 1 for both base bid and alternate bid 1. Replace with "8x16" DOUBLE SCORE CMU RUNNING BOND" for both base bid and alternate bid 1.
4. Media Center floor plan, detail 4, add the following note "Remove existing door 226.4, hardware and dispose of by 6A. Frame to remain for reuse."

Drawing A5.1 -Interior Elevations

1. Add note 7 to "General Casework Notes:". Note 7 At all interior elevations delete the references to single score block base bid and alternate bid. Notes should read 8x16 double scored CMU running bond painted base bid and 8x16 double scored burnished CMU alternate bid 1.
2. Add note 8 to "General Casework Notes:". Note 8 At all wall cabinets include two shelves as per detail 6/A5.3 and one shelf as per detail 2/A5.3.
3. Add detail 24 which is attached to this addendum.
4. Detail 4, typical classroom, the tall paper storage drawers are to be dimensioned vertically as shown on detail 10/A5.3.
5. Detail 5, typical classroom, the section at the computer counter should refer to 1/A5.3. The shelving return at the corner should be dimensions 1'-6" not 1'-2".

Drawing A5.3 -Casework Details

1. Detail 4, standard drawer base, should be revised to show four equally deep drawers and a total height from floor to counter top of 2'-3".
2. Delete from project detail 4, shelf at wall mechanical unit.

Drawing M8.1 -Control Sequences

1. Add the control sequences drawing into the set which is attached to this addendum.

The following materials and/or equipment have been accepted as <u>APPROVED EQUALS</u>:
<u>(Note: see Electrical and Mechanical portion of Addendum for additional approved equals).</u>

Section	Specified Product	Approved Equal
04 2000 - Unit Masonry Cast Stone	Gage Bros., Art Stone, Advanced Thunderstone, Stoneworks,	Marcstone
07 2100 - Thermal Insulation Cavity Walls	AFM Corp., Diversifoam Products Dow Chemical Co.	Firestone Building Products
09 6813 - Tile Carpeting	Shaw Contract	TandusCentiva Abrasive Action II
10 1101 - Visual Display Boards	MooreCo, Claridge Products, Polyvision Corporation	W. E. Neal Slate Company
11 6623 - Gymnasium Equipment	Draper Inc., PSS, Porter Athletic Spalding Equip. & Bison, Inc.	AALCO Manufacturing Comp.

END OF ARCHITECTUAL ADDENDUM NUMBER 1

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 CONDITIONS

A. Conditions of the contract (General and Supplementary Conditions) and Division One General Requirements, govern the work of this section.

B. This section includes all material, and related service necessary to furnish all finish hardware indicated on the drawings, or specified herein.

C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.

D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

1.2 WORK INCLUDED

A. This section includes the following:

1. Furnish door hardware (for hollow metal, wood doors) specified herein, listed in the hardware schedule, and/or required by the drawings.
2. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)
3. Complete hardware for interior and exterior Aluminum doors, excluding cylinders, to be specified by this Section (08 7100), but supplied by Section 08 4113 Aluminum-Framed Entrances and Storefronts. Cylinders for the Aluminum door hardware to be provided by Section 087100.
4. Electro-Mechanical Devices
5. Access Control components and or systems specified within this section.

B. Where items of hardware are not definitely or correctly specified and is required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

1.3 RELATED WORK IN OTHER SECTIONS

A. This section includes coordination with related work in the following sections:

1. Division 6 Section "Finish Carpentry".
2. Division 6 Section "Cabinet Hardware"
3. Division 8 Section "Hollow Metal Doors and Frames".
4. Division 8 Section "Wood Doors"
5. Division 8 Section "Aluminum Entrances and Storefronts"
6. Division 28 Sections "Electrical".

1.4 REFERENCES

A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced.

1. DHI - Recommended Locations for Builders' Hardware.
2. NFPA 80 - Standards for Fire Doors and Windows.
3. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
4. UL - Building Material Directory.
5. DHI - Door and Hardware Institute
6. WHI - Warnock Hersey
7. BHMA - Builders Hardware Manufacturers Association
8. IBC 2006 - International Building Code 2006 Edition (as amended by local building code)

1.5 SUBMITTALS

A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 1 - General Conditions.

B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:

1. Door number, location, size, handing, and rating.
2. Door and frame material, handing.
3. Degree of swing.
4. Manufacturer
5. Product name and catalog number
6. Function, type and style
7. Size and finish of each item
8. Mounting heights
9. Explanation of abbreviations, symbols, etc.
10. Numerical door index, indicating the hardware set/ group number for each door.

C. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).

D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed with the DHI certification seal of the supervising AHC. The supervising AHC shall attend any meetings related to the project when requested by the architect.

E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.

F. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or in compatible items, and proposed substitutions in the hardware schedule.

G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.

H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 1 - General Conditions.

I. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.

J. Furnish with first submittal, a list of required lead times for all hardware items.

K. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 1 - General Conditions.

L. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

M. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

N. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of the initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and

field use in quantities as required by Division 1 - General Conditions. Wiring diagrams shall be included in final submittals transmitted for distribution and field use.

1.6 QUALITY ASSURANCE

A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality, may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division One General Requirements.

B. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.

D. Hardware supplier shall be factory trained and certified by the manufacture to provide and support all computer managed locks and system components.

E. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.

F. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.

G. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.

H. Hardware supplier shall participate when reasonably requested to meet with the contractor and or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy of any unresolved items.

1.7 DELIVERY, STORAGE AND HANDLING

A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.

B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.

C. Coordinate with contractor prior to hardware delivery and recommend secure storage and protection against loss and damage at job site.

D. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall report shortages to the Architect and hardware supplier immediately after receipt of material at the job site.

E. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

1.8 PRE-INSTALLATION MEETING

A. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.

B. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.

C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.9 WARRANTY

A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division One General Requirements.

B. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

PART 2 - PRODUCTS

2.1 FASTENERS

A. All exposed fasteners shall be Phillips head or as otherwise specified, and shall match the finish of the adjacent hardware. All fasteners ex-posed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.

B. Where torx tamper resistant fasteners have been specified for a specific hardware group, provide torx head fasteners with center pin on ALL exposed fasteners.

C. Coordinate required reinforcements for doors and frames. Seek approval of the architect prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

2.2 BUTT HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Hager	McKinney
1 Standard Weight, Plain Bearing	5PB1	1279	T2714
2 Standard Weight, Ball Bearing	5BB1	BB1279	TB2714
3 Standard Weight, Ball Bearing, Non-Ferrous	5BB1	BB1191	TB2314
4 Heavy Weight, Ball Bearing	5BB1HW	BB1168	T4B3786
5 Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	BB1199	T4B3386

B. Unless otherwise specified, furnish the following hinge quantities for each door leaf.
   1. 3 hinges for doors up to 90 inches.
   2. 1 additional hinge for every 30 inch on doors over 90 inches.
   3. 4 hinges for Dutch door applications.

C. Unless otherwise specified, top and bottom hinges shall be located as specified in division 8 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.

D. Unless otherwise specified, furnish hinge weight and type as follows:
   1. Standard weight: plain bearing hinge 5PB1 for interior openings through 36 inches wide without a door closer.
   2. Standard weight: ball bearing hinge 5BB1 for interior opening over 36 through 40 inches wide without a door closer, and for interior openings through 40 inches wide with a door closer.
   3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide, and for all vestibule doors.
   4. Heavyweight: 4 ball bearing hinge 5BB1HWss for exterior openings unless otherwise listed in groups.

E. Unless otherwise specified, furnish hinges for exterior doors, fabricated from brass, bronze, or stainless steel. Unless otherwise specified, hinges for interior doors may be fabricated from steel.

F. Unless otherwise specified, furnish hinges in the following sizes:
   1 5" x 5" 2-1/4" thick doors
   2 4-1/2" x 4-1/2" 1-3/4" thick doors
   3 3-1/2" x 3-1/2" 1-3/8" thick doors

G. Furnish hinges with sufficient width to accommodate trim and allow for 180-degree swing.

H. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins at interior doors, non-removable loose pins (NRP) at exterior and out-swinging interior doors.

I. Unless otherwise specified, furnish all hinges to template standards.

2.3 CONTINUOUS PIN AND BARREL HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Marker	McKinney
1 Edge Mount Pin & Barrel Stainless Steel Continuous Hinge	700 Series	300 Series	300 Series

B. Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 lbs. Edge mount (unless noted otherwise).

C. Construct hinges of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of 0.25 and the exterior barrel diameter of 0.438.

D. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.

E. Each knuckle to be 2 inch, including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.

F. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours.

G. Provide machine screws for doors which have been reinforced to accept machine screws.

H. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

2.4 POWER TRANSFERS

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin
1 Concealed Two Wire	EPT-2
2 Concealed Ten Wire	EPT-10

B. Concealed power transfers shall be concealed in the door and frame when the door is closed.

C. Concealed power transfers shall have a steel tube to protect wires from being cut.

D. Concealed power transfers with spring tubes shall be rejected.

E. Concealed power transfers shall be supplied with a mud box to house all terminations.

2.5 FLUSH BOLTS AND DUST PROOF STRIKES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Door Controls	Hager
1 Dust Proof Strike	DP2	80	280X
2 Auto Flush Bolt (Metal Door)	FB31P	842	292D
3 Auto Flush Bolt (Wood Door)	FB41P	942	291D
4 Manual Flush Bolt	FB458	780	282D

B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".

C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.

D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.

E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.

F. Provide all bottom flush bolts with non-locking dust proof strikes.

2.6 EXIT DEVICES

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	No Substitution
1 Wide Stile, Push Pad	98 / 99 Series	
2 Wide Stile, Electric Latch Retraction	QEL 98 / 99 Series	
3 Lever Trim	996 Series	
4 Pull Trim	990 Series	

B. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

D. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.

E. All exit devices shall be provided with flush end caps to reduce potential damage from impact.

F. All exit devices shall be provided with dead-locking latch bolts to insure security.

G. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.

H. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.

I. Coordinate with related trades to insure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.

J. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)

K. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

L. Unless specific exit device dogging options are noted within hardware sets, provide dogging options as follows:

1. Fire Rated devices: Dogging not permitted.
2. Non-Rated Exit Only functions not equipped with outside trim or pull: Less Dogging.
3. Non-Rated Classroom functions: Less Dogging.
4. Non-Rated devices utilizing electric latch retraction or electrified outside trim: Less Dogging.
5. All Other Non-Rated devices: Cylinder Dogging utilizing interchangeable core cylinders. Cylinder keyway shall match locksets furnished on this project.

M. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.

N. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.

O. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

2.7 LOCKS AND LATCHES

A. Acceptable manufacturers and respective catalog numbers:

	Best	No Substitution
1 Grade 1 Mortise	45H Series 15H	
2 Grade 1 Cylindrical	9K Series 15D	

B. Unless otherwise specified, all locks and latches to have:

1. 2-3/4" Backset
2. 1/2" minimum throw latchbolt
3. 1" throw deadbolt
4. 6 pin cylinders
5. ANSI A115.2 strikes

C. Provide guarded latch bolts for all locksets, and latch bolts with sufficient throw to maintain fire rating of both single and paired door assemblies.

D. Length of strike lip shall be sufficient to clear surrounding trim.

E. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

2.8 PULLS, PUSH BARS, PUSH/PULL PLATES

A. Acceptable manufacturers and respective catalog numbers:

	Burns	Hager	Ives
1 Straight Pull (1" dia., 10" ctc)	26C	4J	8103EZ-0
2 Straight Pull (3/4” dia., 8” ctc)	25B	3G	8102-8
3 Offset Door Pull (1" dia., 10" ctc)	39C	12J	8190-0
4 Pull / Push-Bar (1" dia., 10" ctc Pull)	422 x 26C	153	9103EZ-0
5 Offset Pull / Push-Bar (1" dia., 10" ctc Pull)	422 x 39C	157	9190-0
6 Push Plate (.050 4"X 16")	54	30S 4 x 16	8200 4 x 16
7 Push Plate (.050 6"X 16")	56	30S 6 x 16	8200 6" X 16"
8 Pull Plate (1" dia., 10" ctc - .050" X 4" X 16")	5426C	34J 4 x 16	8303EZ-0 4" X 16"

A. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.

B. Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

2.9 COORDINATORS

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Door Controls	Hager
1 Bar Coordinator	COR x FL	600 x Filler	297D x 297F
2 Mounting Bracket	MB Series	AB, C Series	297 Series

B. Provide coordinators at all pairs of doors having automatic flush bolts and closers on the inactive leaf, and for pairs of doors having vertical rod/mortise exit device combinations with overlapping astragals.

C. Provide appropriate filler bars, closer mounting brackets, carry bars, and special top latch preparations as required by adjacent hardware.

2.10 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:

	LCN	No Substitution
1	4011	/4111 EDA

B. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. Provide extra heavy duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.

D. Closers shall use high strength cast iron cylinders, forged main arms, and 1 piece forged steel pistons.

E. Closers shall utilize a stable fluid withstanding temperature range of +120deg F to -30deg F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

F. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.

G. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.

H. Provide closers with adjustable spring power. Size closers to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

I. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.

J. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions, and by adjacent hardware.

K. Door closers shall be provided with a powder coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100 hour salt spray test.

2.11 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Acceptable manufacturers and respective catalog numbers:

		LCN	BESAM
1	Electro-Hydraulic Operator	4640	PowerSwing

B. Where low kinetic energy, as defined by ANSI/BHMA Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the ADA for opening force and time to close standards.

C. The closing action shall be controlled by modern type cast iron door closer cylinder filled with a flat viscosity fluid, stable from +120F to -30F that would require no seasonal adjustments. The closer shall have field adjustable spring power; have two independent closing speed adjustment valves, and hydraulic back-check.

D. Full closing force shall be provided when the power or assist cycle ends.

E. All power operator systems shall include the following features and functions:

1. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.
2. The operator will be designed with an electronically controlled mechanical clutching mechanism to prevent damage to the operator if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
3. All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI/BHMA Standard A156.18.

4. UL listed for use on labeled doors.
5. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
6. The power operator shall incorporate microprocessor controlled digital controls including: factory default memory settings, on-board diagnostics, non-volatile memory, and integrated delay and relay for controlling door release devices.
7. Provisions in the control box or module shall provide control {inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarms systems, actuators, swing side sensors, and stop side sensors.
8. Wall mounted actuators shall consist of a 4-1/2 inch diameter stainless steel touch plate with a blue filled handicapped symbol. Switches shall be weather resistant and mount on a single gang electrical box furnished by Division 16.

F. All electrically powered operators shall include the following features or functions:
1. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
2. Easily accessible main power and maintain hold open switches will be provided on the operator.
3. An electronically controlled clutch to provide adjustable opening force.
4. A microprocessor to control all motor and clutch functions.
5. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
6. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.
7. If electrical failure occurs, the unit shall operate as a standard door closer.

G. Power Operators shall be warranted by the manufacture to be free from defects in material and workmanship for a period of two years.

2.12 KICK PLATES AND MOP PLATES

A. Furnish protective plates as specified in hardware groups.

B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing.

D. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

E. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.13 OVERHEAD STOPS

A. Acceptable manufacturers and respective catalog numbers:

	Glynn-Johnson	Rixson	Sargent
1 Heavy Duty Surface Mount	GJ900 Series	9 Series	590
2 Heavy Duty Concealed Mount	GJ100 Series	1 Series	690

B. Overhead stops (including slide block and end caps) shall be fabricated from metal.

C. Unless otherwise specified, furnish GJ900 series overhead stop for hollow metal or 1-3/4” solid core doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for hollow metal or 1-3/4” solid core doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.

D. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.

E. Provide special stop only ("SE" suffix) overhead stops when used in conjunction with electronic hold open closers.

F. Do not provide holder function for labeled doors.

2.14 WALL STOPS AND HOLDERS

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Hager	Burns
1 Wrought Convex Wall Bumper	WS406CVX	232W	570
2 Wrought Concave Wall Bumper	WS406CCV	236W	575

B. Furnish a stop or holder for all doors. Furnish floor stops or hinge pin stops only where specifically specified.

C. Where wall stops are not applicable, furnish overhead stops.

D. Do not provide holder function for labeled doors.

2.15 WEATHERSTRIP, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Weatherstrip	429	2891_PK	700NA	755
2. Adhesive Gasket	188	S88	5050	797
3. Mullion Seal/Silencer	8780	5110	5100N	
4. Meeting Edge Seals	8193	18041	9605	959
5. Sweeps	8192	18061_NB	B606	964
6. Sweep w/ drip	8198	345_N	C627	354
7. Drip Cap	142	346	16	R201

B. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

C. Provide weatherstripping all exterior doors and where specified.

D. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

E. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

F. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

2.16 ELECTRIC STRIKES

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	HES
1. Type 1	6000 Series	4500 / 9500 / 9600 Series

B. Provide electric strikes designed for use with the type of locks shown at each opening where specified.

C. Electric strikes shall be UL listed as Burglary-Resistant Electric Door Strikes and where required shall be UL listed as Electric Strike for Fire Doors.

D. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.17 DOOR POSITION SWITCHES

A. Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics	Sentrol
1. Concealed (wood & hollow metal doors)	679 Series	1076W
2. Concealed (aluminum doors)	679 Series	1076W

2.18 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1 Saddle Thresholds	8655	171	425	S205

B. Hardware supplier shall verify all finish floor conditions and coordinate proper threshold as required to insure a smooth transition between threshold and interior floor finish.

C. Threshold Types:

1. Unless otherwise specified, provide saddle threshold similar to Zero 8655 for all exterior openings with an interior floor finish less than or equal to 1/4" in height.
2. Unless otherwise specified, provide half saddle threshold similar to Zero 1674 for all exterior openings with an interior floor finish greater than 1/4" in height. Threshold height shall match thickness of interior floor finish.

2.19 POWER SUPPLIES

A. Provide quantities and types as specified in hardware sets. Shared power supplies will not be accepted without prior approval from the owner.

B. All power supplies shall have the following features:

1. 12/24 VDC Output, field selectable.
2. Class 2 Rated power limited output.
3. Universal 120-240 VAC input.
4. Low voltage DC, regulated and filtered.
5. Polarized connector for distribution boards.
6. Fused primary input.
7. AC input and DC output monitoring circuit w/LED indicators.
8. Cover mounted AC Input indication.
9. Tested and certified to meet UL294.
10. NEMA 1 enclosure.
11. Hinged cover w/lock down screws.
12. High voltage protective cover.

C. All power supplies shall incorporate fused distribution boards.

D. All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

2.20 FINISHES AND BASE MATERIALS

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1. Butt Hinges: Exterior, or Non-Ferrous	630 (US32D - Satin Stainless Steel)
2. Butt Hinges: Interior	652 (US26D - Satin Chromium)
3. Continuous Hinges	630 (US32D - Satin Stainless Steel)
4. Flush Bolts	626 (US26D - Satin Chromium)
5. Exit Devices	626 (US26D - Satin Chromium)
6. Locks and Latches	626 (US26D - Satin Chromium)
7. Pulls and Push Plates/Bars	630 (US32D - Satin Stainless Steel)
8. Coordinators	600 (Prime painted or mill alum.)
9. Closers	689 (Powder Coat Aluminum)
10 Protective Plates	630 (US32D - Satin Stainless Steel)
11 Overhead Stops	630 (US32D - Satin Stainless Steel)
12 Wall Stops and Holders	630 (US32D - Satin Stainless Steel)
13 Thresholds	628 (Mill Aluminum)
14 Weather-strip, Sweeps Drip Caps	Aluminum Anodized
15 Miscellaneous	626 (US26D - Satin Chromium)

2.21 KEYING

A. Acceptable manufacturers and respective catalog numbers:

1 Best No Substitution

B. Provide al locks and cylinders in keyways as required to accommodate owners existing Best master key system.

C. All locks under this section shall be keyed as directed by the owner to an existing Best master key system.

D. Keying shall be by lock manufacturer where permanent records shall be kept.

E. Provide temporary brass construction cores for all exterior lock cylinders. Provide 10% additional temporary cores and or cylinders as required to provide secure storage locations during construction.

F. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

G. Permanent cylinder cores shall be installed by the owner, or owner's representative. Temporary cylinders and cores shall be returned to the distributor once permanent cores have been installed.

H. Permanent master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, installer shall examine door frame installation to insure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.2 INSTALLATION

A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices,

continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.

B. Install all hardware in accordance with the approved hardware schedule and manufacturers instructions for installation and adjustment.

C. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

E. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

F. Shim doors as required to maintain proper operating clearance between door and frame.

G. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

H. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

I. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.

J. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

K. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.

L. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

M. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.

N. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.

O. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

P. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

Q. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.

R. Adjust spring power of door closers to the minimum force required to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to insure opening force does not to exceed 5 lbs.

S. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.

T. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.

U. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

V. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water resistant seal.

W. Deliver to the owner 1 complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.3 FIELD QUALITY CONTROL

A. After installation has been completed, the hardware supplier and manufacturers representative for locksets, door closers, exit devices, and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.

B. After installation has been completed, the hardware supplier and manufacturers representative shall meet with the owner to explain the functions, uses, adjustment, and maintenance of each item of hardware. Hardware supplier shall provide the owner with a copy of all wiring diagrams. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

3.4 ADJUSTMENT AND CLEANING

A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. . Lubricate moving parts with type lubrication recommended by the manufacturer.

B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

3.5 HARDWARE SCHEDULE

A. The following schedule of hardware groups are intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

HW SET #: 01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA		EXISTING HARDWARE TO REMAIN	EXI

HW SET #: 02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE	9K30N	BES
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F01) PASSAGE LATCH
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

HW SET #: 03

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRY	9K37AB	BES
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F04) ENTRY LOCK
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

HW SET #: 04

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	INTRUDER	9K37IN	BES
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F05) INTRUDER LOCK
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY FROM EITHER SIDE. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

HW SET #: 05

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT2	VON
2	EA	MANUAL FLUSH BOLT	MANUAL	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	ELECTRIFIED LOCK	9K3KW-DEU	BES
1	EA	OH STOP	90S	GLY
1	EA	WALL STOP	WS406	IVE
1	EA	POWER SUPPLY	PS902	
1	EA	CARD READER	BY OWNER	
1	EA	DOOR CONTACT	679	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: (F07) ELECTRIFIED STOREROOM LOCK
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR.

HW SET #: 06

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE	9K30N	BES
1	EA	SURFACE CLOSER	4011/4111 EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F01) PASSAGE LATCH
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

HW SET #: 07

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PRIVACY	9K30L VIN	BES
1	EA	SURFACE CLOSER	4011/4111 EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: PRIVACY WITH INDICATOR
LEVER RETRACTS LATCHBOLT FROM EITHER SIDE. DEADBOLT THROWN OR RETRACTED BY KEY OUTSIDE (RETRACTION BY KEY REQUIRED IN THE EVENT OF AN EMERGENCY) OR INSIDE THUMBTURN. THROWING DEADBOLT LOCKS OUTSIDE LEVER AND DISPLAYS “OCCUPIED” PLATE. ROTATING INSIDE LEVER SIMULTANEOUSLY RETRACTS BOTH DEADBOLT AND LATCHBOLT AND UNLOCKS OUTSIDE LEVER.

HW SET #: 08

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM	9K37R	BES
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4011/4111 EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	SET	SEALS	188S	ZER

FUNCTION: (F05) CLASSROOM LOCK
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY. UNLOCKED FROM OUTSIDE BY KEY. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

HW SET #: 09

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM	9K37D	BES
1	EA	SURFACE CLOSER	4111 SCUSH	LCN
1	EA	ELECTRIC STRIKE	4500C	HES
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	EA	POWER SUPPLY	PS902	
1	EA	CARD READER	BY OWNER	
1	EA	DOOR CONTACT	679	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: (F07) STOREROOM LOCK
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR.

HW SET #: 09A

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM	9K37D	BES
1	EA	SURFACE CLOSER	4011/4111 EDA	LCN
1	EA	ELECTRIC STRIKE	4500C	HES
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	EA	POWER SUPPLY	PS902	
1	EA	CARD READER	BY OWNER	
1	EA	DOOR CONTACT	679	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: (F07) STOREROOM LOCK
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR.

HW SET #: 10

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	INSTITUTIONAL	9K37W	BES
1	EA	SURFACE CLOSER	4111 SHCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIPPING	429	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER

FUNCTION: INSTITUTION LOCK
LATCHBOLT RETRACTED BY KEY FROM EITHER SIDE. LEVER ON BOTH SIDES ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

HW SET #: 11

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	SET	AUTO FLUSH BOLT	AUTOMATIC	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	INTRUDER	9K37IN	BES
1	EA	COORDINATOR	COR X FL	IVE
2	EA	SURFACE CLOSER	4111 SHCUSH	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B4E	IVE

FUNCTION: INTRUDER LOCK
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY FROM EITHER SIDE. WHEN LOCKED, LATCHBOLT RETRACTED BY KEY OUTSIDE OR LEVER INSIDE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS LOCKED.

HW SET #: 12

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954 X 154	VON
2	EA	PANIC HARDWARE	LD-99-EO	VON
2	EA	6 PIN CYLINDER	AS REQUIRED	BES
2	EA	SURFACE CLOSER	4111 SCUSH	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B4E	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIPPING	429	ZER
1	SET	MEETING EDGE SEALS	8193	ZER
1	EA	MULLION SEAL	8780	ZER
2	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	AS REQUIRED MATCH DEPTH OF FRAME	B/O

FUNCTION: (ANSI/BHMA 01) EXIT ONLY. LATCHBOLT RETRACTED BY DEPRESSING THE ACTUATION BAR. NO EXTERIOR TRIM OR BLANK ESCUTCHEON.

HW SET #: 13

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	FIRE EXIT HARDWARE	9949-WDC-L-F-LBL	VON
2	EA	6 PIN CYLINDER	AS REQUIRED	BES
2	EA	SURFACE CLOSER	4111 EDA	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B4E	IVE
2	EA	FIRE/LIFE WALL MAG	BY DIVISION 26	LCN
1	SET	SEALS	188S	ZER
1	SET	MEETING STILE SEAL	8193 X 8193	ZER
	EA	N/C F/A CONTACT	BY F/A CONTRACTOR	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY LEVER. KEY IN EXTERIOR CYLINDER LOCKS OR UNLOCKS LEVER.

HW SET #: 14

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT2	VON
1	EA	FIRE EXIT HARDWARE	9949-WDC-L-DT-F-LBL	VON
1	EA	ELEC FIRE EXIT HARDWARE	QEL+-9949-WDC-L-NL-F-LBL	VON
2	EA	6 PIN CYLINDER	AS REQUIRED	BES
2	EA	SURFACE CLOSER	4111 EDA	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B4E	IVE
2	EA	FIRE/LIFE WALL MAG	BY DIVISION 26	LCN
1	SET	SEALS	188S	ZER
1	SET	MEETING STILE SEAL	8193 X 8193	ZER
2	EA	DOOR CONTACT	679	SCE
1	EA	CARD READER	BY OWNER	

1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCHBOLT RETRACTED BY EXIT DEVICE PUSH PAD OR BY KEY OUTSIDE. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK THE DOOR.

HW SET #: 15

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONT. HINGE	FM-300	IVE
2	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
2	EA	PUSH BAR	9100	IVE
2	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4111 EDA	LCN
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN

NOTE: ALL HARDWARE PROVIDED BY SECTION 084413

HW SET #: 16

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONTINUOUS HINGE	FM-300 X (EPT @ QEL)	IVE
1	EA	POWER TRANSFER	EPT2	VON
1	EA	KEYED REMOVABLE MULLION	KR4954 X 154	VON
1	EA	PANIC HARDWARE	99-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL+-99-NL-OP	VON
2	EA	6 PIN CYLINDER	AS REQUIRED	BES
2	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4111 EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	MULLION SEAL	8780	ZER
2	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CARD READER	BY OWNER	
1	EA	POWER SUPPLY	PS902 900-2RS	VON
2	EA	DOOR CONTACT	679	SCE
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

NOTE: ALL HARDWARE PROVIDED BY SECTION 084413

HW SET #: 17

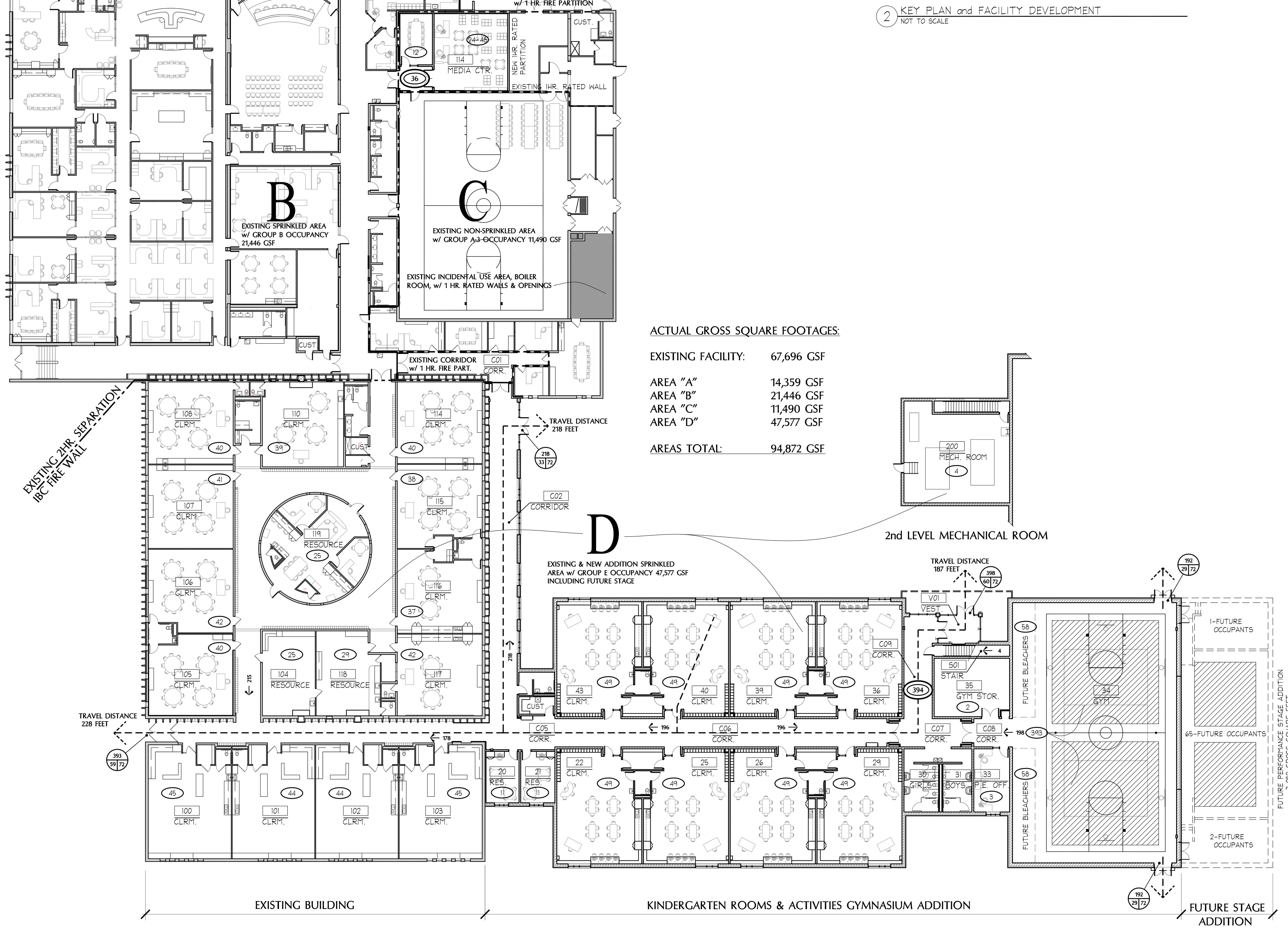
QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CONTINUOUS HINGE	FM-300 X (EPT @ QEL)	IVE
1	EA	POWER TRANSFER	EPT2	VON
1	EA	KEYED REMOVABLE MULLION	KR4954 X 154	VON
1	EA	PANIC HARDWARE	99-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL+-99-NL-OP	VON
2	EA	6 PIN CYLINDER	AS REQUIRED	BES
2	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
2	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4111 EDA	LCN
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	MULLION SEAL	8780	ZER
2	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CARD READER	BY OWNER	
1	EA	POWER SUPPLY	PS902 900-2RS	VON
2	EA	DOOR CONTACT	679	SCE
1	EA	JUNCTION BOX	JB7 R2	VON
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

NOTE: ALL HARDWARE PROVIDED BY SECTION 084413

Door/Hardware Index

Mark #	HWSet #
C01	13
C02	16
C06	14
C08	14
V01.1	15
V01.2	17
S01.1	09
20	04
21	04
22	04
23.1	03
23.2	03
24.1	02
24.2	02
25	04
26	04
27.1	03
27.2	03
28.1	02
28.2	02
29	04
33	04
34.1	12
34.2	12
35	05
36	04
37.1	03
37.2	03
38.1	02
38.2	02
39	04
40	04
41.1	03
41.2	03
42.1	02
42.2	02
43	04
44	09A
45	07
226.1	01
226.2	11
226.3	03
226.4	08
S01.2	06
S01.3	10

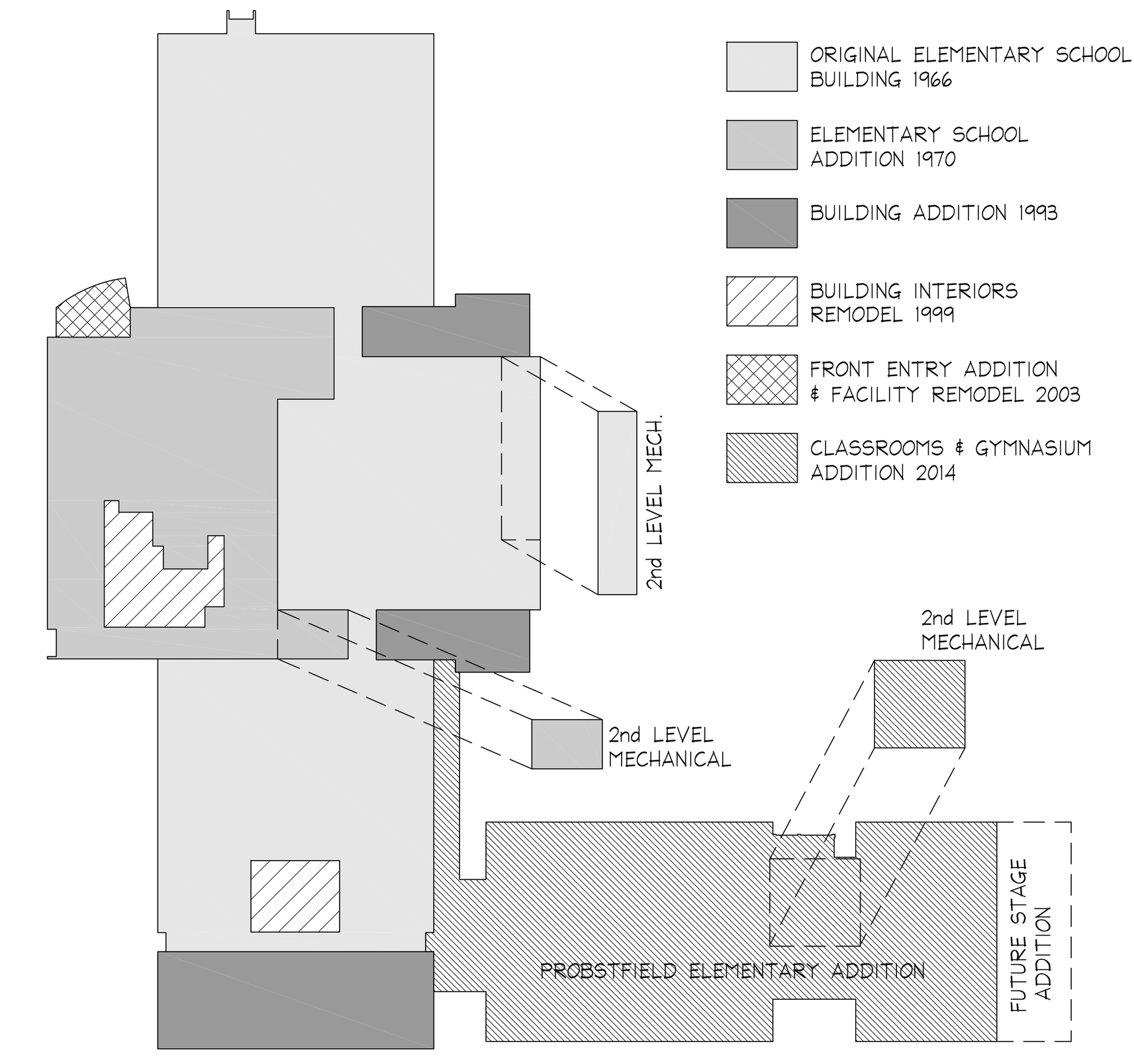
END OF SECTION



ACTUAL GROSS SQUARE FOOTAGES:

EXISTING FACILITY:	67,696 GSF
AREA "A"	14,359 GSF
AREA "B"	21,446 GSF
AREA "C"	11,490 GSF
AREA "D"	47,577 GSF
AREAS TOTAL:	94,872 GSF

1 MAIN LEVEL CODE PLAN for REFERENCE ONLY
SCALE: 1" = 20'
NORTH



2 KEY PLAN and FACILITY DEVELOPMENT
NOT TO SCALE

Probstfield Elementary Code Record:

2410 FOURTEENTH STREET SOUTH, MOORHEAD, MINNESOTA

DATE: MARCH 20, 2014
GOVERNING CODE: 2007 MINNESOTA STATE BUILDING CODE (MSBC)
STATE PLAN REVIEW NUMBER: BLD1403-00046

1. GENERAL BUILDING DESCRIPTION:
THE EXISTING BUILDING IS A SINGLE STORY SLAB-ON-GRADE, MASONRY BEARING WALL STRUCTURE WITH STEEL JOISTS AND DECK. THE INTERIOR PARTITIONS ARE MASONRY, METAL STUD WITH PLASTER AND DRYWALL AT VARIOUS LOCATIONS. THE FACILITY IS PARTIALLY EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM.

THE ADDITION IS A SINGLE STORY SLAB-ON-GRADE STRUCTURE CONSTRUCTED WITH STEEL JOIST AND DECK ROOF ASSEMBLY. EXTERIOR WALLS ARE OF MASONRY CAVITY WALL CONSTRUCTION AND STRUCTURAL METAL STUDS WITH MASONRY VENEER. INTERIOR PARTITIONS A MIX OF MASONRY, METAL STUD AND DRYWALL.

THE ADDITION AND ASSOCIATED EXISTING AREA "D" IS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM PROVIDED THROUGHOUT.

AREAS "A", "B" AND "C" ARE NOT SCHEDULED FOR ANY WORK OTHER THAN THE LIGHT REMODELING FOR THE MEDIA CENTER AND CONFERENCE ROOM.

2. OCCUPANCY CLASSIFICATIONS — SECTION 302
A. SECTION 303, ASSEMBLY — GROUP A-3
B. SECTION 304, BUSINESS — GROUP B
C. SECTION 305, EDUCATIONAL — GROUP E

3. SEPARATION OF OCCUPANCIES — SECTION 508.3.3
A. SEPARATIONS — TABLE 508.3.3

GROUP E TO A-3 — 0 HOUR

ASSEMBLY AREAS ACCESSORY TO GROUP E OCCUPANCIES ARE NOT CONSIDERED SEPARATE OCCUPANCIES PER 508.3.1, EXCEPTION 2, EXCEPT WHEN APPLYING THE REQUIREMENTS OF CHAPTER 11, ACCESSIBILITY.

4. CONSTRUCTION TYPE/FIRE RESISTANCE — TABLE 601 & 602
A. TYPE II-B

BUILDING ELEMENT	FIRE RESISTANCE
STRUCTURAL FRAME	0 HOUR
EXTERIOR BEARING WALLS	0 HOUR
INTERIOR BEARING WALLS	0 HOUR
EXT. NON-BEARING WALLS	0 HOUR
INT. NON-BEARING WALLS	0 HOUR
FLOOR CONSTRUCTION	0 HOUR
ROOF CONSTRUCTION	0 HOUR
CORRIDORS	0 HOUR

5. GENERAL BUILDING HEIGHT & AREA — SECTION 503 & 504
A. ALLOWABLE HEIGHT & AREAS

GROUP	ALLOWABLE HEIGHT TABLE 503	ALLOWABLE HEIGHT WITH SPRINKLER TABLE 503 & 504.2	BASIC ALLOWABLE AREA
E	2 STORIES / 55 FT	NOT APPLICABLE	*14,500 SF

6. ALLOWABLE AREA MODIFICATIONS — SECTION 506

Allowable area increase: **AREA "D"**
If = [(F / P) - .25] [W/30]
If = [1,104 / 1,243 - .25] [30/30]
If = 0.64
Aa = At + (At x If) + (At x Is)
Aa = 14,500 + (14,500 x 0.64) + (14,500 x 3)
Aa = 67,280 SF

-FRONTAGE INCREASE IS PROVIDED DUE TO LOCATION ON PROPERTY.
-SPRINKLER SYSTEM INCREASE IS PROVIDED BECAUSE THE EXISTING AND NEW ADDITION WILL HAVE A SPRINKLER SYSTEM INSTALLED THROUGHOUT.
-ACTUAL AREA IS INCLUDING FUTURE STAGE IS 47,577 SQUARE FEET. ACTUAL AREA IS LESS THAN THE ALLOWABLE.

7. FIRE & SMOKE PROTECTION — CHAPTER 7
NOTE: FIRE WALL LOCATIONS ARE IN EXISTING CONSTRUCTION AND GENERALLY COMPLY WITH MSBC REQUIREMENTS. THERE ARE NO FIRE PARTITIONS IN THE ADDITION. FIRE PARTITIONS IN THE NON-SPRINKLED AREAS COMPLY WITH MSBC REQUIREMENTS, SECTION 708.
A. FIRE WALLS SHALL BE 2-HOUR FIRE-RESISTANCE RATED PER TABLE 705.4.
B. FIRE WALLS SHALL BE CONSTRUCTED TO PROVIDE INDIVIDUAL STRUCTURAL STABILITY PER 705.2.
C. HORIZONTAL CONTINUITY SHALL BE PROVIDED PER 705.5, EXCEPTION 3.
D. WHERE FIRE WALLS INTERSECT AN EXTERIOR WALL AT AN ANGLE LESS THAN 180 DEGREES, MAINTAIN THE FIRE-RESISTANCE RATING OF 1 HOUR FOR A MINIMUM OF 4' BEYOND THE INTERSECTION, PER 705.5.1.
E. VERTICAL CONTINUITY SHALL BE PROVIDED PER 705.6, EXCEPTION 3.

8. FIRE PROTECTION SYSTEMS — SECTION 903.2.2
A. FIRE AREAS GREATER THAN 20,000 SQUARE FEET IN AN E OCCUPANCY REQUIRE AN AUTOMATIC FIRE SPRINKLER SYSTEM.
B. ADDITION AND ASSOCIATED EXISTING AREA WILL BE FULLY SPRINKLED AS PER SECTION 903.3.1.
C. PORTABLE FIRE EXTINGUISHERS ARE INCLUDED AT THE ADDITION AS REQUIRED BY THE INTERNATIONAL FIRE CODE.
D. FIRE ALARM AND DETECTION SYSTEMS WILL BE PROVIDED AS REQUIRED BY SECTION 907.

9. MEANS OF EGRESS — CHAPTER 10
A. SEE PLAN FOR OCCUPANT LOAD CALCULATIONS, PER TABLE 1004.1.
B. MINIMUM REQUIRED EGRESS WIDTH IS CALCULATED AT 0.2" PER OCCUPANT AT STAIRWAYS AND 0.15" FOR OTHER EGRESS COMPONENTS IN A SPRINKLED BUILDING PER TABLE 1005.1.
C. MAXIMUM TRAVEL DISTANCE IS 250' FOR "E" OCCUPANCY IN A BUILDING WITH A SPRINKLER SYSTEM, PER TABLE 1016.1.
D. TABLE 1017.1 FOR AN "A" OCCUPANCY, NO CORRIDOR RATING IS REQUIRED IN A BUILDING WITH A SPRINKLER SYSTEM THAT SERVES AN OCCUPANT LOAD GREATER THAN 30.
E. GYM OCCUPANT LOAD HAS BEEN CALCULATED BASED ON BLEACHER SEATING CAPACITY 116 PLUS 393 ON OPEN FLOOR SPACE BASED ON TABLE 1004.1.1.
F. ASSEMBLY WITHOUT FIXED SEATS, 7 SF PER OCCUPANT. NET SPACE HATCHED AREA TAKES INTO ACCOUNT CIRCULATION AISLES AROUND SEATING ARRANGEMENT.

10. ACCESSIBILITY FOR CHILDREN — CHAPTER 11
A. PROVISIONS OUTLINED IN ICC A117.1 WILL BE MADE FOR CHILDREN IN THE AGE GROUP KINDERGARTEN THROUGH THIRD GRADE. WATER CLOSETS PER SECTION 604.10, SINKS PER SECTION 606.2 AND WORK SURFACES PER SECTION 902.4.

11. PLUMBING FIXTURE COUNT AREA "D" — TABLE 2902.1

CLASSIFICATION	TOTAL OCC'S	OCCUPANT TYPE	FIXTURES/ OCCUPANT	TOTAL REQUIRED	TOTAL PROVIDED
"A" OCCUPANCY	577	289 M	WC 1:125	3	5
			LAV 1:200	2	6
		289 F	WC 1:65	5	5
			LAV 1:200	2	6
			DF 1:500	0	2
			SERV. SINK	1	1
"E" OCCUPANCY	1039	520 M	WC 1:50	10	9.5
			LAV 1:50	10	11.5
		520 F	WC 1:50	10	9.5
			LAV 1:50	10	11.5
			DF 1:100	10	14
			SERV. SINK	1	1

THE A OCCUPANCY IS CONSIDERED EXCLUSIVELY FOR DETERMINING PLUMBING FIXTURE COUNT. THE REMAINDER OF AREA "D" IS CONSIDERED AN E OCCUPANCY.

URINALS MAY BE PROVIDED FOR UP TO ½ OF THE REQUIRED WATER CLOSETS.

SECTION 1004.1.1 EXCEPTION: WHEN APPROVED, THE ACTUAL NUMBER OF OCCUPANTS FOR WHOM EACH OCCUPIED SPACE, FLOOR OR BUILDING IS DESIGNED , ALTHOUGH LESS THAN THOSE DETERMINED BUY CALCULATION, SHALL BE PERMITTED TO BE USED IN THE DETERMINATION OF THE DESIGN OCCUPANT LOAD. CONSIDERATION FOR FRACTIONAL PLUMBING FIXTURE COUNT.

ZERR BERG ARCHITECTS
510 North 4th Avenue Fargo, ND 58102-4821
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gehrtz
CONSTRUCTION SERVICES
CONSTRUCTION MANAGEMENT • COST ESTIMATING • DESIGN/BUILD

Code Plan Legend:

- OCCUPANTS SERVED BY EXIT
- OCCUPANT WIDTH PROVIDED
- OCCUPANT WIDTH REQUIRED
- OCCUPANT LOAD BY ROOM OR AREA
- CUMULATIVE OCCUPANT LOAD BY BUILDING AREA
- OCCUPANTS W/ DIRECTION OF TRAVEL
- EXISTING ONE HOUR RATE WALL or ONE HOUR RATE FIRE PARTITION
- EXISTING TWO HOUR RATE SEPARATION or TWO HOUR RATE FIRE WALL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of Minnesota.
Print Name: Timothy L. Zerr
Signature: [illegible]
Date: 03/20/14 Registration No. 16864

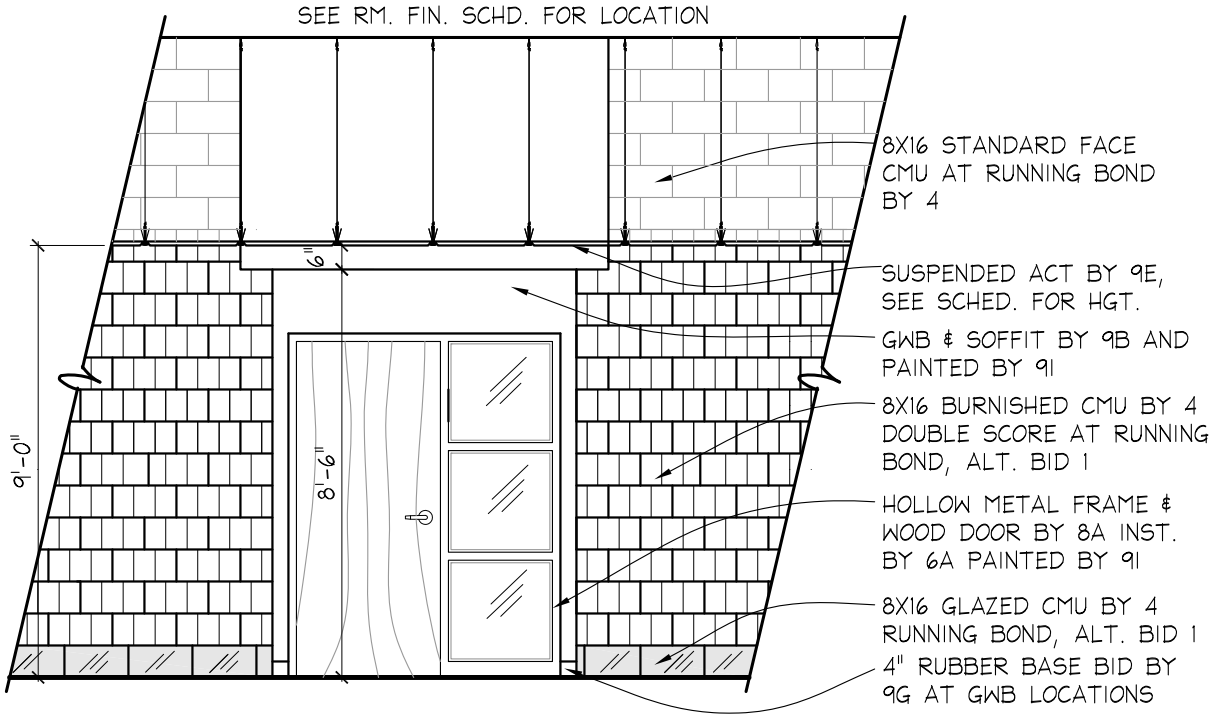
MOORHEAD AREA PUBLIC SCHOOLS

Moorhead Area Public Schools Improvements
Probstfield Elementary School Addition

Moorhead, Minnesota

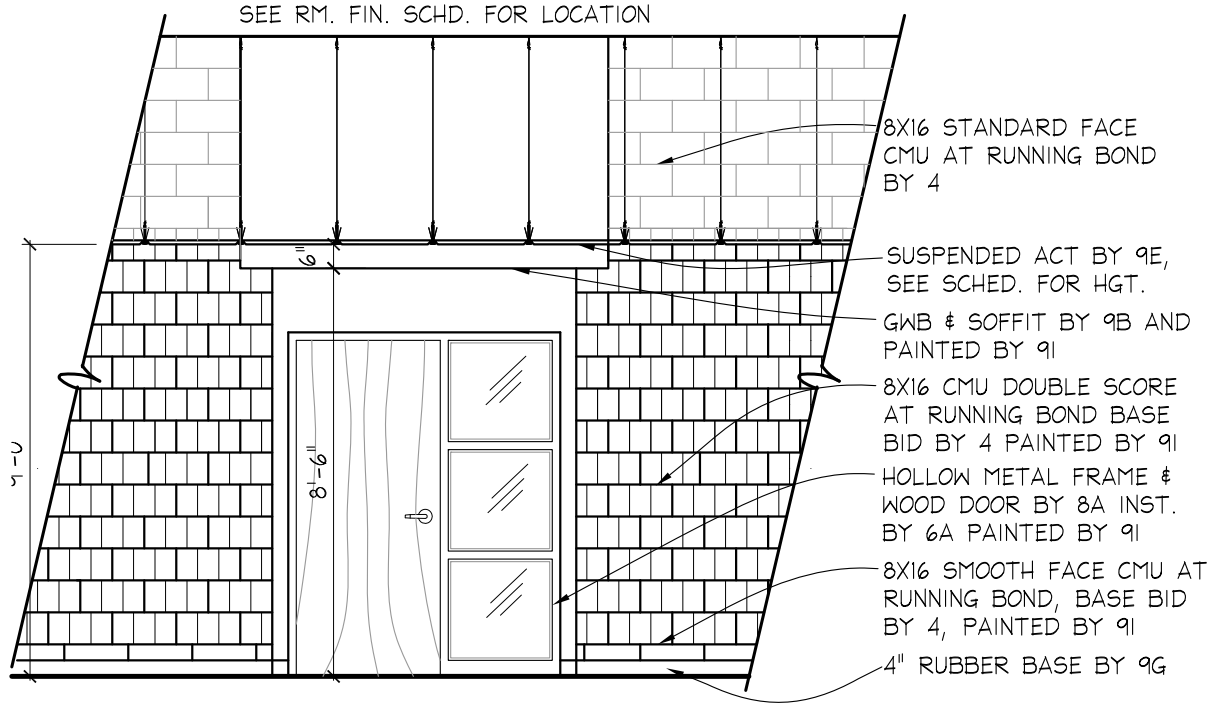
- CODE PLAN

Project No: 13-040
Date: March 20, 2014
A0.1



1 TYPICAL CORRIDOR ELEVATION - ALTERNATE BID 1

SCALE: 1/4" = 1'-0" REVISED ADDENDUM NO. 1



2 TYPICAL CORRIDOR ELEVATION - BASE BID

SCALE: 1/4" = 1'-0" REVISED ADDENDUM NO. 1

ZERR BERG ARCHITECTS
510 North 4th Avenue Fargo, ND 58102-4821
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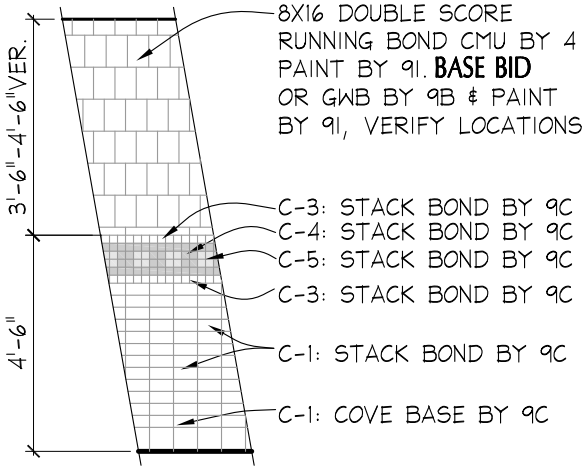
Moorhead Area Public Schools
Probstfield Elementary School Addition

Moorhead, Minnesota

Adden. No. 1

Reference Dwg: 1&2/A3.2
Project No.: 13-040
Date: April 3, 2014



24 WAINSCOTT TILE PATTERN
SCALE: 1/4" = 1'-0

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Moorhead Area Public Schools
Probstfield Elementary School Addition

Moorhead, Minnesota

Adden. No. 1
Reference Dwg: 24/A5.1
Project No.: 13-040
Date: April 3, 2014

Moorhead Area Public Schools
Probstfield Elementary School Addition
Moorhead, Minnesota
Project No. 2013304

ADDENDUM NO. M-1

NOTICE TO BIDDERS: Amend Project Manuals and Drawings to the above referenced project as follows.

DRAWINGS

Sheet M7.1:

1. Add Roof Hood schedule attached to this addendum as R-1/M7.1.

Sheet M8.1:

1. Add the attached sheet M8.1, Control sequences to the drawing set.

The following materials and/or equipment have been accepted as APPROVED EQUALS:

Section	Description of Equipment	Approved Manufacturer
230600 – 2.1	Gas Vents	Metal Fab
230600 – 2.3	Condensing Hot Water Boilers	Thermal Solutions Apex Aerco AM Laars Neotherm
230700 – 2.10	Balancing Valves	Nexus
230700 – 2.11	Combination Autoflow Balancing Valves	Nexus
230700 – 2.16	Chilled Water Storage Tank	ACE
230700 – 2.17	Steam Traps	MEPCO
230700 – 2.18	Strainers	MetraFlex
230700 – 2.21	Thermometers	Winters
230700 – 2.22	Gauges	Winters
230700 – 2.27	Hydronic Radiant Floor Materials	Mr. PEX Systems

END OF ADDENDUM

ROOF HOOD SCHEDULE

UNIT NO.	TYPE	HOOD SIZE L	HOOD SIZE W	THROAT SIZE L	THROAT SIZE W	CONSTRUCTION	NOTES
RH-1	LSFH	75	36	54	22	ALUMINUM	
RH-2	LSFH	75	32	54	18	ALUMINUM	
RH-3	LSFH	39	40	24	18	ALUMINUM	
RH-4	LSFH	39	28	24	12	ALUMINUM	
RH-5	LSFH	39	28	24	12	ALUMINUM	
RH-6	LSFH	39	28	24	12	ALUMINUM	
RH-7	LSFH	39	32	18	18	ALUMINUM	

LSFH	LOW SILHOUETTE, FASCIA HOOD
LSLP	LOW SILHOUETTE, LOUVERED PENTHOUSE
O.A.	OUTSIDE AIR INTAKE
C.A.	COMBUSTION AIR INTAKE
P.P.	PRIME PAINTED

NOTES:
1.

ONE BUILDING SYSTEMS CONSULTANTS
Fargo ■ Grand Forks ■ Bismarck
Alexandria ■ 877.380.0501

Architect:
Zerr Berg Architects
510 North 4th Avenue
Fargo, ND 58102
(701) 280-0187

Project Name:
Moorhead Area Public Schools Improvements
Robert Asp Elementary School Addition

Project Location:
Moorhead, MN

Project Information:

Project No. :	2013305
Drawn By :	AWJ
Checked By :	JEN
Date :	4/3/14
File Name:	2013304-M7.1.dwg

Revision:
ADD M-1

Revision Number:
R-1

Sheet Number:
M7.1

SEQUENCE OF OPERATION:

CHILLER ENABLE/DISABLE: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 55 DEG. F THE CHILLER SHALL BE DISABLED. WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEG. F AND THERE IS A CALL FOR COOLING , THE CHILLER SHALL BE ENABLED.

CHILLER STARTUP: ON A CALL FOR COOLING, THE CHILLER SHALL START (R-3) AFTER FLOW HAS BEEN PROVEN AND AIR HANDLING UNITS/FAN COIL UNITS ARE RUNNING. MONITOR CHILLER STATUS (CS-3)

CHILLER SHUTDOWN: WHEN CHILLER IS DISABLED, THE CHILLED WATER PUMP SHALL RUN FOR 5 MINUTES AFTER THE CHILLER IS SHUT DOWN.

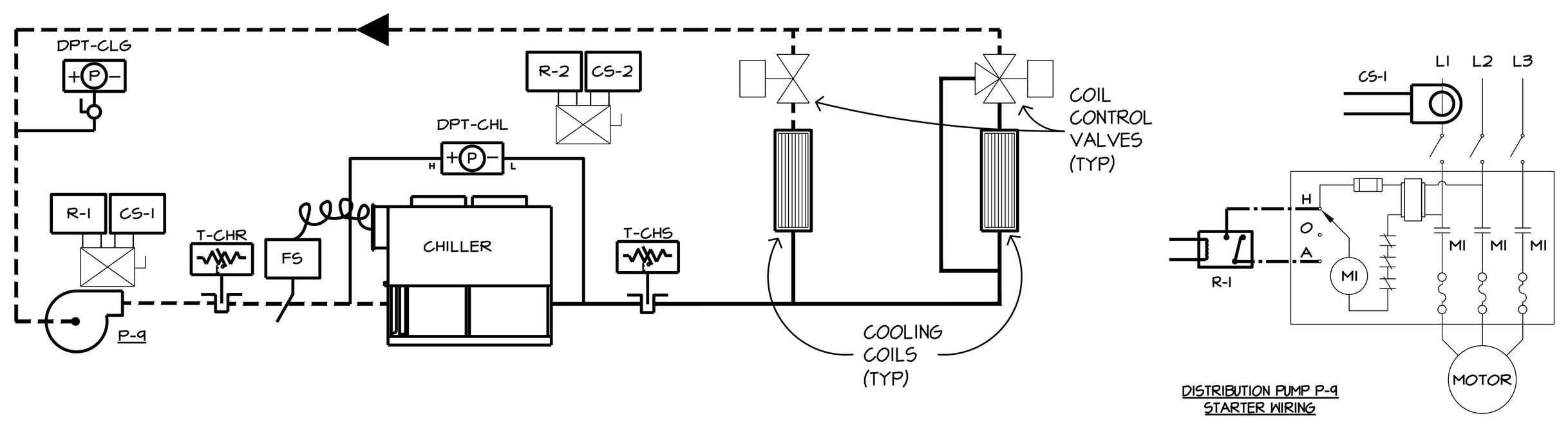
PUMP CONTROL: DURING OCCUPIED TIME, THE OPERATING PUMP SHALL RUN. DURING UNOCCUPIED TIME, IF A CALL FOR COOLING, THE OPERATING PUMP SHALL START (R-1). IF THE STATUS OF THE OPERATING PUMP CANNOT BE PROVEN (CS-1), AN ALARM SHALL BE GENERATED. WHEN THE DISTRIBUTION PUMP IS RUNNING, THE CHILLED WATER SUPPLY AND RETURN TEMPERATURES SHALL BE MONITORED AND ALARMS SHALL BE GENERATED IF THE SUPPLY WATER TEMPERATURE RISES ABOVE THE ALARM LEVEL.

FLOW SWITCH: A FLOW SWITCH (FURNISHED WITH CHILLER) SHALL BE INSTALLED AND HARD WIRED TO THE CHILLER CONTROLLER FOR ITS OWN PROOF OF FLOW SIGNAL.

CHILLER CONTROL: THE NETWORK ENABLED CHILLER CONTROL PANEL SHALL BE CONNECTED TO DDC SYSTEM NETWORK FOR COMPLETE LIST OF CHILLER POINTS AND ALARMS.

CHILLER POINT: REFER TO CHILLER SPEC FOR CHILLER POINTS TO BE LISTED ON BAS.

CHILLED WATER TEMPERATURE: MONITOR INLET AND LEAVING WATER TEMPERATURES INTO CHILLER.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
CS-1	PumpP1Status	PUMP P-1 STATUS		X					
R-1	PumpP1Ctrl	PUMP P-1 CONTROL				X			
T-CHR	ClgRetTemp	COOLING SYSTEM RETURN TEMPERATURE	X				X	X	
T-CHS	ClgSupTemp	COOLING SYSTEM SUPPLY TEMPERATURE	X				X	X	
T-3	ChillerRetTemp	CHILLER RETURN TEMPERATURE	X				X	X	
T-4	ChillerSupTemp	CHILLER SUPPLY TEMPERATURE	X				X	X	
DPT-CHL	ChillerPressDiff	CHILLER PRESSURE DIFFERENTIAL	X						
DPT-CLG	ClgSysPress	SYSTEM PRESSURE	X				X	X	
R-1	ChillCtrl	CHILLER CONTROL				X			
CS-1	ChillStatus	CHILLER STATUS		X					

8 / M8.1 COOLING SYSTEM CONTROL

NO SCALE

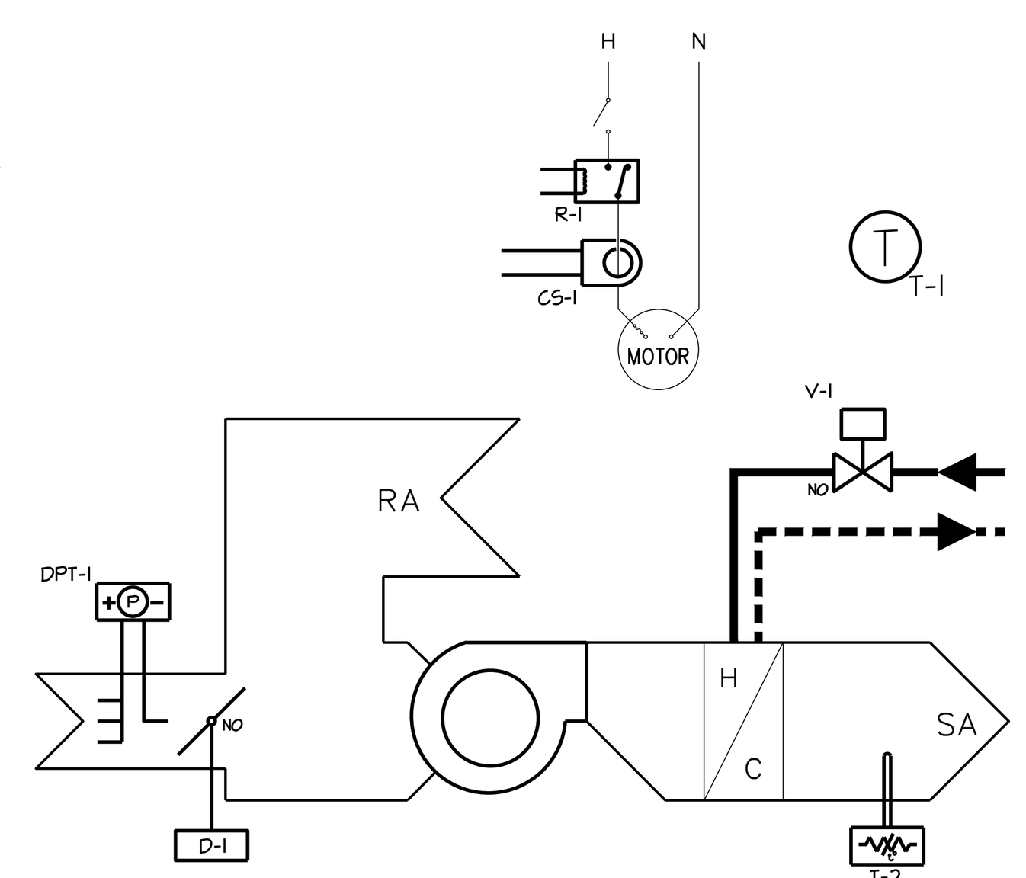
SEQUENCE OF OPERATION

CONTROL MODE: THE SPACE SHALL BE IN THE UNOCCUPIED, MORNING-WARMUP OR OCCUPIED CONTROL MODE. THE CONTROL MODE SHALL BE THE SAME AS THE CONTROL MODE OF THE ASSOCIATED AIR HANDLING UNIT. AN OVERRIDE BUTTON ON THE SPACE TEMPERATURE SENSOR SHALL ALLOW THE SPACE TO RETURN TO THE OCCUPIED MODE FOR AN ADJUSTABLE DURATION.

FAN CONTROL: IN THE OCCUPIED MODE, THE FAN SHALL BE ON. IN UNOCCUPIED MODE, IF THE SPACE TEMPERATURE DROPS BELOW THE REDUCED SPACE TEMPEREATURE, THE FAN SHALL START AND THE HEATING CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE SETPOINT.

TEMPERATURE SETPOINT CONTROL: IN THE MORNING-WARMUP OR OCCUPIED CONTROL MODE, THE TEMPERATURE SETPOINTS SHALL BE OBTAINED FROM THE SPACE TEMPERATURE SETPOINT DIAL. IN THE UNOCCUPIED CONTROL MODE, THE TEMPERATURE SETPOINTS SHALL BE SEPARATE NIGHT SETBACK/SETUP TEMPERATURE SETPOINTS THAT ARE ADJUSTABLE BY THE OPERATOR.

SPACE TEMPERATURE CONTROL: THE VAV DAMPER SHALL MODULATE OPEN AND CLOSED TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT. THE AIRFLOW THROUGH THE VAV BOX INLET SHALL NOT BE ALLOWED TO EXCEED THE MAXIMUM AIRFLOW SETPOINT OR DROP BELOW THE MINIMUM AIRFLOW SETPOINT. IF THE SPACE TEMPERATURE DROPS BELOW THE HEATING SETPOINT, THE VAV DAMPER SHALL BE POSITIONED TO MAINTAIN THE AIRFLOW AT THE HEATING AIRFLOW SETPOINT. THE AIRFLOW SETPOINTS SHALL BE ADJUSTABLE BY THE OPERATOR. WHEN THE VAV BOX IS IN THE HEAT MODE, THE HEATING VALVE ON THE SUPPLY LINE TO THE REHEAT COIL SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE AT THE HEATING SETPOINT. UPON LOSS OF POWER, THE HEATING VALVE SHALL BE OPEN.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-1	SpaceTempStpt	SPACE TEMPERATURE SETPOINT	X						
T-1	SpaceTemp	SPACE TEMPERATURE	X						
DPT-1	Airflow	INLET AIRFLOW	X						
T-2	DischTemp	DISCHARGE AIR TEMPERATURE	X				X	X	
D-1	VAVDamper	VAV DAMPER			X				
V-1	HtgValve	HEATING VALVE			X				
R-1	FanCtrl	FAN CONTROL				X			
CS-1	FanStatus	FAN STATUS		X					

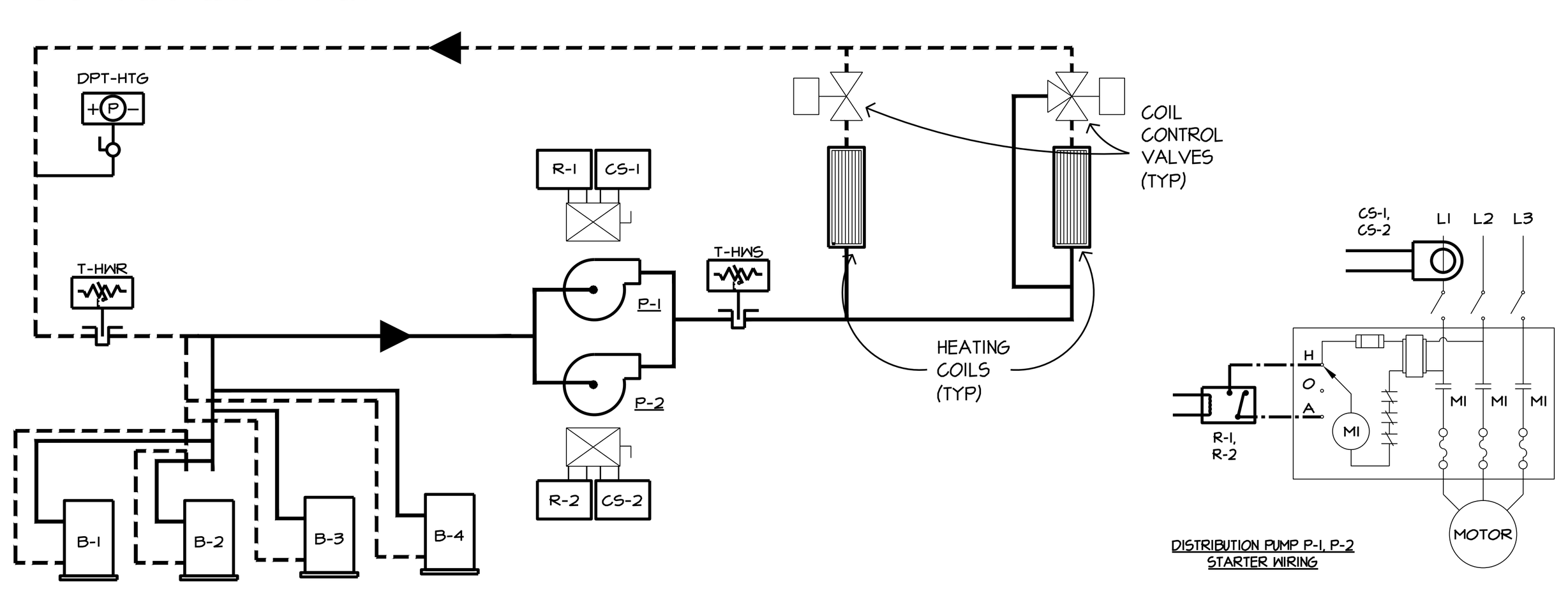
7 / M8.1 SERIES FAN POWERED VAV UNIT CONTROL

NO SCALE

HEATING PLANT SEQUENCE OF OPERATION:

BOILER ENABLE/DISABLE: THE BOILER MANAGEMENT SYSTEM SHALL ENABLE/DISABLE BOILER.

PUMP CONTROL: DURING OCCUPIED TIME, THE OPERATING PUMP SHALL RUN AND THE OTHER PUMP SHALL BE A STANDBY. DURING UNOCCUPIED TIME, IF A CALL FOR HEATING, THE OPERATING PUMP SHALL START. IF THE STATUS OF THE OPERATING PUMP CANNOT BE PROVEN, AN ALARM SHALL BE GENERATED AND THE STANDBY PUMP SHALL BECOME THE OPERATING PUMP. THE LEAD AND STANDBY PUMPS SHALL BE ROTATED EVERY WEEK. WHEN ONE OF THE DISTRIBUTION PUMPS IS RUNNING, THE HOT WATER SUPPLY AND RETURN TEMPERATURES SHALL BE MONITORED.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-HWR	HtgRetTemp	HEATING SYSTEM RETURN TEMPERATURE	X				X	X	
T-HWS	HtgSupTemp	HEATING SYSTEM SUPPLY TEMPERATURE	X				X	X	
DPT-HTG	HtgSysPress	SYSTEM PRESSURE	X				X	X	
R-1	P1Ctrl	DISTRIBUTION PUMP P-1 CONTROL				X			
R-2	P2Ctrl	DISTRIBUTION PUMP P-2 CONTROL				X			
R-3	HeatCtrl	BOILER SYSTEM CONTROL				X			
CS-1	P1Status	DISTRIBUTION PUMP P-1 STATUS		X					
CS-2	P2Status	DISTRIBUTION PUMP P-2 STATUS		X					

6 / M8.1 HEATING SYSTEM CONTROL

NO SCALE

SEQUENCE OF OPERATION

CONTROL MODE: THE AIR HANDLING UNIT SHALL BE IN THE UNOCCUPIED OR OCCUPIED CONTROL MODE. THE CONTROL MODE SHALL BE SELECTED BY AN ADJUSTABLE TIME SCHEDULE.

UNIT STARTUP: ON STARTUP FROM UNOCCUPIED MODE, THE RETURN AIR DAMPERS SHALL BE 100% OPEN, AND THE FRESH AIR DAMPER SHALL BE CLOSED FOR 30 MINUTES (ADJUSTABLE).

POWER FAILURE STARTUP: ON STARTUP FROM A POWER FAILURE, A RANDOM TIME DELAY OF 1 TO 5 MINUTES SHALL BE EXECUTED BEFORE STARTING THE SUPPLY FAN.

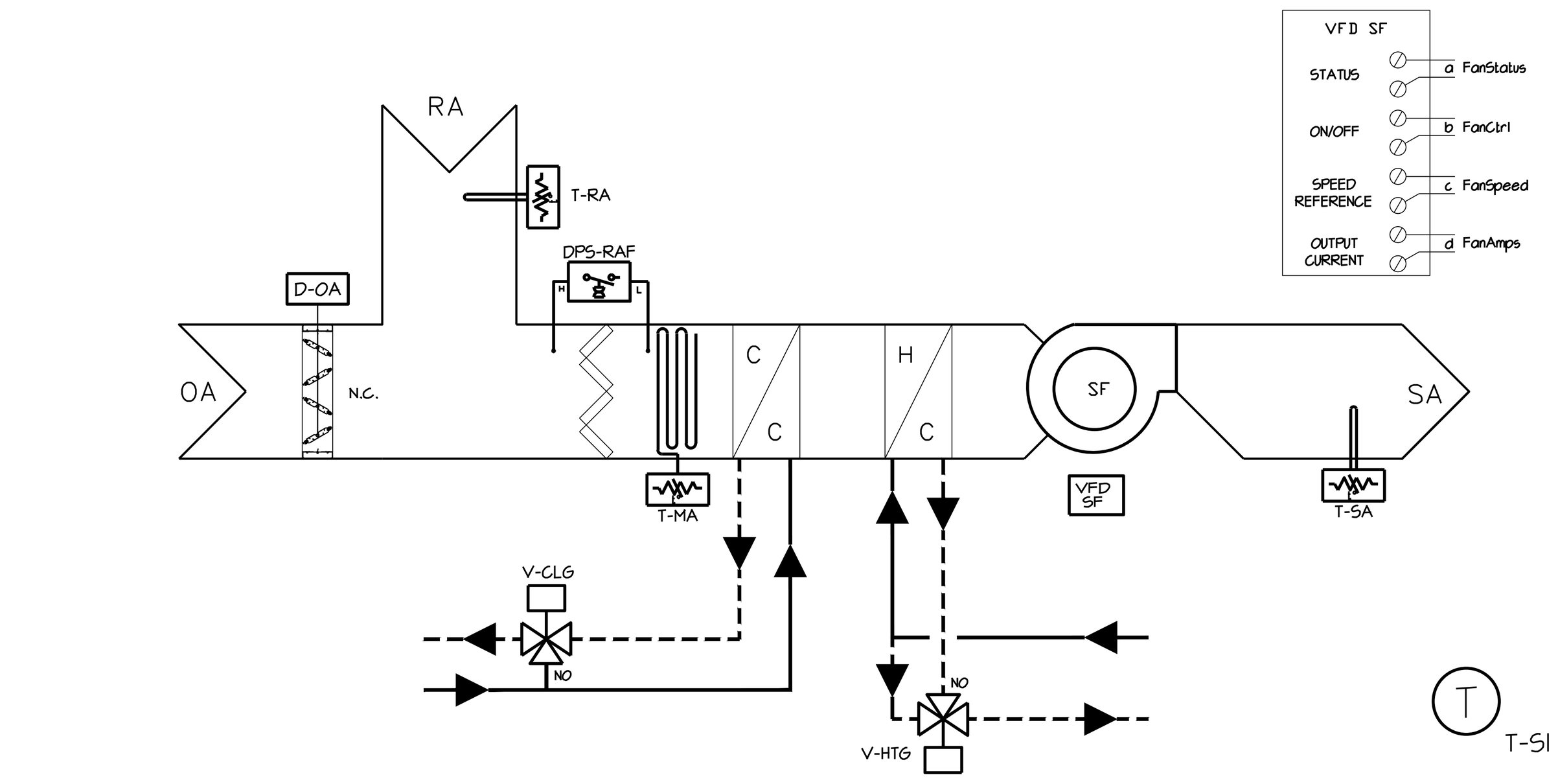
SUPPLY FAN CONTROL: THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE SET TO ON AT THE POINT DETERMINED BY THE BALANCING AGENCY. THE ACTUAL OUTPUT CURRENT OF THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE MONITORED. IF THE CURRENT DETECTED IS ABOVE OR BELOW THE NORMAL OPERATING CURRENT, A "SUPPLY FAN FAILURE" ALARM SHALL BE GENERATED.

UNOCCUPIED CONTROL: WHENEVER THE UNIT IS IN UNOCCUPIED MODE AS DETERMINED BY THE SCHEDULE, THE SUPPLY FAN SHALL CYCLE ON AS REQUIRED TO MAINTAIN A REDUCED SETBACK TEMPERATURE.

LOW TEMPERATURE SHUTDOWN: THE SUPPLY AIR TEMPERATURE SHALL BE MONITORED. WHENEVER A LOW TEMPERATURE CONDITION IS DETECTED, THE SUPPLY FAN SHALL BE TURNED OFF AND A "LOW TEMPERATURE SHUTDOWN" ALARM SHALL BE GENERATED.

DISCHARGE TEMPERATURE CONTROL: THE HEATING VALVE AND THE COOLING VALVE SHALL MODULATE IN SERIES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BY THE SPACE THERMOSTAT. IF THE HOT WATER PUMP SERVING THIS AIR HANDLING UNIT IS PROVEN RUNNING, THE HEATING CONTROL VALVE SHALL BE UNDER CONTROL. IF THE HOT WATER PUMP IS NOT PROVEN RUNNING, THE HEATING VALVE SHALL BE CLOSED TO PREVENT FLOW THROUGH THE COIL. IF THE SUPPLY FAN IS NOT PROVEN RUNNING, THE HEATING VALVE SHALL MODULATE TO MAINTAIN A MINIMUM TEMPERATURE INSIDE THE AIR HANDLING UNIT CASING. IF THE CHILLED WATER PUMP SERVING THIS AIR HANDLING UNIT IS PROVEN RUNNING, THE COOLING CONTROL VALVE SHALL BE UNDER CONTROL. IF THE SUPPLY FAN OR THE CHILLED WATER PUMP ARE NOT PROVEN RUNNING, THE COOLING VALVE SHALL BE CLOSED TO PREVENT FLOW THROUGH THE COIL.

FILTER STATUS: THE STATUS OF THE DIFFERENTIAL PRESSURE SWITCH INSTALLED ACROSS EACH FILTER BANK SHALL BE MONITORED. WHENEVER A DIRTY FILTER CONDITION IS DETECTED, A "DIRTY FILTER" WARNING SHALL BE GENERATED.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-S1	SpaceTemp	SPACE TEMPERATURE	X						
T-SA	SupAirTemp	SUPPLY AIR TEMPERATURE	X						
T-MA	MixAirTemp	MIXED AIR TEMPERATURE	X					X	
T-RA	RetAirTemp	RETURN AIR TEMPERATURE	X						
VFD-SF a	SupFanCtrl	SUPPLY FAN STATUS		X					
VFD-SF b	SupFanCtrl	SUPPLY FAN CONTROL				X			
VFD-SF c	SupFanSpeed	SUPPLY FAN VFD SPEED			X				
VFD-SF d	SupFanAmps	SUPPLY FAN MOTOR AMPS	X				X	X	DISPLAY IN HZ
V-HTG	HtgValve	HEATING VALVE			X				
V-CLG	ClgValve	COOLING VALVE			X				
D-OA	OADamper	OUTDOOR AIR DAMPER			X				
DPT-RAF	FiltStatus	RETURN AIR FILTER STATUS	X				X		

5 / M8.1 AHU-3 CONTROL

NO SCALE

SEQUENCE OF OPERATION

CONTROL MODE: THE AIR HANDLING UNIT SHALL BE IN THE UNOCCUPIED OR OCCUPIED CONTROL MODE. THE CONTROL MODE SHALL BE SELECTED BY AN ADJUSTABLE TIME SCHEDULE.

UNIT STARTUP: ON STARTUP FROM UNOCCUPIED MODE, THE RETURN AIR DAMPERS SHALL BE 100% OPEN, AND THE FRESH AIR AND RELIEF AIR DAMPERS SHALL BE CLOSED FOR 30 MINUTES (ADJUSTABLE).

POWER FAILURE STARTUP: ON STARTUP FROM A POWER FAILURE, A RANDOM TIME DELAY OF 1 TO 5 MINUTES SHALL BE EXECUTED BEFORE STARTING THE SUPPLY FAN.

SUPPLY FAN CONTROL: THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE SET TO ON AT THE POINT DETERMINED BY THE BALANCING AGENCY. THE ACTUAL OUTPUT CURRENT OF THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE MONITORED. IF THE CURRENT DETECTED IS ABOVE OR BELOW THE NORMAL OPERATING CURRENT, A "SUPPLY FAN FAILURE" ALARM SHALL BE GENERATED.

RETURN FAN CONTROL: THE RETURN FAN VARIABLE FREQUENCY DRIVE SHALL BE SET TO ON AT THE POINT DETERMINED BY THE BALANCING AGENCY. THE ACTUAL OUTPUT CURRENT OF THE RETURN FAN VARIABLE FREQUENCY DRIVE SHALL BE MONITORED. IF THE CURRENT DETECTED IS ABOVE OR BELOW THE NORMAL OPERATING CURRENT, A "RETURN FAN FAILURE" ALARM SHALL BE GENERATED.

UNOCCUPIED CONTROL: WHENEVER THE UNIT IS IN UNOCCUPIED MODE AS DETERMINED BY THE SCHEDULE, THE SUPPLY AND RETURN FANS SHALL CYCLE ON AS REQUIRED TO MAINTAIN A REDUCED SETBACK TEMPERATURE.

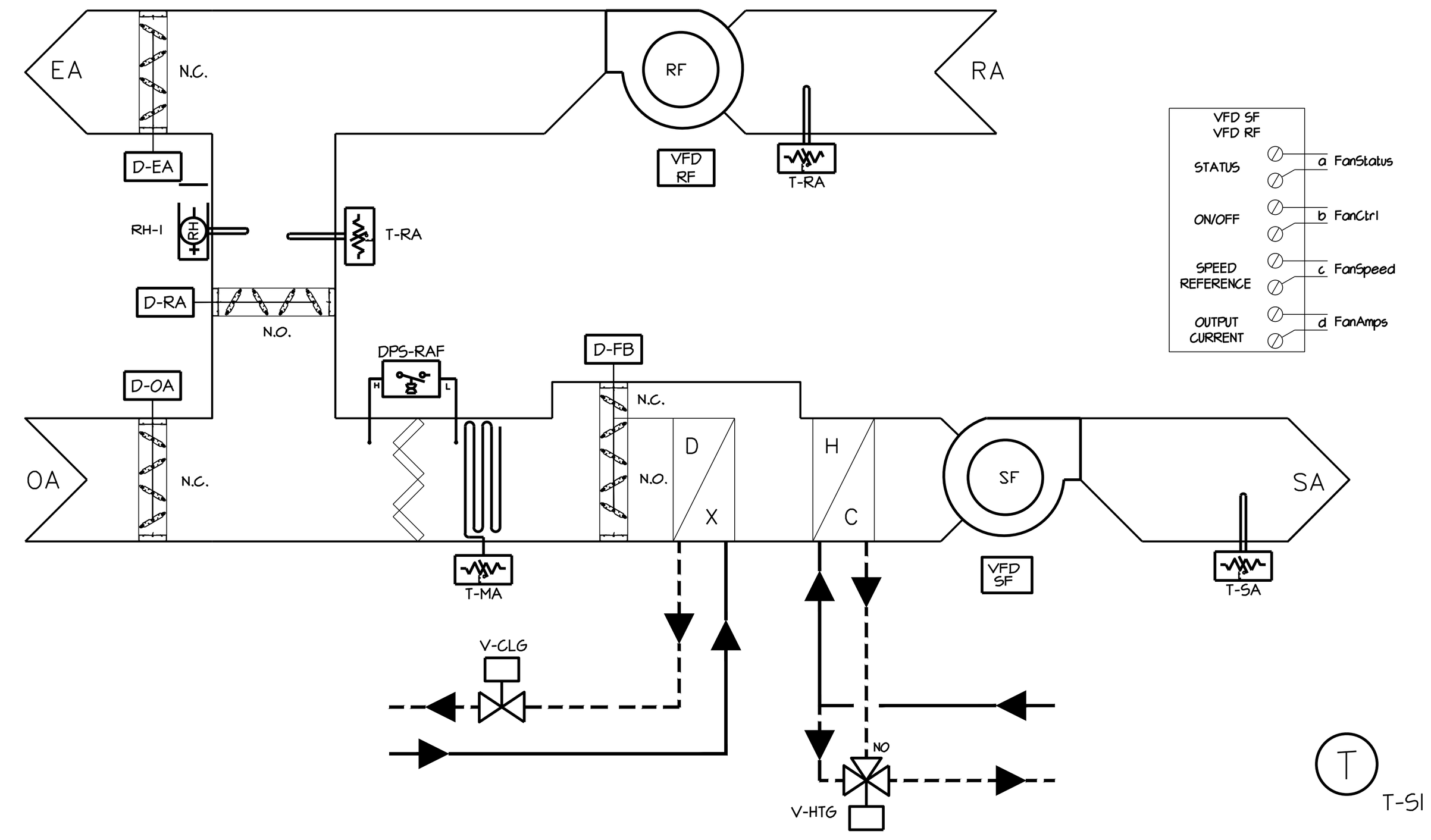
LOW TEMPERATURE SHUTDOWN: THE SUPPLY AIR TEMPERATURE SHALL BE MONITORED. WHENEVER A LOW TEMPERATURE CONDITION IS DETECTED, THE SUPPLY FAN SHALL BE TURNED OFF AND A "LOW TEMPERATURE SHUTDOWN" ALARM SHALL BE GENERATED.

DISCHARGE TEMPERATURE CONTROL: THE HEATING VALVE AND THE COOLING VALVE SHALL MODULATE IN SERIES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BY THE AVERAGE OF TWO (2) SPACE THERMOSTATS. IF THE HOT WATER PUMP SERVING THIS AIR HANDLING UNIT IS PROVEN RUNNING, THE HEATING CONTROL VALVE SHALL BE UNDER CONTROL. IF THE HOT WATER PUMP IS NOT PROVEN RUNNING, THE HEATING VALVE SHALL BE CLOSED TO PREVENT FLOW THROUGH THE COIL. IF THE SUPPLY FAN IS NOT PROVEN RUNNING, THE HEATING VALVE SHALL MODULATE TO MAINTAIN A MINIMUM TEMPERATURE INSIDE THE AIR HANDLING UNIT CASING. IF THE CHILLED WATER PUMP SERVING THIS AIR HANDLING UNIT IS PROVEN RUNNING, THE COOLING CONTROL VALVE SHALL BE UNDER CONTROL. IF THE SUPPLY FAN OR THE CHILLED WATER PUMP ARE NOT PROVEN RUNNING, THE COOLING VALVE SHALL BE CLOSED TO PREVENT FLOW THROUGH THE COIL.

COOLING COIL/FACE & BYPASS DAMPER CONTROL: A FACE & BYPASS DAMPER NORMALLY OPEN TO THE COOLING COIL SHALL MODULATE TO MAINTAIN THE RETURN AIR RELATIVE HUMIDITY AT 50% RH (ADJUSTABLE). IF THE RELATIVE HUMIDITY LEVEL EXCEEDS ITS SET POINT, THE COOLING COIL CONTROL VALVE SHALL GO TO FULL OPEN AND THE FACE & BYPASS DAMPER SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE.

ECONOMIZER CONTROL: IN THE OCCUPIED MODE AND WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 65 DEG F (ADJUSTABLE), THE FRESH AIR DAMPER, RETURN AIR DAMPER, AND RELIEF AIR DAMPER SHALL BE MODULATED TO MAINTAIN THE MIXED AIR TEMPERATURE AT DISCHARGE AIR TEMPERATURE SETPOINT. WHEN THE OUTDOOR AIR TEMPERATURE IS 65 DEG F OR ABOVE, THE FRESH AIR DAMPER SHALL BE SET TO MINIMUM POSITION. IN THE UNOCCUPIED MODE OR WHENEVER THE SUPPLY FAN IS OFF, THE FRESH AIR DAMPER AND THE RELIEF AIR DAMPER SHALL BE CLOSED AND THE RETURN AIR DAMPER SHALL BE OPEN.

FILTER STATUS: THE STATUS OF THE DIFFERENTIAL PRESSURE SWITCH INSTALLED ACROSS EACH FILTER BANK SHALL BE MONITORED. WHENEVER A DIRTY FILTER CONDITION IS DETECTED, A "DIRTY FILTER" WARNING SHALL BE GENERATED.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-S1	SpaceTemp	SPACE TEMPERATURE	X						
T-SA	SupAirTemp	SUPPLY AIR TEMPERATURE	X						
T-MA	MixAirTemp	MIXED AIR TEMPERATURE	X					X	
T-RA	RetAirTemp	RETURN AIR TEMPERATURE	X						
VFD-SF a	SupFanCtrl	SUPPLY FAN STATUS		X					
VFD-SF b	SupFanCtrl	SUPPLY FAN CONTROL				X			
VFD-SF c	SupFanSpeed	SUPPLY FAN VFD SPEED			X				
VFD-SF d	SupFanAmps	SUPPLY FAN MOTOR AMPS	X				X	X	DISPLAY IN HZ
VFD-RF a	RetFanStatus	RETURN FAN STATUS		X					
VFD-RF b	RetFanCtrl	RETURN FAN CONTROL				X			
VFD-RF c	RetFanSpeed	RETURN FAN VFD SPEED			X				DISPLAY IN HZ
VFD-RF d	RetFanAmps	RETURN FAN MOTOR AMPS	X				X	X	
V-HTG	HtgValve	HEATING VALVE			X				
V-CLG	ClgValve	COOLING VALVE			X				
D-OA	OADamper	OUTDOOR AIR DAMPER			X				
D-RA	RADamper	RETURN AIR DAMPER			X				
D-EA	EADamper	EXHAUST AIR DAMPER			X				
D-FB	FaceBypassDamper	FACE & BYPASS AIR DAMPER			X				
DPT-RAF	FiltStatus	RETURN AIR FILTER STATUS	X				X		
RH-1	RetAirRH	RETURN AIR RELATIVE HUMIDITY	X						

4 / M8.1 AHU-2 CONTROL

NO SCALE

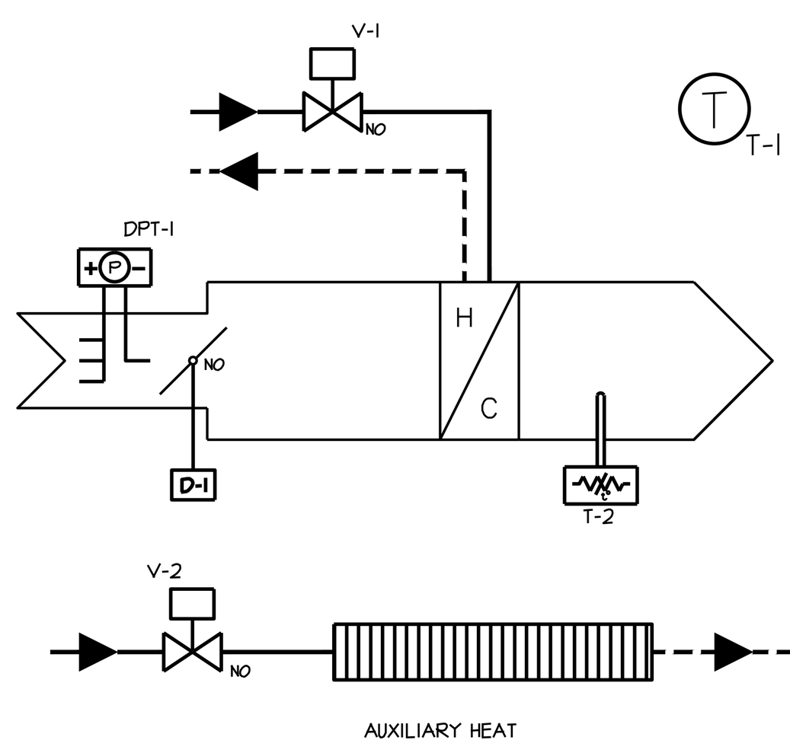
SEQUENCE OF OPERATION

CONTROL MODE: THE VAV TERMINAL UNIT SHALL BE IN THE UNOCCUPIED OR OCCUPIED CONTROL MODE. THE CONTROL MODE SHALL BE THE SAME AS THE CONTROL MODE OF THE ASSOCIATED AIR HANDLING UNIT. AN OVERRIDE BUTTON ON THE SPACE TEMPERATURE SENSOR SHALL ALLOW THE VAV UNIT TO RETURN TO THE OCCUPIED MODE FOR AN ADJUSTABLE DURATION.

TEMPERATURE SETPOINT CONTROL: IN THE OCCUPIED CONTROL MODE, THE TEMPERATURE SETPOINTS SHALL BE OBTAINED FROM THE SPACE TEMPERATURE SETPOINT DIAL. IN THE UNOCCUPIED CONTROL MODE, THE TEMPERATURE SETPOINTS SHALL BE SEPARATE NIGHT-SETBACK/SETUP TEMPERATURE SETPOINTS THAT ARE ADJUSTABLE BY THE OPERATOR.

SPACE TEMPERATURE CONTROL: THE VAV DAMPER SHALL BE MODULATED OPEN AND CLOSED TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT. THE AIRFLOW THROUGH THE VAV BOX INLET SHALL NOT BE ALLOWED TO EXCEED THE MAXIMUM AIRFLOW SETPOINT OR DROP BELOW THE MINIMUM AIRFLOW SETPOINT. IF THE SPACE TEMPERATURE DROPS BELOW THE HEATING SETPOINT, THE VAV DAMPER SHALL BE POSITIONED TO MAINTAIN THE AIRFLOW AT THE HEATING AIRFLOW SETPOINT. THE AIRFLOW SETPOINTS SHALL BE ADJUSTABLE BY THE OPERATOR. WHEN THE SPACE TEMPERATURE IS BELOW THE HEATING SETPOINT AND THE VAV DAMPER IS MAINTAINING THE HEATING AIRFLOW, THE HEATING VALVE ON THE SUPPLY LINE TO THE REHEAT COIL SHALL BE MODULATED TO MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT.

AUX. HEATING VALVE CONTROL: FOR ROOMS WITH AUXILIARY HEATING UNIT, THE AUXILIARY HEATING VALVE SHALL BE POSITIONED IN PARALLEL WITH THE TERMINAL COIL HEATING VALVE. UPON LOSS OF POWER, THE HEATING VALVE SHALL BE OPEN.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-1	SpaceTempStpt	SPACE TEMPERATURE SETPOINT	X						
T-1	SpaceTemp	SPACE TEMPERATURE	X				X	X	
DPT-1	Airflow	AIRFLOW	X						
T-2	DischTemp	DISCHARGE AIR TEMPERATURE	X						
D-1	VAVDamper	VARIABLE AIR VOLUME DAMPER			X				
V-1	HtgValve	HEATING VALVE			X				
V-2	AuxValve	AUXILLIARY HEATING VALVE			X				

3 / M8.1 VAV UNIT CONTROL

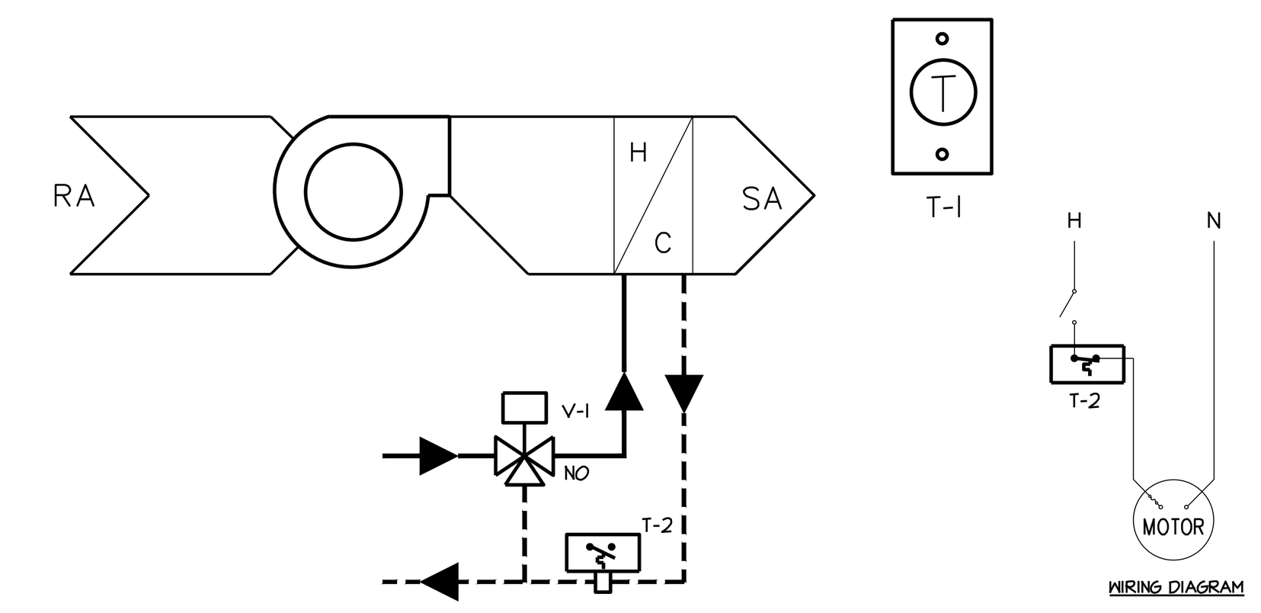
NO SCALE

SEQUENCE OF OPERATION

CONTROL MODE: THE CABINET UNIT HEATER SHALL BE IN THE UNOCCUPIED OR OCCUPIED CONTROL MODE.

TEMPERATURE SETPOINT CONTROL: IN THE OCCUPIED CONTROL MODE, THE ACTIVE TEMPERATURE SETPOINT SHALL BE THE OCCUPIED TEMPERATURE SETPOINT THAT IS ADJUSTABLE BY THE OPERATOR. IN THE UNOCCUPIED CONTROL MODE, THE ACTIVE TEMPERATURE SETPOINT SHALL BE A SEPARATE NIGHT-SETBACK TEMPERATURE SETPOINT THAT IS ADJUSTABLE BY THE OPERATOR.

SPACE TEMPERATURE CONTROL: WHEN THE SPACE TEMPERATURE IS BELOW THE ACTIVE SETPOINT, THE TWO-POSITION HEATING VALVE ON THE SUPPLY LINE TO THE UNIT HEATER COIL SHALL BE OPEN TO MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE SETPOINT. A STRAP-ON AQUASTAT ON THE RETURN LINE FROM THE UNIT HEATER COIL SHALL CYCLE THE UNIT HEATER FAN. UPON LOSS OF POWER, THE HEATING VALVE SHALL BE OPEN.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-1	SpaceTempStpt	SPACE TEMPERATURE SETPOINT	X						
T-1	SpaceTemp	SPACE TEMPERATURE	X						
T-2	-	AQUASTAT	<--------------hard-wired-------------->						
V-1	HtgValve	HEATING VALVE				X			

2 / M8.1 CABINET UNIT HEATER CONTROL

NO SCALE

SEQUENCE OF OPERATION:

CONTROL MODE: THE AIR HANDLING UNIT SHALL BE IN THE UNOCCUPIED OR OCCUPIED CONTROL MODE. THE CONTROL MODE SHALL BE SELECTED BY AN ADJUSTABLE TIME SCHEDULE.

UNIT STARTUP: ON STARTUP FROM UNOCCUPIED MODE, THE RETURN AIR DAMPERS SHALL BE 100% OPEN, AND THE FRESH AIR AND RELIEF AIR DAMPERS SHALL BE CLOSED FOR 30 MINUTES (ADJUSTABLE).

POWER FAILURE STARTUP: ON STARTUP FROM A POWER FAILURE, A RANDOM TIME DELAY OF 1 TO 5 MINUTES SHALL BE EXECUTED BEFORE STARTING THE SUPPLY FAN.

SUPPLY FAN CONTROL: THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE SET TO ON AT THE POINT DETERMINED BY THE BALANCING AGENCY. THE ACTUAL OUTPUT CURRENT OF THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL BE MONITORED. IF THE CURRENT DETECTED IS ABOVE OR BELOW THE NORMAL OPERATING CURRENT, A "SUPPLY FAN FAILURE" ALARM SHALL BE GENERATED.

RETURN FAN CONTROL: THE RETURN FAN VARIABLE FREQUENCY DRIVE SHALL BE SET TO ON AT THE POINT DETERMINED BY THE BALANCING AGENCY. THE ACTUAL OUTPUT CURRENT OF THE RETURN FAN VARIABLE FREQUENCY DRIVE SHALL BE MONITORED. IF THE CURRENT DETECTED IS ABOVE OR BELOW THE NORMAL OPERATING CURRENT, A "RETURN FAN FAILURE" ALARM SHALL BE GENERATED.

LOW TEMPERATURE DETECTION CONTROL: THE STATUS OF A LOW TEMPERATURE DETECTION SWITCH (TS-1) INSTALLED ON THE ENTERING SIDE OF THE COOLING COIL SHALL BE MONITORED. WHENEVER A LOW TEMPERATURE CONDITION IS DETECTED, THE SUPPLY AND RETURN FANS SHALL BE STOPPED AND "LOW AIR TEMPERATURE" ALARM SHALL BE DISPLAYED ON THE OPERATOR WORKSTATION. THE OPERATOR SHALL HAVE THE ABILITY TO RESTART THE FANS AFTER ACKNOWLEDGING THE ALARM.

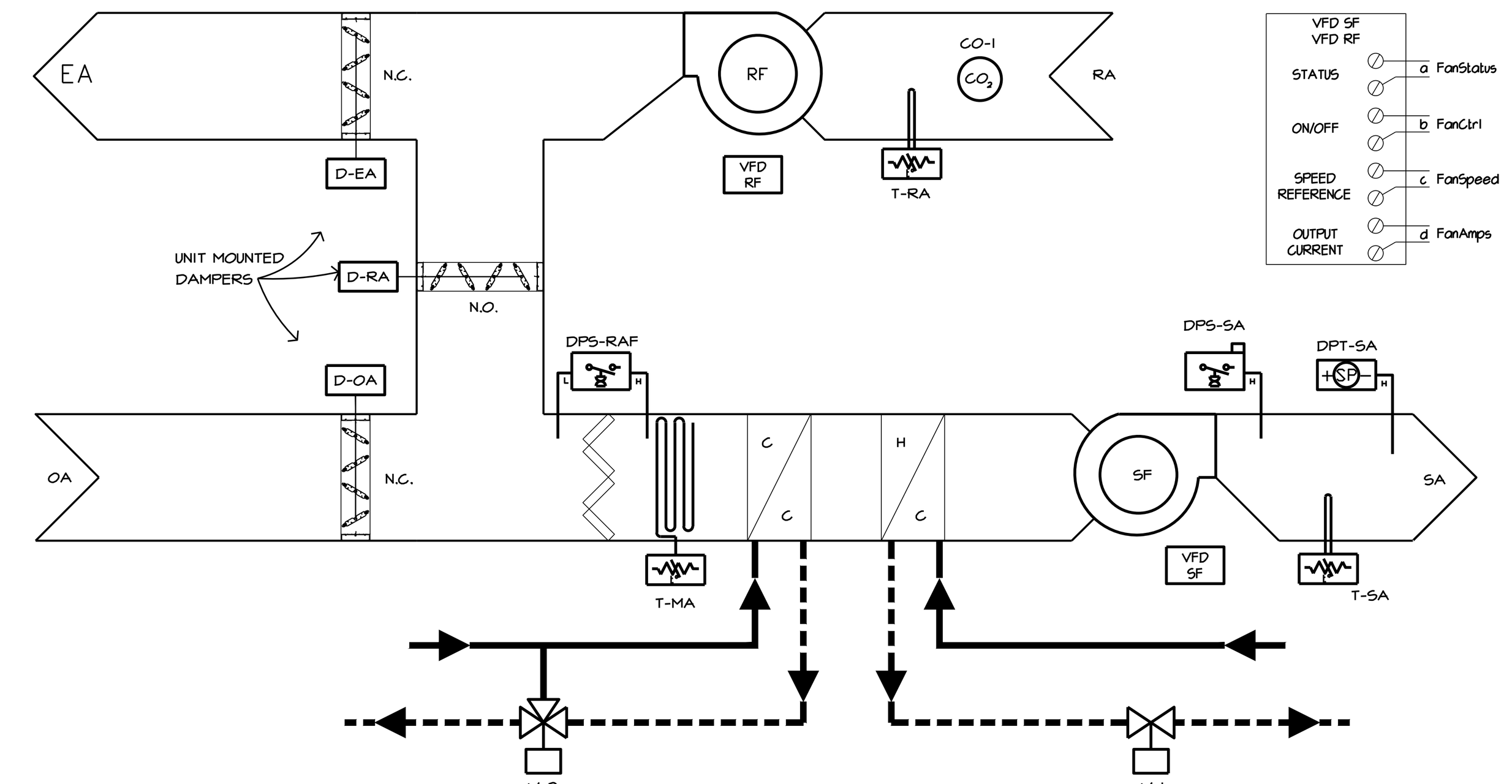
OUTSIDE AIR DAMPER CONTROL: THE OUTSIDE AIR DAMPER SHALL BE CONTROL BY CARBON DIOXIDE SENSOR (CO-1) IN THE RETURN AIR DUCTWORK. THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN A 700 PPM (ADJ.) OFFSET BETWEEN OUTSIDE AIR AND AIR IN THE RETURN DUCT.

ECONOMIZER CONTROL: IN THE OCCUPIED MODE AND WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 65 DEG F (ADJUSTABLE), THE OUTDOOR AIR DAMPER, RETURN AIR DAMPER, AND RELIEF AIR DAMPER SHALL BE MODULATED TO MAINTAIN THE MIXED AIR TEMPERATURE AT 55 DEG F (ADJUSTABLE). WHEN THE OUTDOOR AIR TEMPERATURE IS 65 DEG F OR ABOVE, THE OUTDOOR AIR DAMPER SHALL BE SET TO MINIMUM POSITION. THE MINIMUM FRESH AIR QUANTITY SHALL BE DETERMINED BY CARBON DIOXIDE SENSOR. IN THE UNOCCUPIED MODE, NIGHT CYCLE OR WHENEVER THE SUPPLY FAN IS OFF, THE OUTDOOR AIR DAMPER AND THE RELIEF AIR DAMPER SHALL BE CLOSED AND THE RETURN AIR DAMPER SHALL BE OPEN.

FILTER STATUS: THE STATUS OF A FILTER STATUS SWITCH INSTALLED ACROSS EACH FILTER BANK SHALL BE MONITORED. WHENEVER A DIRTY FILTER CONDITION IS DETECTED, A "DIRTY FILTER" WARNING SHALL BE DISPLAYED ON THE OPERATOR WORKSTATION.

MAIN COOLING COIL CONTROL: IF THE CHILLED WATER PUMP SERVING THIS AIR HANDLING UNIT IS PROVEN RUNNING, THE CHILLED WATER CONTROL VALVE (V-2) SHALL MODULATE TO MAINTAIN THE COOLING COIL LEAVING AIR TEMPERATURE AT 55 DEG F (ADJUSTABLE). IF THE CHILLED WATER PUMP IS NOT RUNNING, THE CONTROL VALVE SHALL BE CLOSED TO PREVENT FLOW THROUGH THE COIL.

MAIN HEATING COIL CONTROL: THE HOT WATER CONTROL VALVE (V-1) SHALL MODULATE TO MAINTAIN THE AIR HANDLING UNIT DISCHARGE TEMPERATURE AT 55 DEG F (ADJUSTABLE). IF THE FRESH AIR DAMPER IS PAST MINIMUM POSITION, THE HOT WATER VALVE SHALL BE CLOSED. IF THE SUPPLY FAN IS OFF, THE HOT WATER VALVE SHALL BE OPEN AND MODULATE TO MAINTAIN A MINIMUM TEMPERATURE IN THE AIR-HANDLING UNIT CASING.



POINT SCHEDULE									
CONTROL DEVICE	POINT NAME	POINT DESCRIPTION	POINT TYPE				ALARM		NOTES
			AI	BI	AO	BO	HI	LOW	
T-SA	DischAirTemp	DISCHARGE AIR TEMPERATURE	X						
T-RA	RetAirTemp	RETURN AIR TEMPERATURE	X						
T-MA	MixAirTemp	MIXED AIR TEMPERATURE	X					X	
DPS-RAF	RetFiltStatus	RETURN FILTER STATUS		X					
DPT-SA	SupDuctPress	SUPPLY DUCT PRESSURE	X						
VFD-SF a	SupFanStatus	SUPPLY FAN STATUS		X					
VFD-SF b	SupFanCtrl	SUPPLY FAN CONTROL				X			
VFD-SF c	SupFanSpeed	SUPPLY FAN VFD SPEED			X				DISPLAY IN HZ
VFD-SF d	SupFanAmps	SUPPLY FAN MOTOR AMPS	X				X	X	
VFD-RF a	RetFanStatus	RETURN FAN STATUS		X					
VFD-RF b	RetFanCtrl	RETURN FAN CONTROL				X			
VFD-RF c	RetFanSpeed	RETURN FAN VFD SPEED			X				DISPLAY IN HZ
VFD-RF d	RetFanAmps	RETURN FAN MOTOR AMPS	X				X	X	
V-HTG	HtgValve	HEATING VALVE			X				
V-CLG	ClgValve	COOLING VALVE			X				
D-OA	OADamper	OUTDOOR AIR DAMPER			X				
D-RA	RADamper	RETURN AIR DAMPER			X				
D-EA	EADamper	EXHAUST AIR DAMPER			X				
CO-1	CarbonSens	CARBON DIOXIDE SENSOR	X				X		

1 / M8.1 AHU-1 CONTROL

NO SCALE

ZERR BERG ARCHITECTS
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701-280-0187 • Fax 701-280-9021

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CONSTRUCTION MANAGEMENT - COST ESTIMATING - DESIGN/BUILD

ONE BUILDING SYSTEMS CONSULTANTS
Fargo ▪ Grand Forks ▪ Bismarck
Alexandria ▪ 877.380.0501

MECHANICAL SHEET INDEX

ROOM SCHEDULE

20	RESOURCE
21	RESOURCE
22	CLASSROOM
23	STORAGE
24	TOILET
25	CLASSROOM
26	CLASSROOM
27	STORAGE
28	TOILET
29	CLASSROOM
30	GIRLS TOILET
31	BOYS TOILET
32	TOILET VESTIBULE
33	P.E. OFFICE
34	ACTIVITIES GYMNASIUM
35	GYMNASIUM STORAGE
36	CLASSROOM
37	STORAGE
38	TOILET
39	CLASSROOM
40	CLASSROOM
41	STORAGE
42	TOILET
43	CLASSROOM
44	CUSTODIAN
45	STAFF TOILET
200	MECHANICAL ROOM
226A	MEDIA CENTER
226B	FAMILY CONFERENCE ROOM
226C	VESTIBULE
226D	STORAGE
C01	CORRIDOR
C02	CORRIDOR
C03	CORRIDOR
C04	CORRIDOR
C05	CORRIDOR
C06	CORRIDOR
C07	CORRIDOR
C08	CORRIDOR
C09	CORRIDOR
S01	STAIR
V01	VESTIBULE

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Engineer under the laws of the State of Minnesota.

Print Name: James E. Nelson

Signature: James E. Nelson

Date: 3/20/2014 Registration No. 19509

MOORHEAD AREA PUBLIC SCHOOLS

Moorhead Area Public Schools Improvements
Probstfield Elementary School Addition

Moorhead, Minnesota

CONTROL SEQUENCES

Project No: 2013304
Date: March 20, 2014

M8.1

April 3, 2014

Jim Cole
Zerr Berg Architects
510 4th Ave. N.
Fargo, ND 58102

RE: Probstfield Elementary School Addition
Addendum No. 1 – Electrical Items
MBN Project No. 13-229

Please include the following items in the next addendum issued for the project:

Changes to the Drawings:

SHEET E2.0

1. Gymnasium 34: Revise switching of the shaded north type H1 fixture to 'x' in lieu of 'w'.

SHEET E3.0

1. Door S01.1: Add 120V connection for electric strike, connect to circuit L1D-30. Provide rough in for owner provided card reader at this door.
2. Door 35: Add 120V connection for electric strike in removable mullion, connect to circuit L1D-32. Provide rough in for owner provided card reader at this door.
3. Door 44: Add 120V connection for electric strike, connect to circuit L1D-40. Provide rough in for owner provided card reader at this door.

SHEET E4.0

1. Add wall mounted telephone jack adjacent to gymnasium control cabinet in Corridor C08.
2. Door S01.1: Add card reader wiring and connections to electric strike, see Detail 3/E6.0 for typical requirements.
3. Door 35: Add card reader wiring and connections to electric strike, see Detail 3/E6.0 for typical requirements.
4. Door 44: Add card reader wiring and connections to electric strike, see Detail 3/E6.0 for typical requirements.

Changes to the Specifications:

Section 27-5125 Sound Reinforcement Systems:

1. Delete Paragraph 1.03.B in its entirety.
2. Paragraph 2.02.G Wireless Microphones: Revise to Shure ULXP Series.

Prior Approvals:

Section 26-5100 Interior Lighting

Fixture Type:	Manufacturer:	Series
B1	Columbia	LSER24 Series
	Lithonia	2FSL4 Series
	LSI	PEC24 Series
	Daybrite	AVE Series
B2	Columbia	LSER22 Series
	Lithionia	2FSL2 Series
	LSI	PEC22 Series
	Daybrite	AVE Series
F1	Metalux	SN-LED Series
	Lithonia	ZL2N Series
H1	Columbia	LLHV Series
	Lithonia	IBL Series
	GE	ABHX Series
	Daybrite	FBL Series
W1	Hubbell	PGM Series
	Specgrade	WP Series
	ELCAST	CWP Series
	Philips	WP Series
AA1	Kim Lighting	ALT240 Series
	Lithonia	CSX2 Series
	LSI	XSB Series

END OF ADDENDUM NO. 1