

Report By:

**National TAB - Kansas City
1126 Swift St
N Kansas City, MO 64116**

NATIONAL

TAB

Comfort. Under control.

Report: TAB REPORT

Function: Test, Adjust, & Balance

Date: 05/04/2023

PROJECT

Project Eagle (Liberty, MO)

1551 SHEPHERD RD

LIBERTY, MO 64083

Client

Metro Air Conditioning

8151 McCoy

Shawnee, KS 66227

National TAB

Project: Project Eagle (Liberty, MO)

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CERTIFICATION



PROJECT: Project Eagle (Liberty, MO)

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems. The measurements shown, and the information given, in this report are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

NEBB TAB FIRM: National TAB - Kansas City

REGISTRATION NO: 3768

CERTIFIED BY: Will Turnbough

DATE: 5/10/2023

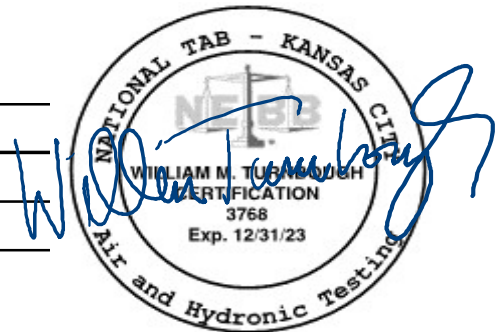
Submitted and Certified by:

NEBB TAB FIRM: National TAB - Kansas City

TAB PROFESSIONAL: Will Turnbough

REGISTRATION NO: CP-24289

CERTIFICATION EXP: 12/31/2023



National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-1

AREA:125

Unit Data		
	Design	Actual
MFG	NA	CARRIER
Serial Num	-	3422C09161
Model Num	DD	48FCDA04A1M6A6F0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	14.25X28.25
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Test Data		
	Design	Actual
SF CFM	1150	1164
RA CFM	1075	1085
OA CFM	75	79
RL Voltage	460	489/491/492
RL Amperage	0.9	0.54/0.56/0.61
OA Damper Position	-	2.30V/3%

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.12"
Fan Suction SP	-	-0.31"
Fan Discharge SP	-	0.31"
Total ESP	0.50	0.43"
Fan Total SP	0.54	0.62"

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	1	1
Motor Rpm	-	1406
Phase	3	3
Rated Voltage	460	460
Rated Amperage	0.9	0.9
Service Factor	-	NL

Completed By: Jacob Davidson on 03/29/2023

Notes: Speed set at 7.22VDC position B 20% Motor label not accessible. Motor data taken from submittals and unit label

Date: 03/29/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-1/125

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	123	SD-1	10	250	351	274	109.6
SGRD2	125	LSD-1	10	250	329	256	102.4
SGRD3	125	LSD-1	10	250	326	254	101.6
SGRD4	125	SD-1	10	400	487	380	95.0

Completed By: Jacob Davidson on 03/29/2023

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Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-2

AREA:120

Unit Data		
	Design	Actual
MFG	NA	CARRIER
Serial Num	-	2722C10247
Model Num	DD	48FCEA06A2M6A6F0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	14.25X28.25
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	1	1
Motor Rpm	-	1769
Phase	3	3
Rated Voltage	460	460
Rated Amperage	1.9	1.9
Service Factor	-	NL

Test Data		
	Design	Actual
SF CFM	2000	1987
RA CFM	1700	1665
OA CFM	300	322
RL Voltage	460	491/492/490
RL Amperage	1.9	1.04/1.06/1.09
OA Damper Position	-	4.30V/28%

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.26"
Fan Suction SP	-	-0.64"
Fan Discharge SP	-	0.43"
Total ESP	0.75	0.69"
Fan Total SP	0.87	1.07"

Notes: Unit gives "SHUTDOWN ALARM" error message when heating. Speed set at 7.18VDC position B 20% Motor label not accessible. Motor data taken from submittals and unit label

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Diffuser Supply (GRD)

RTU-2/120

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	120	SD-1	10	325	330	318	97.8
SGRD2	120	SD-1	10	325	335	320	98.5
SGRD3	120	SD-1	10	325	388	281	86.5
SGRD4	120	LSD-1	8	125	124	116	92.8
SGRD5	120	LSD-1	10	250	262	234	93.6
SGRD6	120	LSD-1	10	250	349	312	124.8
SGRD7	120	LSD-1	10	250	260	253	101.2
SGRD8	120	LSD-1	8	150	158	153	102.0

Completed By: Jacob Davidson on 03/29/2023

Asset	Notes	Date
SGRD6	DAMPER IS FULLY OPEN. UNABLE TO CLOSE DAMPER WITHOUT PUTTING THE REST OF THE SYSTEM OUT OF BALANCE DUE TO DAMPERS HAVING NOTCHED POSITION SETTINGS. NOT ANTICIPATED TO CAUSE ANY COMFORT ISSUES.	05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-3

AREA:120

Unit Data		
	Design	Actual
MFG	CARRIER	CARRIER
Serial Num	-	3122P60878
Model Num	BELT	48TCED14E2M6A6F0J0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35
Num PreFilter 1	-	4
PreFilter Size 1	-	20X20X2

Test Data		
	Design	Actual
SF CFM	4500	3902
SF RPM	1059	878/1060
RA CFM	3700	3083
OA CFM	800	819
RL Voltage	460	492/496/491
RL Amperage	4.6	3.75/3.83/4.21
OA Damper Position	-	4.5V

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	5	NL
Motor Rpm	-	1750
Phase	3	3
Rated Voltage	460	230/460
Rated Amperage	5.3	9.2/4.6
Service Factor	-	1.15

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.69"
Fan Suction SP	-	-1.06"
Fan Discharge SP	-	0.70"
Total ESP	0.75	1.39"
Fan Total SP	1.01	1.76"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.75"
Num of Belts	-	1
Belt Size	-	AX49

Notes: LEAKAGE NOTED AT ROOF ON THE DISCHARGE SIDE. RECOMMEND SEALING.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-3/120

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	122	SD-1	10	350	330	252	72.0
SGRD2	121	SD-1	10	350	283	309	88.3
SGRD3	120	SD-1	12	475	379	415	87.4
SGRD4	120	SD-1	12	475	342	414	87.2
SGRD5	120	SD-1	12	475	361	458	96.4
SGRD6	120	SD-1	12	475	298	387	81.5
SGRD7	120	SD-1	12	475	326	412	86.7
SGRD8	120	SD-1	12	475	366	450	94.7
SGRD9	120	SD-1	12	475	615	367	77.3
SGRD10	120	SD-1	12	475	402	438	92.2

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-4

AREA:111

Unit Data		
	Design	Actual
MFG	NA	CARRIER
Serial Num	-	2722C10395
Model Num	DD	48FCEM07A2M6A6F0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	14.25x28.25
Num PreFilter 1	-	4
PreFilter Size 1	-	16X16X2

Test Data		
	Design	Actual
SF CFM	2400	2415
RA CFM	2175	2177
OA CFM	225	238
RL Voltage	460	493/494/496
RL Amperage	2.2	0.72/0.74/0.76
OA Damper Position	-	10%/2.85V

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	2	1.8
Motor Rpm	-	2055
Phase	3	3
Rated Voltage	460	460
Rated Amperage	2.2	2.2
Service Factor	-	NL

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.16"
Fan Suction SP	-	-0.30"
Fan Discharge SP	-	0.27"
Total ESP	0.75	0.43"
Fan Total SP	0.92	0.57"

Notes: Speed set at 9.03VDC position C 60% Motor label not accessible. Motor data taken from submittals and unit label

Date: 03/29/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-4/111

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	112	SD-1	12	325	296	342	105.2
SGRD2	111	LSD-1	10/1.133	250	226	260	104.0
SGRD3	111	LSD-1	10/1.133	250	216	250	100.0
SGRD4	111	LSD-1	10/1.133	250	210	242	96.8
SGRD5	111	LSD-1	10/1.133	250	219	252	100.8
SGRD6	110	SD-1	10	275	263	301	109.5
SGRD7	129	SD-1	8	125	116	134	107.2
SGRD8	111	SD-1	8	225	165	190	84.4
SGRD9	111	SD-1	8	225	196	226	100.4
SGRD10	111	SD-1	8	225	187	216	96.0

Completed By: Jacob Davidson on 03/21/2023

Asset	Notes	Date
SGRD8	DAMPER FULLY OPEN. UNABLE TO PUSH ANYMORE AIR TO DIFFUSER WITHOUT PUTTING OTHERS OUT OF BALANCE. DIFFUSER IS IN OPEN OFFICE AND WILL NOT CAUSE COMFORT ISSUES.	03/16/2023

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Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-5

AREA:148

Unit Data		
	Design	Actual
MFG	NA	CARRIER
Serial Num	-	3422C09266
Model Num	DD	48FCEA05A1M6A6F0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 NETAL MESH
OA Filter Size 1	-	14.25X28.25
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	0.50	1/2
Motor Rpm	-	1478
Phase	3	3
Rated Voltage	460	460
Rated Amperage	1.2	1.2
Service Factor	-	NL

Test Data		
	Design	Actual
SF CFM	1420	1483
RA CFM	1290	1345
OA CFM	130	138
RL Voltage	460	496
RL Amperage	1.2	0.76
OA Damper Position	-	6%/2.55V

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.31"
Fan Suction SP	-	-0.46"
Fan Discharge SP	-	0.20"
Total ESP	0.50	0.51"
Fan Total SP	0.56	0.66"

Completed By: Jacob Davidson on 03/13/2023

Notes: Speed set at 7.51VDC position B 50% Motor label not accessible. Motor data taken from submittals and unit label

Date: 03/29/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-5/148

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	113	SD-1	10	200	187	215	107.5
SGRD2	111	SD-1	10	350	289	360	102.9
SGRD3	114	SD-1	10	275	259	299	108.7
SGRD4	111	SD-1	10	350	300	362	103.4
SGRD5	145	SD-1	8	125	187	123	98.4
SGRD6	146	SD-3	6	40	77	42	105.0
SGRD7	147	SD-3	6	40	76	43	107.5
SGRD8	148	SD-3	6	40	75	39	97.5

Completed By: Jacob Davidson on 03/13/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-6

AREA:128

Unit Data		
	Design	Actual
MFG	CARRIER	CARRIER
Serial Num	-	2822P78973
Model Num	BELT	48TCEM08E2M6A6FOC0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35.25
Num PreFilter 1	-	4
PreFilter Size 1	-	16X20X2

Test Data		
	Design	Actual
SF CFM	2700	2904
SF RPM	790	812
RA CFM	2125	2334
OA CFM	575	570
RL Voltage	460	496/495/495
RL Amperage	4.2	2.91/3.03/3.21
OA Damper Position	-	29%/4.35V

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON MOTORS
Frame	-	56HZ
Horsepower	0.75	NL
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	460	460
Rated Amperage	4.2	4.3
Service Factor	-	1.15

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.44"
Fan Suction SP	-	-0.66"
Fan Discharge SP	-	0.53"
Total ESP	0.75	0.97"
Fan Total SP	0.83	1.19"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	4 TURNS OUT
Fan Sheave Size	-	8.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	17.5"
Num of Belts	-	1
Belt Size	-	AX52

Completed By: Jacob Davidson on 03/13/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-6/128

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	128	SD-1	12	450	494	480	106.7
SGRD2	128	SD-1	12	450	439	494	109.8
SGRD3	128	SD-1	12	450	461	485	107.8
SGRD4	128	SD-1	12	450	437	475	105.6
SGRD5	128	SD-1	12	450	489	482	107.1
SGRD6	128	SD-1	12	450	450	488	108.4

Completed By: Jacob Davidson on 03/13/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-7

AREA:107

Unit Data		
	Design	Actual
MFG	CARRIER	CARRIER
Serial Num	-	3222P61140
Model Num	BELT	48TCDM12A2M6A6FOC0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25x35.25
Num PreFilter 1	-	4
PreFilter Size 1	-	20X20X2

Test Data		
	Design	Actual
SF CFM	3900	3961
SF RPM	965	876
RA CFM	3700	3742
OA CFM	200	219
RL Voltage	460	497/496/495
RL Amperage	5.3	4.32/4.41/4.52
OA Damper Position	-	1%/2.10V

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON MOTORS
Frame	-	56HZ
Horsepower	0.75	NL
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	460	460
Rated Amperage	5.3	5.3
Service Factor	-	1.15

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.61"
Fan Suction SP	-	-0.88"
Fan Discharge SP	-	0.51"
Total ESP	0.75	1.12"
Fan Total SP	0.94	1.39"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	7/8 in.
Motor Sheave SetPt	-	4 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1 in.
Belt CL Distance	-	17"
Num of Belts	-	1
Belt Size	-	AX49

Completed By: Jacob Davidson on 03/13/2023

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-7/107

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	107	SD-1	12	650	664	619	95.2
SGRD2	107	SD-1	12	650	602	646	99.4
SGRD3	107	SD-1	12	650	709	668	102.8
SGRD4	107	SD-1	12	650	710	670	103.1
SGRD5	107	SD-1	12	650	600	699	107.5
SGRD6	107	SD-1	12	650	516	659	101.4

Completed By: Jacob Davidson on 03/13/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU-8

AREA:130

Unit Data		
	Design	Actual
MFG	CARRIER	CARRIER
Serial Num	-	2822P78972
Model Num	BELT	48TCEM08A2M6A6FOC0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35
Num PreFilter 1	-	4
PreFilter Size 1	-	16X20X2

Test Data		
	Design	Actual
SF CFM	2685	2833
SF RPM	788	807
RA CFM	2385	2569
OA CFM	300	328
RL Voltage	460	496/495/496
RL Amperage	4.2	2.74/2.86/3.24
OA Damper Position	-	4.05V/ 25%

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	0.75	NL
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	460	460
Rated Amperage	4.2	4.3
Service Factor	-	1.15

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.42"
Fan Suction SP	-	-0.72"
Fan Discharge SP	-	0.64"
Total ESP	0.75	1.06"
Fan Total SP	0.83	1.36"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	8.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	17.5"
Num of Belts	-	1
Belt Size	-	AX52

National TAB

Project: Project Eagle (Liberty, MO)

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU-8/130

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SGRD1	130	SD-1	10	400	438	438	109.5
SGRD2	132	SD-1	10	300	300	300	100.0
SGRD3	133	SD-1	8	100	116	108	108.0
SGRD4	134	SD-3	6	40	44	43	107.5
SGRD5	135	SD-3	6	40	42	42	105.0
SGRD6	136	SD-3	6	40	41	41	102.5
SGRD7	137	SD-3	6	40	42	42	105.0
SGRD8	137	SD-1	6	75	80	80	106.7
SGRD9	132	SD-1	8	200	204	204	102.0
SGRD10	132	LSD-1	10	275	325	301	109.5
SGRD11	132	LSD-1	10	275	322	300	109.1
SGRD12	131	LSD-1	10	350	351	351	100.3
SGRD13	130	LSD-1	10	275	308	299	108.7
SGRD14	130	LSD-1	10	275	284	284	103.3

Completed By: Jacob Davidson on 03/30/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-1

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	18248
SF RPM	-	388
Motor RPM	-	1765
RL Voltage	-	485/484/485
RL Amperage	-	7.1/7.2/7.4
Total ESP	-	UTO
Fan Discharge SP	-	UTO

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60 MIN 120 MAX
Air Flow Switch SP Actual	-	0.37"

Notes: OA SETPOINT 7.0 VDC / 10451 CFM OA

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-2

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	18466
SF RPM	-	389
Motor RPM	-	1765
RL Voltage	-	487/486/485
RL Amperage	-	6.9/7.1/7.3
Total ESP	-	UTO
Fan Discharge SP	-	UTO

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTHINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60MIN 120 MAX
Air Flow Switch SP Actual	-	0.39"

Notes: OA SETPOINT 7.0 VDC / 10842 CFM OA

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-3

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	19000
SF RPM	-	409

General		
	Design	Actual
Fan Rotation Correct	-	YES

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60 MIN 120 MAX

Notes: 16 - 20X25X2 OA FILTERS / OA SETPOINT 7.0 VDC / 10166 CFM OA / TOTAL FLOW MEASUREMENT NOT ACCURATE DUE TO WINDY CONDITIONS. BASED ON IDENTICAL UNITS AND RPM, THE UNIT IS OPERATING AT APPROXIMATELY 19,000 CFM.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-4

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	19163
SF RPM	-	390
Motor RPM	-	1768
RL Voltage	-	485/484/485
RL Amperage	-	6.9/7.0/7.3
Total ESP	-	UTO
Fan Discharge SP	-	UTO

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60 MIN 120 MAX
Air Flow Switch SP Actual	-	0.42"

Notes: 16 - 20X25X2 OA FILTERS / OA SETPOINT 7.0 VDC / 10166 CFM OA / AIRFLOW WAS MEASURED AT INTAKE AS 17250 CFM BUT AFFECTED BY WIND. USED BURNER DIFFERENTIAL TO CALCULATE AIRFLOW BASED OFF KNOWN FLOW ON ANOTHER IDENTICAL UNIT.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-5

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	18078
SF RPM	-	408
Motor RPM	-	1771
RL Voltage	-	485/485/486
RL Amperage	-	8.2/8.4/8.5
Total ESP	-	UTO
Fan Discharge SP	-	UTO

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTHINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60 MIN 120 MAX
Air Flow Switch SP Actual	-	0.31'

Notes: 16 - 20X25X2 OA FILTERS / OA SETPOINT 7.5VDC / 10028 CFM OA

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Supply



Comfort. Under control.

Asset: MAU-6

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	RUPP AIR SYSTEMS	RUPP AIR SYSTEMS
Model Num	RAM-M 27	RAM-M 27
Serial Num	-	4946628
Type	-	GAS FIRED MAU
Configuration	-	VERTICAL

Test Data		
	Design	Actual
CFM	20000	20698
SF RPM	-	415
Motor RPM	-	1775
RL Voltage	-	485/484/485
RL Amperage	-	8.3/8.2/8.0
Total ESP	-	UTO
Fan Discharge SP	-	UTO

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTHINGHOUSE
Frame	-	213T
Horsepower	-	7.5
Motor Rpm	-	1755
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	19.1/9.55
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

Drive Data		
	Design	Actual
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1-3/8"
Fan Sheave Size	-	25"
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	26"
Num of Belts	-	2
Belt Size	-	5VX-1030
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	50
Discharge Air Temp SetPt	-	60 MIN 120 MAX
Air Flow Switch SP Actual	-	0.49"

Notes: 16 - 20X25X2 OA FILTERS / OA SETPOINT 7.5VDC / 10258 CFM OA / AIRFLOW WAS MEASURED AT INTAKE AS 17756 CFM BUT AFFECTED BY WIND. USED BURNER DIFFERENTIAL TO CALCULATE AIRFLOW BASED OFF KNOWN FLOW ON ANOTHER IDENTICAL UNIT.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)

System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: CEF-1-1

AREA:126

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	SP-A110
Serial Num	-	20260580
Type	CEILING	CEILING

Test Data		
	Design	Actual
CFM	75	91
RL Voltage	-	108V
RL Amperage	-	0.15A
Total ESP	0.25	0.15"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	NL
Horsepower	14W	NL
Motor Rpm	894	950
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	0.19
Service Factor	-	NL

Notes: FAN SPEED MINIMIZED.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: CEF-1-2

AREA:127

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	SP-A110
Serial Num	-	20260579
Type	CEILING	CEILING

Test Data		
	Design	Actual
CFM	75	97
RL Voltage	-	108V
RL Amperage	-	0.15A
Total ESP	0.25	0.14"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	NL
Horsepower	14W	NL
Motor Rpm	894	950
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	0.19
Service Factor	-	NL

Notes: FAN SPEED MINIMIZED.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)

System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: CEF-1-3

AREA:140

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	SP-A110
Serial Num	-	20260578
Type	CEILING	CEILING

Test Data		
	Design	Actual
CFM	75	108
RL Voltage	-	111
RL Amperage	-	0.15"
Total ESP	0.25	0.03"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	NL
Horsepower	14W	NL
Motor Rpm	894	950
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	0.19
Service Factor	-	NL

Notes: FAN SPEED MINIMIZED.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-1

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261313
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	504

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS MEASURED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-2

AREA:MEZZANINE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261314
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	509

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS CALCULATED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)

System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-3

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261315
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	509

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS MEASURED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-4

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261316
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	509

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS MEASURED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-5

AREA:MEZZANINE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261317
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	509

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS MEASURED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-6

AREA: WAREHOUSE

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-420-50-1-52-X
Serial Num	-	20261318
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	20000	20000
Fan RPM	500	509

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184T
Horsepower	5	5
Motor Rpm	1725	1750
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	13.2/6.6
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	2VP50
Motor Bore Size	-	1-1/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	15"
Fan Sheave Bore	-	1-1/4"
Belt CL Distance	-	16"
Num of Belts	-	2
Belt Size	-	AX57

Notes: AIRFLOW CANNOT BE DIRECTLY MEASURED. UNABLE TO TILT FAN TO GET STATIC PRESSURE OR SAFELY MEASURE AMPS. FAN RPM WAS MEASURED TO BE AT DESIGN, THEREFORE SINCE DUCT IS JUST A STUBBED DROP AIRFLOW SHOULD BE AT DESIGN.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-7

AREA:121

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	G-143-B-4-1-22-X
Serial Num	-	20261404
Type	CRE	DOWNBLAST

Test Data		
	Design	Actual
CFM	1000	1038
RL Voltage	-	NOT SAFE
RL Amperage	-	4.8
Total ESP	0.50	0.16"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	48Y
Horsepower	0.25	1/4
Motor Rpm	1140	1140
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	3.2
Service Factor	-	1.0

Notes: SET FAN TO DESIGN AIRFLOW BUT FAN WAS OVERRAMPING AND MAKING A GRINDING NOISE. MOTOR IS OVERRAMPING AT ALL SETPOINTS. INCREASED FAN SPEED UNTIL MOTOR WAS AT 3.29 AMPS AND 1780 CFM.

Date: 05/04/2023

National TAB

Project: Project Eagle (Liberty, MO)

FAN - Exhaust



Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF-7/121

Asset								
Asset Name	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EGRD1	EX-4	6	100	1	161	167	101	101.0
EGRD2	EX-2	10	250	1	536	432	263	105.2
EGRD3	EX-2	8	200	1	344	363	220	110.0
EGRD4	EX-2	10	250	1	464	422	256	102.4
EGRD5	EX-2	8	200	1	275	327	198	99.0

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-8

AREA:148

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	G-097-A-4-1-19-X
Serial Num	-	20261471
Type	CRE	DOWNBLAST

Test Data		
	Design	Actual
CFM	200	254
Total ESP	0.50	0.15"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	48Y
Horsepower	0.25	1/4
Motor Rpm	-	1725
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	3.1
Service Factor	-	1.0

Notes: FAN SPEED MINIMIZED

Date: 05/04/2023

National TAB

Project: Project Eagle (Liberty, MO)

FAN - Exhaust



Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF-8/148

Asset								
Asset Name	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EGRD1	EX-4	6	50	1	62	65	59	118.0
EGRD2	EX-4	6	50	1	82	68	62	124.0
EGRD3	EX-4	6	50	1	73	72	65	130.0
EGRD4	EX-4	6	50	1	67	74	68	136.0

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-9

AREA:138

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	G-098-8-4-1
Serial Num	-	20261527
Type	CRE	DOWNBLAST

Test Data		
	Design	Actual
CFM	250	464
RL Voltage	-	NOT SAFE
RL Amperage	-	1.4
Total ESP	0.50	0.18"

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	48Y
Horsepower	0.25	1/4
Motor Rpm	1140	1140
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	3.2
Service Factor	-	1

Notes: SPEED CONTROLLER MINIMIZED.

Date: 05/04/2023

National TAB

Project: Project Eagle (Liberty, MO)

FAN - Exhaust



Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF-9/138

Asset								
Asset Name	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EGRD1	EX-4	6	50	1	91	108	101	202.0
EGRD2	EX-4	6	50	1	85	97	87	174.0
EGRD3	EX-4	6	50	1	108	103	96	192.0
EGRD4	EX-4	6	50	1	105	95	88	176.0
EGRD5	EX-4	6	50	1	114	99	92	184.0

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-10

AREA: BATTERY CHG

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-200-15-1-30-X
Serial Num	-	20261559
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	4000	3600
Fan RPM	838	837
RL Voltage	-	NOT SAFE
RL Amperage	-	NOT SAFE
Suction ESP	-	-0.53"
Discharge ESP	-	ATM
Total ESP	0.325	0.53"

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184
Horsepower	1.5	1.5
Motor Rpm	1725	1735
Phase	1	1
Voltage (rated)	115	115/230
Amperage (rated)	-	16.4/8.2
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	3.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	AK66
Fan Sheave Bore	-	3/4"
Belt CL Distance	-	7.25"
Num of Belts	-	1
Belt Size	-	AX28

Notes: TOTAL FLOW MEASURED USING A FAN CURVE. DUCTWORK NOT ACESSIBLE.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-11

AREA: BATTERY CHG

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	BELT	GB-200-15-1-30-X
Serial Num	-	20261560
Type	-	DOWNBLAST

Test Data		
	Design	Actual
CFM	4000	3700
Fan RPM	838	838
RL Voltage	-	NOT SAFE
RL Amperage	-	NOT SAFE
Suction ESP	-	-0.47"
Discharge ESP	-	ATM
Total ESP	0.325	0.47"

Motor Data		
	Design	Actual
Motor MFG	-	BALDOR
Frame	-	184
Horsepower	1.5	1.5
Motor Rpm	1725	1735
Phase	1	60
Voltage (rated)	115	115/230
Amperage (rated)	-	16.4/8.2
Service Factor	-	1.15

Drive Data		
	Design	Actual
Motor Sheave Size	-	3.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	AK66
Fan Sheave Bore	-	3/4
Belt CL Distance	-	7.25
Num of Belts	-	1
Belt Size	-	AX28

Notes: TOTAL FLOW MEASURED USING A FAN CURVE. DUCTWORK NOT ACCESSIBLE.

Date: 05/10/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-A9

AREA:1

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	G-123-A-5-1-19-X
Serial Num	-	20261572
Type	CRE	DOWNBLAST

Test Data		
	Design	Actual
CFM	1500	1500
RL Voltage	-	NA
RL Amperage	-	5.7
Total ESP	0.25	0.27

Motor Data		
	Design	Actual
Motor MFG	-	NIDEC
Frame	-	NL
Horsepower	0.5	1/2
Motor Rpm	1725	1650
Phase	1	1
Voltage (rated)	115	115/230
Amperage (rated)	-	5.4/2.7
Service Factor	-	1.0

Notes: UNABLE TO ACCESS DUCTWORK TO MEASURE AIRFLOW DIRECTLY. SET FAN TO DESIGN STATIC PRESSURE HOWEVER MOTOR WAS OVERAMPING. INCREASED FAN SPEED UNTIL MOTOR WAS BELOW FLA. LEFT AT APPROXIMATELY 2250 CFM.

Date: 05/04/2023

National TAB

Project: Project Eagle (Liberty, MO)
System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF-B10

AREA:1

Unit Data		
	Design	Actual
MFG	NA	GREENHECK
Model Num	DD	G-123-A-5-1-19-X
Serial Num	-	20261582
Type	CRE	DOWNBLAST

Test Data		
	Design	Actual
CFM	1500	1587
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.25	0.28"

Motor Data		
	Design	Actual
Motor MFG	-	NIDEC
Frame	-	NL
Horsepower	0.5	1/2
Motor Rpm	1725	1650
Phase	1	1
Voltage (rated)	115	115/230
Amperage (rated)	-	5.4/2.7
Service Factor	-	1

Notes: UNABLE TO ACCESS DUCTWORK TO MEASURE AIRFLOW DIRECTLY. SET FAN TO DESIGN STATIC PRESSURE. AIRFLOW APPROXIMATELY 1587 CFM BASED ON FAN LAW CALCULATION AND STATIC PRESSURE.

Date: 05/10/2023

Abbreviation List

A = Area (ft ²)	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A _k = Effective Area	SP = Static Pressure
BHP = Brake Horsepower (IP) HP	SR = Supply Register
Btu = British Thermal Unit	T = Temperature
Btu/h = Btuh = BTUH = BTU/Hour	T _{ma} = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T _{oa} = Outside Air Temperature
CD = Ceiling Diffuser	T _{ra} = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO ₂ = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C _v = Flow Constant	K _v = Flow constant (SI)
d = Diameter (in.) IP	kW = Kilowatt = 1000 Watts
Δ = Difference or Change (Final - Initial)	LAT = Leaving Air Temperature
DB = Dry Bulb	lb = Pounds
EA = Exhaust Air	LWT = Leaving Water Temperature
EAT = Entering Air Temperature	ma = Mixed Air
EF = Exhaust Fan	MIN = Minimum
Eff = Efficiency	MAX = Maximum
EG = Exhaust Grille	N/A = Not Applicable
ESP = External Static Pressure	NA = No Access
EWT = Entering Water Temperature	NL = Not Listed
°F = Degrees Fahrenheit, °F	NPSHA = Net Positive Suction Head Available
FPB = Fan Powered Box	NS = Not Specified
FLA = Full Load Amps	OA = Outside Air
fpm = Feet per Minute (fpm)	OAT = Outside Air Temperature
ft = Foot	PD = Sheave Pitch Diameter
gal = Gallons	P.D. = Pressure Drop
GPM = Gallons Per Minute (GPM)	PF = Power Factor
h = Enthalpy (BTU/lb dry air)	SG = Supply Grille
P = Pressure	SR = Supply Register
ppm = parts per million	TP = Total Pressure
psi = Pounds Per Square Inch	T _{ra} = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
% _{ra} = % of Return Air	V = Velocity
RA = Return Air	VAV = Variable Air Volume
RAT = Return Air Temperature	VD = Volume Damper
RF = Return Fan	VFD = Variable Frequency Drive
RG = Return Grille	W = Watt
RH = Relative Humidity	WB = Wet Bulb
RPM = Revolutions Per Minute	wg = wc = water gauge = water column
RTU = Roof Top Unit	WHP = Water Horsepower (IP)
SA = Supply Air	ω = Humidity Ratio

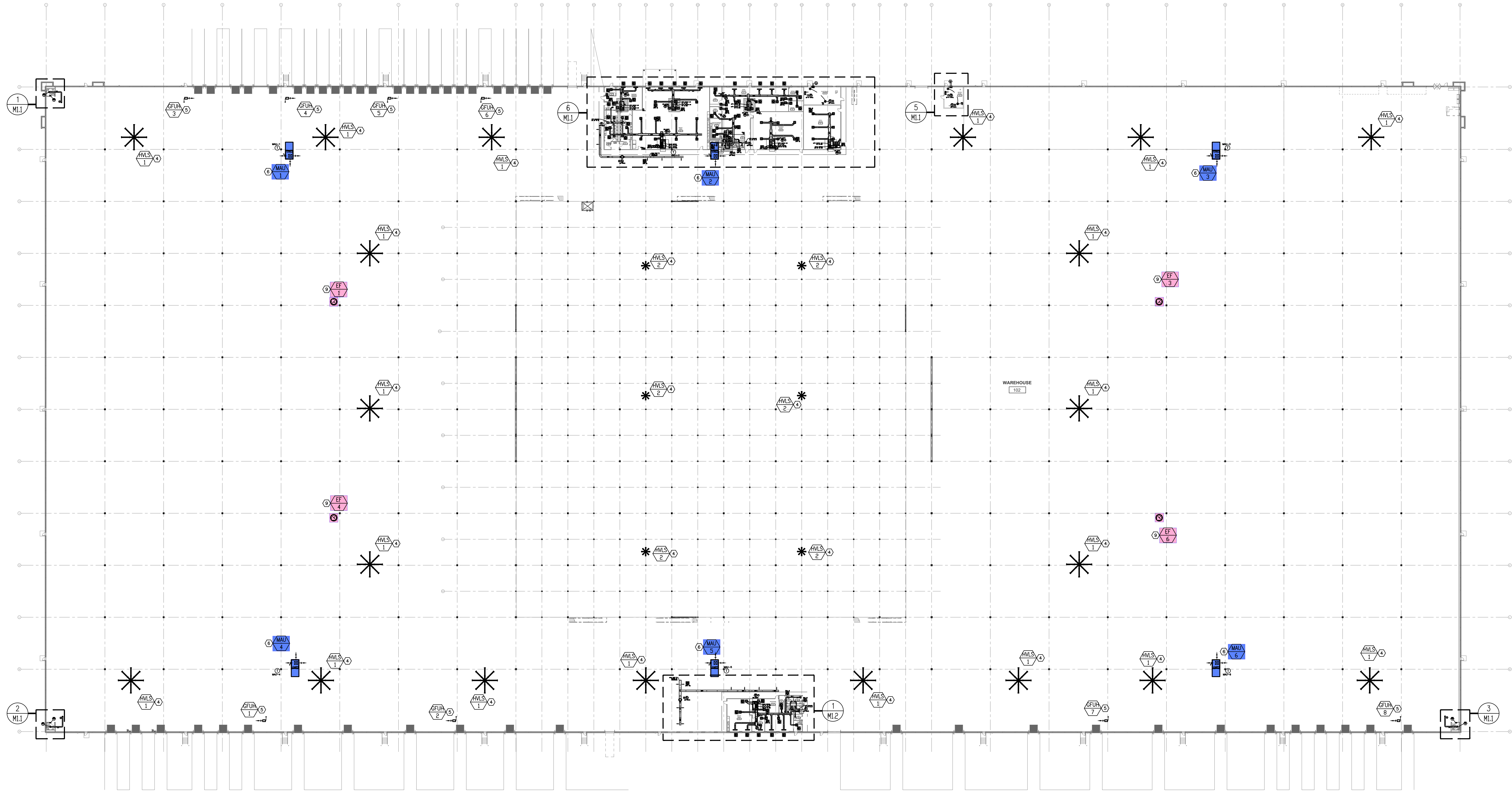


National TAB

Testing, Adjusting, and Balancing Equipment



Function		Range	Minimum Accuracy	Instrument Information	Calibration Date	Date Due
AIR	AIR PRESSURE	0 in wg to 10 in wg	2% +/- 0.001 in wg	Evergreen Telemetry S-PVF-1 2300177A	2/23/2023	2/23/2024
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Evergreen Telemetry S-PVF-1 2300177A	2/23/2023	2/23/2024
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	Evergreen Telemetry CH-15D 2300114	2/20/2023	2/23/2024
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Shimpo DT 207Lp S/N D1690029R	8/11/2022	8/11/2023
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023



1 OVERALL MECHANICAL PLAN
M1.0 SCALE: 1" = 40'-0"
PLAN NORTH

MECHANICAL GENERAL NOTES:

- ALL MECHANICAL DUCTWORK SHALL BE GALVANIZED STEEL, CONSTRUCTED ACCORDING TO SMACNA STANDARDS.
- ALL CONCEALED SUPPLY AIR AND RETURN AIR DUCTWORK SHALL BE EXTERNALLY INSULATED WITH 2" THICK, 3/4 LB DENSITY FIBERGLASS DUCT WRAP.
ALL EXHAUST DUCTWORK TO BE UN-INSULATED.
ALL MAU DUCTWORK TO BE UN-INSULATED.
- HVAC CONTRACTOR WILL CHECK EACH SYSTEM FOR PROPER OPERATION.
- HVAC CONTRACTOR SHALL HAVE AN INDEPENDENT CONTRACTOR TO TEST & BALANCE HVAC SYSTEM TO THE PROPER AIRFLOWS AND STATIC PRESSURES. A COPY OF THE BALANCING REPORT WILL BE SUBMITTED TO THE OWNER UPON COMPLETION. AIR TO (+/-) 10% , WATER TO (+/-) 5%.
- FLEXIBLE RUN-OUTS TO BE U.L. LISTED AND HAVE A MAXIMUM LENGTH OF 8'-0". DUCT RUNS TO BE SAME SIZE AS DIFFUSER NECK SIZE SHOWN.
- AIR HANDLING UNITS SUPPLYING 2,000 CFM OR MORE SHALL HAVE A SMOKE DETECTOR INSTALLED IN THE RETURN AIR DUCTWORK. THE SMOKE DETECTOR SHALL BE INTERLOCKED TO SHUT DOWN ALL SUPPLY FANS UPON ALARM.
- MAINTAIN MINIMUM 10'-0" FROM ALL PLUMBING VENTS AND EXHAUST VENTS TO ALL OUTSIDE AIR INTAKES.
- DO NOT INSTALL PIPING OR DUCTWORK OVER ELECTRICAL PANELS.

MECHANICAL PLAN NOTES:

- ELECTRIC UNIT HEATER FURNISHED BY MECHANICAL, POWERED BY ELECTRICAL CONTRACTOR. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
- PROVIDE 6" EXHAUST VENT UP THROUGH ROOF. PROVIDE WITH WEATHERCAP. MAINTAIN 15'-0" FROM EDGE OF ROOF. INTERLOCK FAN WITH RESTROOM LIGHTSWITCH. (BY OTHERS)
- EXTEND 16X16 EXHAUST DUCT DOWN BELOW STRUCTURE WITH MESH OPENING. EXHAUST FAN TO BE CONTROLLED BY LINE VOLTAGE THERMOSTAT AND BE INTERLOCKED WITH ASSOCIATED LOUVER AS SHOWN.
- PROVIDE HVLS FAN WITH STAND ALONE CONTROLLER. CONDUIT/CONTROL WIRING BY OTHERS.
- INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND COORDINATE WITH LIGHTING AND FIRE SUPPRESSION SYSTEM. FINAL LOCATIONS WITH TENANT.
- COORDINATE LOCATION OF MAU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE UN-INSULATED RETURN AIR DUCT DROP WITH MESH SCREEN AND PROVIDE SUPPLY AIR DISCHARGE WITH MANUFACTURER'S STANDARD 3-WAY DISCHARGE DIFFUSER. (TYPICAL FOR ALL MAU'S)
- COORDINATE LOCATION OF RTU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE INTERNALLY LINED RETURN AIR AND SUPPLY AIR DUCTWORK DUCT THRU ROOF AND TRANSITION TO SPIRAL OR RECTANGULAR DUCTWORK DROP AS NOTED. ALL DUCTWORK TO BE EXTERNALLY INSULATED PER GENERAL NOTES. (TYPICAL FOR ALL RTU'S)
- INSTALL BATTERY CHARGING EXHAUST DUCTWORK TIGHT TO BOTTOM OF STRUCTURE. PROVIDE EXHAUST GRILLES AS NOTED AT 30" FROM BOTTOM OF DUCT. EXHAUST FAN TO RUN CONTINUOUSLY.
- PROVIDE GALVANIZED STEEL DRIP PAN UNDER WAREHOUSE EXHAUST AIR FANS. (TYP. 6)
- GAS-FIRED HEATER FLUE THRU ROOF. VERIFY SIZING WITH MANUFACTURER. MAINTAIN 15'-0" FROM EDGE OF ROOF.

LEGEND

- UH 1 DAYTON UNIT HEATER 10 KW, 480/3 PHASE - PROVIDE WITH UNIT MOUNTED THERMOSTAT. MOUNT BOTTOM OF HEATER 8'-0" A.F.F.
- L 1 GREENHECK (OR EQUAL) INTAKE LOUVER MODEL ESD635, 24"x24" WITH BIRDSCREEN AND MOTORIZED 120V DAMPER. MOUNT BOTTOM OF LOUVER 6'-0" A.F.F. LOUVER TO BE INTERLOCKED WITH ROOF MOUNTED EXHAUST FAN EF-5.
- AFUH 1 LENNOX (OR EQUAL) GAS FIRED UNIT HEATER LF25-200A-1 120V/1 PHASE, 7 AMPS, 200 MBH, 200LBS PROVIDE WITH HANGING KIT, HEATING ONLY THERMOSTAT
- AHLS 1 GREENHECK (OR EQUAL) 24'-0" DS-6-24-170 HV HVLS FAN. 2 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLER
- AHLS 2 GREENHECK (OF EQUAL) 8'-0" DS-6-8-170 HV HVLS FAN. 1 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLERS
- EH 1 ELECTRIC WALL HEATER - RAYWALL OR EQUAL. 2KW @ 277/1 PHASE. PROVIDE WITH RECESS MOUNTING FRAME, DISCONNECT, INTEGRAL THERMOSTAT.
- SD-1 SUPPLY AIR DIFFUSER - AS SCHEDULED
- RG-1 RETURN AIR GRILLE - AS SCHEDULED
- RG-2 RETURN AIR GRILLE - AS SCHEDULED
- EX-1 EXHAUST AIR GRILLE - AS SCHEDULED
- EX-2 EXHAUST AIR GRILLE - AS SCHEDULED
- SG-1 SUPPLY AIR GRILLE - AS SCHEDULED
- SG-2 SUPPLY AIR GRILLE - AS SCHEDULED
- RETURN AIR GRILLE - AS SCHEDULED
- THERMOSTAT WITH ZONE/UNIT DESIGNATION. MOUNT AT 48" A.F.F.
- WD 1-3 CARBON DIOXIDE SENSOR - MOUNT IN RETURN OR WALL AS SHOWN
- ZD THERMOSTATIC ZONE DAMPER, MATCH DUCTWORK SIZING. PROVIDE WITH DUCT MOUNTED TEMPERATURE SENSOR AND WALL MOUNTED THERMOSTAT. PROVIDE 120/1 PHASE POWER WIRING AND CONTROL TRANSFORMER AS REQUIRED.

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MetroAir
PROJECT EAGLE
LIBERTY, MO

SCALE: AS NOTED DATE: 12/23/21 DRAWN BY: M.D.K.
APPROVED BY: G.M.M. DWG # M1 OF 6
OWNER COMMENTSS

DATE: 11/22/21
PROJECT MANAGER: M. HUNSBERGER
DRAWN BY: MDK
CHECKED BY: GMM

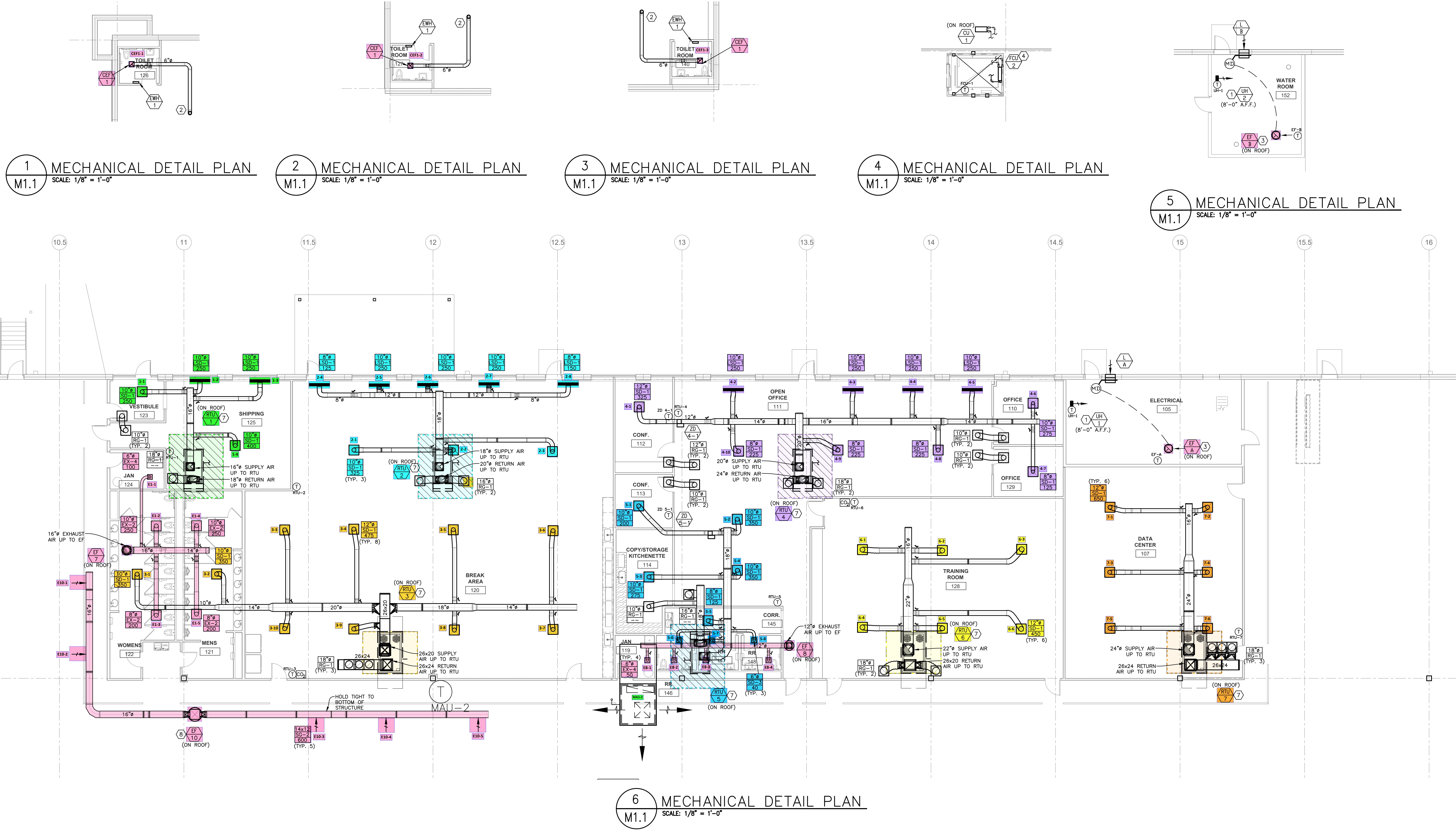
REGISTRATION

OPUS AE GROUP L.L.C.
CERTIFICATE LICENSE NO. 39146818M

SHEET TITLE
Mechanical Overall Floor Plan

SHEET NUMBER

M1.0



MECHANICAL GENERAL NOTES:

- ALL MECHANICAL DUCTWORK SHALL BE GALVANIZED STEEL, CONSTRUCTED ACCORDING TO SMCA STANDARDS.
- ALL CONCEALED SUPPLY AIR AND RETURN AIR DUCTWORK SHALL BE EXTERNALLY INSULATED WITH 2" THICK, 3/4 LB DENSITY FIBERGLASS DUCT WRAP. ALL EXHAUST DUCTWORK TO BE UN-INSULATED. ALL MAU DUCTWORK TO BE UN-INSULATED.
- HVAC CONTRACTOR WILL CHECK EACH SYSTEM FOR PROPER OPERATION.
- HVAC CONTRACTOR SHALL HAVE AN INDEPENDENT CONTRACTOR TO TEST & BALANCE HVAC SYSTEM TO THE PROPER AIRFLOWS AND STATIC PRESSURES. A COPY OF THE BALANCING REPORT WILL BE SUBMITTED TO THE OWNER UPON COMPLETION. AIR TO (+/-) 10% , WATER TO (+/-) 5%.
- FLEXIBLE RUN-OUTS TO BE U.L. LISTED AND HAVE A MAXIMUM LENGTH OF 8'-0". DUCT RUNS TO BE SAME SIZE AS DIFFUSER NECK SIZE SHOWN.
- AIR HANDLING UNITS SUPPLYING 2,000 CFM OR MORE SHALL HAVE A SMOKE DETECTOR INSTALLED IN THE RETURN AIR DUCTWORK. THE SMOKE DETECTOR SHALL BE INTERLOCKED TO SHUT DOWN ALL SUPPLY FANS UPON ALARM.
- MAINTAIN MINIMUM 10'-0" FROM ALL PLUMBING VENTS AND EXHAUST VENTS TO ALL OUTSIDE AIR INTAKES.
- DO NOT INSTALL PIPING OR DUCTWORK OVER ELECTRICAL PANELS.

MECHANICAL PLAN NOTES:

- ELECTRIC UNIT HEATER FURNISHED BY MECHANICAL, POWERED BY ELECTRICAL CONTRACTOR. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
- PROVIDE 6" EXHAUST VENT UP THROUGH ROOF. PROVIDE WITH WEATHERCAP. MAINTAIN 15'-0" FROM EDGE OF ROOF. INTERLOCK FAN WITH RESTROOM LIGHTSWITCH. (BY OTHERS)
- EXTEND 16X16 EXHAUST DUCT DOWN BELOW STRUCTURE WITH MESH OPENING. EXHAUST FAN TO BE CONTROLLED BY LINE VOLTAGE THERMOSTAT AND BE INTERLOCKED WITH ASSOCIATED LOUVER AS SHOWN.
- PROVIDE HVLS FAN WITH STAND ALONE CONTROLLER. CONDUIT/CONTROL WIRING BY OTHERS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND COORDINATE WITH LIGHTING AND FIRE SUPPRESSION SYSTEM.
- PROVIDE WITH WALL MOUNTED, HEATING ONLY THERMOSTAT MOUNTED ON EXTERIOR WALL AT 5'-0" A.F.F. COORDINATE FINAL LOCATIONS WITH TENANT.
- COORDINATE LOCATION OF MAU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE UN-INSULATED RETURN AIR DUCT DROP WITH MESH SCREEN AND PROVIDE SUPPLY AIR DISCHARGE WITH MANUFACTURER'S STANDARD 3-WAY DISCHARGE DIFFUSER. (TYPICAL FOR ALL MAUS)
- COORDINATE LOCATION OF RTU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE INTERNALLY LINED RETURN AIR AND SUPPLY AIR DUCTWORK DUCT THRU ROOF AND TRANSITION TO SPIRAL OR RECTANGULAR DUCTWORK DROP AS NOTED. ALL DUCTWORK TO BE EXTERNALLY INSULATED PER GENERAL NOTES. (TYPICAL FOR ALL RTUS)
- INSTALL BATTERY CHARGING EXHAUST DUCTWORK TIGHT TO BOTTOM OF STRUCTURE. PROVIDE EXHAUST GRILLES AS NOTED AT 30" FROM BOTTOM OF DUCT. EXHAUST FAN TO RUN CONTINUOUSLY.
- PROVIDE GALVANIZED STEEL DRIP PAN UNDER WAREHOUSE EXHAUST AIR FANS. (TYP. 6)
- GAS-FIRED HEATER FLUE THRU ROOF. VERIFY SIZING WITH MANUFACTURER. MAINTAIN 15'-0" FROM EDGE OF ROOF.

LEGEND

- UH 1 DAYTON UNIT HEATER 10 KW, 460/3 PHASE - PROVIDE WITH UNIT MOUNTED THERMOSTAT. MOUNT BOTTOM OF HEATER 8'-0" A.F.F.
- L 1 GREENHECK (OR EQUAL) INTAKE LOUVER MODEL ESD635, 24"x24" WITH BIRDSCREEN AND MOTORIZED 120V DAMPER. MOUNT BOTTOM OF LOUVER 8'-0" A.F.F. LOUVER TO BE INTERLOCKED WITH ROOF MOUNTED EXHAUST FAN EF-5.
- AFU 1 LENNOX (OR EQUAL) GAS FIRED UNIT HEATER LF25-200A-1 120V/1 PHASE, 7 AMPS, 200 MBH, 200LBS PROVIDE WITH HANGING KIT, HEATING ONLY THERMOSTAT
- RLS 1 GREENHECK (OR EQUAL) 24'-0" DS-6-24-170 HV HVLS FAN, 2 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLER
- RLS 2 GREENHECK (OF EQUAL) 8'-0" DS-6-8-170 HV HVLS FAN, 1 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLERS
- EH 1 ELECTRIC WALL HEATER - RAYWALL OR EQUAL. 2KW @ 277/1 PHASE. PROVIDE WITH RECESS MOUNTING FRAME, DISCONNECT, INTEGRAL THERMOSTAT.
- SD-1 SUPPLY AIR DIFFUSER - AS SCHEDULED
- RG-1 RETURN AIR GRILLE - AS SCHEDULED
- RG-2 RETURN AIR GRILLE - AS SCHEDULED
- EX-1 EXHAUST AIR GRILLE - AS SCHEDULED
- EX-2 EXHAUST AIR GRILLE - AS SCHEDULED
- SG-1 SUPPLY AIR GRILLE - AS SCHEDULED
- SG-2 SUPPLY AIR GRILLE - AS SCHEDULED
- RTU RETURN AIR GRILLE - AS SCHEDULED
- TH THERMOSTAT WITH ZONE/UNIT DESIGNATION. MOUNT AT 48" A.F.F.
- WS 1-3 CARBON DIOXIDE SENSOR - MOUNT IN RETURN OR WALL AS SHOWN
- ZD THERMOSTATIC ZONE DAMPER, MATCH DUCTWORK SIZING. PROVIDE WITH DUCT MOUNTED TEMPERATURE SENSOR AND WALL MOUNTED THERMOSTAT. PROVIDE 120/1 PHASE POWER WIRING AND CONTROL TRANSFORMER AS REQUIRED.

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MetroAir
PROJECT EAGLE
LIBERTY, MO
SCALE: AS NOTED DATE: 12/23/21 DRAWN BY: M.D.K.
APPROVED BY: G.M.M. DWG # M2 OF 6
OWNER COMMENTS

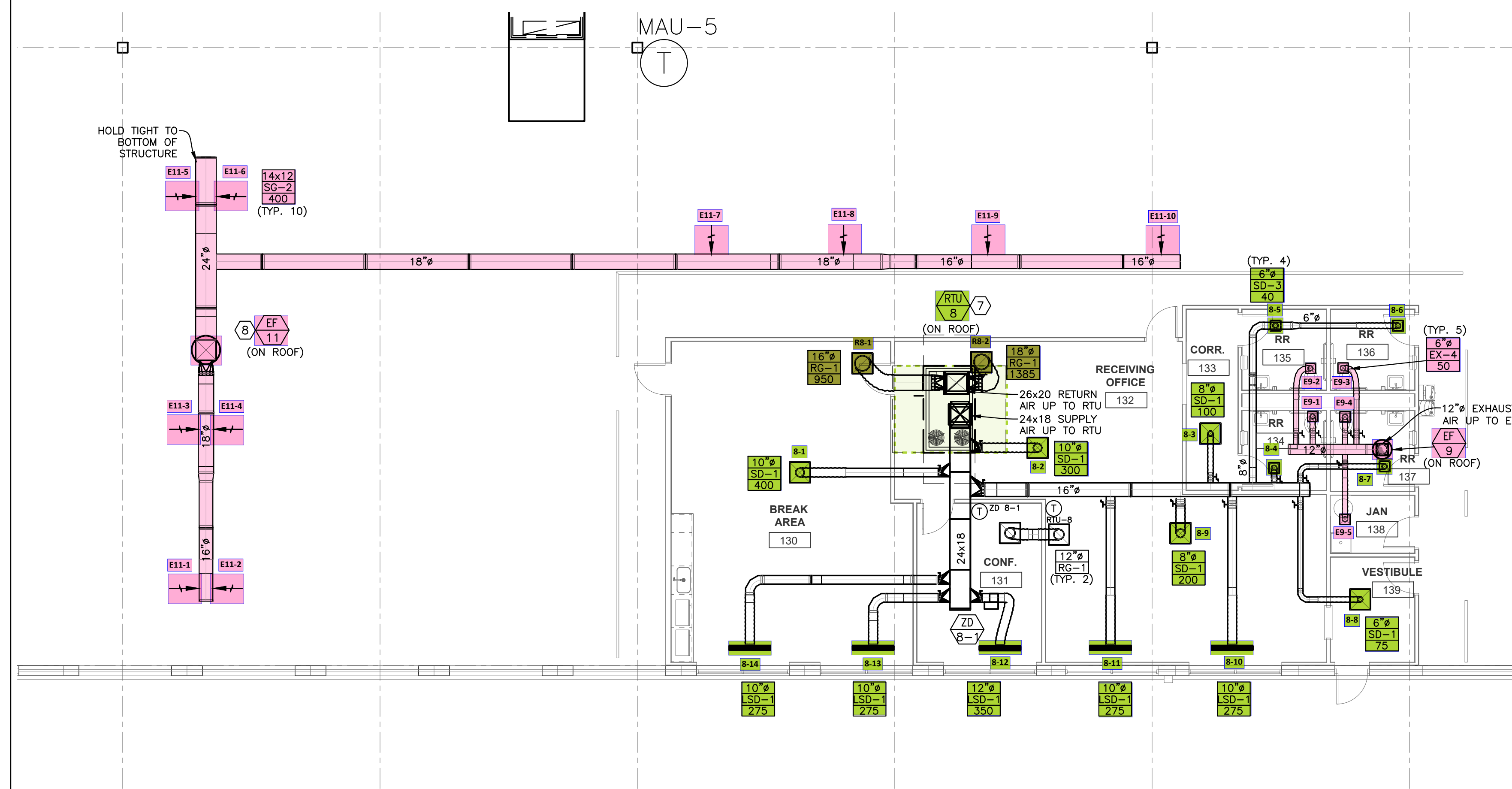
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PROJECT MANAGER: M. HUNSBERGER
DRAWN BY: MDK
CHECKED BY: GMM

REGISTRATION

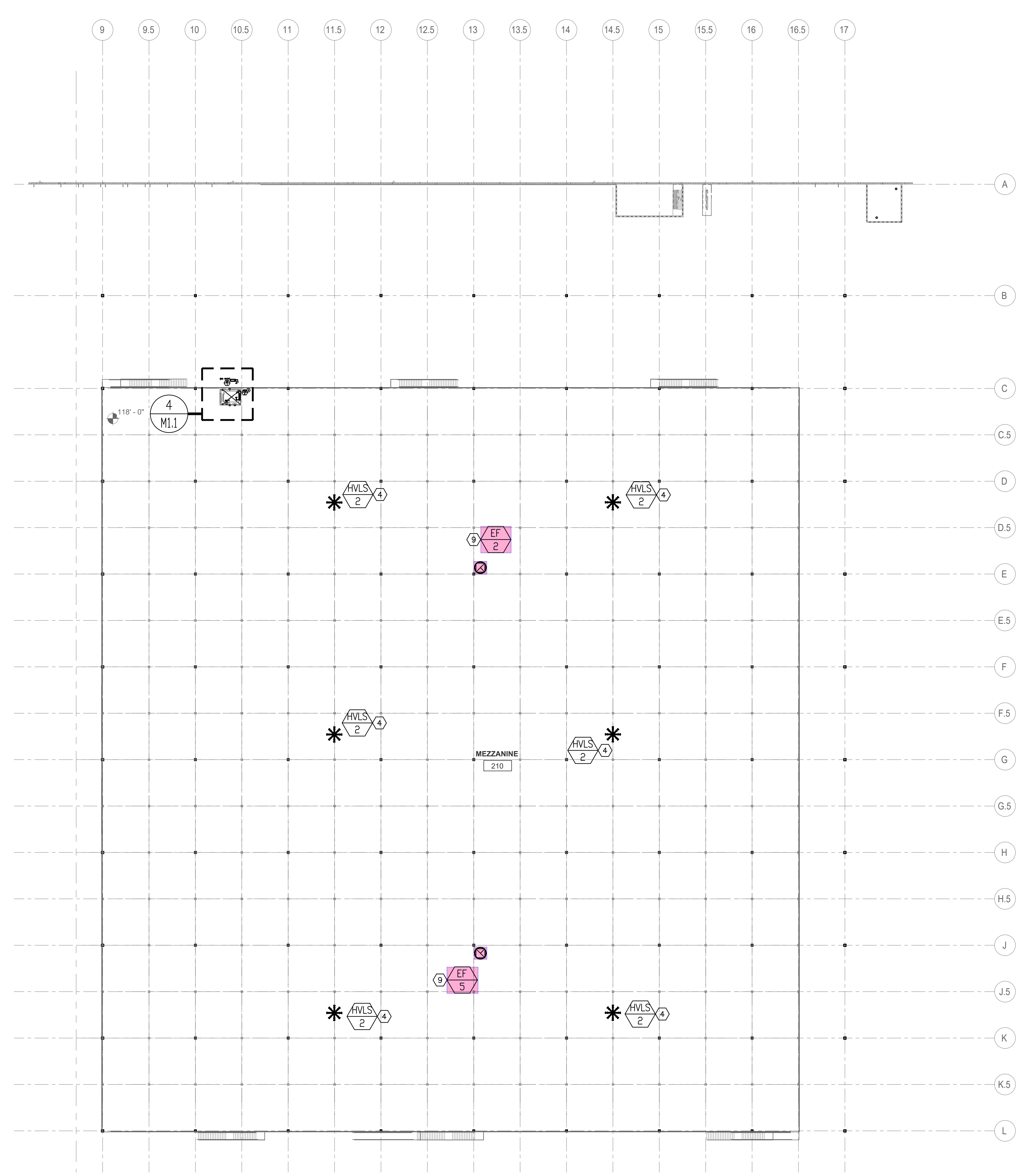
Mechanical
Detail Floor
Plans

SHEET NUMBER

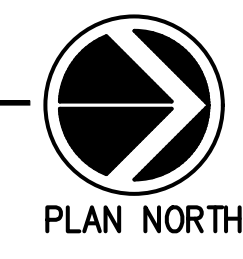
M1.1



1
MECHANICAL DETAIL PLAN
SCALE: 1/8" = 1'-0"



3
OVERALL MEZZANINE PLAN
SCALE: 1" = 30'-0"



MECHANICAL GENERAL NOTES:

- ALL MECHANICAL DUCTWORK SHALL BE GALVANIZED STEEL, CONSTRUCTED ACCORDING TO SMACNA STANDARDS.
- ALL CONCEALED SUPPLY AIR AND RETURN AIR DUCTWORK SHALL BE EXTERNALLY INSULATED WITH 2" THICK, 3/4 LB DENSITY FIBERGLASS DUCT WRAP. ALL EXHAUST DUCTWORK TO BE UN-INSULATED. ALL MAU DUCTWORK TO BE UN-INSULATED.
- HVAC CONTRACTOR WILL CHECK EACH SYSTEM FOR PROPER OPERATION.
- HVAC CONTRACTOR SHALL HAVE AN INDEPENDENT CONTRACTOR TO TEST & BALANCE HVAC SYSTEM TO THE PROPER AIRFLOWS AND STATIC PRESSURES. A COPY OF THE BALANCING REPORT WILL BE SUBMITTED TO THE OWNER UPON COMPLETION. AIR TO (+/-) 10% , WATER TO (+/-) 5%.
- FLEXIBLE RUN-OUTS TO BE U.L. LISTED AND HAVE A MAXIMUM LENGTH OF 8'-0". DUCT RUNS TO BE SAME SIZE AS DIFFUSER NECK SIZE SHOWN.
- AIR HANDLING UNITS SUPPLYING 2,000 CFM OR MORE SHALL HAVE A SMOKE DETECTOR INSTALLED IN THE RETURN AIR DUCTWORK. THE SMOKE DETECTOR SHALL BE INTERLOCKED TO SHUT DOWN ALL SUPPLY FANS UPON ALARM.
- MAINTAIN MINIMUM 10'-0" FROM ALL PLUMBING VENTS AND EXHAUST VENTS TO ALL OUTSIDE AIR INTAKES.
- DO NOT INSTALL PIPING OR DUCTWORK OVER ELECTRICAL PANELS.

MECHANICAL PLAN NOTES:

- ELECTRIC UNIT HEATER FURNISHED BY MECHANICAL, POWERED BY ELECTRICAL CONTRACTOR. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
- PROVIDE 6" EXHAUST VENT UP THROUGH ROOF. PROVIDE WITH WEATHERCAP. MAINTAIN 15'-0" FROM EDGE OF ROOF. INTERLOCK FAN WITH RESTROOM LIGHTSWITCH. (BY OTHERS).
- EXTEND 18X16 EXHAUST DUCT DOWN BELOW STRUCTURE WITH MESH OPENING. EXHAUST FAN TO BE CONTROLLED BY LINE VOLTAGE THERMOSTAT AND BE INTERLOCKED WITH ASSOCIATED LOUVER AS SHOWN.
- PROVIDE HVLS FAN WITH STAND ALONE CONTROLLER. CONDUIT/CONTROL WIRING BY OTHERS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND COORDINATE WITH LIGHTING AND FIRE SUPPRESSION SYSTEM.
- PROVIDE WITH WALL MOUNTED, HEATING ONLY THERMOSTAT MOUNTED ON EXTERIOR WALL AT 5'-0" A.F.F. COORDINATE FINAL LOCATIONS WITH TENANT.
- COORDINATE LOCATION OF RTU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE UN-INSULATED RETURN AIR DUCT DROP WITH MESH SCREEN AND PROVIDE SUPPLY AIR DISCHARGE WITH MANUFACTURER'S STANDARD 3-WAY DISCHARGE DIFFUSER. (TYPICAL FOR ALL MAU'S)
- COORDINATE LOCATION OF RTU WITH FIRE SUPPRESSION PIPING AND STRUCTURE. PROVIDE INTERNALLY LINED RETURN AIR AND SUPPLY AIR DUCTWORK DUCT THRU ROOF AND TRANSITION TO SPIRAL OR RECTANGULAR DUCTWORK DROP AS NOTED. ALL DUCTWORK TO BE EXTERNALLY INSULATED PER GENERAL NOTES. (TYPICAL FOR ALL RTU'S)
- INSTALL BATTERY CHARGING EXHAUST DUCTWORK TIGHT TO BOTTOM OF STRUCTURE. PROVIDE EXHAUST GRILLES AS NOTED AT 30" FROM BOTTOM OF DUCT. EXHAUST FAN TO RUN CONTINUOUSLY.
- PROVIDE GALVANIZED STEEL DRIP PAN UNDER WAREHOUSE EXHAUST AIR FANS. (TYP. 6)
- GAS-FIRED HEATER FLUE THRU ROOF. VERIFY SIZING WITH MANUFACTURER. MAINTAIN 15'-0" FROM EDGE OF ROOF.

LEGEND

- DAYTON UNIT HEATER 10 KW, 460/3 PHASE - PROVIDE WITH UNIT MOUNTED THERMOSTAT. MOUNT BOTTOM OF HEATER 8'-0" A.F.F.
- GREENHECK (OR EQUAL) INTAKE LOUVER MODEL ESD635, 24"x24" WITH BIRDSCREEN AND MOTORIZED 120V DAMPER. MOUNT BOTTOM OF LOUVER 6'-0" A.F.F. LOUVER TO BE INTERLOCKED WITH ROOF MOUNTED EXHAUST FAN EF-5.
- LENNOX (OR EQUAL) GAS FIRED UNIT HEATER LF25-200A-1 120V/1 PHASE, 7 AMPS, 200 MBH, 200LBS PROVIDE WITH HANGING KIT, HEATING ONLY THERMOSTAT
- GREENHECK (OR EQUAL) 24'-0" DS-6-24-170 HV HVLS FAN. 2 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLER!
- GREENHECK (OR EQUAL) 8'-0" DS-6-8-170 HV HVLS FAN. 1 HP @ 460/3 PHASE. PROVIDE WITH HANGING KIT AND CONTROLLERS
- ELECTRIC WALL HEATER - RAYWALL OR EQUAL. 2KW @ 277/1 PHASE. PROVIDE WITH RECESS MOUNTING FRAME, DISCONNECT, INTEGRAL THERMOSTAT.
- SD-1 SUPPLY AIR DIFFUSER - AS SCHEDULED
- RG-1 RETURN AIR GRILLE - AS SCHEDULED
- RG-2 RETURN AIR GRILLE - AS SCHEDULED
- EX-1 EXHAUST AIR GRILLE - AS SCHEDULED
- EX-2 EXHAUST AIR GRILLE - AS SCHEDULED
- SG-1 SUPPLY AIR GRILLE - AS SCHEDULED
- SG-2 SUPPLY AIR GRILLE - AS SCHEDULED
- RETURN AIR GRILLE - AS SCHEDULED
- THERMOSTAT WITH ZONE/UNIT DESIGNATION. MOUNT AT 48" A.F.F.
- WV 1-3
- CARBON DIOXIDE SENSOR - MOUNT IN RETURN OR WALL AS SHOWN
- THERMOSTATIC ZONE DAMPER, MATCH DUCTWORK SIZING. PROVIDE WITH DUCT MOUNTED TEMPERATURE SENSOR AND WALL MOUNTED THERMOSTAT (TYP. 3)
- PROVIDE 120/1 PHASE POWER WIRING AND CONTROL TRANSFORMER AS REQUIRED.

PLOT DATE: 10/8/2021 7:08:30 AM

DATE
11/22/21
PROJECT MANAGER
M. HUNSBERGER
DRAWN BY
MDK
CHECKED BY
GMM

REGISTRATION

OPUS AE GROUP, L.L.C.
CERTIFICATE LICENSE NO. 39148918M

SHEET TITLE
**Mechanical
Detail Floor
Plans**

SHEET NUMBER

MetroAir
PROJECT EAGLE
LIBERTY, MO
SCALE: AS NOTED | DATE: 12/23/21 | DRAWN BY: M.D.K.
APPROVED BY: G.M.M. | DWG # M3 OF 6
OWNER COMMENTSS

M1.2