WISCONSIN DEPARTMENT OF TRANSPORTATION
TRAFFIC MANAGEMENT CENTER
DATA CENTER ELECTRICAL & HVAC IMPROVEMENTS
MILWAUKEE, WISCONSIN

Date: **12/12/2019**

OWNER: WI DOT
433 WEST ST PAUL AVENUE, SUITE 300
MILWAUKEE, WI 53203

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CS001 PROJECT COVER SHEET

ELECTRICAL

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E202 SCHEDULES AND DETAILS

MECHANICAL

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M303.1 MECHANICAL UNDERFLOOR PLANS
M303.2 MECHANICAL THIRD FLOOR PLAN
M304 MECHANICAL ROOF PLAN
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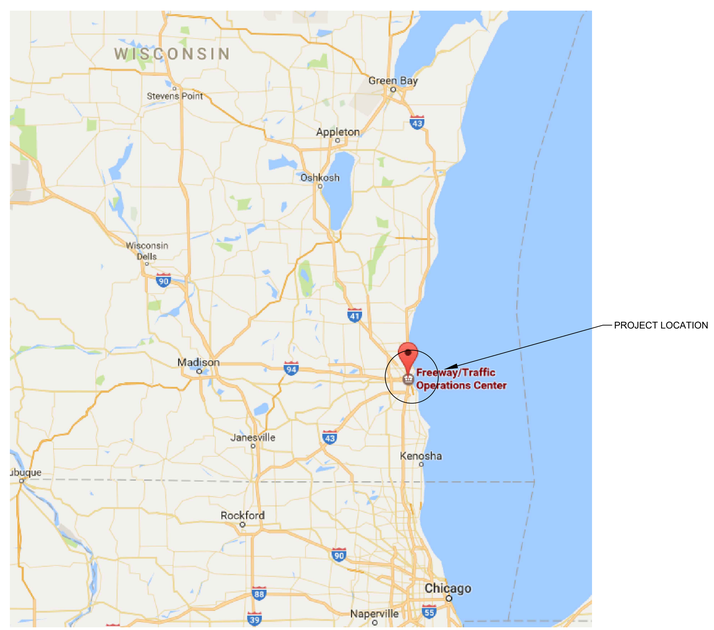

TRUE NORTH

Project Location Map

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SYMBOLS LIST

	LIGHT SWITCH
	CONDUIT, CAPPED
	CONVIENCE OUTLET - DUPLEX RECEPTACLE, WALL MOUNTED 15" AFF SUBSCRIPTS: (G) GROUND FAULT INTERRUPTER, (C) MOUNTED 6" ABOVE COUNTER, (WP) WEATHERPROOF, (EQ) MOUNTED ON EQUIPMENT FURNISHED BY OTHERS, (H) MOUNTED HORIZONTALLY, (S) UPPER-HALF SWITCHED, (TS) MOUNTED HORIZONTALLY IN TOE SPACE, (EP) EXPLOSION PROOF, (IG) ISOLATED GROUND, (TSS) TRANSIENT SURGE SUPPRESSOR
	COMMUNICATIONS OUTLET, 4" SQUARE BOX WITH SINGLE GANG RING, WALL MOUNTED 15" AFF, 3/4"C. TO ACCESSIBLE CEILING SUBSCRIPTS: (C) MOUNTED 6" ABOVE COUNTER TOP, (W) MOUNTED 56" AFF LEVITON 41643-W WHERE WHITE (NOT LABELED) LEVITON 41642-W WHERE WHITE (NOT LABELED), 2 PORT PROVIDE PLENUM CABLING AND 3'+ PIGTAIL AT RACK NOTE: ALL JACK NEED TO BE NUMBERED BOTH ON JACK AND ON NON TERMINATED END AT RACK.
	SPECIAL PURPOSE OUTLET - SEE SCHEDULE
	JUNCTION/PULL BOX - SIZE AS REQUIRED
	MOTOR - SEE SCHEDULE
	PROTECTIVE DEVICE - DISCONNECT SWITCH
#	NEW PANELBOARD, SURFACE OR RECESSED MOUNTED, AS SHOWN. # INDICATES PANELBOARD DESIGNATION
#	EXISTING PANELBOARD, SURFACE OR RECESSED MOUNTED, AS SHOWN. # INDICATES PANELBOARD DESIGNATION
	TRANSFER SWITCH
DP #	DISTRIBUTION PANEL - MOUNTED ON/IN WALL, SURFACE OR RECESSED AS SHOWN, # INDICATES ALPHA-NUMERIC PANEL DESIGNATION

ONE-LINE DIAGRAM SYMBOLS

	RACEWAY WIRE CONNECTIONS
	JUNCTION OF CONNECTION
	CIRCUIT BREAKER
	FUSE
	FUSIBLE SWITCH
	DISCONNECT SWITCH
	GROUND FAULT FUSIBLE SWITCH
	3-PHASE, 4-WIRE, WYE, GROUNDED NEUTRAL
	3-PHASE, 3-WIRE, DELTA
M	METER
A	PANELBOARD (DIAGRAMMATIC)
	TRANSFORMER
	POTENTIAL TRANSFORMER
	IN-LINE TRANSFORMER
	MOTOR
	SPECIAL PURPOSE OUTLET
	JUNCTION BOX
	GROUND
	MOTOR STARTER - COMBINATION FUSIBLE
	MOTOR STARTER - COMBINATION CIRCUIT BREAKER
	PLUG / RECEPTACLE
	FLEXIBLE CONNECTION TO EQUIPMENT
	AUTOMATIC TRANSFER SWITCH
G	GENERATOR

ONE-LINE DIAGRAM SYMBOLS NOTES

ALL SYMBOLS IN LIST MAY NOT BE USED IN DRAWING

225	AMPERE RATING
SFHA	C/B OR FUSE TYPE

GENERAL NOTES:

1. ALL ELECTRICAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS AND ALL OTHER INFORMATION RELATED TO THE PERFORMANCE OF THE WORK.

2. THE CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THIS WORK SHALL BECOME THOROUGHLY FAMILIAR WITH THE PROJECT SPECIFICATIONS BEFORE COMMENCING ANY WORK. THE PROJECT SPECIFICATIONS AND DRAWINGS FORM THE BASIS OF THE CONTRACT REQUIREMENTS AND INCLUDE THE TYPE AND GRADE OF MATERIALS TO BE INSTALLED, EQUIPMENT TO BE FURNISHED, THE MANNER BY WHICH TO BE INSTALLED AND WHERE TO BE LOCATED. IN THE EVENT OF A CONFLICT BETWEEN THE PROJECT SPECIFICATIONS AND DRAWINGS; SPECIFICATIONS GOVERN UNLESS THE ARCHITECT/ENGINEER DIRECTS OTHERWISE.

3. INFORMATION PERTAINING TO EXISTING PROJECT CONDITIONS, SUCH AS PRESENT LOCATIONS OF ARCHITECTURAL AND STRUCTURAL BUILDING COMPONENTS, MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND OTHER MISCELLANEOUS CONSTRUCTION APPEARS ON THE DRAWINGS. WHILE SUCH INFORMATION HAS BEEN BASED ON AVAILABLE RECORDS AND COLLECTED WITH REASONABLE CARE, THE ENGINEER DOES NOT ASSUME ANY EXPRESSED OR IMPLIED GUARANTEE THAT CONDITIONS SO INDICATED ARE SHOWN ENTIRELY COMPLETE, CORRECT AND REPRESENTATIVE OF THOSE ACTUALLY EXISTING. ALL CONTRACTORS SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL EXISTING JOB CONDITIONS PRIOR TO BIDDING, AND VERIFY ALL DIMENSIONS.

4. THE ELECTRICAL CONTRACTOR SHALL CHECK CAREFULLY ALL CONSTRUCTION DRAWINGS AND SPECIFICATIONS THAT ARE PART OF THIS PROJECT TO INSURE THAT NO FIXTURE, OUTLET, ALARM STATION OR CONTROL AND POWER WIRING IS OMITTED. HE SHALL CONSULT ALL TRADES FURNISHING EQUIPMENT AND OBTAIN FROM THEM ALL DATA. IN SOME CASES EQUIPMENT, FIXTURES AND DEVICES ARE SHOWN ONLY. ASCERTAIN AND PROVIDE THE WIRING AND CONTROL STATIONS REQUIRED FOR THE PROPER FUNCTION OF BUILDING EQUIPMENT. NO EXTRA CHARGES SHALL BE ACCEPTED BY OWNER AFTER BIDDING FOR SUCH EQUIPMENT AND LABOR.

5. EQUIPMENT LABELS AND INSTRUCTIONS REGARDING THE APPLICATION AND INSTALLATION OF THE LISTED EQUIPMENT SHALL BE FOLLOWED TO INSURE THAT THE EQUIPMENT IS BEING INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S LISTING INSTRUCTIONS. .

6. ALL WORK IS TO BE DONE IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE APPLICABLE CODES AND REGULATIONS.

7. ALL OUTAGES SHALL BE SCHEDULED WITH THE OWNER AND PERFORMED IN ACCORDANCE THEREWITH.

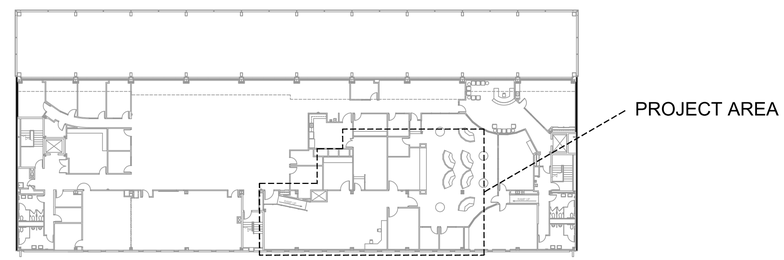
8. COORDINATE WORK WITH OTHER TRADES AND INSTALL CONDUITS AND BOXES TO CLEAR EMBEDDED DUCTS, PIPING, OPENING, AND OTHER STRUCTURAL FEATURES.

9. CONDUIT RUNS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC. ALL CONDUITS SHALL RUN CONCEALED, EXCEPT IN EQUIPMENT ROOMS AND WHERE APPROVED BY ARCHITECT/ENGINEER.

10. CONTRACTOR SHALL PROVIDE ALL BUILDING PENETRATIONS AND PATCHING TO MAINTAIN ORIGINAL STRUCTURAL CHARACTERISTICS AND/OR FIRE RATING.

11. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING EQUIPMENT ACCESS INTO THE BUILDINGS. SHOULD EQUIPMENT SIZES BE SUCH AS NECESSITATE GREATER BUILDING OPENING(S) THAN EXISTING OPENING(S), SUCH MODIFICATIONS SHALL BE MADE BY THE CONTRACTOR, INCLUDING COMPLETE RESTORATION TO THE ORIGINAL CONDITION.

12. PROJECT IS IN A SECURE FACILITY THAT REQUIRES A BACKGROUND CHECK FOR SECURITY CLEARANCE.



KEY PLAN

NO SCALE

ABBREVATIONS LIST

A	AMP
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ALT	ALTERNATE
AS	AS SHOWN
AU	AT UNIT
B,JB	JUNCTION BOX
BFG	BELOW FINISHED GRADE
BP	BUS PLUG
CB, C/B	CIRCUIT BREAKER(S)
CDT	CONDUIT
CKT	CIRCUIT
CS	COMBINATION MOTOR STARTER
CU	COPPER
D, DS	DISCONNECT SWITCH
DN	DOWN
DRWGS	DRAWINGS
E, EC, X	BY ELECTRICAL CONTRACTOR
EQ	EQUIPMENT
EX	EXISTING
F	FURNISHED BY
G, GFI	GROUND FAULT INTERRUPTER TYPE
GND	GROUND
GRC	GALVANIZED RIGID CONDUIT
H-O-A	HAND-OFF-AUTO SWITCH
HP	HORSEPOWER
I	INSTALLED BY
IL	INTERLOCK
IS	IN STARTER COVER
ISO	ISOLATION
IU	IN UNIT
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LD	LOAD (KW OR HP)
MCB	MAIN CIRCUIT BREAKER
MFR	MANUFACTURER
MSB	MAIN SWITCHBOARD
MT	EMPTY
MTD	MOUNTED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NU	NEAR UNIT (REFER TO HVAC & PLUMBING DRWGS FOR EXACT LOCATION.)
OC	ON CENTER
PEC	PROJECT ELECTRICAL CONTRACTOR
P.L.	PILOT LIGHT
QTY	QUANITY
R	RECEPTACLE
RAI	REMAIN AS IS
RM	ROOM
SPC	SPACE
SPO	SPECIAL PURPOSE OUTLET
SPR	SPARE
SW	SWITCH
SWBD	SWITCHBOARD
UG	UNDERGROUND
UO	UNIQUE OUTLET
UOI	UNLESS OTHERWISE INDICATED
V	VENDOR SUPPLYING EQUIPMENT
VFD	VARIABLE FREQUENCY DRIVE
W	WIRED BY
W/	WITH
WP	WEATHERPROOF
XFMR	TRANSFORMER

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EXISTING PROJECT CONDITIONS

INFORMATION RELATIVE TO EXISTING PROJECT CONDITIONS, SUCH AS PRESENT LOCATIONS OF ARCHITECTURAL AND STRUCTURAL BUILDING COMPONENTS, MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND OTHER MISCELLANEOUS CONSTRUCTION, APPEARS ON THESE DRAWINGS. WHILE SUCH INFORMATION HAS BEEN BASED ON AVAILABLE RECORDS AND COLLECTED WITH REASONABLE CARE, THE ARCHITECT AND ENGINEER DO NOT ASSUME ANY EXPRESSED OR IMPLIED GUARANTEE THAT CONDITIONS AS INDICATED ARE SHOWN ENTIRELY COMPLETE, CORRECT AND REPRESENTATIVE OF THOSE ACTUALLY EXISTING. ALL CONTRACTORS SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL EXISTING JOB CONDITIONS PRIOR TO BIDDING AND SHALL FIELD VERIFY ALL DIMENSIONS SHOWN HEREIN.

ELECTRICAL SHUTDOWN AND PHASING NOTES

SHUTDOWNS CANNOT BE PERFORMED DURING PEAK HOURS. THOROUGH COORDINATION WITH OWNER SHALL BE REQUIRED PRIOR TO DOING ANY WORK AND ANY BUILDING SHUT-DOWNS. THE CONTRACTOR SHALL PROVIDE A WRITTEN M.O.P. (METHOD OF PROCEDURE), APPROVED BY THE OWNER FOR ALL BUILDING SHUT-DOWNS PRIOR TO COMMENCING WORK. CONTRACTOR CAN NOT PROCEED UNTIL OWNER'S ACCEPTANCE OF CONTRACTORS SHUT-DOWN PLAN IS GIVEN.

SCOPE OF WORK

WORK TO BE COMPLETED BY ELECTRICAL CONTRACTOR:

1. REPLACE EXISTING THREE PHASE UNINTERRUPTABLE POWER SUPPLY (UPS) WITH TWO NEW THREE PHASE UPS'S AND POWER DISTRIBUTION UNIT (PDU) TO CREATE NEW DUAL BUS DISTRIBUTION TO SERVER LOADS.
2. PROVIDE STATIC TRANSFER SWITCH AHEAD OF PDU-2 TO PROVIDE UPS POWER FROM BOTH A AND B BUS TO SINGLE CORDED LOADS IN THE CONTROL ROOM.
3. PROVIDE TRANSIENT VOLTAGE SURGE PROTECTION DEVICE IN PANEL EMDP TO PROTECT DOWNSTREAM UPS'S.
4. EXTEND EMERGENCY POWER OFF CONTROL SYSTEM FOR SHUTDOWN OF NEW UPS AND HVAC SYSTEMS.
5. EXTEND POWER TO NEW HVAC SYSTEM EQUIPMENT.
6. REMOVAL OF EXISTING ELECTRICAL EQUIPMENT RELEASED FROM SERVICE. SEE DEMOLITION PLANS AND SPECIFICATIONS.

NO.	DATE	REVISION DESCRIPTION

LEEDY & PETZOLD ASSOCIATES, LLC
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12970 W. BLUEMOUND ROAD - SUITE 101
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DESIGNED BY JRH
DRAWN BY TGS
CHECKED BY JRH

PROJECT DESCRIPTION: WISCONSIN DEPARTMENT OF TRANSPORTATION STATEWIDE TRAFFIC MANAGEMENT CENTER DATA CENTER ELECTRICAL IMPROVEMENTS

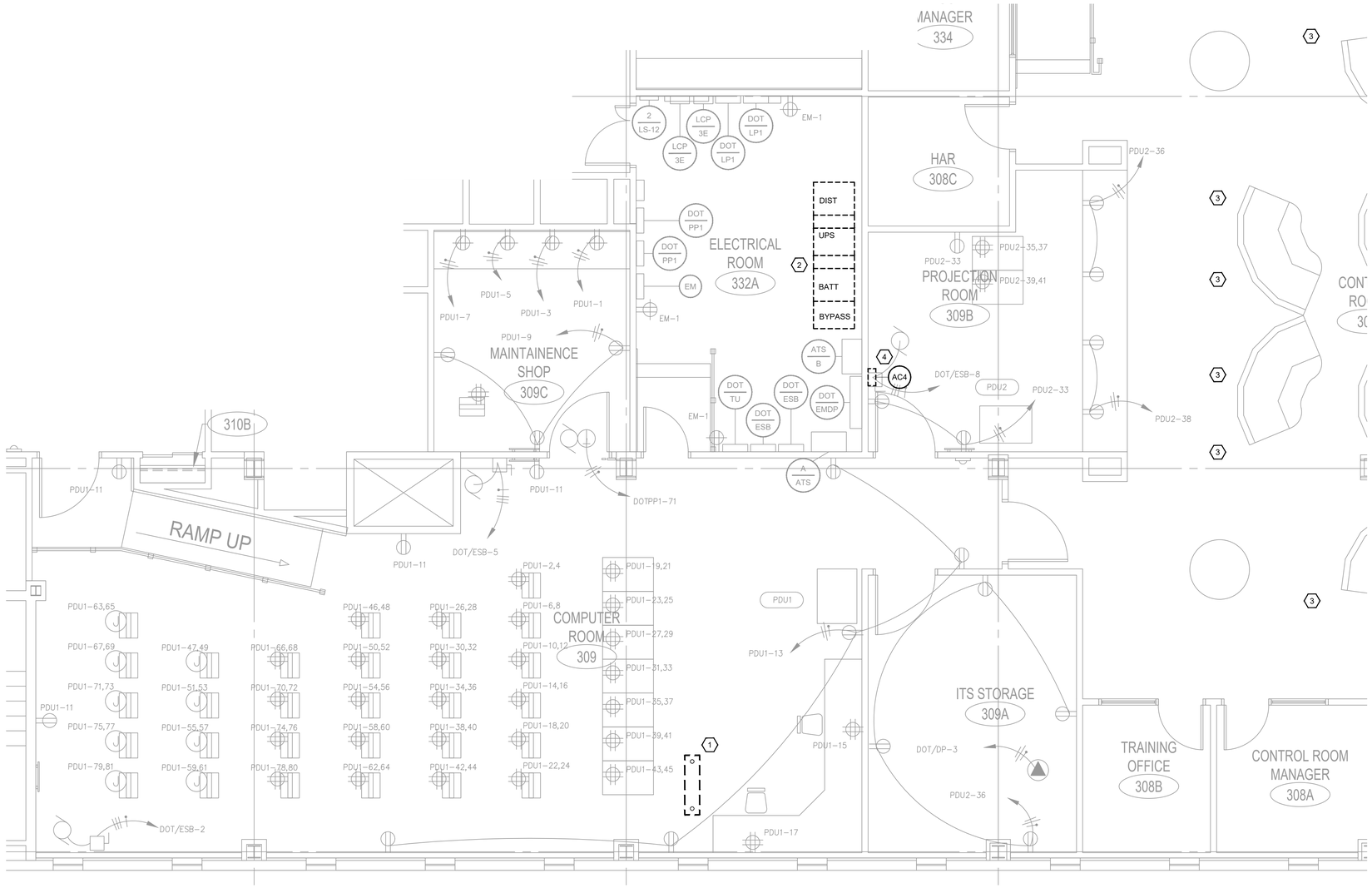
PROJECT LOCATION: WI DOT TMC 433 WEST ST PAUL AVENUE, SUITE 300 MILWAUKEE, WI 53203

SHEET TITLE: SYMBOLS, ABBREVATIONS, AND INDEX OF DRAWINGS

PROJECT NUMBER: 8514

DATE: 12/12/2019

SHEET NUMBER: E100



DEMOLITION NOTES

1. NEW 'UPS B' MUST BE INSTALLED PRIOR TO DISCONNECTION AND DEMOLITION OF EXISTING UPS.
2. ALL ELECTRICAL EQUIPMENT INCLUDING ASSOCIATED CONTROLS, WIRING, DISCONNECTS, RACEWAY, AND BOXES ARE TO BE REMOVED UNLESS NOTED OTHERWISE. ADDITIONAL COMPONENTS TO BE REMOVED EXIST WHICH ARE NOT SHOWN. FIELD VERIFY AND CHECK THE EXACT LOCATIONS AND NUMBERS OF ALL THE DEVICES AND EQUIPMENT TO BE REMOVED.
3. COORDINATE ALL REMOVAL WORK WITH NEW CONSTRUCTION.
4. CIRCUITS SERVING AREAS BEYOND THE IMMEDIATE DEMOLITION SHALL BE MAINTAINED. WIRING SHALL BE REMOVED, TERMINATED, OR EXTENDED AS REQUIRED TO MAINTAIN CIRCUIT CONTINUITY.
5. DISPOSE OF ALL REMOVED ELECTRICAL DEVICES, UNLESS OTHERWISE REQUESTED BY OWNER. VERIFY EQUIPMENT TO REMAIN PROPERTY OF THE OWNER. CONDUIT, BOXES, WIRING, AND MISC. ELECTRICAL SCRAP SHALL BE REMOVED FROM THE JOB SITE.
6. CHECK FOR PROPER OPERATION OF ALL EXISTING DEVICES OR SYSTEMS THAT ARE TO BE RELOCATED OR TO REMAIN. REPAIR IF NEEDED. REMOVED OR RELOCATE ALL EXISTING ELECTRICAL DEVICES ASSOCIATED WITH REMOVED OR RELOCATED MECHANICAL EQUIPMENT, COORDINATE WITH HVAC DRAWINGS.

SHEET NOTES

1. DEMOLISH EXISTING LIGHT FIXTURE FOR NEW HVAC EQUIPMENT LOCATION. SEE DEMOLITION ONE-LINE DIAGRAM SHEET E200.
2. DEMOLISH EXISTING UNINTERRUPTABLE POWER SUPPLY (UPS) AND ASSOCIATED WIRING FROM "ATS-B" AND TO "PDU-1" AND "PDU-2".
3. DISCONNECT POWER TO ABANDONED TERMINAL UINITS UNDER FLOOR TU-1 THROUGH 6 IN CONTROL ROOM 308. SEE MECHANICAL PLANE "2/M303.1". RE-LABEL BREAKERS AS SPARE.
4. DEMOLISH EXISTING AC4 PANEL TO BE RELOCATED TO NEW LOCATION AS SHOWN ON SHEET E102.

NORTH

1 / E101

THIRD FLOOR ELECTRICAL PLAN - DEMOLITION

SCALE: $\frac{1}{4}$" = 1'-0"

0 1 2 4 8 16

NO.	DATE	REVISION DESCRIPTION

DESIGNED BY JRH
DRAWN BY TGS
CHECKED BY JRH

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DATA CENTER ELECTRICAL IMPROVEMENTS

PROJECT LOCATION
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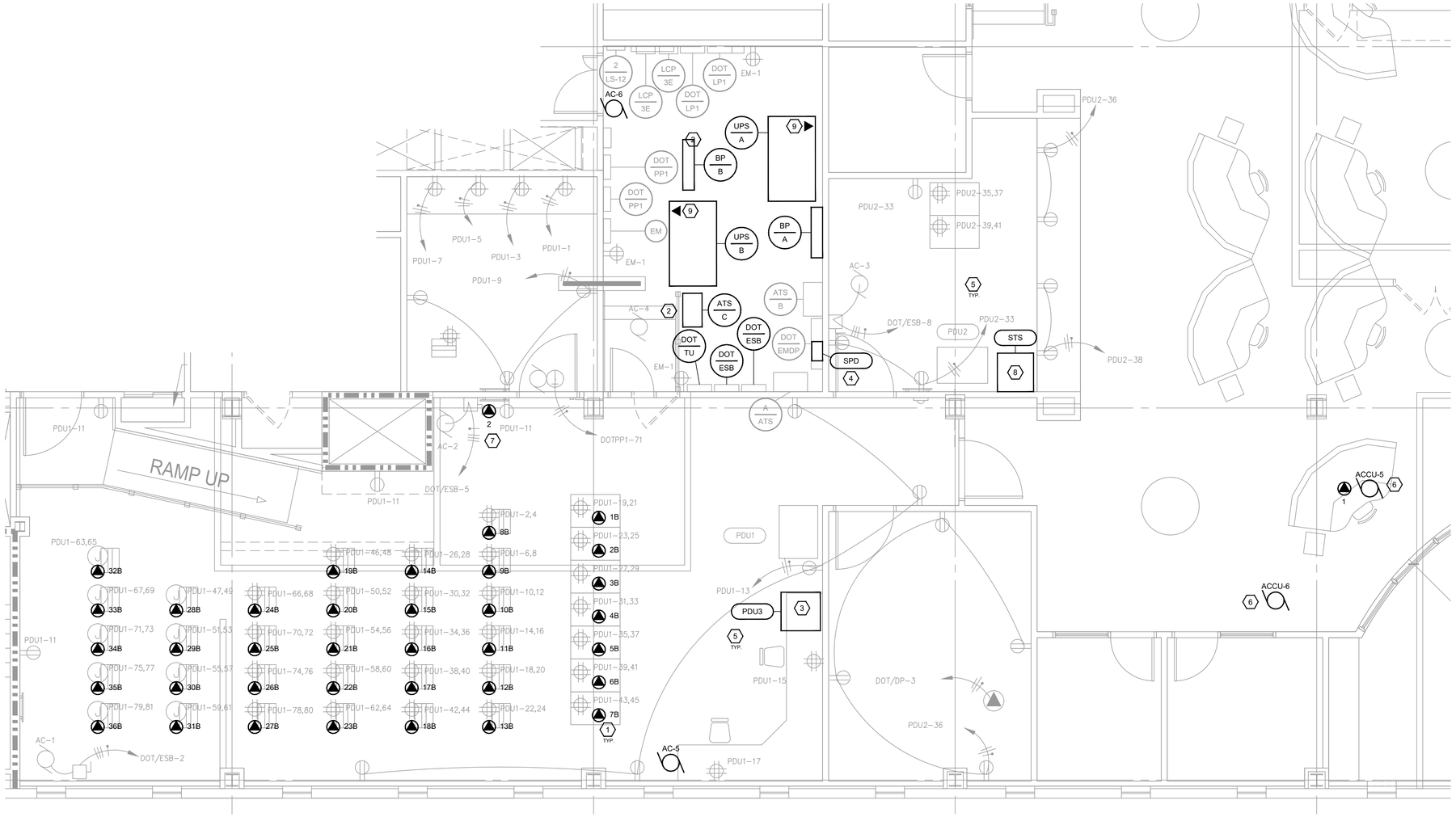
SHEET TITLE
THIRD FLOOR ELECTRICAL PLAN - DEMOLITION

PROJECT NUMBER 8514
DATE 12/12/2019

SHEET NUMBER
E101



NORTH

1 / E102

THIRD FLOOR ELECTRICAL PLAN - NEW

SCALE: $\frac{1}{4}$" = 1'-0"

0 1 2 4 8 16

GENERAL NOTES

1. NEW 'UPS B' MUST BE INSTALLED PRIOR TO DISCONNECTION AND DEMOLITION OF EXISTING UPS.
2. SIZES AND LAYOUTS ARE BASED ON LIEBERT EQUIPMENT. ELECTRICAL CONTRACTOR SHALL VERIFY DIMENSIONS AND SPACE REQUIREMENTS IF SUPPLYING EQUIPMENT FROM ALTERNATE MANUFACTURERS THAN SPECIFIED.
3. VERIFY EXISTING LAYOUT AND DIMENSIONS WITH FINAL APPROVED SHOP DRAWINGS PRIOR TO BEGINNING THIS WORK.
4. ALL BRANCH CIRCUIT WIRING INSTALLED BELOW THE RAISED FLOOR SHALL BE RUN IN INSULATED AND SHIELDED LIQUID TIGHT FLEXIBLE METAL CONDUIT WITH APPROPRIATE RECEPTACLE, GALVANIZED BOX AND FACE PLATE.
5. ALL WALL, FLOOR, AND CEILING PENETRATIONS SHALL BE FIRE SEALED FOR 1-HR RATING UNLESS A HIGHER RATING IS REQUIRED. COORDINATE WITH ARCHITECT.
6. E.C. SHALL COORDINATE EQUIPMENT CONNECTIONS TO DETERMINE WHETHER CORD AND PLUG OR HARD WIRED.
7. BRANCH CIRCUIT WIRING SHALL BE LABELED AT EACH END WITH ASSIGNED CIRCUIT NUMBER, AND PANEL FEED.
8. LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE COLORED TO MATCH UPS SOURCE. SOURCE "A" SHALL BE YELLOW. SOURCE "B" SHALL BE BLUE.
9. PROVIDE CONTROL WIRING FOR NEW AND EXISTING MECHANICAL EQUIPMENT. SEE MECHANICAL PLANS FOR MORE DETAIL.

SHEET NOTES

1. INSTALL NEW DUPLEX OUTLET IN BACK OF THE CORRESPONDING DATA RACK NEXT TO THE EXISTING QUAD OUTLET, FED FROM NEW "PDU-3". SEE SHEET "E202" FOR "PDU-3" SCHEDULE.
2. INSTALL NEW "ATS/C" AND "BP/B" ONTO FREE STANDING UNISTRUT.
3. DESK TO BE REMOVED BY OWNER. INSTALL NEW "PDU/3" AND CONNECT TO NEW "UPS/A".
4. INSTALL NEW SURGE PROTECTIVE DEVICE "SPD" ABOVE THE PANEL "DOT/EMDP".
5. PROVIDE #2AWG BONDING CONDUCTOR FROM RAISED FLOOR GROUNDING SYSTEM TO NEW EQUIPMENT.
6. AIR COOLED CONDENSING UNITS AND ELECTRICAL CONNECTIONS ON ROOF TOP.
7. RELOCATE AND WIRE EXISTING AC4 PANEL TO THE NEW LOCATION AS SHOWN. THE CONTRACTOR SHALL WORK WITH LIEBERT AND THE TMC IT DEPARTMENT TO COMMISSION THE PANEL AND VERIFY ALARMING FUNCTIONS.
8. INSTALL NEW STATIC TRANSFER SWITCH ON RAISED FLOOR ADJACENT TO PDU-2. PROVIDE UNDERFLOOR BRACING AND EQUIPMENT SUPPORT. SEE DETAIL '1/E202'.
9. PROVIDE REMOTE MONITORING OF UPS SYSTEM THRU INTEGRATION WITH OWNER BAS SYSTEM. PROVIDE COMMUNICATION/NETWORK WIRING AND PROGRAMMING AS REQUIRED. COORDINATE WITH OWNER.

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PROJECT DESCRIPTION
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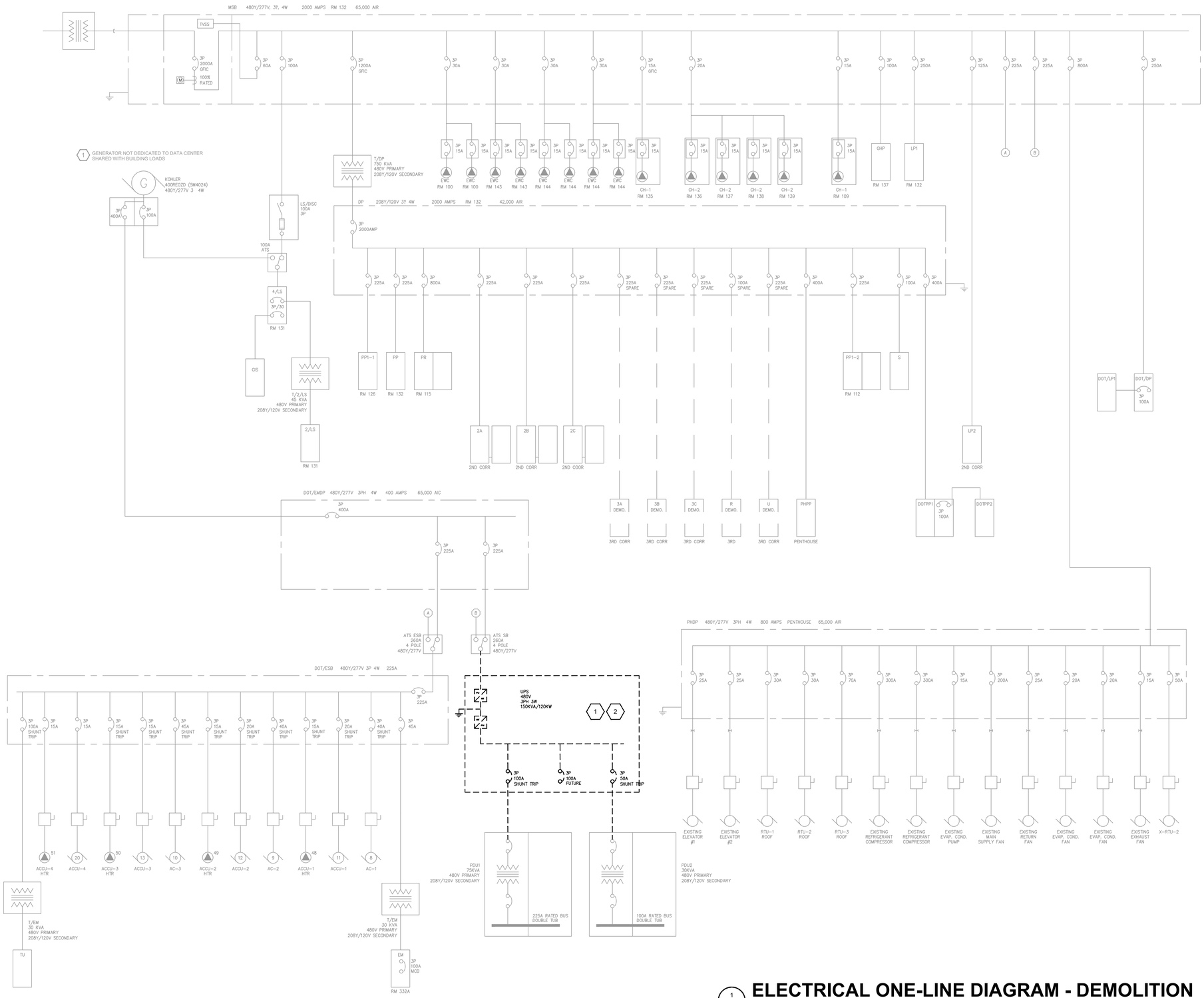
SHEET TITLE
THIRD FLOOR ELECTRICAL PLAN - NEW

PROJECT NUMBER 8514
DATE 12/12/2019

SHEET NUMBER
E102



ONE-LINE DIAGRAM SYMBOLS

	RACEWAY WIRE CONNECTIONS
	JUNCTION OF CONNECTION
	CIRCUIT BREAKER
	FUSE
	FUSIBLE SWITCH
	DISCONNECT SWITCH
	NEW BUSDUCT
	EXISTING BUSDUCT
C	GENERATOR
	CT CABINET
M	METER
	SELECTOR SWITCH
A	PANELBOARD (DIAGRAMMATIC)
	AUTOMATIC TRANSFER SWITCH
	TRANSFORMER
	MOTOR
	SPECIAL PURPOSE OUTLET
	JUNCTION BOX
	FUSIBLE BUS PLUG
	GROUND

SHEET NOTES

1. DEMOLISH EXISTING UPS AND ASSOCIATED INPUT AND OUTPUT FEEDERS.
2. EXISTING MG&E UPS SYSTEM MODEL 72-160400-44, 150KVA, INPUT 480VAC, 3-PH, 3W+G, 60Hz, 155A. OUPUT 480VAC, 3-PH, 3W+G, 60Hz, 180A.

ONE-LINE DIAGRAM NOTES:

1. E-1 ALL ITEMS DEPICTED BY A DARK SOLID LINE ARE NEW.
2. E-1 ALL ITEMS DEPICTED BY A LIGHT SOLID LINE ARE EXISTING TO REMAIN.
3. E-1 ALL ITEMS DEPICTED BY A DARK DASHED LINE ARE EXISTING TO BE REMOVED.

1 / E200

ELECTRICAL ONE-LINE DIAGRAM - DEMOLITION

NO SCALE

LPA # 8355

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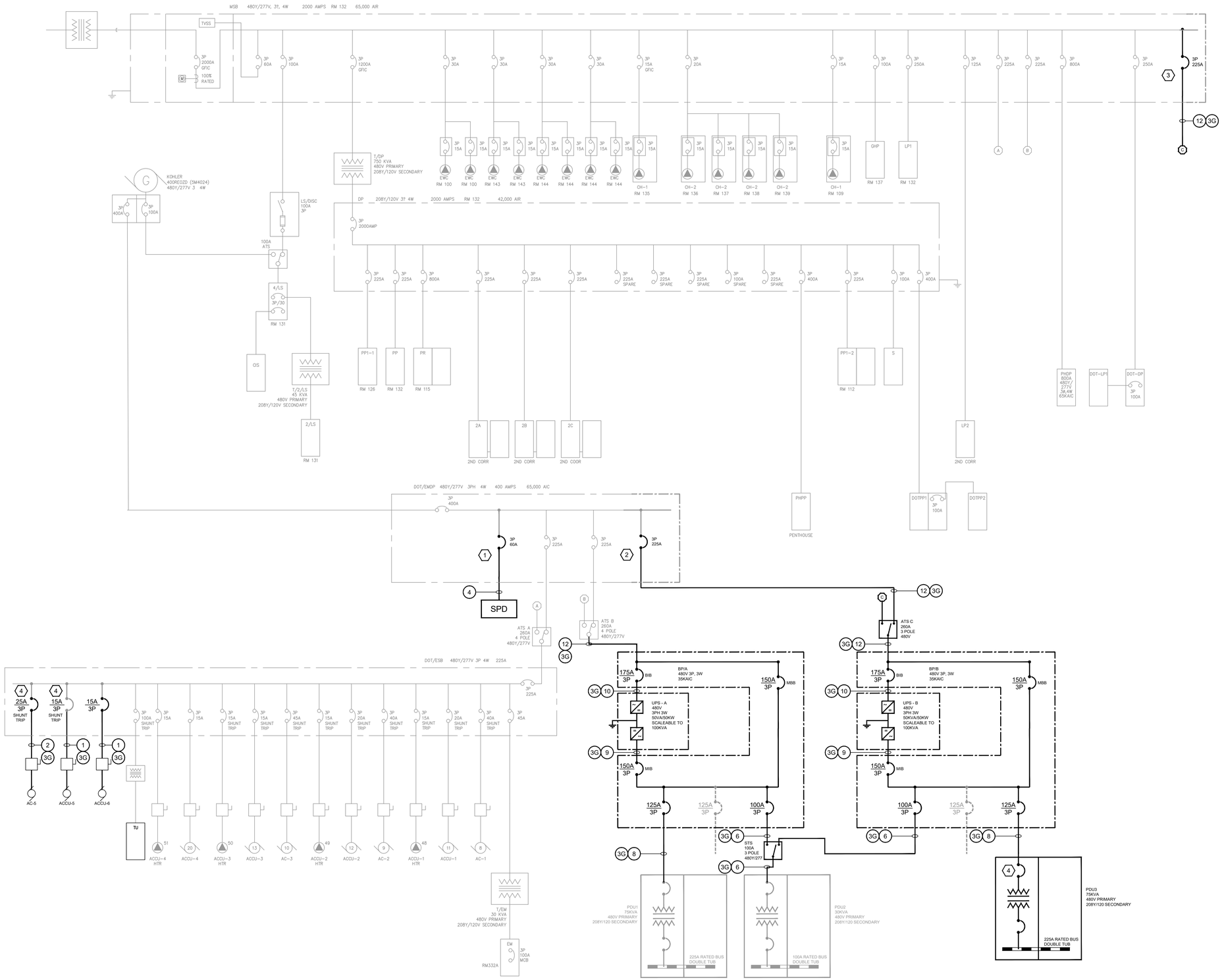
E200



1 E201

ELECTRICAL ONE-LINE DIAGRAM - NEW

NO SCALE

ONE-LINE DIAGRAM SYMBOLS

	RACEWAY WIRE CONNECTIONS
	JUNCTION OF CONNECTION
	CIRCUIT BREAKER
	FUSE
	FUSIBLE SWITCH
	DISCONNECT SWITCH
G	GENERATOR
M	METER
A	PANELBOARD (DIAGRAMMATIC)
	AUTOMATIC TRANSFER SWITCH
	TRANSFORMER
	MOTOR
	SPECIAL PURPOSE OUTLET
	JUNCTION BOX
	FUSIBLE BUS PLUG
	GROUND

SHEET NOTES

1. INSTALL NEW 60A, 3P BREAKER INTO EXISTING PANEL "DOT/EMDP". RUN 4#6 1#6G TO SURGE PROTECTIVE DEVICE, LIEBERT MODEL NO. "560270YP16ACG10".
2. INSTALL NEW 225A, 3P BREAKER INTO EXISTING PANEL "DOT/EMDP".
3. INSTALL NEW 225A, 3P BREAKER INTO EXISTING MAIN SWITCHBOARD, "MDP".
4. INTERLOCK PDU SHUNT TRIP BREAKERS WITH FIRE SUPPRESSION SYSTEM EPO.

FEEDER SCHEDULE

No.	FEEDER AMPACITY	CONDUCTOR SIZE		CONDUIT SIZE	
		Ø & NEUTRAL	GROUND	3, 3G, 1, 1G	4, 4G
1	20	#12	#12	3/4"	3/4"
2	30	#10	#10	3/4"	3/4"
3	50	#8	#10	3/4"	1"
4	60	#6	#10	1"	1"
5	80	#4	#8	1-1/4"	1-1/4"
6	100	#3	#8	1-1/4"	1-1/4"
7	110	#2	#6	1-1/4"	1-1/2"
8	125	#1	#6	1-1/2"	2"
9	150	#1/0	#6	1-1/2"	2"
10	175	#2/0	#6	2"	2"
11	200	#3/0	#6	2"	2-1/2"
12	225	#4/0	#4	2"	2-1/2"
13	250	250	#4	2-1/2"	3"
14	300	350	#4	3"	3"
15	400	500	#3	3"	3-1/2"

FEEDER SCHEDULE NOTES:

1. THE ABOVE FEEDER SCHEDULE IS A SCHEDULE OF TYPICAL FEEDERS AND NOT ALL SIZES MAY BE UTILIZED.
2. FEEDER SIZES SHOWN ON THE RISER DIAGRAM INDICATE FEEDER AMPACITIES AND DO NOT NECESSARILY CORRESPOND TO CIRCUIT BREAKER AMPACITIES. CERTAIN FEEDERS MAY BE SIZED FOR DERATION FACTORS REQUIRED BY CODE AND/OR ARE OVERSIZED FOR VOLTAGE DROP.
3. ALL FEEDERS SHALL BE 3Ø, 4W. & GROUND (4G) UNLESS OTHERWISE NOTED WITH THE FOLLOWING SYSTEM DESCRIPTIONS:
   - (1) - 1Ø, 2W.
   - (1G) - 1Ø, 2W. & GROUND
   - (3) - 3Ø, 3W.
   - (3G) - 3Ø, 3W. & GROUND
   - (4) - 3Ø, 4W.

ONE-LINE DIAGRAM NOTES:

1 E-1 ALL ITEMS DEPICTED BY A DARK SOLID LINE ARE NEW.

2 E-1 ALL ITEMS DEPICTED BY A LIGHT SOLID LINE ARE EXISTING TO REMAIN.

3 E-1 ALL ITEMS DEPICTED BY A DARK DASHED LINE ARE EXISTING TO BE REMOVED.

NO.	DATE	REVISION DESCRIPTION

DESIGNED BY JRH
DRAWN BY TGS
CHECKED BY JRH

LEEDY & PETZOLD ASSOCIATES, LLC
CONSULTING ELECTRICAL ENGINEERS/PLANNERS
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PROJECT DESCRIPTION: WISCONSIN DEPARTMENT OF TRANSPORTATION STATEWIDE TRAFFIC MANAGEMENT CENTER DATA CENTER ELECTRICAL IMPROVEMENTS

PROJECT LOCATION: WI DOT TMC 433 WEST ST PAUL AVENUE, SUITE 300 MILWAUKEE, WI 53203

SHEET TITLE: ELECTRICAL ONE-LINE DIAGRAM - NEW

PROJECT NUMBER: 8514

DATE: 12/12/2019

SHEET NUMBER: E201

PANELBOARD SCHEDULE

PANEL TU VOLTAGE 120/208V, 3Ø AIC 10,000

☐ FLUSH ■ MAIN 225 ■ GROUND BUS BUS 225
■ SURFACE ☐ MLO ☐ ISOLATED GROUND BUS ☐ FEED THRU

REMARKS: UPS-B

CIR #	C/B SIZE	DESCRIPTION	LOAD KVA	LOAD A Ø KVA	LOAD B Ø KVA	LOAD C Ø KVA	LOAD KVA	DESCRIPTION	C/B SIZE	CIR #
1	15	AC-6						2	20	2
3								1	15	4
5										6
7										8
9										10
11										12
13										14
15										16
17										18
19										20
21										22
23										24
25										26
27										28
29										30
31										32
33										34
35										36
37										38
39										40
41										42
		TOTALS								
		TOTAL CONNECT, KVA								

PANELBOARD SCHEDULE

PANEL DOT/ESB VOLTAGE 480Y/277V, 3Ø 4W AIC 10,000

☐ FLUSH ■ MAIN 225 ■ GROUND BUS BUS 225
■ SURFACE ☐ MLO ☐ ISOLATED GROUND BUS ☐ FEED THRU

REMARKS: SQUARE D "NF" TYPE

CIR #	C/B SIZE	DESCRIPTION	LOAD KVA	LOAD A Ø KVA	LOAD B Ø KVA	LOAD C Ø KVA	LOAD KVA	DESCRIPTION	C/B SIZE	CIR #
31	15	ACCU-5						ACCU-6	15	32
33										34
35										36
37		SHUNT TRIP								38
39								AC-5	25	40
41										42
43										44
45								SHUNT TRIP		46
47										48
49										50
51										52
53										54
55										56
57										58
59										60
		TOTALS								
		TOTAL CONNECT, KVA								

PANELBOARD SCHEDULE

PANEL PDU-3 VOLTAGE 208Y/120V AIC 22,000

☐ FLUSH ■ MAIN 225 ■ GROUND BUS BUS 225
■ SURFACE ☐ MLO ☐ ISOLATED GROUND BUS ☐ FEED THRU

REMARKS: UPS-B

CIR #	C/B SIZE	DESCRIPTION	LOAD KVA	LOAD A Ø KVA	LOAD B Ø KVA	LOAD C Ø KVA	LOAD KVA	DESCRIPTION	C/B SIZE	CIR #
1	20	1B						19B	20	2
3	20	2B						20B	20	4
5	20	3B						21B	20	6
7	20	4B						22B	20	8
9	20	5B						23B	20	10
11	20	6B						24B	20	12
13	20	7B						25B	20	14
15	20	8B						26B	20	16
17	20	9B						27B	20	18
19	20	10B						28B	20	20
21	20	11B						29B	20	22
23	20	12B						30B	20	24
25	20	13B						31B	20	26
27	20	14B						32B	20	28
29	20	15B						33B	20	30
31	20	16B						34B	20	32
33	20	17B						35B	20	34
35	20	18B						36B	20	36
37										38
39										40
41										42
		TOTALS								
		TOTAL CONNECT, KVA								

SPECIAL OUTLET SCHEDULE - COMPUTER EQUIPMENT

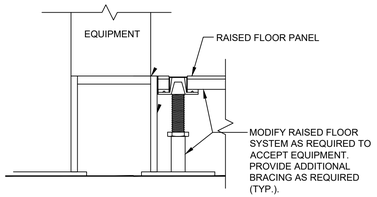
General Drawing Symbol -

MARK TO	MARK UO	EQUIPMENT SERVED TYPE	LOC.	ELECTRICAL CHARACTER HP	KW	AMPS	VOLT	Ø	PWR. SOURCE PANEL	C/B	WIRE SIZE	TERMINAL R	D	B	SO NOTE
	1B	SERVER RACK				20	120	1	PDU-3	1	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	2B	SERVER RACK				20	120	1	PDU-3	3	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	3B	SERVER RACK				20	120	1	PDU-3	5	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	4B	SERVER RACK				20	120	1	PDU-3	7	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	5B	SERVER RACK				20	120	1	PDU-3	9	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	6B	SERVER RACK				20	120	1	PDU-3	11	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	7B	SERVER RACK				20	120	1	PDU-3	13	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	8B	SERVER RACK				20	120	1	PDU-3	15	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	9B	SERVER RACK				20	120	1	PDU-3	17	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	10B	SERVER RACK				20	120	1	PDU-3	19	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	11B	SERVER RACK				20	120	1	PDU-3	21	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	12B	SERVER RACK				20	120	1	PDU-3	23	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	13B	SERVER RACK				20	120	1	PDU-3	25	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	14B	SERVER RACK				20	120	1	PDU-3	27	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	15B	SERVER RACK				20	120	1	PDU-3	29	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	16B	SERVER RACK				20	120	1	PDU-3	31	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	17B	SERVER RACK				20	120	1	PDU-3	33	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	18B	SERVER RACK				20	120	1	PDU-3	35	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	19B	SERVER RACK				20	120	1	PDU-3	2	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	20B	SERVER RACK				20	120	1	PDU-3	4	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	21B	SERVER RACK				20	120	1	PDU-3	6	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	22B	SERVER RACK				20	120	1	PDU-3	8	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	23B	SERVER RACK				20	120	1	PDU-3	10	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	24B	SERVER RACK				20	120	1	PDU-3	12	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	25B	SERVER RACK				20	120	1	PDU-3	14	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	26B	SERVER RACK				20	120	1	PDU-3	16	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	27B	SERVER RACK				20	120	1	PDU-3	18	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	28B	SERVER RACK				20	120	1	PDU-3	20	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	29B	SERVER RACK				20	120	1	PDU-3	22	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	30B	SERVER RACK				20	120	1	PDU-3	24	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	31B	SERVER RACK				20	120	1	PDU-3	26	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	32B	SERVER RACK				20	120	1	PDU-3	28	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	33B	SERVER RACK				20	120	1	PDU-3	30	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	34B	SERVER RACK				20	120	1	PDU-3	32	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	35B	SERVER RACK				20	120	1	PDU-3	34	1 #12, 1 #12G-1/2"C.	5-20R			SO-2
	36B	SERVER RACK				20	120	1	PDU-3	36	1#12, 1 #12G-1/2"C.	5-20R			SO-2
	1	LEE TEMP ACCU-5				15	208	1	TU	##	3 #8, 1 #10G-3/4"C.	D			
	2	AC-4				20	120	1	TU	##	1 #12, 1 #12G-1/2"C.	B			SO-1

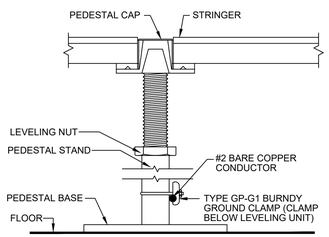
ABBREVIATIONS: TO: TYPICAL OUTLET (CIRCUITING PER SUBSCRIPT ON THE DRAWINGS).
UO: UNIQUE OUTLET (CIRCUITING PER SCHEDULE ABOVE).

TERMINAL TYPE: R: DENOTES RECEPTACLE
D: DENOTES UNFUSED DISCONNECT
B: DENOTES JUNCTION BOX
PEC TO VERIFY TYPE IN EACH CASE

S.O. NOTES:
1. EXISTING AC4 PANEL TO BE RELOCATED AS SHOWN ON PLANS.
2. LABEL RECEPTACLE FACEPLATE INDICATING PDU AND CIRCUIT NUMBER TO MATCH EXISTING LABELS.
3. NOT USED.



1 / E202 **EQUIPMENT SUPPORT DETAIL**
NO SCALE



2 / E202 **RAISED FLOOR PEDESTAL GROUND CONNECTION DETAIL**
NO SCALE

MOTOR WIRING SCHEDULE

NO.	MOTOR CHARACTERISTICS HP	VOLT	Ø	DRIVING/LOCATION	X-REF. DES.	PWR FEED SOURCE	NO	STARTER TYPE	F	I	W	LOC.	CONTROL TYPE	F	I	W	LOC.	MW NOTE
1	1.4 FLA	480	3	AIR COOLED CONDENSING UNIT #5	ACCU-5	DOT/ESB	##											MW-1,2
2	7.6 MCA	480	3	AIR COOLED CONDENSING UNIT #6	ACCU-6	DOT/ESB	##											MW-1
3	14.9 FLA	480	3	AIR CONDITIONING UNIT #5	AC-5	DOT/ESB	##											MW-1,2
4	3 MCA	208	1	AIR CONDITIONING UNIT #6	AC-6	TU	##											MW-1,3

MOTOR WIRING NOTES:
MW-1. FIELD ASSIGN BREAKER NUMBER.
MW-2. INTERLOCK SHUNT TRIP BREAKERS WITH FIRE SUPPRESSION SYSTEM EPO.
MW-3. PROVIDE NON-FUSED DISCONNECT AT THE UNIT.

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NO.	DATE	REVISION DESCRIPTION

DESIGNED BY JRH
DRAWN BY TGS
CHECKED BY JRH

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PROJECT DESCRIPTION:
WISCONSIN DEPARTMENT OF TRANSPORTATION
STATEWIDE TRAFFIC MANAGEMENT CENTER
DATA CENTER ELECTRICAL IMPROVEMENTS

PROJECT LOCATION:
WI DOT TMC
433 WEST ST PAUL AVENUE, SUITE 300
MILWAUKEE, WI 53203

SHEET TITLE:
SCHEDULES AND DETAILS

PROJECT NUMBER: 8514
DATE: 12/12/2019

SHEET NUMBER
E202

WISCONSIN DEPARTMENT OF TRANSPORTATION
TMC DATA CENTER ELECTRICAL & HVAC IMPROVEMENTS

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SHEET INDEX

M001 – Title Sheet
M101.1 – Mechanical Underfloor Demo Plans
M303.1 – Mechanical Underfloor Plans
M303.2 – Mechanical Third Floor Plan
M304 – Mechanical Roof Plan
M400 – Details and Schedules

MECHANICAL SYMBOLS

ABBREVIATIONS

AD	ACCESS DOOR/AREA DRAIN
AFF	ABOVE FINISH FLOOR
AFMS	AIR FLOW MEASURING STATION
AHU	AIR HANDLING UNIT
AMB	AMBIENT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
BAS	BUILDING AUTOMATION SYSTEM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
COL	COLUMN
CUH	CABINET UNIT HEATER
dB	DECIBELS
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DIA	DIAMETER
DTG	DOOR TRANSFER GRILLE
DTR	DUAL TEMPERATURE RETURN
DTS	DUAL TEMPERATURE SUPPLY
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EER	ENERGY EFFICIENCY RATIO
EFF	EFFICIENCY
EOM	END OF MAIN
EQPM	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
EXTG	EXISTING
FA	FREE AREA
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER OR FLOOR DRAIN
FPM	FEET PER MINUTE
FSD	FIRE AND SMOKE DAMPER
FT-HD	FOOT HEAD
FV	FACE VELOCITY
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HD	HUB DRAIN
HEPA	HIGH EFFICIENCY PARTICULATE AIR (FILTER)
HP	HORSEPOWER
HZ	HERTZ, FREQUENCY
ID	INSIDE DIAMETER
IN. W.C.	INCHES WATER COLUMN
LAT	LEAVING AIR TEMPERATURE
LLT	LOW LIMIT, FREEZESTAT
LWBT	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAT	MIXED AIR TEMPERATURE
MBH	1000 BTU/HR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MD	MANUAL DAMPER
NTS	NOT TO SCALE
OAD	OUTSIDE AIR DAMPER
OAT	OUTSIDE AIR TEMPERATURE
OD	OUTSIDE DIAMETER
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PRV	PRESSURE RELIEF VALVE OR PRESSURE REDUCING VALVE OR POWER ROOF VENTILATOR
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH, GAUGE
PTR	PRESSURE/TEMPERATURE RELIEF VALVE
RD	ROOF DRAIN
RH	RELATIVE HUMIDITY
RV	RELIEF VALVE
SAD	SOUND ATTENUATING DEVICE
SD	SUPPLY DIFFUSER
SMD	SMOKE DAMPER
SRV	SAFETY RELIEF VALVE
STD	STANDARD
T	THERMOSTAT
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TYP	TYPICAL
UCD	UNDERCUT DOOR
UNO	UNLESS NOTED OTHERWISE
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE

COMMON SYMBOLS

AHU-1	EQUIPMENT MARK SYMBOL
#	NOTE SYMBOL
1	REVISION SYMBOL, WITH CLOUD
1 / XX-XX	TITLE MARK (TITLE MARK/SHEET NUMBER)
	DEMOLITION
	EXISTING
	NEW
	CONNECT TO EXISTING
NORTH / N	NORTH ARROW

PIPING SYMBOLS

	SUPPLY
	RETURN
	FLOW DIRECTION
BBD	BOILER BLOW DOWN
BFW	BOILER FEED WATER
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CNST	CONDENSATE
CWS	CONDENSER WATER SUPPLY (COLD)
CWR	CONDENSER WATER RETURN (HOT)
D	DRAIN
DTS	DUAL TEMPERATURE SUPPLY
DTR	DUAL TEMPERATURE RETURN
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
GS	GLYCOL SUPPLY
GR	GLYCOL RETURN
HPC	HIGH PRESSURE COND RETURN
HPS	HIGH PRESSURE STEAM (>100PSI)
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
LPS	LOW PRESSURE STEAM (<15PSI)
LPC	LOW PRESSURE COND RETURN
NG	NATURAL GAS
REF	REFRIGERANT
RHTS	REHEAT SUPPLY
RHTR	REHEAT RETURN
STM	STEAM
	CONNECTION, BOTTOM
	CONNECTION, TOP
	ELBOW, TURNED UP
	ELBOW, TURNED DOWN
	PUMP
	PIPE CAP
	REDUCER, CONCENTRIC
	REDUCER, ECCENTRIC
	UNION
	BLIND FLANGE
	FLANGE
	COUPLING
	BUSHING
R OR %	PIPE PITCH, RISE(R), DROP(D), PERCENTAGE
	FLEXIBLE PIPE CONNECTION – RUBBER
	PIPE ANCHOR
	THERMOMETER
	PRESSURE GAGE
	COMBINATION TEMP/PRESS GAUGE
	PRESS/TEMP TEST PLUG
	BALL VALVE
	GATE VALVE
	GLOBE VALVE
	GLOBE VALVE, ANGLED
	BUTTERFLY VALVE
	VERTICAL BUTTERFLY
	PLUG VALVE
	BALANCING VALVE
	PRESSURE REDUCING VALVE
	2-WAY VALVE, NON-DESIGNATED
	3-WAY VALVE, NON-DESIGNATED
	MANUAL VALVE
	VALVE OPERATOR ELECTRIC – MODULATING
	VALVE OPERATOR ELECTRIC – TWO POSITION
	VALVE OPERATOR PNEUMATIC
	CHECK VALVE
	TRIPLE DUTY VALVE, COMBINATION SHUTOFF, BALANCE, AND CHECK VALVE
	THREE WAY MODULATING VALVE
S/R	SAFETY(S), RELIEF(R)
	AUTOMATIC AIR VENT
	MANUAL AIR VENT
	THERMOSTATIC AIR VENT
	INVERTED BUCKET TRAP
	FLOAT & THERMOSTATIC (F&T) TRAP
	STRAINER
	STRAINER WITH VALVE
	BACKFLOW PREVENTER
	BREAK
	EXPANSION JOINT

DUCT SYMBOLS

Ø	ROUND
	OVAL
	SQUARE FEET
	SUPPLY AIR DUCT UP
	SUPPLY AIR DUCT DOWN OR AWAY
	OUTSIDE AIR DUCT UP
	OUTSIDE AIR DUCT DOWN OR AWAY
	RETURN AIR DUCT UP
	RETURN AIR DUCT DOWN OR AWAY
	EXHAUST AIR DUCT UP
	EXHAUST AIR DUCT DOWN OR AWAY
	DUCT LINER ACOUSTICAL INSUL.
24x12	RECTANGULAR DUCT 24" WIDE X 12" DEEP CLEAR INSIDE DIMENSION
12"Ø	ROUND RIGID DUCT 12" DIA
8"Ø	ROUND RIGID DUCT 8" DIA
8"Ø	ROUND FLEXIBLE DUCT, 8" DIA
D	DUCT INCLINE (R)ISE/(D)ROP
	DUCT CAP
	ECCENTRIC TRANSITION
	CONCENTRIC TRANSITION
	RECT. TO ROUND TRANSITION
	LOW LOSS TAKE-OFF
	90° ELBOW WITH TURNING VANES (SUPPLY ONLY)
	RADIUS ELBOW (ACCEPTABLE ANYWHERE)
OR	ROUND BRANCH TAKEOFF
	BULLHEAD TEE FOR RETURN OR EXHAUST
	BULLHEAD TEE FOR SUPPLY
	RADIUS TEE
	OPPOSED BLADE DAMPER
	PARALLEL BLADE DAMPER
OR	REHEAT COIL
	STEAM DISTRIBUTION TUBE HUMIDIFIER
	ACCESS DOOR
OR	FLEXIBLE DUCT CONNECTION
	MANUAL VOLUME DAMPER
	MOTORIZED AUTO DAMPER ELECTRIC – MODULATING
	MOTORIZED AUTO DAMPER ELECTRIC – TWO POSITION
	MOTORIZED AUTO DAMPER PNEUMATIC
	BACK DRAFT DAMPER
AFM	AIR FLOW MEASURING STATION
SD	DUCT SMOKE DETECTOR
T	THERMOSTAT
T R	REVERSE ACTING THERMOSTAT
H	HUMIDISTAT
FD	FIRE DAMPER (HORIZONTAL DUCT)
SMD	SMOKE DAMPER (HORIZONTAL DUCT)
FSD	FIRE/SMOKE DAMPER (HORIZONTAL DUCT)
FD	FIRE DAMPER (VERTICAL DUCT)
SMD	SMOKE DAMPER (VERTICAL DUCT)
FSD	FIRE/SMOKE DAMPER (VERTICAL DUCT/RISER)
	DOOR TRANSFER GRILLE
	AIR FLOW DIRECTION
SG-1 240 TYP.-5	SUPPLY GRILLE @ 240CFM TYPICAL OF 5
	SUPPLY AIR GRILLE
	RETURN/TRANSFER AIR GRILLE
	EXHAUST AIR GRILLE

CONTROL SYMBOLS – INPUT

T	TEMPERATURE SENSOR AND WELL
T	TEMPERATURE SENSOR
T	AVERAGING TEMPERATURE SENSOR
T	SPACE TEMPERATURE SENSOR
	AVERAGING TEMPERATURE SWITCH
H	DUCT HUMIDITY SENSOR
	DUCT HUMIDITY SWITCH
H	SPACE HUMIDITY SENSOR
	BINARY CONTACT
	DIFFERENTIAL PRESSURE SWITCH
P	DIFFERENTIAL PRESSURE SENSOR
P	STATIC PRESSURE SENSOR
GPM	WATER FLOW, DUAL TURBINE
GPM	WATER FLOW, SINGLE TURBINE
GPM	WATER FLOW, VENTURI
	WATER FLOW SWITCH
	WATER LEVEL SWITCH
	SMOKE DETECTOR SWITCH
CFM	AIR FLOW SENSOR
PPM	GAS SENSOR
BTU	ENERGY SENSOR
RPM	SPEED SENSOR
POS	POSITION FEEDBACK
TON	TON (COOLING) INPUT
CT	CURRENT SENSOR
VLT	VOLTAGE SENSOR
CS	CURRENT SWITCH
kW	KILOWATT SENSOR
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR

CONTROL SYMBOLS – EQUIPMENT

	DIRECT DRIVE PROP FAN
	BELT DRIVE PROP FAN
	CENTRIFUGAL FAN
	HUMIDIFIER
	DUAL TEMPERATURE COIL
	COOLING COIL
	HEATING COIL
	OPPOSED BLADE DAMPER
	PARALLEL BLADE DAMPER
	WING HEATING COIL
	BAG FILTERS
	ANGLED PLEATED FILTERS
VFD	VARIABLE FREQUENCY DRIVE

CONTROL SYMBOLS – OUTPUT

	N.C. BINARY OUTPUT
	N.O. BINARY OUTPUT
IGV	INLET GUIDE VANE OUTPUT
MOD	MODULATING OUTPUT
mA	MILI-AMP OUTPUT
VLT	VOLTAGE OUTPUT

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DESIGN INTENT

A. Electrical Room – Base Bid
   a. Provide a second split system cooling unit to provide N+1 cooling capacity. This new unit will become the primary unit with the existing one being the back up. Contractor to adjust temperature setpoints so that the new unit is the lead.
   b. Provide temperature monitoring (by the Department).

B. Data Center – Base Bid
   a. Provide a third computer room cooling unit to provide full N+1 cooling capacity. With the current two units, space temperature is not maintained when one unit fails.
   b. Relocate auto changeover panel to coordinate the three computer room cooling units.
   c. Provide temperature and alarm monitoring (by the Department).

C. Control Room Alternate Bid – HVAC-1
   a. Eliminate the non-functioning underfloor terminal units. Add a new space temperature sensor and control the cooling unit to space temperature. The control room will be controlled as a single zone.
   b. All floor grilles and diffusers will have manual dampers for balancing and temperature adjustment.
   c. Improve return air flow back to the cooling unit.

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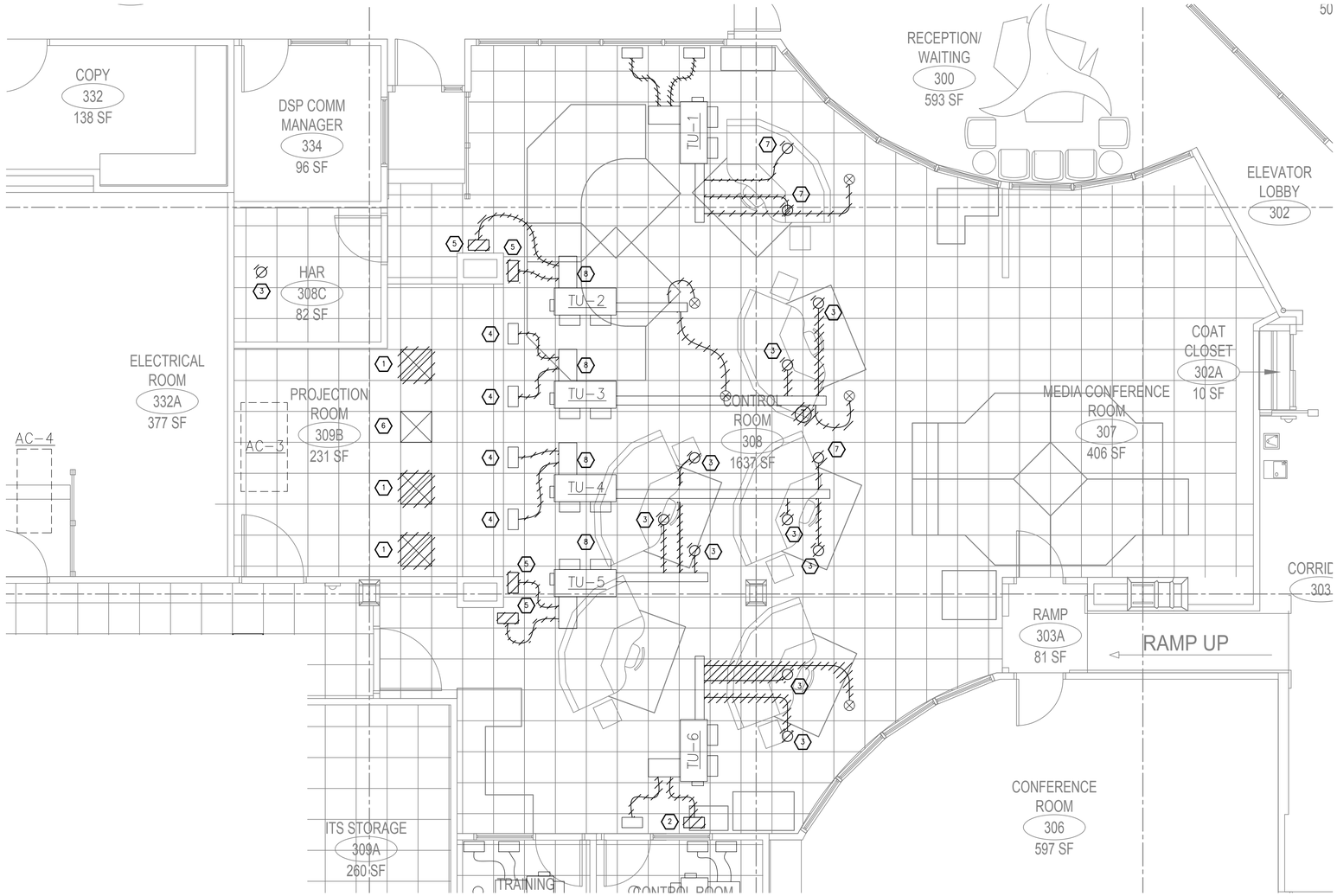
TITLE SHEET

PROJECT ENGINEER:
JB

PROJECT NUMBER:
17127

SHEET NUMBER:
M001

ALL WORK ON THIS PAGE ALT BID HVAC-1



2 M303.1 MECHANICAL UNDERFLOOR DEMO PLAN
SCALE: 1/8" = 1'

0 2' 10'
1" 5' 20'

N

PLAN NOTES: #

1. REMOVE GRILLE AND REPLACE WITH FLOOR TILE FROM OWNER STOCK. UTILIZE TWO (2) IN THE COMPUTER ROOM AND TURN OVER 3RD ONE TO OWNER.
2. RELOCATE RECTANGULAR FLOOR GRILLE, REPLACE FLOOR TILE, AND CARPET.
3. RELOCATE ROUND FLOOR GRILLE, REPLACE FLOOR TILE, AND CARPET.
4. CAP GRILLE UNDER FLOOR.
5. RELOCATE GRILLE, REPLACE FLOOR TILE AND CARPET FROM OWNER STOCK. TILE AND CARPET WILL NEED TO BE CUT TO SIZE.
6. COMPUTER ROOM FLOOR GRILLE TO REMAIN.
7. CLOSE ROUND FLOOR GRILLE DAMPER, ZERO CFM.
8. TU-X UNDERFLOOR UNITS
   a. REMOVE RUN-OUT DUCT WORK
   b. ABANDON UNITS IN PLACE BELOW FLOOR

CUTTING OF FLOOR TILE AND CARPET SHALL BE DONE OUTSIDE OF THE CONTROL ROOM TO MINIMIZE DISTRACTIONS TO THE OCCUPANTS.

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TMC DATA CENTER ELECTRICAL & HVAC IMPROVEMENTS

SHEET TITLE:
MECHANICAL UNDERFLOOR PLANS

PROJECT ENGINEER:
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PROJECT NUMBER:
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SHEET NUMBER:
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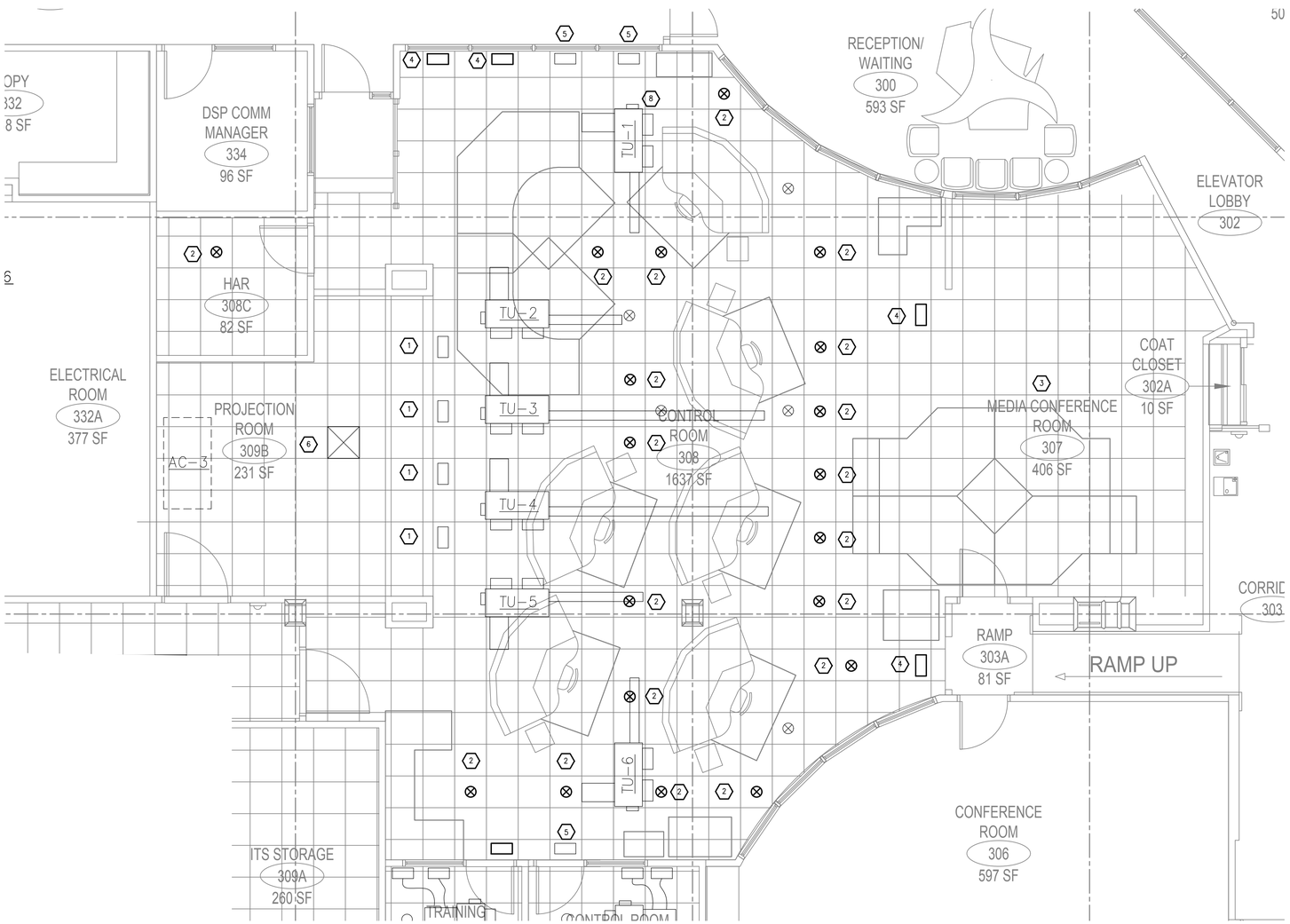
ALL WORK ON THIS PAGE ALT BID HVAC-1



1 M303.1 MECHANICAL UNDERFLOOR DISTRIBUTION PLAN
SCALE: 1/8" = 1'

0 2' 10' 1' 5' 20'

N

PLAN NOTES: #

1. GRILLE CAPPED UNDERFLOOR.
2. NEW/RELOCATED ROUND FLOOR GRILLE. FOR RELOCATED GRILLES UTILIZE FLOOR TILE AND CARPET SQUARE FOR OLD LOCATION FOR NEW GRILLES CUT FLOOR TILE AND CARPET. NEW DIFFUSERS INSTALLED ARE TO MATCH EXISTING TITUS TAF-R MODEL DIFFUSERS 8"Ø WITH MANUALLY ADJUSTED FLOW REGULATOR, DIR/DUST RECEPTACLE, AND TRIM RING WITH SPACER FLANGES.
3. THIS AREA OF THE CONTROL ROOM IS SERVED OVERHEAD BY EXISTING VAV-10.
4. NEW LOCATION FOR RELOCATED RECTANGULAR FLOOR GRILL, ADD MANUAL BALANCING DAMPER PER DETAIL 2/M400.
5. FLOOR GRILL TO REMAIN, ADD MANUAL BALANCING DAMPER PER DETAIL 2/M400.
6. FOR AIR BALANCING, BLANK OFF PERCENTAGE OF BACK SIDE WITH SHEET METAL TO ACHIEVE DESIGN AIRFLOW.

ROOM AIR FLOWS TABLE

ROOM	STATUS	GRILL	TYPE	CFM/EA	QUANTITY	CFM SUBTOTAL
PROJECTION	EXISTING	REC	24X24 FLOOR	400	1	400
CONTROL	EXISTING	REC	16X8	140	8	1,120
CONTROL	EXISTING	ROUND	8" RND	100	9	900
CONTROL	NEW	ROUND	8" RND	100	11	1,100
ROOM 308A	EXISTING	TU-X	–	220	1	220
ROOM 308B	EXISTING	TU-X	–	330	1	330
ROOM 308C	EXISTING	REC	–	110	1	110
EXISTING FLOOR PLENUM LEAKAGE (ESTIMATED 10%)						465
TOTAL CFM						4,645
LIEBERT AC-3 CFM						4,650

CUTTING OF FLOOR TILE AND CARPET SHALL BE DONE OUTSIDE OF THE CONTROL ROOM TO MINIMIZE DISTRACTIONS TO THE OCCUPANTS.

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MECHANICAL UNDERFLOOR PLANS

PROJECT ENGINEER:
JB

PROJECT NUMBER:
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SHEET NUMBER:
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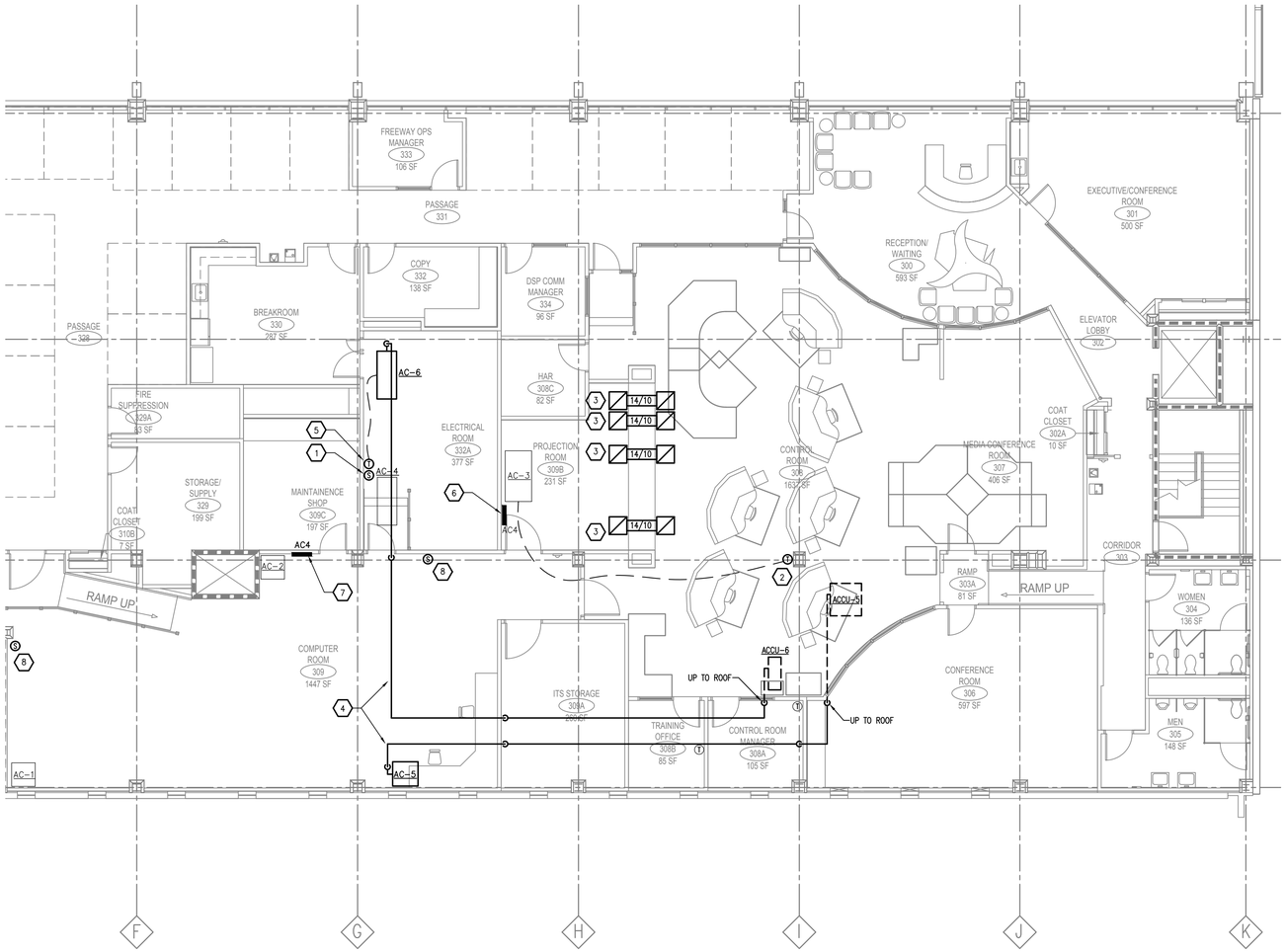
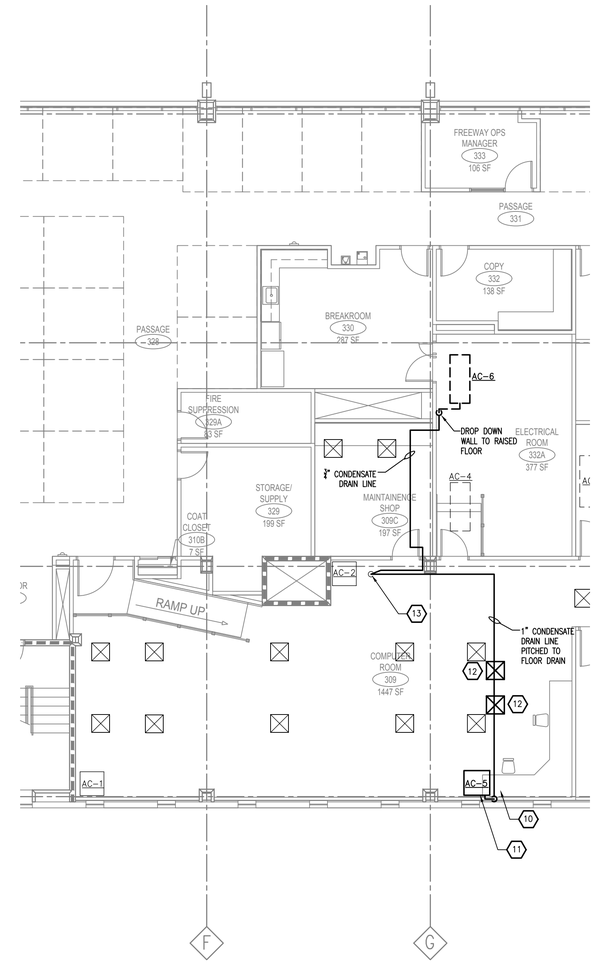


1 M303.2 THIRD FLOOR MECHANICAL PLAN
SCALE: 1/8" = 1'



1 M303.1 THIRD FLOOR MECHANICAL UNDERFLOOR DISTRIBUTION PLAN
SCALE: 1/8" = 1'

ALT BID HVAC-1 INCLUDES:
PLAN NOTE 2
PLAN NOTE 3 AND THE FOUR (4) ASSOCIATED 14" X 10" TRANSFER DUCTS

PLAN NOTES: (#)

1. OWNER TO PROVIDE ROOM TEMPERATURE SENSOR AND ALARM IF TEMPERATURE IS ABOVE SETPOINT 76°F (ADJ).
2. PROVIDE NEW SPACE TEMPERATURE THERMOSTAT TO CONTROL AC-3. COORDINATE THE CONTROL MODIFICATION WITH MANUFACTURER (LIEBERT). NOTE CONTROL ROOM IS OCCUPIED 24/7.
3. PROVIDE 2X2 LAY IN EGG CRATE TRANSFER GRILL, TITUS 50F OR EQUAL, PER DETAIL 1/M400.
4. REFRIGERANT PIPING ROUTE FOR SUCTION & LIQUID LINES. CONTRACTOR TO PROVIDE MANUFACTURER WITH DETAILED ISOMETRIC OF PIPING ROUTE. MANUFACTURER TO SIZE PIPING AND PROVIDE INSTALLATION DETAILS PER THEIR REQUIREMENTS.
5. PROVIDE NEW SPACE TEMPERATURE THERMOSTAT TO CONTROL AC-6. COORDINATE THE CONTROL MODIFICATION WITH MANUFACTURER (LIEBERT). ADJUST TEMPERATURE SETPOINTS SO THAT THE NEW UNIT AC-6 IS THE LEAD, AND AC-4 IS THE BACK UP WITH A 2°F DIFFERENTIAL.
6. RELOCATE AND WIRE THE EXISTING LIEBERT AC4 PANEL TO THE NEW LOCATION DESIGNATED BY NOTE 7.
7. NEW LOCATION FOR LIEBERT AC4 AUTO-CHANGEOVER PANEL FROM ROOM 309B TO COORDINATE THE ACTIVITIES OF THE THREE COMPUTER ROOM COOLING UNITS. INCLUDE 24V POWER WIRING AND CONTROL WIRING FROM AC-1, AC-2, & AC-5 TO THIS PANEL. ON/OFF AND COMMON ALARM SHALL BE WIRED TO THE PANEL.
8. OWNER TO PROVIDE TWO ROOM TEMPERATURE SENSORS AND ALSO PICK UP THE "COMMON ALARM POINT" FROM THE LIEBERT AUTOCHANGEOVER PANEL. ALARM UPON A UNIT FAILURE OR WHEN SPACE TEMPERATURES ARE ABOVE 76°F.
9. REMOVE FLOOR GRILL FROM PROJECTOR ROOM, REINSTALL IN COMPUTER ROOM IN THE LOCATION DESIGNATED BY PLAN NOTE 12.
10. AGENCY WILL REMOVE 1 SECTION OF DESK.
11. CUT FLOOR TILE FOR UNIT DISCHARGE.
12. REMOVE FLOOR TILE, INSTALL FLOOR GRILL FROM PROJECTOR ROOM. USE THIS TILE TO FILL IN HOLE IN PROJECTOR ROOM.
13. EXISTING FLOOR DRAIN.

CRITICAL SYSTEM MONITORING (BY THE DEPARTMENT)

THE DEPARTMENT OF TRANSPORTATION THROUGH THEIR IT INFRASTRUCTURE WILL INSTALL, MONITOR, AND ALARM THE FOLLOWING POINTS:

A. COMPUTER ROOM TEMPERATURE 1 (ANALOG)
B. COMPUTER ROOM TEMPERATURE 2 (ANALOG)
C. COMMON ALARM FROM LIEBERT PANEL AC4 (BINARY). THIS POINT INDICATES THAT ONE OF THE THREE LIEBERT UNITS IS IN AN ALARM STATE.
D. ELECTRICAL ROOM TEMPERATURE (ANALOG)

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TMC DATA CENTER ELECTRICAL & HVAC IMPROVEMENTS

SHEET TITLE:
MECHANICAL THIRD FLOOR PLAN

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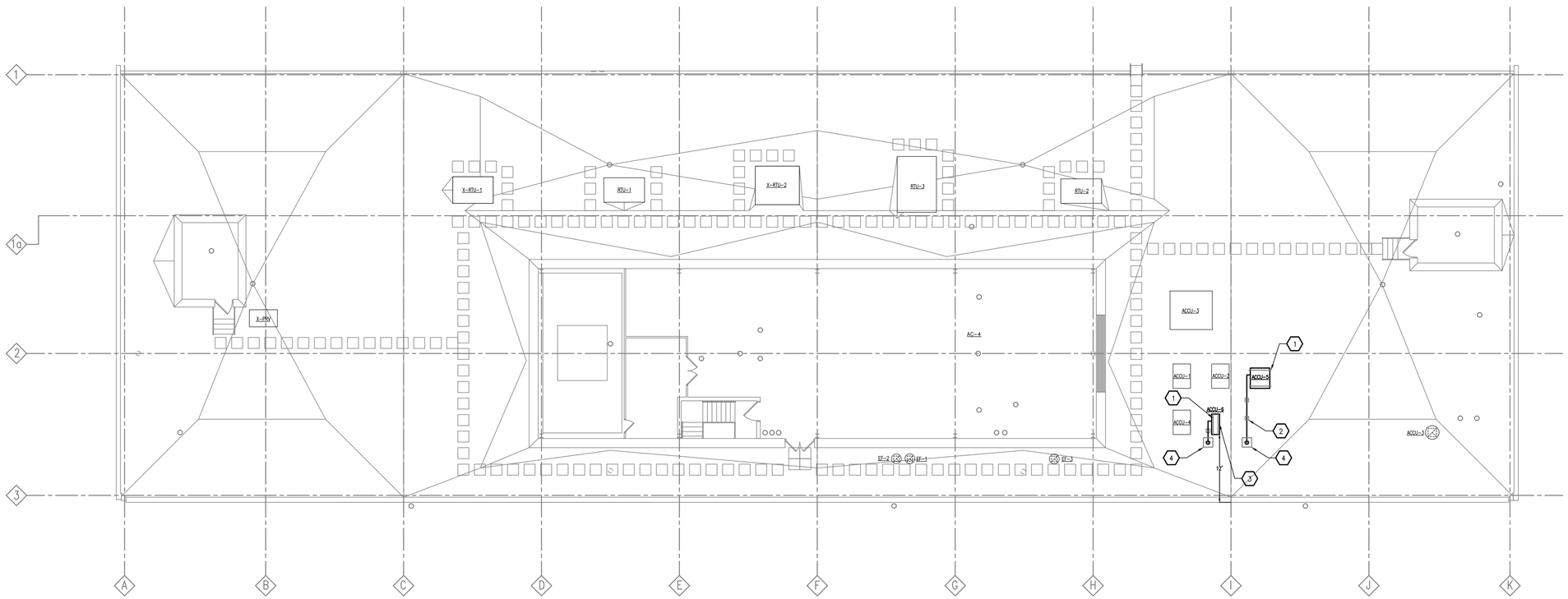

1 / M304 MECHANICAL ROOF PLAN
SCALE: 3/32" = 1'

0 2' 10'
1' 5' 20'

N

PLAN NOTES: (#)

1. PROVIDE ROOF SUPPORT RAIL PER DETAIL 4/M400. ROOFING BY CONTRACTOR.
2. PIPE SUPPORT BLOCK
3. PROVIDE WIND BAFFLE
4. PROVIDE ROOF CURB PER DETAIL 3/M400. ROOFING BY CONTRACTOR

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AIR COOLED CONDENSING UNITS

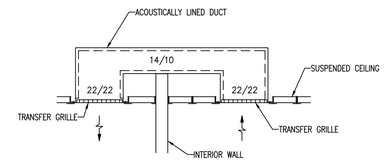
TAG	MANUFACTURER	MODEL	LOCATION	LOW TEMP PROTECTION	OPERATING RANGE (°F)	ELECTRICAL	WEIGHT (LBS)	NOTES
ACCU-5	LIEBERT	MCS028E1ADB041	ROOF	LEE-TEMP	-30 TO 95	460V/3ø, 1.4 FLA, 15 OPD	209	1
ACCU-6	CARRIER	24AHA436A006	ROOF	LEE-TEMP	-20 TO 125	460V/3ø, 7.6 MCA, 15 MOCP	184	2

NOTES:
1. LEE TEMP REQUIRES SEPARATE POWER - 208/230V/1ø, 0.7 FLA, 0.9 WSA, 15 OPD
2. PROVIDE LOW AMBIENT CONTROL -20°F, CRANK CASE HEATER, AND WIND BAFFLE

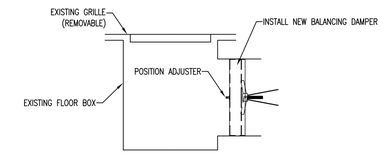
AIR CONDITIONING UNITS

TAG	MANUFACTURER	MODEL	LOCATION	COMPRESSOR		HEATING		COOLING			HUMIDIFICATION			ELECTRICAL	WEIGHT (LBS)	SCOP	EER	NOTES
				TYPE	REFRIGERANT	TYPE	CAPACITY (KW)	CFM	SENSIBLE (MBH)	TOTAL (MBH)	TYPE	CAPAC.	KW					
AC-5	LIEBERT	PX018DA1A8A562	RM 309	SCROLL	R-410A	-	-	2800	57.1	62.5	-	-	-	460V/3ø, 14.9 FLA, 17.6 WSA, 25 OPD	670	2.54	-	1,2,3
AC-6	CARRIER	40MKCB34F--3	RM 332A	SCROLL	R-410A	-	-	1335	29.56	29.56	-	-	-	208V/230V/1ø, 3 MCA, 15 MOCP	91.9	-	14	-

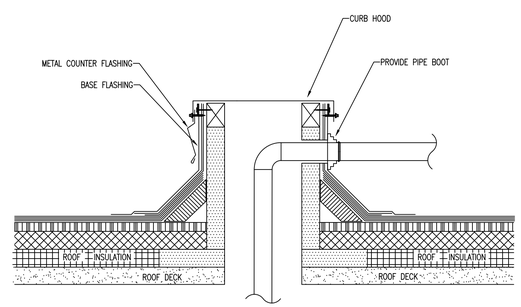
NOTES:
1. THIS BACK UP UNIT WILL NOT HAVE RE-HEAT OR HUMIDIFICATION
2. LIEBERT MANUFACTURER REPRESENTATIVE TO PROVIDE A FACTORY AUTHORIZED SERVICE TECHNICIAN TO PROGRAM AND COMMISSION THE EXISTING REALLOCATED AC4 AUTO-CHANGEOVER PANEL. THE AC4 PANEL SHALL COORDINATE THE OPERATION OF AC-1, AC-2, AND AC-5.
3. AUTO CHANGEOVER PANEL REQUIRES A 115V CIRCUIT AND A 24V TRANSFORMER FOR POWER



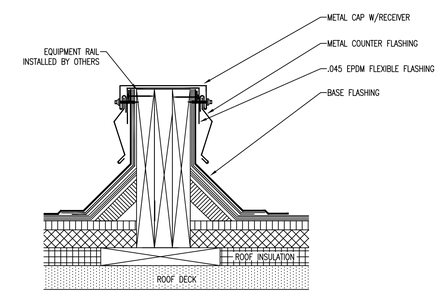
1 M400 TRANSFER GRILLE DETAIL
SCALE: N.T.S.



2 M400 RECTANGULAR FLOOR GRILL DETAIL
SCALE: N.T.S.



3 M400 PIPE CURB DETAIL
SCALE: N.T.S.



4 M400 ROOF SUPPORT RAIL DETAIL
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DETAILS AND SCHEDULES

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