Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

Report: TAB REPORT

Function: Test, Adjust, & Balance

Date: 08/28/2023

PROJECT

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

need

need, AK 11111

Client

Oliphant Heating

208 WOLLARD BLVD

RICHMOND, MO

Project Summary

The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report is further detail about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

RTU's (Roof Top Units) w/ Diffusers

Each of the RTU's were measured at their terminal devices or via traverse to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. Any equipment that fell outside of that tolerance is noted throughout the report.

General Exhaust Fans w/ Grilles

The general exhaust fans were measured by reading each air device with a flow hood. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within tolerance of design. Each terminal device was balanced to within tolerance of the design volume using the installed volume dampers. Any equipment that fell outside of this tolerance is noted throughout the report.

Final Building Tests

After completing the test and balance the final building pressure was measured. It was confirmed that the building pressure fell within acceptable tolerances and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

- Open BALANCE_SCHEDULE_LARGE_JOBS.xlsx

CheckList List

- TECH - SITE PICTURES
- TECH - STEP 1: INITIAL WALKTHROUGH
- TECH - STEP 2: UNIT DATA AND EVAL
- TECH - STEP 3: TEST, ADJUST AND BALANCE
- TECH - STEP 4: FINAL TESTS

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

CheckList Information

Name :	TECH - SITE PICTURES	**Status :**	Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	08/28/2023 - Brianna Biggs - National TAB		
Completed Date :	08/28/2023 - Michael McDonnell - National TAB		

CheckList Item Details

STORE FRONT

Comment:

TwinLakes-WI
08/28/2023

RTU-1

Comment:

RTU-1
08/28/2023

Label
08/28/2023

RTU-2

Comment:

RTU-2(1)
08/28/2023

Label
08/28/2023

RTU-3

Comment:

RTU-3(1)
08/28/2023

Label
08/28/2023

RTU-4

Comment:

RTU-4
08/28/2023

Label
08/28/2023

EF-1

Comment:

EF-1
08/28/2023

EF-2

Comment:

EF-2
08/28/2023

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

CheckList Information

Name :	TECH - STEP 1: INITIAL WALKTHROUGH	**Status :**	Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	08/28/2023 - Brianna Biggs - National TAB		
Completed Date :	08/28/2023 - Michael McDonnell - National TAB		

CheckList Item Details

INITIAL SITE WALKTHROUGH

Review Plan Review Checklist, has it been signed off and meets our standards to start balancing? If not contact processor to ensure job is ready.

Comment:

Yes

All diffusers and grilles are installed and match design?

Comment:

Yes

Thermostats have power?

Comment:

Yes

Have trades/general contractor been notified about any issues and are they created on FaciliBuild?

Comment:

Yes

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

CheckList Information

Name :	TECH - STEP 2: UNIT DATA AND EVAL	**Status :**	Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	08/28/2023 - Brianna Biggs - National TAB		
Completed Date :	08/28/2023 - Michael McDonnell - National TAB		

CheckList Item Details

UNIT DATA AND EVALUATION WHILE GATHERING UNIT DATA CHECK THE FOLLOWING:

RTU's/AHU's

Comment:

Economizers are assembled and functional?

Comment:

Yes

DCV Max damper opening position is set to minimum?

Comment:

Yes

Free cooling enthalpy set point set for lowest setting (Typically "D")

Comment:

ES5

Motors are all operating below the FLA rating?

Comment:

Yes

Are belts tight?

Comment:

Yes

If direct drive unit is the speed controller working.

Comment:

Yes

Is gas piping installed and valves turned on?

Comment:

Yes

Unit free of noticeable noise and vibration

Comment:

Yes

EF's

Rotation is correct?

Comment:

Yes

Belts are tight?

Comment:

NA, direct drive.

There is no major leakage around base of fan?

Comment:

Yes

Is the motor operating below the motor FLA rating?

Comment:

NA, single speed ceiling fan.

For restroom fan(s) is the back draft damper installed and can it fully open?

Comment:

NA, single speed ceiling fan.

Unit free of noticeable noise and vibration?

Comment:

Yes

DOCUMENTATION

Have trades/general contractor been notified about any issues and are they created on FaciliBuild?

Comment:

Yes

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

CheckList Information

Name :	TECH - STEP 3: TEST, ADJUST AND BALANCE	**Status :**	Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	08/28/2023 - Brianna Biggs - National TAB		
Completed Date :	08/28/2023 - Michael McDonnell - National TAB		

CheckList Item Details

TEST, ADJUST, AND BALANCE ALL EQUIPMENT:

DURING TESTING MAKE NOTE OF THE FOLLOWING:

Is space free of drafting?

Comment:

Yes

Is space comfortable in all areas?

Comment:

Yes

Is the space free of ventilation noise?

Comment:

Yes

If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".

Comment:

NA

08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

CheckList Information

Name :	TECH - STEP 4: FINAL TESTS	**Status :**	Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	08/28/2023 - Brianna Biggs - National TAB		
Completed Date :	08/28/2023 - Michael McDonnell - National TAB		

CheckList Item Details

FINAL TESTS

ADDITIONAL

Thermostats are programmed?

Comment:

No, left in fan on as told by GC.

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: AHU/RTU

Asset: RTU1 AREA:

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	2222C10472
Model Num	48GCE	48GCEM05F2
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	28X14.25
Num Final Filter 1	-	2
Final Filter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	208	208/230
Rated Amperage	-	7.1

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	9.4V
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	**Actual**
SF CFM	1750	1756
SF RPM	-	2145
RA CFM	1600	1612
OA CFM	150	144
RL Voltage	-	210
RL Amperage	-	3.4
SF Rotation	-	CORRECT
RA Damper Position	-	94%
Min OA Damper Position	-	VENT MIN: 2.55V (6%) / VENT MAX: 2.55V (6%)
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	ES5

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.59"
Fan Suction SP	-	-0.98"
Fan Discharge SP	-	0.55"
Total ESP	-	1.14"
Fan Total SP	-	1.53"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

Completed By: Michael McDonnell on 08/28/2023

Notes:
DIFFUSER DESIGN TOTALS =1400
ADJUSTED TOTALS.

Written By: Brianna Biggs on 08/28/2023

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Project:08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

AHU/RTU

Diffuser Supply (GRD)

RTU1/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	STORAGE	D	14X6	363	0.48	219	322	365	100.6
SGRD2	STORAGE	D	14X6	363	0.48	205	303	358	98.6
SGRD3	STORAGE	D	14X6	363	0.48	191	283	359	98.9
SGRD4	STORAGE	D	14X6	363	0.48	201	297	372	102.5
SGRD5	OFFICE	A	8"	100	1.0	172	237	96	96.0
SGRD6	HALLWAY	A	8"	100	1.0	147	202	102	102.0
SGRD7	RESTROOM	C	8"	50	1.0	84	116	54	108.0
SGRD8	RESTROOM	C	8"	50	1.0	78	108	50	100.0
Total				1752		1297	1868	1756	100.23%

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: AHU/RTU

Asset: RTU2 AREA:

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	4322P66644
Model Num	48FCE	48HCED08F2
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	35.5X19.5
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	-	NL
Motor Rpm	-	1670
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	6.7-6.6

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VL44
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	4 TURNS OPEN
Fan Sheave Size	-	AFD74 (7.5")
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.75"
Num of Belts	-	1
Belt Size	-	A48
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	2800	2826
SF RPM	-	801
RA CFM	2150	2154
OA CFM	650	672
RL Voltage	-	210/209/210
RL Amperage	-	3.4/3.2/3.1
SF Rotation	-	CCW, CORRECT
RA Damper Position	-	HIGH-MAX: 77% MIN: 92% LOW-MAX: 72% MIN: 85%
Min OA Damper Position	-	HIGH-MAX: 3.85V MIN: 2.9 LOW-MAX: 4.25V MIN: 3.2V
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	ES5

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.60"
Fan Suction SP	-	-0.78"
Fan Discharge SP	-	0.60"
Total ESP	1.0"	1.20"
Fan Total SP	-	1.38"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

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Project:08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

AHU/RTU

Diffuser Supply (GRD)

RTU2/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	SALES	B	12"	350	1.0	373	346	346	98.9
SGRD2	SALES	B	12"	350	1.0	356	350	350	100.0
SGRD3	SALES	B	12"	350	1.0	379	371	371	106.0
SGRD4	SALES	B	12"	350	1.0	341	324	324	92.6
SGRD5	SALES	B	12"	350	1.0	372	346	346	98.9
SGRD6	SALES	B	12"	350	1.0	398	343	343	98.0
SGRD7	SALES	B	12"	350	1.0	348	370	370	105.7
SGRD8	SALES	B	12"	350	1.0	371	376	376	107.4
Total				2800		2938	2826	2826	100.93%

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: AHU/RTU

Asset: RTU3 AREA:

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	4322P66645
Model Num	48FCE	48HCED08F2
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	35.5"X19.5"
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	-	NL
Motor Rpm	-	1670
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	6.7-6.6

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VL44
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	4 TURNS OPEN
Fan Sheave Size	-	AFD74 (7.5")
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.5"
Num of Belts	-	1
Belt Size	-	A48
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	2800	2797
SF RPM	-	778
RA CFM	2150	2163
OA CFM	650	634
RL Voltage	-	210/210/210
RL Amperage	-	3.4/3.0/2.9
SF Rotation	-	CCW, CORRECT
RA Damper Position	-	HIGH-MAX: 79% MIN: 89% LOW-MAX:73% MIN:86%
Min OA Damper Position	-	HIGH-MAX: 3.75V MIN: 2.95 LOW-MAX:4.2V MIN: 3.15V
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	ES5

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.58"
Fan Suction SP	-	-0.76"
Fan Discharge SP	-	0.56"
Total ESP	1.0"	1.14"
Fan Total SP	-	1.32"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

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National TAB

Project:08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

AHU/RTU

Diffuser Supply (GRD)

RTU3/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	SALES	B	12"	350	1.0	339	376	376	107.4
SGRD2	SALES	B	12"	350	1.0	384	344	344	98.3
SGRD3	SALES	B	12"	350	1.0	375	353	353	100.9
SGRD4	SALES	B	12"	350	1.0	246	323	323	92.3
SGRD5	SALES	B	12"	350	1.0	329	333	333	95.1
SGRD6	SALES	B	12"	350	1.0	393	345	345	98.6
SGRD7	SALES	B	12"	350	1.0	387	375	375	107.1
SGRD8	SALES	B	12"	350	1.0	351	348	348	99.4
Total				2800		2804	2797	2797	99.89%

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: AHU/RTU

Asset: RTU4 AREA:

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	4422P67341
Model Num	48FCE	48HCED11F2
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	35.5X19.5
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	-	NL
Motor Rpm	-	1750
Phase	3	3
Rated Voltage	208	230
Rated Amperage	-	9.2

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VM50
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	4 TURNS OPEN
Fan Sheave Size	-	AFD74 (7.5")
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.75"
Num of Belts	-	1
Belt Size	-	A48
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	3500	3660
SF RPM	-	926
RA CFM	2725	2873
OA CFM	775	787
RL Voltage	-	209/210/210
RL Amperage	-	4.9/5.3/5.2
SF Rotation	-	CCW, CORRECT
RA Damper Position	-	HIGH-MAX: 77% MIN: 87% LOW-MAX: 68% MIN: 83%
Min OA Damper Position	-	HIGH-MAX-3.95V MIN:3.05V LOW-MAX:4.6V MIN: 3.4V
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	ES5

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.76"
Fan Suction SP	-	-1.05"
Fan Discharge SP	-	0.72"
Total ESP	1.0"	1.48"
Fan Total SP	-	1.77"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

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Project:08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

AHU/RTU

Diffuser Supply (GRD)

RTU4/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	SALES	B	12"	440	1.0	436	457	457	103.9
SGRD2	SALES	B	12"	435	1.0	485	470	470	108.0
SGRD3	SALES	B	12"	435	1.0	570	434	434	99.8
SGRD4	SALES	B	12"	440	1.0	439	471	471	107.0
SGRD5	SALES	B	12"	440	1.0	413	447	447	101.6
SGRD6	SALES	B	12"	435	1.0	486	478	478	109.9
SGRD7	SALES	B	12"	435	1.0	450	441	441	101.4
SGRD8	SALES	B	12"	440	1.0	365	462	462	105.0
Total				3500		3644	3660	3660	104.57%

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: FAN - Exhaust

Asset: EF1 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	BROAN
Model Num	SP-B110	NA
Serial Num	-	NA
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	NA

Test Data		
	Design	**Actual**
CFM	75	75
Fan RPM	-	DD
Fan Rotation	-	CORRECT
Motor RPM	-	DD
System SetPt	-	SINGLE SPEED
RL Voltage	-	NA
RL Amperage	-	NA

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Project: 08-28-23 FAMILY DOLLAR - TWIN LAKES, WI

System/Unit: FAN - Exhaust

Asset: EF2 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	BROAN
Model Num	SP-B110	NA
Serial Num	-	NA
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	**Actual**
CFM	75	92
Fan RPM	-	DD
Fan Rotation	-	CORRECT
Motor RPM	-	DD
System SetPt	-	SINGLE SPEED

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	NA

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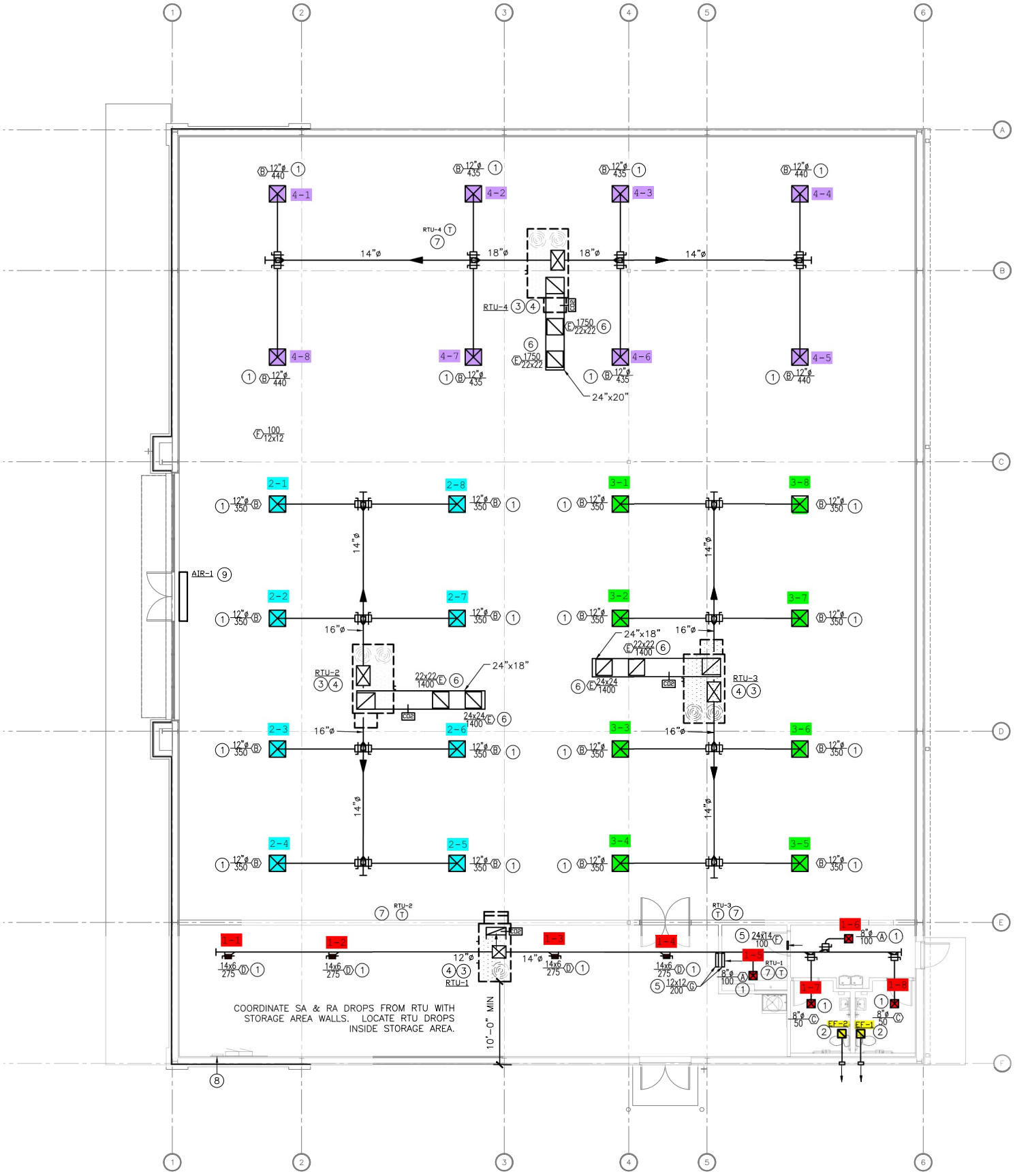

1 MECHANICAL HVAC PLAN
SCALE: 1/8" = 1'-0"

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