DANE COUNTY DEPARTMENT of PUBLIC WORKS, HIGHWAY and TRANSPORTATION

County Executive
Kathleen M. Falk

1919 Alliant Energy Center Way ◆ Madison, Wisconsin 53713
Phone: (608) 266-4018 ◆ Fax: (608) 267-1533

Commissioner / Director
Gerald J. Mandli

December 21, 2009

ATTENTION ALL REQUEST FOR BID (RFB) HOLDERS

RFB NO. 309030 - ADDENDUM NO. 1

PUBLIC SAFETY COMMUNICATIONS CENTER

INFRASTRUCTURE UPGRADES

BIDS DUE: THURSDAY, JANUARY 7, 2010, 2:00 PM. DUE DATE AND TIME **ARE** CHANGED BY THIS ADDENDUM.

This Addendum is issued to modify, explain or clarify the original Request for Bid (RFB) and is hereby made a part of the RFB. Acknowledge receipt of this Addendum by inserting the number and issue date off this addendum in the blank space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification. Please attach this Addendum to the RFB.

CHANGES TO PROJECT MANUAL

General

1) Cover
   a) MODIFY Bid Opening Date/Time to: THURSDAY, JANUARY 7, 2010 / 2:00 PM

2) Invitation to Bid
   a) MODIFY Bid Opening time to: 2:00 PM, THURSDAY, JANUARY 7, 2010

3) Bid Form
   a) REMOVE the bid form entirely and REPLACE with attached revised bid form.

4) Pre-bid Conference
   a) See attached sign in sheet from pre-bid conference held December 16, 2009

Electrical Specifications

5) Add specifications section 26 22 00 Low Voltage Transformer as attached.

6) Add specification section 26 33 33 Automatic Static Transfer Switch as attached.

7) Section 26 33 53, Page 11: Delete lines 38 thru 43, Load bus synchronization.

8) Section 26 33 53, Page 11: Delete lines 50 thru 52, Battery circuit breaker.

9) Section 26 33 53, Page 12: Delete lines 1 thru 4.

CHANGES TO DRAWINGS

Architectural Drawings

1) Sheet AD2.1
   a) Drawing 1 Demolition Plan
   REVISE drawing per attached drawing A/SD-1 for additional demolition.

2) Sheet A2.1
   a) Drawing 1 Floor Plan
   REVISE drawing per attached drawing A/SD-2 for adding door 122 and modifying landing and millwork cubbies at door 103.

3) Sheet A3.1
   a) ADD the following general note to this sheet: "General Contractor to perform all roofing modifications including roof membrane, flashing and insulation changes required to complete the work. See HVAC drawings H3.1 and detail H/H4.1 for additional roofing modifications at penthouse roof. Coordinate work with HVAC contractor."

4) Sheet A2.2
   a) Drawing 1 Reflected Ceiling Plan
   REVISE drawing per attached drawing A/SD-3 for ceiling modification at added door 122.

5) Sheet A5.1
   a) Door Schedule
   REVISE door schedule per attached drawing A/SD-4 for added door 122.
   b) Drawing 7 Handrail Modification – Rm 103
   REVISE drawing per attached drawing A/SD-5 for handrail change at landing.
   c) Drawing 8 Interior Elevation at Staff Entry
   REVISE drawing per attached drawing A/SD-6 for millwork cubbies change.

HVAC Drawings

6) Sheet H3.2
   a) Drawing A; HVAC NEW WORK PLAN – PENTHOUSE ALTERNATE BID 1
   ADD attached drawing H3.2 for clarification of piping and equipment not required.

7) Sheet H4.1
   a) Drawing H; RAIL DETAIL
   ADD drawing per attached drawing H/SD-4 for clarification of mechanical and general contractor's responsibility of cutting and patching of roof.

8) Sheet HD2.1
   a) HVAC Demolition Plan - Ductwork
   REVISE drawing per attached drawing H/SD-1 for revising Keyed Note 6, revising Keyed Note 7, removing existing smoke eater, and removing existing exhaust fan EF-2.
   b) HVAC Demolition Plan - Piping
   REVISE drawing per attached drawing H/SD-2 to clarify the removal of the existing AHU, the existing humidifier, and the existing temperature control panels.

Electrical Drawings

9) Sheet E 2.1: Mech 116 & Corr 131; Modify fixtures as noted on attached drawing E/SD-1.

10) Sheet E 2.1: Computer Equipment 120; add isolation transformer IS-1 adjacent to static transfer switch. See attached drawing E/SD-2.

11) Sheet E5.1: Detail B/E5.1 Electrical One Line Diagram – New Work;
    a) Delete specific notes 4 & 5.
    b) Delete two (2)100A, 3 pole contactors & two (2) 200A, 3 pole contactors from feeders to UPS A & UPS B.
    c) Delete load bus sync control panel and control wiring to UPS A & B.
    d) Modify one line diagram for automatic static transfer switch. See attached drawing E/SD-3

Information Technology Drawings

12) Sheet T2.1
    a) Existing Rack Elevations detail C/T2.1
    A set of T/SD sketches will be issued with Addendum #2 indicating route for Optical Fiber Cable called out to be installed in detail note 6.

Plumbing Drawings

13) Sheet P2.1
    a) Drawing A; New Work Plan - Fire Protection
    REVISE drawing per attached drawing P/SD-1 for change to automatic sprinkler designation.

END OF ADDENDUM

For additional information about this Addendum, please call Steve Richards at 608/219-6339, or email questions to richards.steven@co.dane.wi.us.

Sincerely,
Rob Nebel
Project Manager

Enclosures:
Pre-Bid Tour Attendance Sheet
Revised Bid Form
Section 26 22 00 - Low Voltage Transformer
Section 26 33 33 – Automatic Static Transfer Switch
Drawings:
A/SD-1 thru A/SD-6
H/SD-1, H/SD-2, and H/SD-4
H3.2
E/SD-1 thru E/SD-3
P/SD-1

12/16/2009
RFB No. 309030

Pre-Bid Conference
Public Safety Communications Infrastructure Upgrades
Sign In Sheet

Company:	Tri-North	E-mail:	jroach@tri-north.com
Name:	Jerry Roach		
Company:	Avenue Contractors	E-mail:	sbrykczynkski@avenuecontractors.inc
Name:	Steve Brykczynski		
Company:	H.J. Pertzborn	E-mail:	dgriesbach@hjpertzborn.com
Name:	Dave Griesbach		
Company:	KBS Construction	E-mail:	Toddk@kbsconstruction.com
Name:	Todd Krcma		
Company:	FSI	E-mail:	csanford1@wi.rr.com
Name:	Craig Sanford		
Company:	Hill Electric	E-mail:	Jbeyer@hillelectric.tv
Name:	Jim Beyer		
Company:	Hill Electric	E-mail:	jbujar@hillelectric.tv
Name:	John Bujar		
Company:	Thermo Dynamics	E-mail:	andyh@tdhvac.com
Name:	Andy Harrah		
Company:	Bauer & Raether	E-mail:	BMC@chorus.net
Name:	Beverly Conner		
Company:	Bauer & Raether	E-mail:	dbauer@chorus.net
Name:	Dennis Bauer		
Company:	Miron Construction	E-mail:	andrew.daniels@miron-construction.net
Name:	Andrew Daniels		
Company:	H & H Industries	E-mail:	rreuschlein@hhindustries.com
Name:	Randy Reuschlein		
Company:	Kilgust Mechanical	E-mail:	barryb@kilgust.com
Name:	Barry Bresee		
Company:	JH Findorff	E-mail:	aterney@Findorff.com
Name:	Austin Tierney		
Company:	H & H Electric	E-mail:	Jmccann@hhelectric.com
Name:	Jason McCann		
Company:	H & H Electric	E-mail:	msimonson@hhelectric.com
Name:	Mike Simonson		
Company:	Electri-Tec	E-mail:	brett@electrci-tec.com
Name:	Brett P.		

_____

Name of Bidding Firm

BID FORM

BID NO. 309030
PROJECT: DANE COUNTY PUBLIC SAFETY COMMUNICATION CENTER INFRASTRUCTURE UPGRADES
CITY-COUNTY BUILDING

TO: DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION PROJECT ENGINEER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

BASE BID - LUMP SUM:

Work includes construction services for office space remodel of approximately 10,000 sq. ft. including drywall partitions, flooring, ceiling, HVAC, electrical and fire protection. The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Department of Public Works, Highway & Transportation hereby agrees to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and _____ /100 Dollars
Written Price

$_____
Numeric Price

The undersigned further agrees to add the alternate(s) portion of the Work as described, for the following addition(s) to or subtraction(s) from the Base Bid stipulated below. They further agree to honor the alternate(s) bid for 60 days from date of Award of Contract.

ALTERNATE BID 1 - LUMP SUM:
Provide credit for deleting plate to plate heat exchanger HX-1 and all associated piping and controls to that unit. Replace heat recovery chillers CH-1 and CH-2 with normal chillers at the same conditions as scheduled for the heat recovery chillers. See Drawing H3.2

_____ and _____ /100 Dollars
Written Price

$_____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 2 – LUMP SUM:
Provide a price addition for providing variable frequency drives (VFD) on each existing heating pumps (P-1 and P-2) located on the second floor which serve the first floor heating water system. Provide controls to operate the pumps using the VFDs. The two pumps are 7.5 horse power each, 460 volt 3 phase. Do not provide a bypass for the VFDs.

_____ and _____ /100 Dollars
Written Price

$_____
Numeric Price (circle: Add or Deduct)

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

Dane County Department of Public Works must have this project completed by May 27, 2010. Assuming this Work can be started by January 27, 2010, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

I hereby certify that all statements herein are made on behalf of:

_____

(Name of Corporation, Partnership or Person submitting Bid)

Select one of the following:
1. A corporation organized and existing under the laws of the State of _____, or

2. A partnership consisting of _____, or

3. A person conducting business as _____;

Of the City, Village, or Town of _____ of the State of _____.

I have examined and carefully prepared this Bid from the associated Construction Documents and have checked the same in detail before submitting this Bid; that I have full authority to make such statements and submit this Bid in (its) (their) (my) behalf; and that the said statements are true and correct. In signing this Bid, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a Bid; that this Bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; that this Bid has not been knowingly disclosed prior to the opening of Bids to another bidder or competitor; that the above statement is accurate under penalty of perjury.

SIGNATURE: _____

(Bid is invalid without signature)

Print Name: _____ Date: _____

Title: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Contact Person: _____

THIS PAGE IS FOR BIDDERS' REFERENCE AND NEED NOT BE SUBMITTED WITH BID FORM.

BID CHECK LIST:
These items **must** be included with Bid:
☐ Bid Form (pg. 1-3) ☐ Bid Bond ☐ Fair Labor Practices Certification

BIDDERS SHOULD BE AWARE OF THE FOLLOWING:

DANE COUNTY VENDOR REGISTRATION PROGRAM

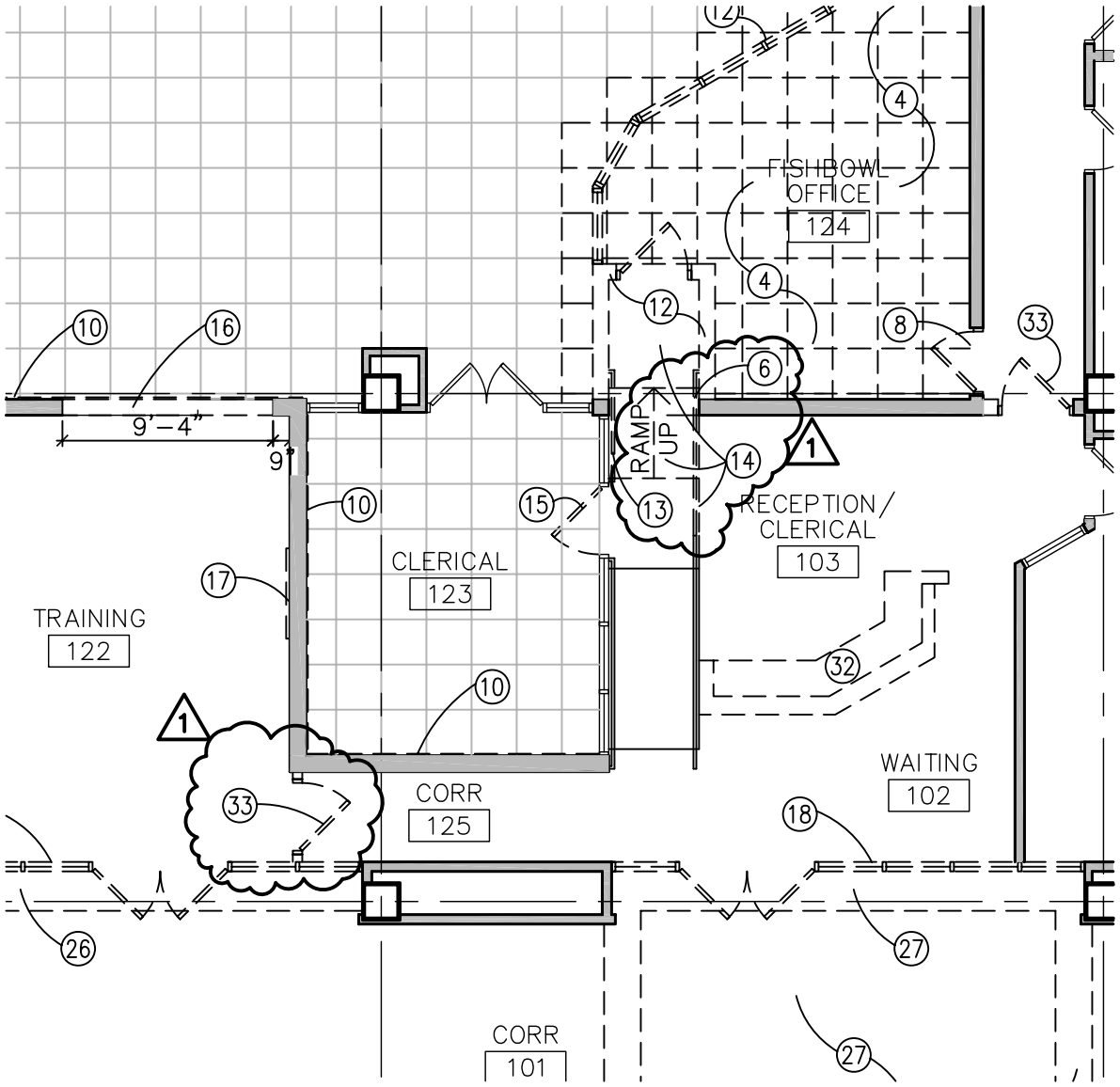
Any person bidding on any County contract must be registered with the Dane County Purchasing Division & pay an annual registration fee. A contract will not be awarded to an unregistered vendor. Obtain a *Vendor Registration Form* by calling 608/266-4131 or complete a new form or renewal one online at:
www.danepurchasing.com/registration

DANE COUNTY BEST VALUE CONTRACTING PRE-QUALIFICATION

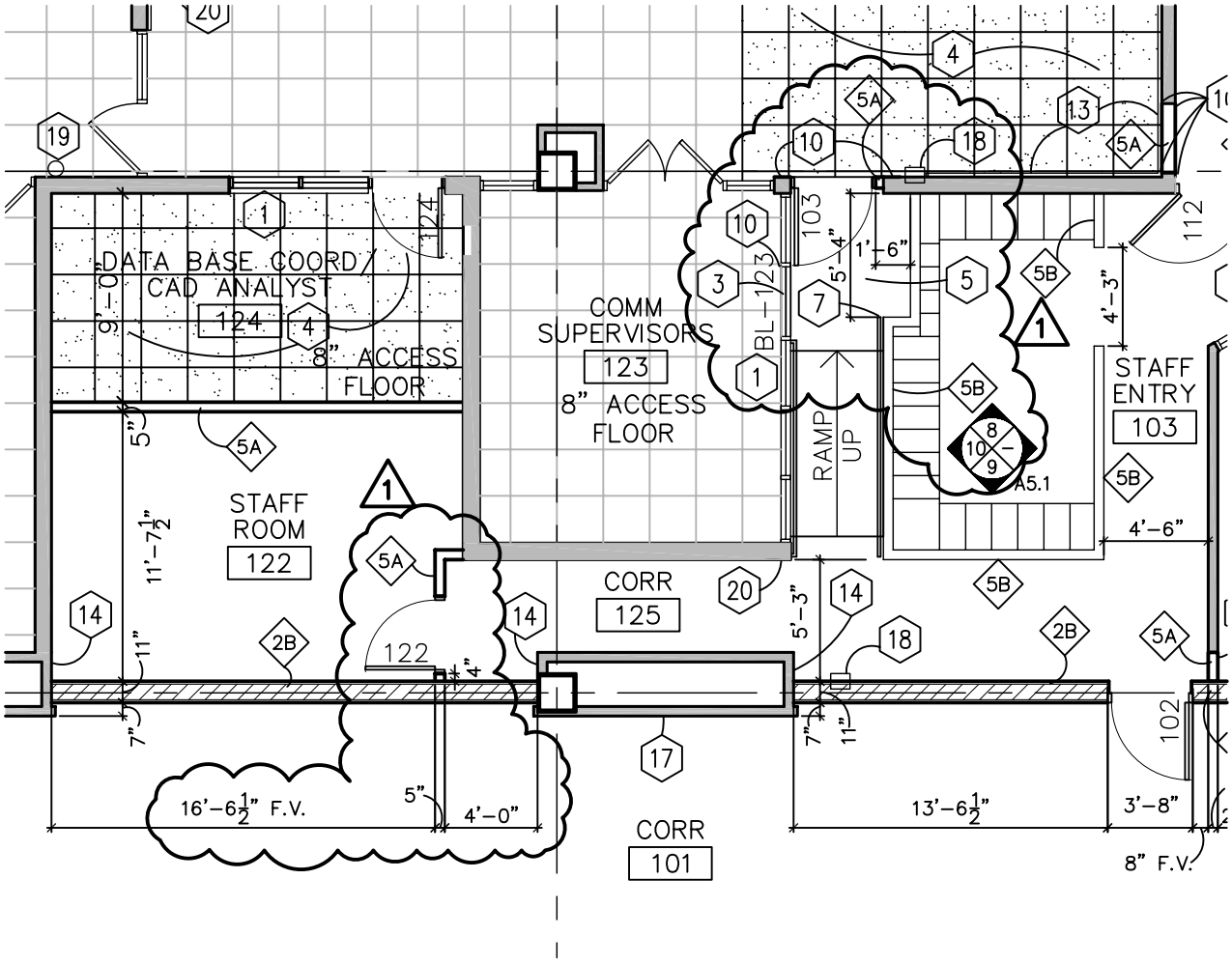
Contractors must be pre-qualified as a Best Value Contractor with the Dane County Public Works Engineering Division before the award of contract. Obtain a *Best Value Contracting Application* by calling 608/266-4018 or complete one online at:
www.co.dane.wi.us/pwht/BVC_Application.aspx

EQUAL BENEFITS REQUIREMENT

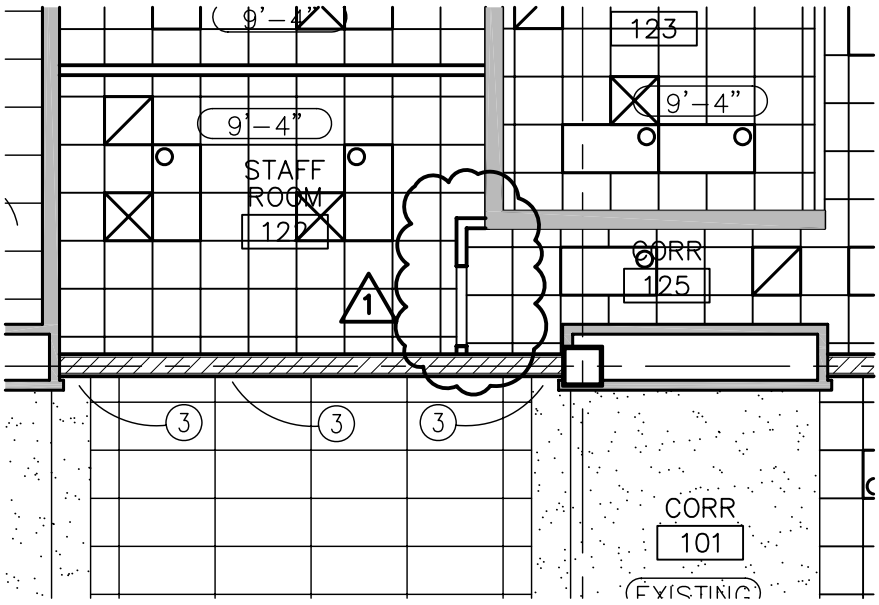
By submitting a Bid, the contractor acknowledges that a condition of this contract is to provide equal benefits as required by Dane County Code of Ordinances Chapter 25.016. Contractor shall provide equal benefits as required by that Ordinance to all required employees during the term of the contract. For more information:
www.danepurchasing.com/partner_benefit.aspx



REVISION TO DRAWING 1 DEMOLITION PLAN			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET AD2.1 A/SD-1



REVISION TO DRAWING 1 FLOOR PLAN			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET A2.1 A/SD-2



REVISION TO DRAWING 1 REFLECTED CEILING PLAN			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET A2.2 A/SD-3

DOOR SCHEDULE

Opening Number	DOOR Type	DOOR Width	DOOR Height	DOOR Mat'l	DOOR Glass Type	FRAME Type	FRAME Mat'l	FRAME Glass Type	Label	Door Pos Ind	Elec Lock	Hardware Set	Function	
102	A	3'-4"	7'-2"	HM	–	1	HM	–	1 HR	Y	Y	3	D	CA PL
103	A	3'-4"	7'-2"	WD	–	1	HM	–	–	–	–	4	AB	
111	A	3'-0"	7'-2"	WD	–	1	HM	–	1 HR	–	–	5	R	
112	B	3'-0"	7'-2"	WD	3A	1	HM	–	–	–	–	5	R	
115	A	3'-0"	7'-2"	WD	–	1	HM	–	–	–	–	1	AB	
122 (1)	A	3'-0"	7'-2"	WD	–	1	HM	–	–	–	–	1	AB	
124	A	3'-0"	7'-2"	WD	–	2	HM	3A	–	–	–	1	AB	
126	A	3'-0"	7'-2"	WD	–	2	HM	3A	–	–	–	1	AB	
127	A	3'-0"	7'-2"	WD	–	2	HM	3A	–	–	–	1	AB	
128	EXISTG	EXISTG	EXISTG	EXISTG	–	EXISTG	HM	–	–	–	–	2	AB	NE
130	A	3'-0"	7'-2"	HM	–	1	HM	–	–	Y	Y	3	D	CA PL
131	A	3'-0"	7'-2"	HM	–	1	HM	–	–	Y	Y	3	R	CA PL

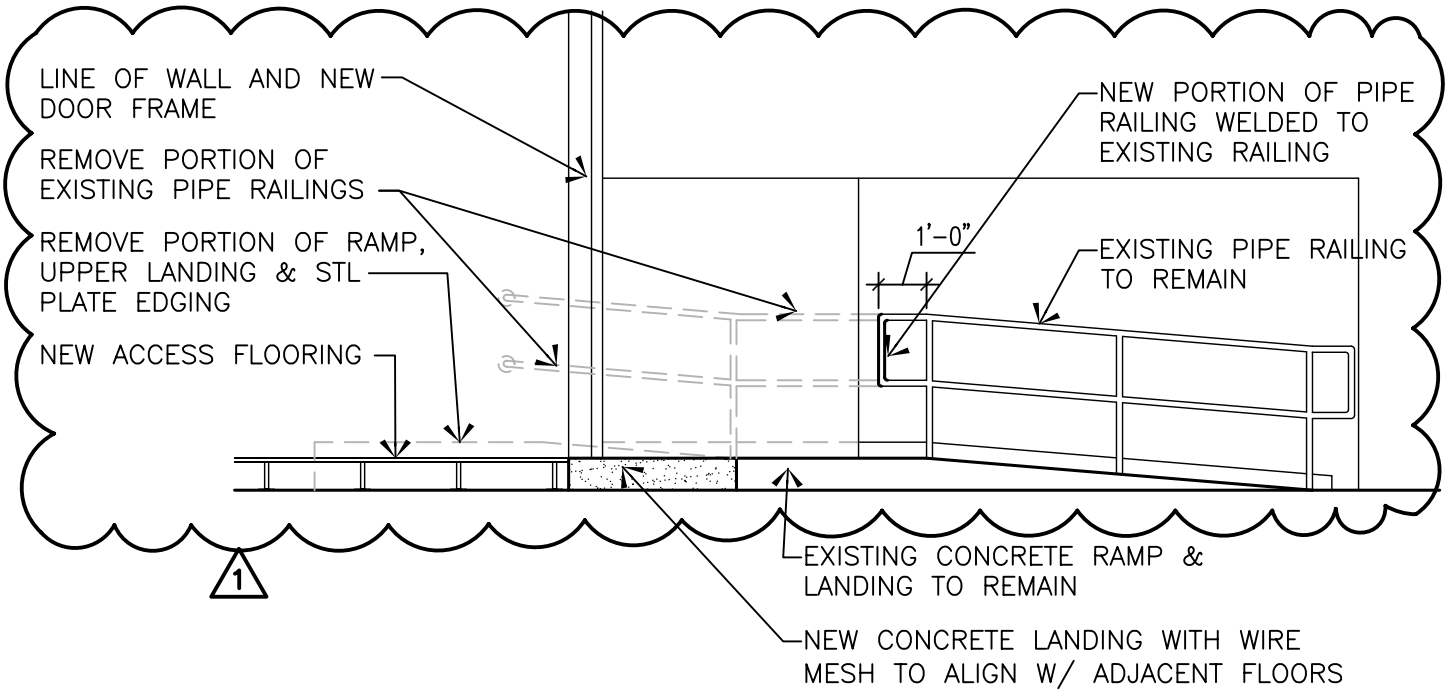
REVISION TO DOOR SCHEDULE

Dane Co Public Safety Comm Center Infrastructure Upgrades

Madison, Wisconsin
Co Bid No. 309030

Venture Architects

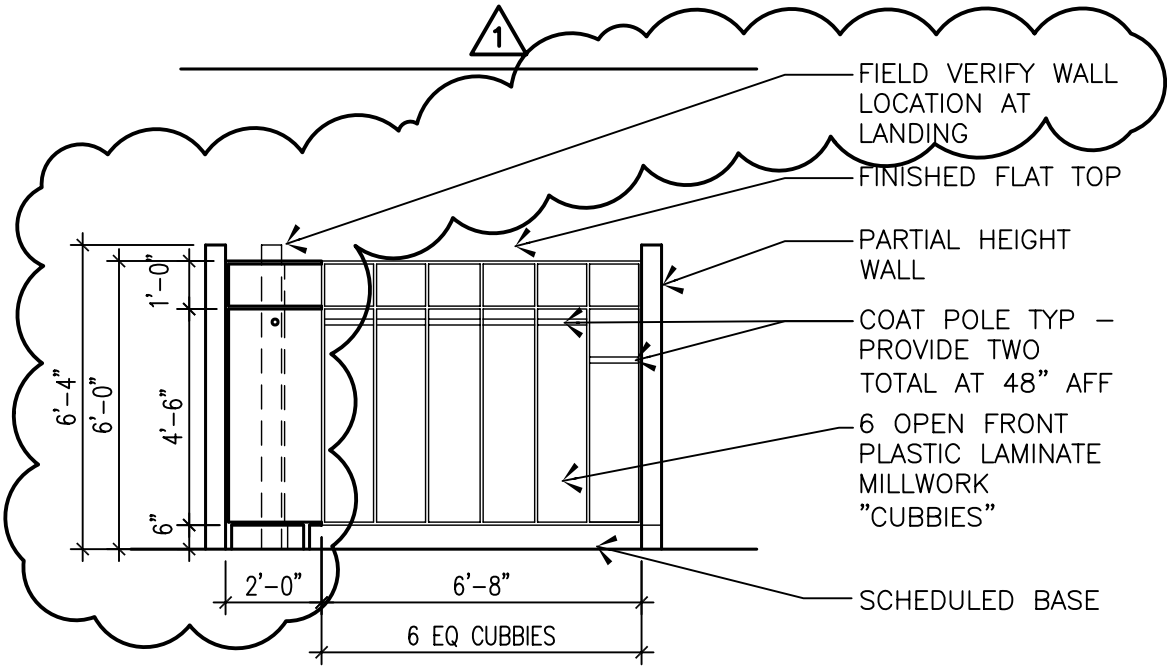
ADDENDUM 1	REF. SHEET A5.1
12/21/09	A/SD-4



7 EXISTING HANDRAIL MODIFICATION – RM 103

1/4" = 1'-0"

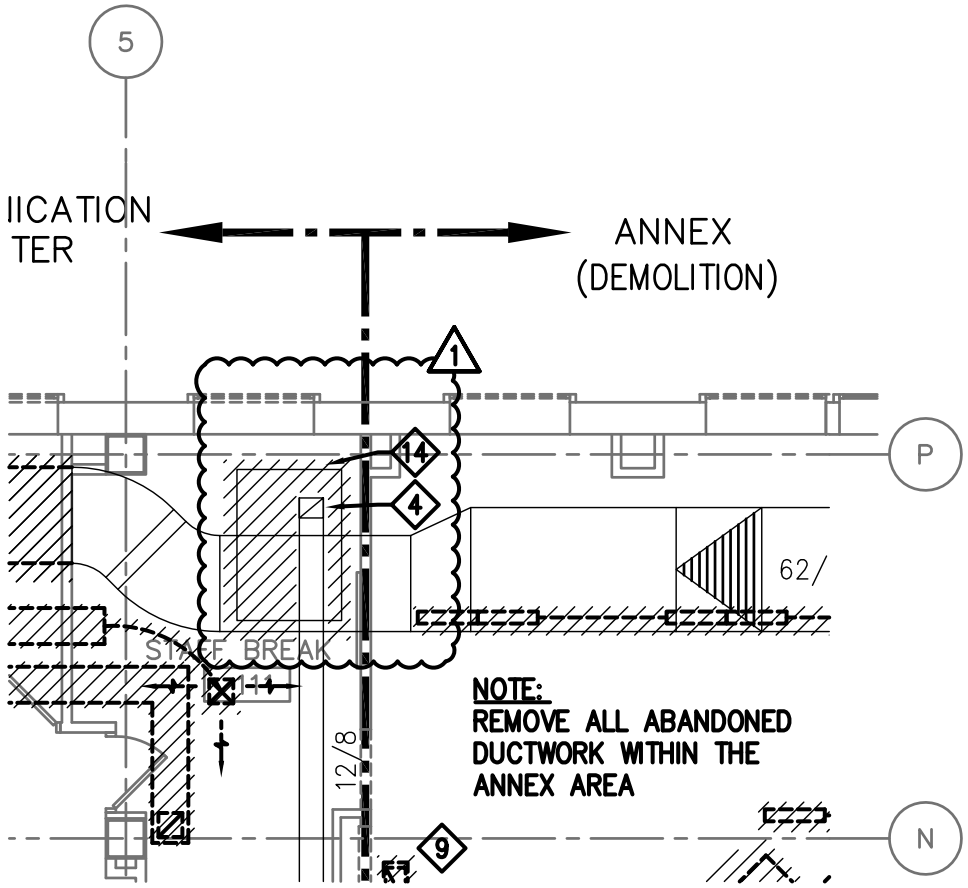
REVISION TO DRAWING 7 HANDRAIL MODIFICATION - RM 103			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET A5.1 A/SD-5



8 INT. ELEVATION @ STAFF ENTRY

1/4" = 1'-0"

REVISION TO DRAWING 8 INTERIOR ELEVATION AT STAFF ENTRY			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	/Venture/Architects	ADDENDUM 1 12/21/09	REF. SHEET A5.1 A/SD-6



A
HD2.1

HVAC DEMOLITION PLAN – DUCTWORK

SCALE: 1/8" = 1'–0"

12"0 1' 5' 10' 20'

KEYED NOTES (A/HD2.1):

5 EXISTING EXHAUST GRILLES TO BE DEMOLISHED. PATCH AND SEAL REMAINING DUCTWORK TO AS NEW CONDITION.

6 EXISTING CRU TO BE DEMOLISHED. NEW CRU-2 (REF: A/H2.1) 1 SHALL BE INSTALLED AND OPERATIONAL PRIOR TO DEMOLITION OF THIS CRU.

7 EXISTING CRU TO BE DEMOLISHED. NEW CRU-3 (REF A/H2.1) 1 SHALL BE INSTALLED AND OPERATIONAL PRIOR TO DEMOLITION OF THIS CRU.

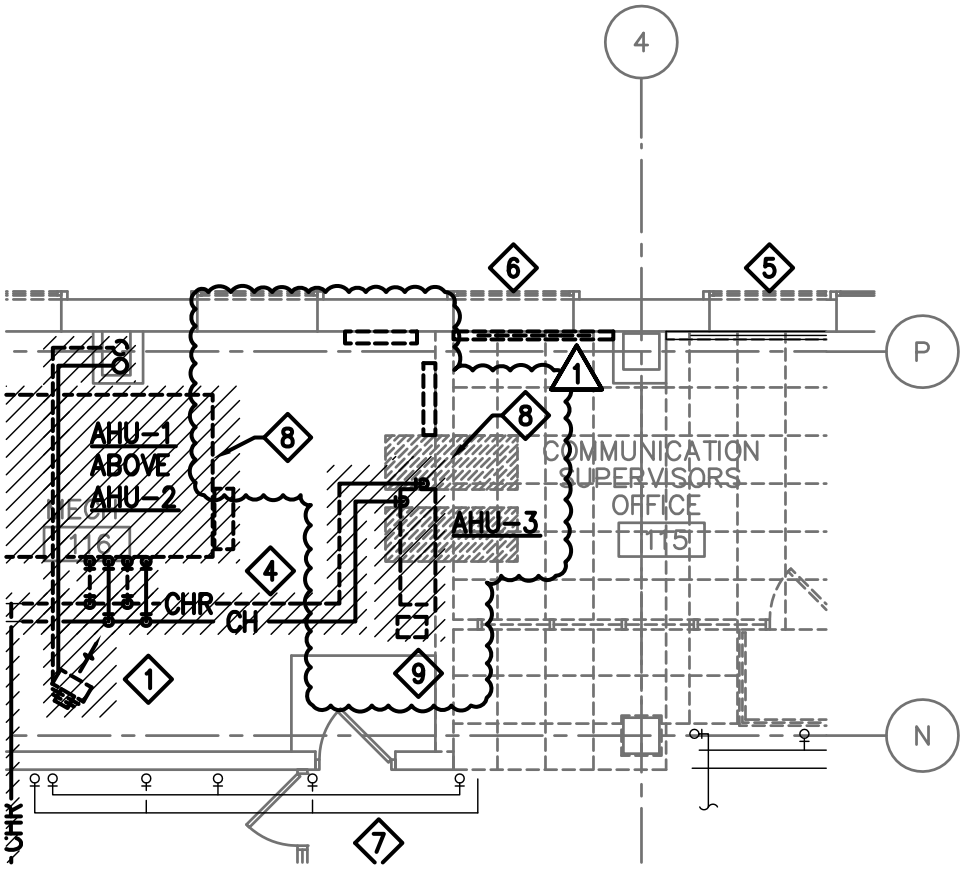
14 EXISTING SMOKE EATER TO BE DEMOLISHED.

15 EXISTING EXHAUST FAN EF-2 TO BE DEMOLISHED. 1

Henneman Engineering Inc.
Madison:
1232 Fourier Drive, Suite 101
Madison, Wisconsin 53717-1960
T 608.833.7000
F 608.833.6996
Email: info@henneman.com
Website: http://www.henneman.com

HEI # 09-6082A

BID SET - ADDENDUM			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin **Co Bid No. 309030**	/Venture/Architects	**ADDENDUM 1** **12/21/09**	**REF. SHEET HD2.1** **H/SD-1**



B / HD2.1 HVAC DEMOLITION PLAN – PIPING

SCALE: 1/8" = 1'-0"

12"0 1' 5' 10' 20'

KEYED NOTES (B/HD2.1):

7 EXISTING STEAM PIPING TO FLOOR ABOVE TO REMAIN.

8 EXISTING AHU TO BE DEMOLISHED.

9 EXISTING HUMIDIFIER AND ASSOCIATED PIPING TO BE DEMOLISHED.

10 REMOVE ALL TEMPERATURE CONTROL PANELS SERVING EQUIPMENT REMOVED FROM THIS ROOM.

Henneman Engineering Inc.
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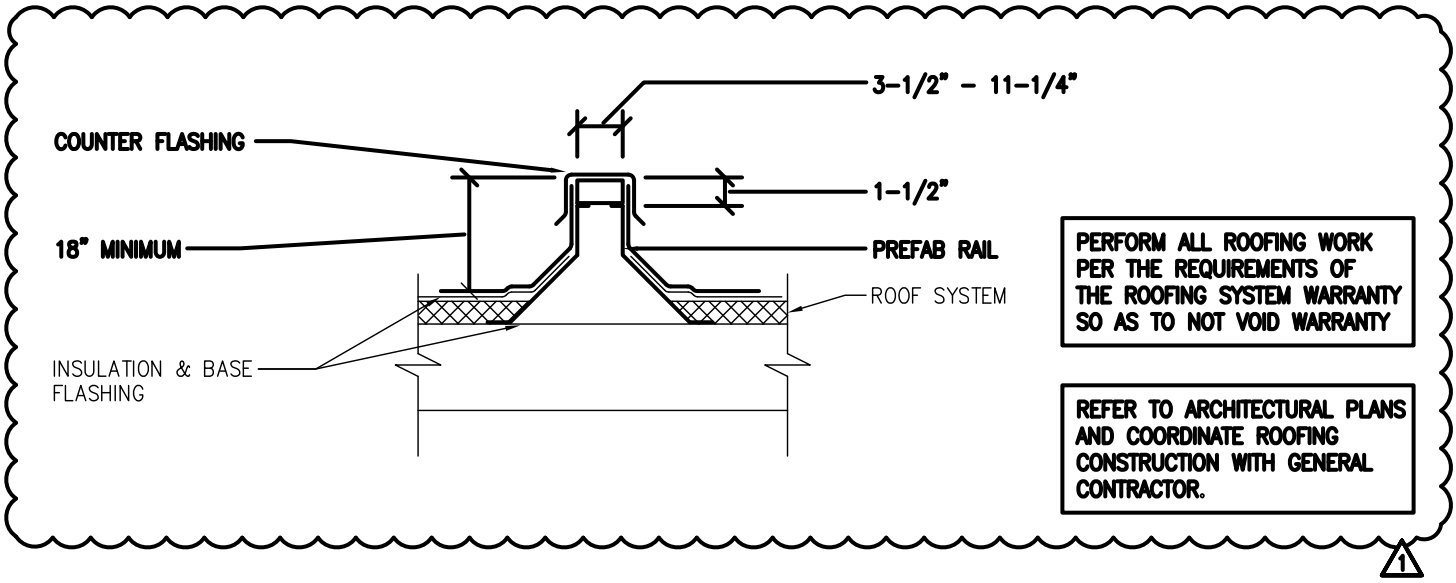
Email: info@henneman.com
Website: http://www.henneman.com

HEI # 09-6082A

BID SET - ADDENDUM			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET HD2.1 H/SD-2



H / H4.1 RAIL DETAIL

NO SCALE

Henneman Engineering Inc.
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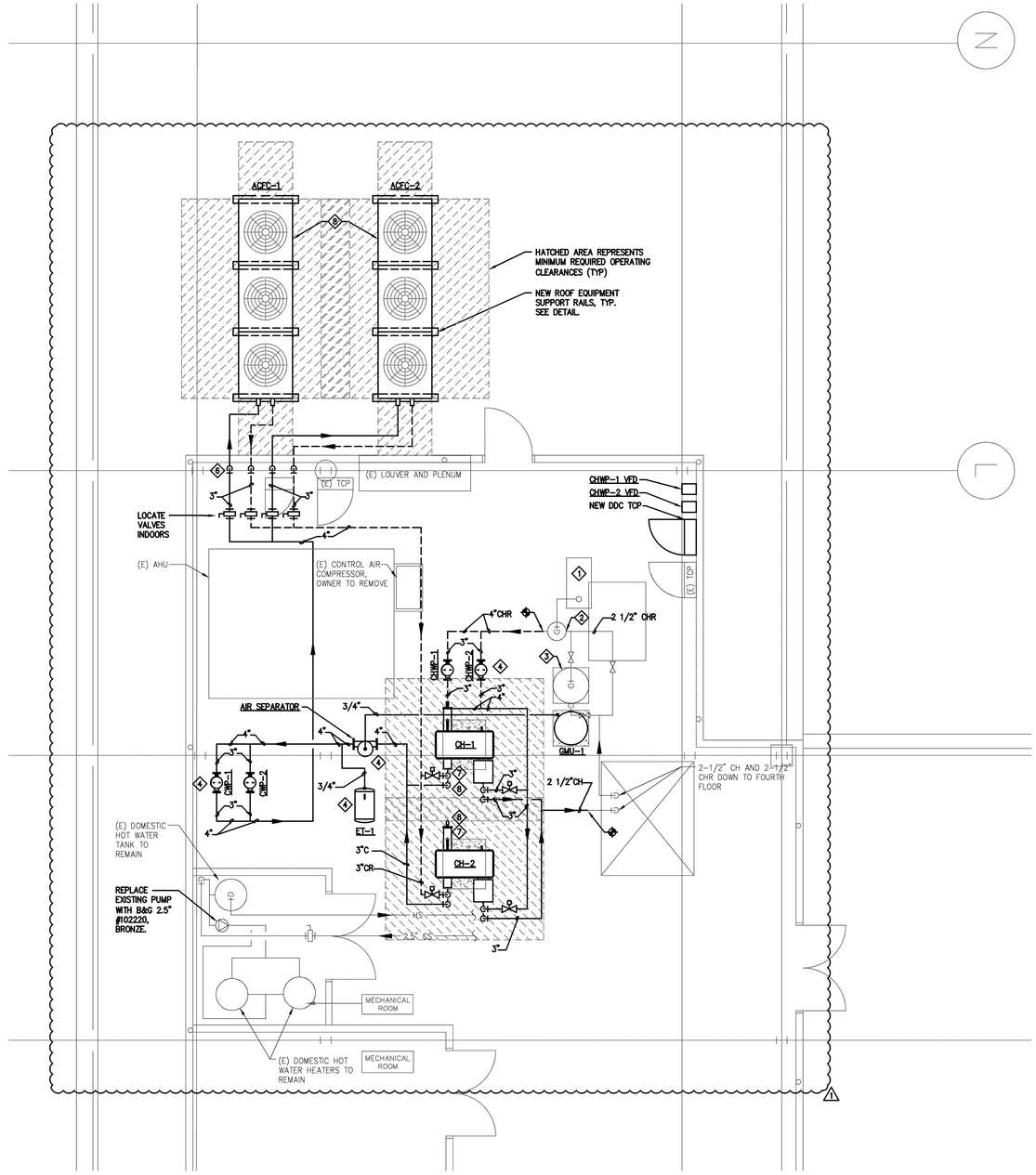
BID SET - ADDENDUM			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET H4.1 H/SD-4



A
H3.2

HVAC NEW WORK PLAN – PENTHOUSE
ALTERNATE BID 1

SCALE: 1/4" = 1'-0"

12" 0 1' 5' 10'

KEYED NOTES:

1. (E) 40-GALLON EXPANSION TANK TO BE RE-USED.
2. (E) AIR SEPARATOR AND POT FEEDER TO BE RE-USED.
3. (E) PAD MOUNTED CHILLER WATER STORAGE TANK TO BE RE-USED.
4. SUSPEND NEW HYDRONIC EQUIPMENT APPROXIMATELY 9'-0" AFF.
5. NOT USED
6. NEW PIPING TO PENETRATE WALL ABOVE AND BEHIND EXISTING TEMPERATURE CONTROL PANELS (TCP). DO NOT LOCATE PIPING ABOVE EXISTING TCPs OR ELECTRICAL PANELS.
7. PROVIDE NEW 4" CONCRETE EQUIPMENT PAD. PAINT PAD TO MATCH FLOOR, USE VOC FREE PAINT. PROVIDE 4"x4"x1/8" WALL STRUCTURAL FOOT RAILS RESTING ON WAFFLE VIBRATION ISOLATORS PER MANUFACTURER RECOMMENDATIONS. ISOLATORS TO BE 4"x4"x3 MINIMUM WITH MAXIMUM LOAD RATING OF AT LEAST 50 PSI.
8. INCLUDE CRANE RENTAL COSTS IN BID IF CRANE RENTAL IS REQUIRED.

Henneman Engineering Inc.
Madison:
1232 Fourier Drive, Suite 101
Madison, Wisconsin 53717-1960
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Website: http://www.henneman.com
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F 608.833.6996

HEI JOB NO. 09-6082A

Date of Issue 11/30/09

No.	Description	Date
1	Addendum #1	12/21/09

Reference Diagram

Reference Plan

Dane County
Public Safety
Communications
Center Infrastructure
Upgrades

1st Floor
City County Building
210 Martin Luther
King Jr. Blvd.
Madison, Wisconsin

Venture Architects

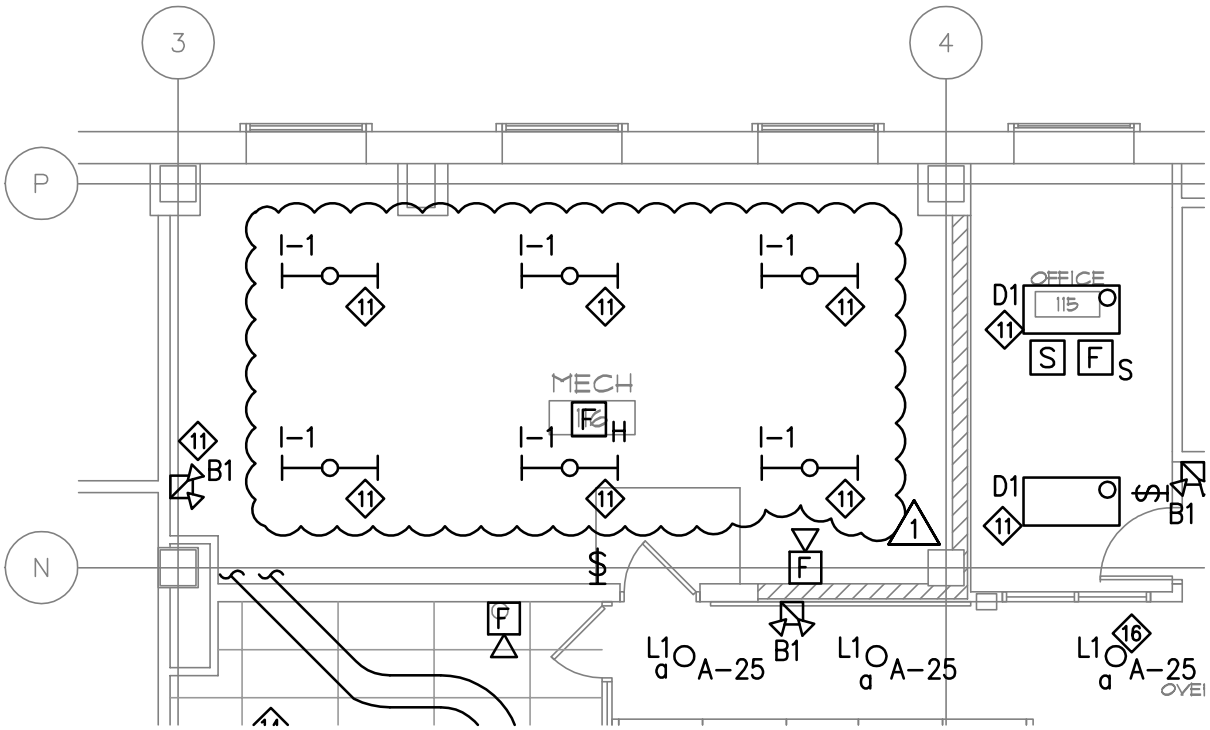
Venture Architects
325 E. Highland
Milwaukee, WI 53202
Telephone 414-271-3399

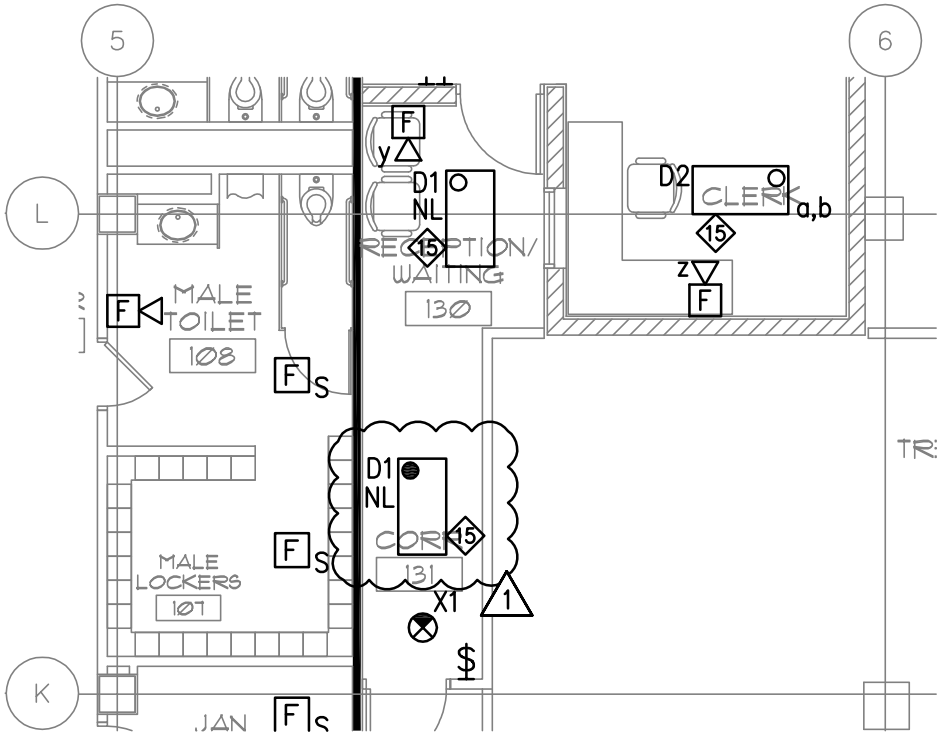
COUNTY BID # 109055

VA PROJECT # 208006

Sheet Name
HVAC DEMOLITION
+ NEW WORK PLANS

Sheet No.
H3.2





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HEI # 09-6082A

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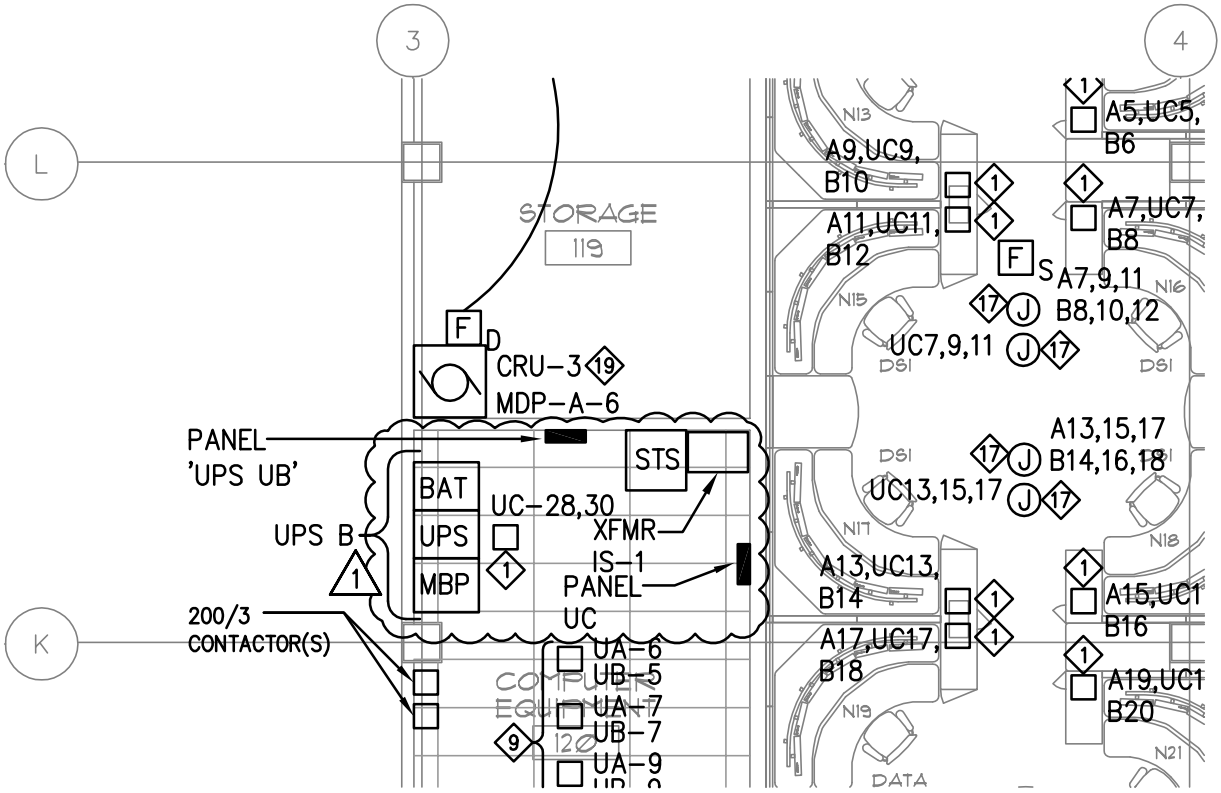
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin **Co Bid No. 309030**	**/Venture/ Architects**	**ADDENDUM 1** **12/21/09**	**REF. SHEET E2.1** **E/SD-1**



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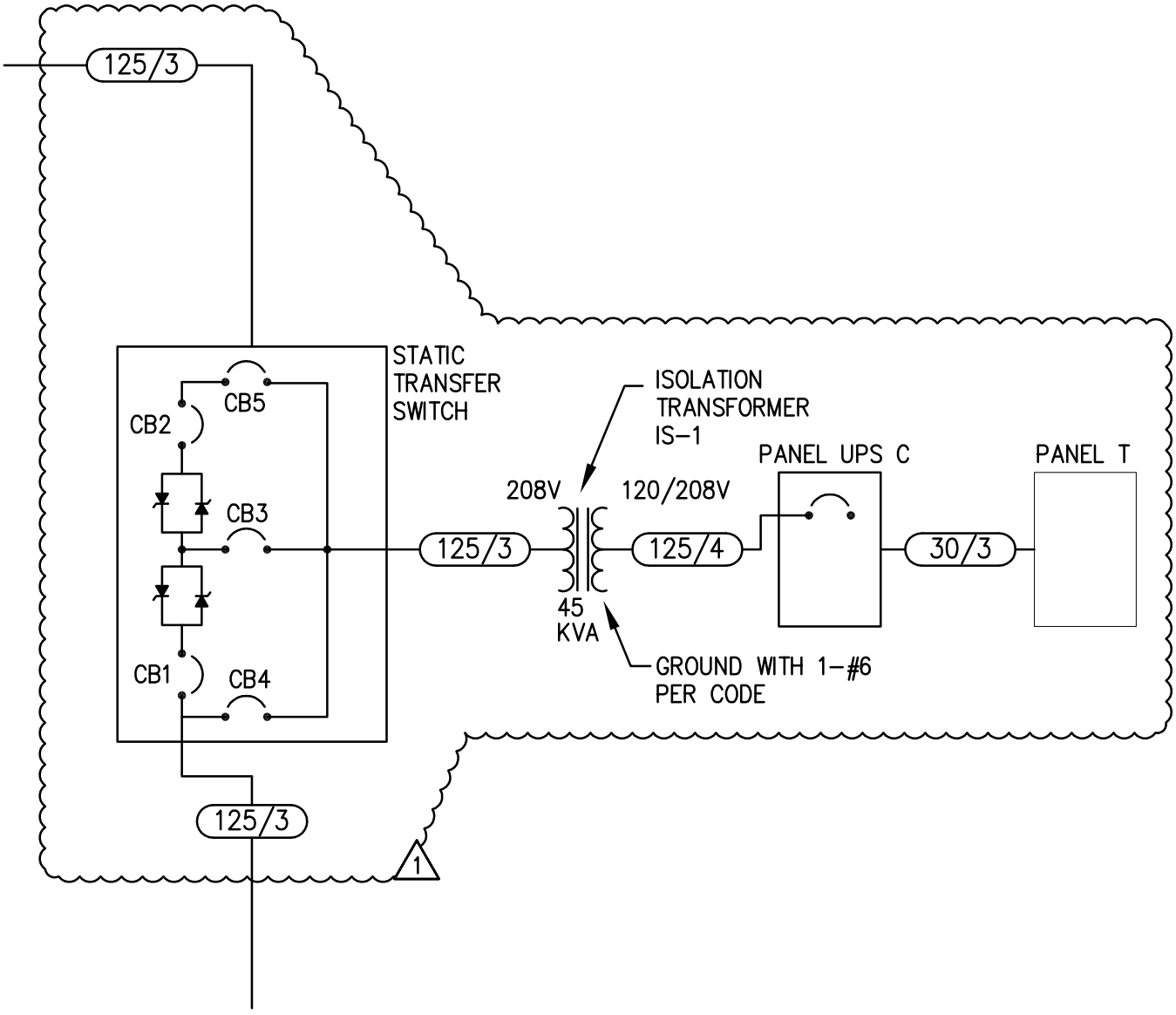
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin **Co Bid No. 309030**	/Venture/Architects	**ADDENDUM 1** **12/21/09**	**REF. SHEET E2.1** **E/SD-2**



Henneman Engineering Inc.
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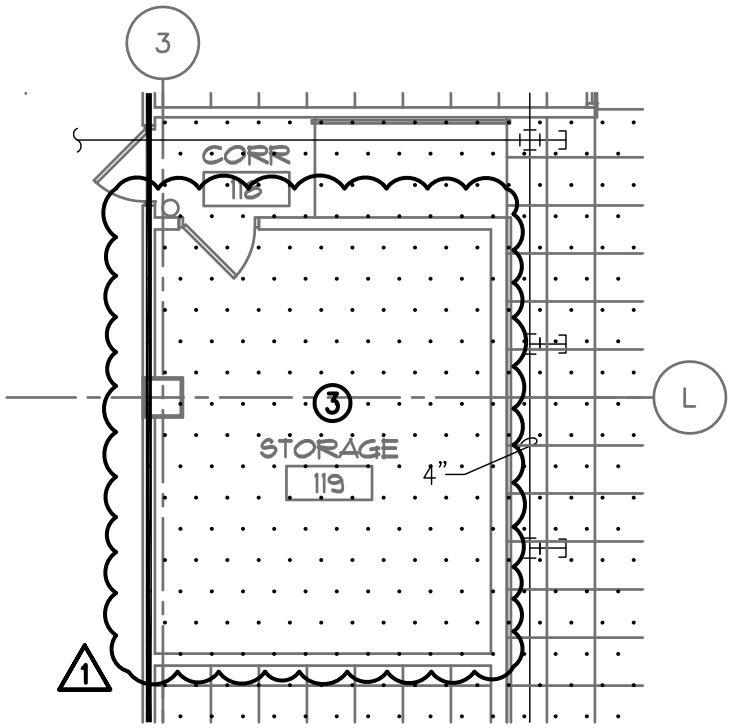
HEI # 09-6082A

BID SET - ADDENDUM			
Dane Co Public Safety Comm Center Infrastructure Upgrades			
Madison, Wisconsin **Co Bid No. 309030**	**/Venture/Architects**	**ADDENDUM 1** **12/21/09**	**REF. SHEET E5.1** **E/SD-3**



A
P2.1

NEW WORK PLAN – FIRE PROTECTION

SCALE: 1/8" = 1'–0"

12"0 1' 5' 10' 20'

FIRE PROTECTION NOTES:

③ ADD AUTOMATIC CONCEALED SPRINKLERS TO EXISTING NON–SPRINKLERED AREA. MODIFY EXISTING PIPING AS NEEDED.

COORDINATE NEW SPRINKLER LOCATIONS WITH ELECTRICAL AND MECHANICAL CONTRACTORS.

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HEI # 09-6082A

BID SET - ADDENDUM

Dane Co Public Safety Comm Center Infrastructure Upgrades

Madison, Wisconsin Co Bid No. 309030	Venture Architects	ADDENDUM 1 12/21/09	REF. SHEET P2.1 P/SD-1

SECTION 26 22 00
LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

SCOPE
The work under this section includes dry type general purpose two winding transformers meeting the requirements of NEMA TP-1, and dry type isolation transformers. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Submittals
- Operation and Maintenance Data
- Delivery, Storage, and Handling

PART 2 - PRODUCTS
- Dry Type Isolation Transformers

PART 3 - EXECUTION
- Installation
- Field Quality Control

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

REFERENCES
NEMA TP-1

SUBMITTALS
Include outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, loss data, efficiency at 25, 50, 75 and 100 percent rated load, sound level, tap configurations, insulation system type, and rated temperature rise.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

DELIVERY, STORAGE, AND HANDLING
Store and protect equipment in a dry location with uniform temperature. Cover ventilating openings to keep out dust.

Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow if handled in inclement weather.

PART 2 - PRODUCTS

DRY TYPE ISOLATION TRANSFORMERS
Dry Type Isolation Transformers: Factory-assembled, air cooled dry type shielded isolation transformers: ratings as shown on the Drawings.

Insulation system and average winding temperature rise for rated KVA as follows:

KVA Rating	Insulation Class	Temperature Rise (degree C)
1-10	185	80
15-500	220	80

Case temperature shall not exceed 35 degrees C rise above 40 degrees C ambient at its warmest point.

Winding Taps, Transformers 15 KVA and Larger: Four 2-1/2 percent full capacity taps on primary winding-two above and two below rated voltage.

Sound Levels: Maximum sound levels are as follows:

KVA Rating	Sound Level
1-9	40 dB
10-45	45 dB
50-500	50 dB

Provide electrostatic winding shield with separate insulated grounding connection.

Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

Coil Conductors: Continuous windings with termination pads brazed or welded.

Isolate core and coil from enclosure using vibration-absorbing mounts.

Enclosure: NEMA Type 1. Provide lifting eyes or brackets.

Nameplate: Include transformer connection data.

Mounting: Transformers 75 KVA and less shall be suitable for wall, floor, or trapeze mounting: transformers larger than 75 KVA shall be suitable for floor or trapeze mounting.

PART 3 - EXECUTION

INSTALLATION

Set transformer plumb and level.

Use flexible conduit, 2 ft. (0.6 m) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

Mount transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure.

Provide sufficient space around transformer for cooling as recommended by the manufacturer.

FIELD QUALITY CONTROL

Check for damage and tight connections prior to energizing transformer.

Measure primary and secondary voltages and make appropriate tap adjustments within 2-1/2% of the normal operating load after the building is in full operation.

END OF SECTION

SECTION 26 33 33
AUTOMATIC STATIC TRANSFER SWITCH

PART 1 - GENERAL

SUMMARY

These specifications describe the requirements for an automatic static transfer switch. The automatic static transfer switch is a solid-state, three-pole, dual-position transfer switch designed to switch automatically and manually between two synchronized three-phase AC power sources without an interruption of power to the load longer than 1/4 cycle.

The input power shall be supplied from two different AC power sources, which are nominally of the same voltage level, phase rotation and frequency. The primary purpose of the automatic static transfer switch is to allow virtually uninterrupted transfer from one source to the other in case of the failure of one source or by manual initiation for test or maintenance. The switching action shall not connect together the two sources of power that would allow backfeeding one source to the other. The automatic static transfer switch shall allow for either source to be designated as the preferred source. The switch will automatically transfer to the preferred source and remain so until manually initiated to transfer or until the selected source fails. If the selected source fails, the automatic static transfer switch shall transfer without interruption greater than 1/4 cycle to the other source, designated as the alternate source. The automatic static transfer switch shall be furnished with key-interlocked static switch isolation and bypass breakers to each source, which allow uninterrupted manual transfer to and from either source for maintenance.

STANDARDS

The specified system shall be designed, manufactured, tested and installed in accordance with:

- American National Standards Institute (ANSI)
- Canadian Standards Association (CSA)
- Institute of Electrical and Electronics Engineers (IEEE)
- ISO 9001
- National Electrical Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories (UL) (ULc)
- EN 50091-2
- EN 61000-6-3 & 6-2
- EN 60947-6-1
- IEC 62310

The automatic static transfer switch shall be UL and UL listed per UL Standard 1008 for Automatic Transfer Switches.

The automatic static transfer switch shall comply with the latest FCC Part 15 EMI emission limits for Class A computing devices and the emission limits of EN50091-1, 2, 3 Class A.

The automatic static transfer switch shall safely withstand without misoperation or damage:

- Transient voltage surges on either AC power input as defined by ANSI/IEEE C62.41 for Category B3 locations (high surge exposure industrial and commercial facilities)
- Electrostatic discharges (ESD) up to 10 kV at any point on the exterior of the unit
- Electromagnetic fields from portable transmitters within 3 ft. (1m) of the unit

The automatic static transfer switch shall comply with the immunity requirements of EN50082-1.

DEFINITIONS

STS - Static Transfer Switch

SCR - Silicon Controlled Rectifier

MTBF - Mean Time Between Failure is the actual arithmetic average time between failures of the critical AC output bus.

Non-automatic circuit breaker - A circuit breaker that has no automatic thermal overload trip element but does have a magnetic trip element for short-circuit/fault protection. Short-circuit and overload protection must be provided by an upstream overcurrent device.

SYSTEM DESCRIPTION

DESIGN REQUIREMENTS

Voltage: Input/output voltage specifications of the automatic static transfer switch shall be 208 volts, three phase, 60 Hz, 3-wire plus ground.

Output Load Capacity: Specified output load capacity of the automatic static transfer switch shall be 100A. The Automatic static transfer switch shall be continuous rated to carry a full 100% load.

MODES OF OPERATION

The Static Transfer Switch (STS) shall be a three-pole, double-throw, solid-state, automatic transfer switch that is fed from two AC power sources. One source shall be designated as the preferred source, while the other is the alternate source. Selection of which input source is preferred shall be user selectable from the operator control panel. All transfers shall be a fast break-before-make with no overlap in conduction from one source to the other. All transfers, including sense and transfer times, shall have less than a 1/4 cycle interruption in power to the load.

The Static Transfer Switch is fuseless and consists of six pairs of Silicon Controlled Rectifiers (SCRs) connected in an AC switch configuration. The brick type SCRs are continuous rated to carry 100% of the Automatic static transfer switch rated load while operating within the automatic static transfer switch specifications. The use of fuses for protection is not permitted due to possible fuse clearing in an out of phase transfer.

The Static Transfer Switch logic power shall automatically power up when connected to the power source. The control panel shall be active as long as one input to the automatic static transfer switch is energized. The automatic static transfer switch shall be supplied with factory default settings; mechanical trim pots shall not be used for calibration or adjusting settings. All settings must be adjustable; the settings shall be adjusted/configured from the LCD display.

Normal Mode: The unit is fed by two sources with the output connected to the load. In normal operation, the load shall be connected to the preferred source as long as all phases of the preferred source are within the acceptable limits. Upon failure of the preferred source, the load shall be transferred to the alternate source until such time as the preferred source returns to within the acceptable limits. Transfer voltage limits shall be ±10% of the nominal input voltage for steady state conditions, with low voltage transfer limits having an inverse time relationship that is within the IEEE Std. 446 computer voltage tolerance envelope. After the preferred source returns to within the acceptable voltage limits for at least the preset adjustable retransfer time delay (typically 3 seconds) and is in phase with the alternate source, the load shall be retransferred automatically to the preferred source. The automatic retransfer to the preferred source can be disabled if so selected by the user from the operator control panel. When the automatic retransfer is disabled, emergency transfers from the alternate source to the preferred source shall not be disabled upon alternate source failure.

Load Current Inhibit: The automatic static transfer switch shall sense the load current and, if the load current exceeds an adjustable preset level deemed to represent a load inrush or fault condition, the automatic static transfer switch shall disable the automatic transfer even if the voltage on the selected source exceeds the transfer limits. The load current transfer inhibit shall be manually reset after the current returns to normal to allow for continued protection against a source failure.

Manual Transfer: Automatic static transfer switch shall allow manually initiated transfers between the two sources, providing the alternate source is within acceptable voltage limits and phase tolerances with the preferred source. Allowable phase differences between the sources for manually initiated transfers shall be adjustable from the operator control panel. The automatic static transfer switch shall be capable of tolerating transfers up to 180 degrees out of phase for emergency conditions. However, the user-adjustable phase synchronization window shall be limited to ±30 degrees. If the transfer is manually initiated, the automatic static transfer switch shall transfer between the two sources without interruption of power to the load greater than 1 millisecond provided that both sources are available and synchronized within the user-adjustable phase synchronization window. For sources where the two frequencies are not exactly the same (as would be the case between a utility and standby generator source), manually initiated transfers shall be delayed by the automatic static transfer switch until the two sources are within the user-adjustable phase synchronization window.

Emergency Transfer: In an effort to maintain power to the load, upon loss of the source that the load is connected to, the automatic static transfer switch shall automatically transfer to the other source in less than 1/4 cycle, overriding any retransfer time delays or other inhibits except load overcurrent providing that the other source is available. If one source is shorted upstream, causing an undervoltage condition on that source, the automatic static transfer switch will sense the undervoltage and transfer to the alternate source.

SCR Failure: The automatic static transfer switch shall continuously monitor the status of the SCR switching devices for proper operation. In the event of a shorted SCR on the source powering the load, the automatic static transfer switch shall automatically alarm the condition and trip open the other source isolation breaker. In the event of a shorted SCR on the other source, the automatic static transfer switch shall automatically alarm the condition and trip open the other source isolation breaker. In the event of an open SCR, the switch shall automatically alarm the condition and transfer to the other source. All open and shorted SCR alarm conditions shall be latched and require the system to be repaired and reset to restore normal operation.

Maintenance Bypass: The automatic static transfer switch shall be furnished with key-interlocked maintenance bypass breakers that allow the automatic static transfer switch power, controls and monitoring electronics to be bypassed to either input source for maintenance without interruption of power to the load. The packaging of the automatic static transfer switch shall have all electronics isolated from the input, output and bypass connections to allow safe servicing of any components without access to hazardous voltages when the unit is in maintenance bypass.

PERFORMANCE REQUIREMENTS

Nominal Input/Output Voltage 208 volts three phase, 3-wire-plus-ground

Voltage Range: +10%, -10% of nominal

Frequency: 60 Hz ±0.5 Hz

Maximum Continuous Current: 100 amps

Load Power Factor Range: 0.75 to 1.0, leading or lagging

Load Crest Factor: Up to 3.5

Source Voltage Distortion: Up to 10% THD with notches and ringing transients

Surge Protection: Sustains input surges without damage per criteria listed in ANSI C62.41 Category A and B

Sensing and Transfer Time: 4 ms

Overload Capability: 125% for 30 minutes (100-400A)
150% for 2 minutes
500% for 0.25 seconds

Short Circuit Withstand Capability:

	208-240V	**380-480V**	**600V**
100-250A	125kA	100kA	50kA

ENVIRONMENTAL CONDITIONS

Storage Temperature Range: -40° to +80°C (-40° to 176°F)
Operating Temperature Range: 0° to 40°C (32° to 104°F)
Relative Humidity: 0 to 95% without condensation
Operating Altitude: Up to 4000 ft. (1200m) above sea level without derating. Above 4000 ft. (1200m), output current is derated by 6% per 1000 ft. (18% per 1000m).
Storage/Transport Altitude: Up to 40,000 ft. (12,200m) above sea level
Audible Noise: Less than 55 dBA at 5 ft. (1.5m) with audible alarm off

RELIABILITY

MTBF:
The automatic transfer static switch shall be designed for high reliability and high availability with an MTBF exceeding 1,000,000 hours. To the fullest extent practical, redundant circuits and components shall be used to eliminate single points of failure.

Power Supply:
Redundant power supplies shall be provided to prevent any single-point power supply failure mode. The automatic transfer static switch shall have two completely separate power supplies mounted on separate boards so a power supply can be replaced while the load is on bypass. There shall be two separate DC buses, one from each power supply, to provide redundancy throughout the controls.

Logic:
Control logic shall be triple-redundant. Each of the three logic modules shall have its own separate power connection to each power supply bus. Each logic module shall be fused to prevent it from shorting the power supplies if an internal failure occurs. Gating and control logic shall be partitioned so that the failure of one source's gating or sensing logic does not prevent the switch from transferring to the other source.

Components:
All electrical components requiring normal maintenance or repair shall be replaceable without de-energizing the load, assuming that at least one source is available. Solid-state switching devices shall be packaged to allow safe repair of the switching devices without having to de-energize the load. All molded case switches or non-auto circuit breakers shall be of a plug-in or draw-out type to allow replacement without de-energizing the load. All control and logic components shall be mounted separate from the power components.

Fuseless:
No fuses are to be used to protect the solid-state power switching devices. All solid-state power switching devices shall be rated to prevent hazardous device failure in power systems with available fault currents up to 100,000A @ 208V.

Access:
The automatic transfer static switch shall be designed for front access only. The automatic transfer static switch shall be designed so all installation, repairs and maintenance can be done from the front or top of the unit. The automatic transfer static switch shall be designed to minimize the exposure of hazardous voltages to allow safe servicing of the unit while the load is energized. Barriers shall be used on and around customer connections to protect personnel during maintenance.

DOCUMENTATION

Equipment Manual

The manufacturer shall furnish an installation, operation and maintenance manual with installation, startup, operation and maintenance instructions for the specified system.

Proposal Submittals

Submittals with the proposal shall include:

- A system one-line diagram.
- Outline drawing including weights, dimensions, heat dissipation and recommended service clearances.
- Location and detailed layouts of customer power and control connections.
- Description of equipment to be furnished, including deviations from these specifications.

Delivery Submittal

Submittals upon STS delivery shall include a complete set of submittal drawings and one (1) installation, operation and maintenance manual that shall include a functional description of the equipment with block diagrams, safety precautions, instructions, step-by-step operating procedures and routine maintenance guidelines, including illustrations.

Spare Parts

A list of recommended spare parts shall be furnished upon request.

User's List

An in-service user's list shall be furnished upon request.

WARRANTY

The manufacturer shall provide a warranty against defects in material and workmanship for 12 months after initial system startup or 18 months after ship date, whichever occurs first. (Refer to the Warranty Statement for details.)

QUALITY ASSURANCE

Manufacturer Qualifications

A minimum of five years' experience in the design, manufacture and testing of STS systems is required. The specified system shall be completely factory-tested before shipment. Testing shall include, but shall not be limited to: quality control checks, Hi-Pot test (two times rated voltage plus 1000 volts, per UL requirements), transfer tests and metering calibration tests. The system shall be designed, manufactured and tested according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

Factory Testing

Before shipment, the manufacturer shall fully and completely test the automatic static transfer switch to assure compliance with the specifications.

PART 2 – PRODUCT

MANUFACTURERS

Liebert STS 2
Act Bid: GE, MGE, Eaton, Powerware

FABRICATION

Materials

All materials of the automatic static transfer switch shall be new, of current manufacture, high grade and free from all defects and shall not have been in prior service except as required during factory testing.

The maximum working voltage, current and di/dt of all solid-state power components and electronic devices shall not exceed 75% of the ratings established by their manufacturer. The operating temperature of solid-state component subassembly shall not be greater than 75% of their ratings.

Wiring

Wiring practices, materials and coding shall be in accordance with the requirements of the National Electrical Code (NFPA 70). All bolted connections of busbars, lugs and cables shall be in accordance with requirements of the National Electrical Code and other applicable standards. All electrical power connections are to be torqued to the required value and marked with a visual indicator.

Provision shall be made for power and control cables to enter or leave from the top or bottom of the automatic transfer static switch cabinet.

Frame and Enclosure

The automatic transfer static switch unit, comprised of solid-state, three-pole, dual-position transfer switch, key-interlocked static switch isolation and bypass breakers, shall be housed in a single free-standing NEMA type 1 enclosure and meet IP20 requirements. The frame shall be constructed of galvanized steel and pop riveted to provide a strong substructure. The frame shall include four heavy-duty swivel castors for ease of installation and four permanent leveling feet for final installation. Doors and removable exterior panels shall be a minimum of 16GA steel and be powder-painted the manufacturer's standard color textured enamel finish paint. A key-lock, hinged front door shall provide access to the circuit breakers. A tool shall be required to remove exterior panels that expose hazardous voltages. All removable panels shall be grounded to the frame for safety and EMI/RFI protection. The cabinet shall be structurally designed to handle forklifting from the base.

Front access only shall be required for expedient servicing, maintenance and installation. The automatic static transfer switch shall be constructed of replaceable subassemblies that can be easily changed without exposing personnel to high voltage. Printed circuit assemblies shall be plug connections.

Removable conduit/cable termination plates shall be provided in the top and bottom of the unit for termination of the two source input and/or output conduits, raceways or cables.

The complete STS shall have maximum dimensions of [30 in./610 mm (up to 250 amps).
The distributed floor weight shall be less than 150 lb./sq. ft. (660 kg/m^2).

The automatic static transfer switch can be tipped 15 degrees in any direction without falling over.

Cooling (100-600A)

The automatic static transfer switch shall utilize convection air cooling for the enclosure with forced air cooling of the heat sinks. All fans shall be redundant so that a single fan failure will not cause temperature to increase beyond acceptable limits. Heat rejection shall be through screened protective openings in the top of the unit. Air filters shall be located in the front door at the point of air inlet.

Grounding

The automatic static transfer switch shall operate from sources that are solidly grounded or impedance-grounded. The unit shall not be used on corner-grounded delta systems.

The AC output neutral shall be electrically isolated from the automatic static transfer switch chassis. The automatic static transfer switch chassis shall have an equipment ground terminal.

COMPONENTS

Non-Automatic Circuit Breakers

The automatic static transfer switch shall be equipped with five molded-case, plug-in, non-automatic circuit breakers. The breakers shall be UL listed and IEC rated for use at the system voltage. The plug-in feature of the breaker shall include interlock, which prevents the breaker from being unplugged without being in the Off (open) position. Three of the breakers shall provide for total isolation of the solid-state switching devices with an input breaker for each source and a load isolation breaker. Two of the breakers shall provide for maintenance bypassing of the solid-state switching devices to either input source. Key interlocks shall be provided on the breakers to prevent improper maintenance bypassing of the solid-state switch. A bypass breaker cannot be closed unless the solid-state switch is connected to the same input source, and only one bypass breaker can be closed at a time. All breakers shall be equipped with N.O. and N.C. auxiliary switches for monitoring of the breaker positions. The two input breakers for the solid-state switching devices also shall be equipped with 48 VDC shunt trips to allow for control by the automatic static transfer switch logic.

Silicon Controlled Rectifiers (SCRs)

The automatic static transfer switch consists of six pairs of SCRs connected in an AC switch configuration. The SCRs shall be brick-type and rated to carry the full 100% rated load. The SCRs shall be rated to prevent hazardous device failure in power systems with available fault currents listed in Section 0, Item 0.

Control Panel

The automatic static transfer switch shall be provided with a microprocessor-based control panel for operator interface to configure and monitor the automatic static transfer switch. The control panel shall be located on the front of the unit and can be operated without opening the hinged front door. The display shall not be mounted to the front door so the door can be easily removed for maintenance. A backlit, menu-driven, full graphics, color touch-screen Liquid Crystal Display (LCD) shall be used to display system information, status information, a one-line diagram of the automatic static transfer switch, active alarms, alarm history information, startup and bypass instructions. No mechanical pushbuttons shall be used.

The mimic panel screen shall indicate the power flow, the status of all molded-case non-automatic circuit breakers, the preferred source and the Automatic static transfer switch position (connected to source 1 or 2) as well as active alarms.

Pop-up boxes selected from the menu bar shall be provided for operator interface to the LCD control panel for menu selection, control of the preferred source, manual transfer initiation, auto/manual retransfer selection and other system setpoints. In addition, an operator can silence and reset the audible alarm by touching the screen. To facilitate STS operation, help text, step-by-step startup, transfer and maintenance bypass procedures shall be displayed on the LCD screen. For manual transfers, a syncscope shall display the leading or lagging real-time phase difference between the two input sources.

The control panel shall be equipped with an internal RS232 port and Flash memory to allow the automatic static transfer switch software to be upgraded by a factory-trained customer engineer without shutting down the load.

To facilitate diagnostics, an event log of the last 512 alarm events shall be stored in non-volatile memory and displayed on the LCD. Two history logs, each having 64 frames of unit status frozen upon an alarm condition designated as a freeze fault, will be stored in non-volatile memory and displayable on the LCD. A frame shall be acquired every 4 milliseconds, with 40 frames before the fault and 23 frames after the fault. Each frame contains metering data, active alarms/faults and unit status. A system calendar and real-

time clock shall be included to time-stamp all stored events. Monitored parameters shall be acquired two times per 4-millisecond frame.

CAN bus shall be used to communicate between the logic and the control panel as well as the options. For remote monitoring, a serial RS-232 port shall provide present switch status information, alarm history information and the history of status screens that are triggered upon a major alarm event.

Metering

The following metering parameters shall be displayed:

- Input AC voltage for both sources, line-to-line for each phase
- Input AC current for both sources for each phase
- Input frequency for both sources
- Output kVA
- Output kW
- Percent load
- Number of switch transfers
- Synchronization phase angle

All voltages and currents shall be measured using true-RMS techniques for accurate representation of non-sinusoidal waveforms associated with computers and other electronic loads. The metering parameters shall have a full-scale accuracy of ±2%.

Alarm Messages

Active alarms shall be monitored and displayed simultaneously as part of the LCD event panel. The following alarm messages shall be displayed:

Source 1 Failure	CB1 (Source 1) Open	Power Supply S1 AC Failed
Source 2 Failure	CB2 (Source 2) Open	Power Supply S2 AC Failed
Sources Out of Sync	CB3 (Output) Open	Power Supply DC A Failed
Source 1 Overvoltage	CB3A Open (If used)	Power Supply DC B Failed
S1 Undervoltage (fast)	CB4 (S1 Bypass) Closed	Power Supply Logic Failed
S1 Undervoltage RMS (slow)	CB5 (S2 Bypass) Closed	S1 Voltage sense module failed
Source 2 Overvoltage	CB1 Shunt trip fail	S2 Voltage sense module failed
S2 Undervoltage (fast)	CB2 Shunt trip fail	S1 SCR sense module failed
S2 Undervoltage RMS (slow)	S1 SCR Open	S2 SCR sense module failed
Source 1 Overcurrent	S2 SCR Open	S1 Current sense module failed
Source 2 Overcurrent	S1 SCR Shorted	S2 Current sense module failed
Source 1 Over/Under Frequency	S2 SCR Shorted	S1 Gate drive module failed
Source 2 Over/Under Frequency	Primary fan failure	S2 Gate drive module failed
Source 1 Phase Rotation Error	Control Module Fail	Internal comm failed
Source 2 Phase Rotation Error	S1 I-peak	Option comm failed
Output undervoltage	S2 I-peak	Output voltage sense module failed
STS on alternate source	Auto Retransfer Inhibit	Heatsink Overtemp
Transfer Inhibit		

An audible alarm shall be activated when any of the alarms occurs. All alarms shall be displayed in text form.

ACCESSORIES - REQUIRED

Optimized Transfer

The automatic static transfer switch shall be furnished with an optimized transfer control algorithm. This algorithm shall optimize the automatic static transfer switch transfer timing such that the volt-seconds applied to a downstream transformer(s) primary is balanced, thus sufficiently minimizing peak saturation current drawn by the downstream transformer(s).

In addition to controlling the transformer primary current and flux, the optimized transfer control algorithm must maintain the load voltage within the CBME/ITIC Standards during the transfer. To maintain load voltage after the preferred source is turned off, the control algorithm must be able to pulse-fire the alternate source SCRs to minimize load discontinuity and voltage disruption.

The automatic static transfer switch must maintain the above specification under the following conditions:

1. Loss of source
2. Loss of a single phase
3. Voltage droop
4. Phase-to-neutral short
5. Phase-to-phase short
6. Power factor load range of 0.75 to 1.0 leading or lagging
7. Out-of-phase conditions from +180° to -180°

Programmable Relay Board

A Programmable Relay Board with eight sets of isolated Form C contacts shall be provided to indicate a change of status of any alarm condition. Any alarm can be programmed onto any channel or channels. Up to two programmable relay boards can be installed in the automatic static transfer switch. Programming is performed through the touch screen display. Each contact shall be rated 1A @ 30 VDC or 250mA @ 125 VAC.

Liebert IntelliSlot® Web/485 Card with Adapter

The automatic static transfer switch shall have a Liebert IntelliSlot network card that enables the automatic static transfer switch to communicate with a network management system (NMS). The Liebert IntelliSlot Web/485 Card with Adapter (IS-WEB485ADPT) will include internal hardware and software to communicate (via SNMP and HTTP) to any IP-based Ethernet network through a RJ-45 connector. The Liebert IS-WEB485ADPT shall provide redundant paths for communication that make it possible to connect to a Building Management System (BMS) using Modbus while simultaneously communicating with an NMS through SNMP and HTTP. A terminal block shall be provided to connect to Modbus.

Key Lockout Switch

A key lockout switch shall be provided which activates a software lockout of the touch-screen display to prevent manual transfers and configuration changes. When locked out, the touch screen becomes a read-only display and a key is required to do manual transfers or change settings. The alarm silence button shall not be disabled when in the lockout position. The switch shall be located behind the front door but can be operated without opening the front door.

Certified Test Report

A certified copy of the factory test report shall be provided for each unit.

PART 3 - EXECUTION

FIELD QUALITY CONTROL

The following inspections and test procedures shall be performed by factory-trained field service personnel during the automatic static transfer switch startup.

Visual Inspection

- Inspect equipment for signs of damage.
- Verify installation per drawings.
- Inspect cabinets for foreign objects.
- Verify neutral (if used) and ground conductors are properly sized and configured.
- Verify all printed circuit boards are configured properly.

Mechanical Inspection

- Check all control wiring connections for tightness.
- Check all power wiring connections for tightness.
- Check all terminal screws, nuts and spade lugs for tightness.

Electrical Inspection

- Check all fuses for continuity.
- Confirm input voltage and phase rotation is correct.
- Verify control transformer connections are correct for voltages being used.

MANUFACTURER'S FIELD SERVICE

Service Personnel

The automatic static transfer switch manufacturer shall directly employ a nationwide service organization, consisting of factory-trained field service personnel dedicated to the startup, maintenance and repair of UPS and power equipment. The organization shall consist of regional and local offices.

The manufacturer shall provide a fully automated national dispatch center to coordinate field service personnel schedules. One toll-free number shall reach a qualified support person 24 hours/day, 7 days/week, 365 days/year. If emergency service is required, response time shall be 20 minutes or less.

An automated procedure shall be in place to ensure that the manufacturer is dedicating the appropriate technical support resources to match escalating customer needs.

Replacement Parts Stocking

Parts shall be available through an extensive network to ensure round-the-clock parts availability throughout the country.

Recommended spare parts shall be fully stocked by local field service personnel with backup available from the national parts center and the manufacturing location. The national parts center Customer Support Parts Coordinators shall be on call 24 hours/day, 7 days/week, 365 days/year for immediate parts availability. Parts from the national parts center shall be shipped within 4 hours on the next available flight out and delivered to the customer's site within 24 hours.

STS Maintenance Training

Maintenance training courses for customer employees shall be made available by the automatic static transfer switch manufacturer. This training is in addition to the basic operator training conducted as a part of the system startup.

The training course shall cover STS theory, location of subassemblies, safety and STS operational procedures. The course shall include control, metering and feedback circuits to the Printed Circuit Board (PCB) level. Troubleshooting and fault isolation using alarm information and internal self-diagnostics should be stressed.

Maintenance Contracts

A complete offering of preventive and full service maintenance contracts for the automatic static transfer switch shall be available. An extended warranty and preventive maintenance package shall be available. Factory-trained service personnel shall perform warranty and preventive maintenance service.

END OF SECTION