

AIR BALANCING SPECIALTY INC.

**GLADSTONE CENTER FOR CHILDREN & FAMILIES
G.C.C.F.
GLADSTONE, OREGON**

PROJECT NO: 20-4235-D

AIR BALANCING SPECIALTY INC. 3532 S.E. MILWAUKIE AVENUE PORTLAND, OREGON 97202-2751
IN BUSINESS SINCE 1964 CERTIFIED NEBB FIRM - CERTIFICATION NO. 2984
PHONE (503) 230-2332 FAX (503) 230-2820

PROJECT NAME:

GLADSTONE CENTER FOR CHILDREN & FAMILIES (G.C.C.F.) - GLADSTONE, OREGON

ARCHITECT:

DATE STARTED: 11/23/20

DATE FINISHED: 11/23/20

MECHANICAL ENGINEER:

WORK PERFORMED BY: DALE NEFFENDORF

GENERAL CONTRACTOR:

CERTIFIED BY: _____

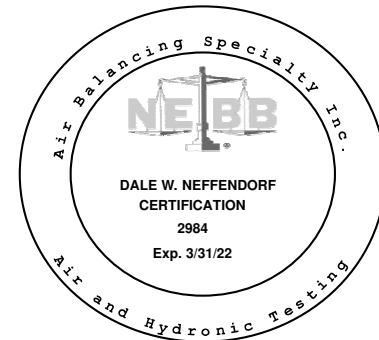
MECHANICAL CONTRACTOR:

DATE: _____

SHEET METAL CONTRACTOR:

CONTROL CONTRACTOR:

NORTHWEST CONTROL COMPANY
PO BOX 22919
MILWAUKIE, OR. 97726



IN BUSINESS SINCE 1964

AIR BALANCING SPECIALTY INC.

CERTIFIED NEBB No. 2984

3532 SE Milwaukie Avenue Portland, Oregon 97202-2751 Phone (503) 230-2332 Fax (503) 230-2820

CERTIFIED TEST AND BALANCE REPORT

PROJECT NO.: 20-4235-D

INSTRUMENT AIR	MODEL NO.	SERIAL NO.	RANGE	CALIBRATION DATE
(D) Shortridge Airdata Multimeter ADM Accessories	ADM860	M90214	0.0001 to 60.00" WC.	11/14/2019
(DH) Datameter Flow Hood	8400		25 - 2500 CFM	
(DP) Datameter Pitot Tube	12", 18", 24", 36", 48" & 60"		50 - 30000 FPM	
(DA) Datameter Airfoil	AFP18		50 - 5000 FPM	
(DG) Datameter Velgrid	VLG84		50 - 2500 FPM	
Rotating Vane Anemometer	A4/-4"	71537	200 - 10000 FPM	11/13/2019
Amprobe Ammeter	Fluke 335	11100082	0 - 750 Volts / 0 - 300 Amps	11/13/2019
Shimpo Tachometer	DT-207L	D096B0082	6 - 30,000 RPM	11/13/2019
WATER				
Hydrodata Meter	HDM-250	W96144	DP -10 to +300 PSI	11/14/2019

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CERTIFIED NEBB No. 2984

3532 SE Milwaukie Avenue Portland, Oregon 97202-2751 Phone (503) 230-2332 Fax (503) 230-2820

EQUIPMENT USED IN BALANCING

PROJECT: GLADSTONE CENTER FOR CHILDREN AND FAMILIES (G.C.C.F.) - GLADSTONE, OREGON

PROJECT NO.: 20-4235-D

Ref	Ins	AREA SERVED	OUTLETS			Blow	DESIGN			MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct	
			Rm.#	No.	Size		AK	Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM		
			(Maximum / Minimum / Heating)(Inlet Size)																		
		AHU-1																			
		TU-14	(As Found 800 / 400 / 600 Changed to 1000 / 1000 / 1000)(12"O)							(100%)		(56%)									
	DH	Kindergarten # 1	1		4W	1.00					270		220								
	DH	Kindergarten # 1	2		4W	1.00					330		270								
	DH	Kindergarten # 1	3		4W	1.00					325		250								
	DH	Kindergarten # 1	4		4W	1.00					265		220								
		Total									1190		960								
		(Display)									(635)		(906)								
		Temp / RH									64.7 / 41.8		67.8 / 38.2								
		Cubic Feet							9373												
		Air Changes per hour (ACH)							6.0		7.62		6.15								
											0		0								
											0		0								
		TU-15	(As Found 800 / 400 / 600 Changed to 1000 / 1000 / 1000)(12"O)							(100%)		(55%)									
	DH	Kindergarten # 2	1		4W	1.00					410		350								
	DH	Kindergarten # 2	2		4W	1.00					380		320								
	DH	Kindergarten # 2	3		4W	1.00					455		375								
		Total									1245		1045								
		(Display)									(516)		(1008)								
		Temp / RH									68.3 / 37.5		69.8 / 36.1								
		Cubic Feet							9885												
		Air Changes per hour (ACH)							6.0		7.38		6.34								
		TU-16	(As Found 800 / 400 / 600 Changed to 1000 / 1000 / 1000)(12"O)							(75%)											
	DH	Kindergarten # 3	1		4W	1.00					345										
	DH	Kindergarten # 3	2		4W	1.00					315										
	DH	Kindergarten # 3	3		4W	1.00					335										
		Total									995										
		(Display)									(978)										
		Temp / RH									70.3 / 37.0										
		Cubic Feet							9829												
		Air Changes per hour (ACH)							6.0		6.07										

Ref	Ins	AREA SERVED	OUTLETS			Blow	AK	DESIGN		MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct	
			Rm.#	No.	Size			Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM		
			(Maximum / Minimum / Heating)(Inlet Size)																		
		AHU-1																			
		TU-17	(As Found 1500 / 500 / 800 Changed to 3000 / 3000 / 3000)(16"O)							(100%)		(100%)									
	R	Indoor Playroom	1	12x10	SW	0.63			580	365	580	365									
	R	Indoor Playroom	2	12x10	SW	0.63			690	435	690	435									
	R	Indoor Playroom	3	12x10	SW	0.63			710	447	710	447									
	R	Indoor Playroom	4	12x10	SW	0.63			750	473	750	473									
	R	Indoor Playroom	5	12x10	SW	0.63			740	466	740	466									
	R	Indoor Playroom	6	12x10	SW	0.63			660	416	660	416									
		Total							2602		2602										
		(Display)							(850)		(2616)										
		Temp / RH							68.4 / 36.7		67.8 / 39.4										
		Cubic Feet						27840													
		Air Changes per hour (ACH)						6.0		5.6		5.6									
		TU-24	(As Found 800 / 400 / 600 Changed to 1050 / 1050 / 1050)(12"O)							(100%)		(80%)									
	DH	Kindergarten # 4	1		4W	1.00				355		355									
	DH	Kindergarten # 4	2		4W	1.00				360		350									
	DH	Kindergarten # 4	3		4W	1.00				405		400									
		Total								1120		1105									
		(Display)								(478)		(1084)									
		Temp / RH							69.9 / 37.5		70.7 / 36.5										
		Cubic Feet						10218													
		Air Changes per hour (ACH)						6.0		6.58		6.49									
		TU-25	(As Found 800 / 400 / 600 Changed to 1100 / 1100 / 1100)(12"O)							(68%)		(66%)									
	DH	Kindergarten # 5	1		4W	1.00				365		365									
	DH	Kindergarten # 5	2		4W	1.00				385		375									
	DH	Kindergarten # 5	3		4W	1.00				400		390									
		Total								1150		1130									
		(Display)								(1068)		(1122)									
		Temp / RH							70.7 / 35.9		70.7 / 36.0										
		Cubic Feet						10541													
		Air Changes per hour (ACH)						6.0		6.55		6.43									

Ref	Ins	AREA SERVED	OUTLETS			Blow	AK	DESIGN		MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct
			Rm.#	No.	Size			Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	
			(Maximum / Minimum / Heating)(Inlet Size)																	
		AHU-1																		
		TU-28	(As Found 800 / 400 / 600 Changed to 1000 / 1000 / 1000)(12"O)							(100%)	(56%)									
	DH	Kindergarten # 6	1		4W	1.00				465	350									
	DH	Kindergarten # 6	2		4W	1.00				450	320									
	DH	Kindergarten # 6	3		4W	1.00				470	330									
		Total								1385	1000									
		(Display)								(555)	(999)									
		Temp / RH								68.5 / 38.3	67.1 / 40.2									
		Cubic Feet						9876												
		Air Changes per hour (ACH)						6.0		8.41	6.08									
										0	0									
										0	0									
		TU-	(As Found 1100 / 400 / 500 Changed to 700 / 700 / 700)(12"O)							(100%)	(54%)									
	DH	Kitchen	1		4W	1.00				630	510									
	DH	Kitchen	2		4W	1.00				300	250									
		Total								930	760									
		(Display)								(520)	(720)									
		Temp / RH								66.5 / 40.9	66.3 / 41.2									
		Cubic Feet						6690												
		Air Changes per hour (ACH)						6.0		8.34	6.82									
		TU-8	(As Found 800 / 400 / 600 Changed to 900 / 900 / 900)(12"O)							(100%)	(41%)									
	DH	ESD	7	1	4W	1.00				435	355									
	DH	ESD	7	2	4W	1.00				400	280									
	DH	ESD	7	3	4W	1.00				520	295									
		Total								1355	930									
		(Display)								(781)	(913)									
		Temp / RH								67.1 / 40.7	66.7 / 41.3									
		Cubic Feet						8161												
		Air Changes per hour (ACH)						6.0		9.96	6.83									

Ref	Ins	AREA SERVED	OUTLETS			Blow	DESIGN			MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct	
			Rm.#	No.	Size		AK	Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM		
			(Maximum / Minimum / Heating)(Inlet Size)																		
		AHU-1																			
		TU-7	(As Found 800 / 400 / 600 Changed to 900 / 900 / 900)(12"O)							(100%)		(44%)									
	DH	ESD	8	1		4W	1.00				410		275								
	DH	ESD	8	2		4W	1.00				410		285								
	DH	ESD	8	3		4W	1.00				550		370								
		Total									1370		930								
		(Display)									(514)		(910)								
		Temp / RH									68.3 / 41.3		69.0 / 39.4								
		Cubic Feet						8181													
		Air Changes per hour (ACH)						6.0			10.04		6.82								
		TU-6	(As Found 800 / 400 / 600 Changed to 900 / 900 / 900)(10"O)							(100%)		(68%)									
	DH	Headstart	9	1		4W	1.00				550		475								
	DH	Headstart	9	2		4W	1.00				530		455								
		Total									1080		930								
		(Display)									(563)		(919)								
		Temp / RH									69.9 / 38.5		69.4 / 39.0								
		Cubic Feet						8181													
		Air Changes per hour (ACH)						6.0			7.90		6.82								
		TU-2	(As Found 800 / 400 / 600 Changed to 900 / 900 / 900)(10"O)							(100%)		(100%)									
	DH	Headstart	10	1		4W	1.00				440		440								
	DH	Headstart	10	2		4W	1.00				465		465								
		Total									905		905								
		(Display)									(349)		(906)								
		Temp / RH									69.6 / 38.9		69.8 / 39.0								
		Cubic Feet						8181													
		Air Changes per hour (ACH)						6.0			6.63		6.63								

Ref	Ins	AREA SERVED	OUTLETS			Blow	AK	DESIGN		MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct
			Rm.#	No.	Size			Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	
			(Maximum / Minimum / Heating)(Inlet Size)																	
		AHU-1																		
		TU-10	(As Found 1500 / 500 / 800)(16"O)								(100%)	(100%)								
	DA	Lobby			22"O	Sock	2.64			125	330	@ 1.26" DSP								
		(Display)									(222)	(330)								
		Temp / RH								69.4	38.9									
		Cubic Feet						NA												
		Air Changes per hour (ACH)						6.0		NA	NA									
		TU-3	(As Found 400 / 200 / 300 Changed to 550 / 550 / 550)(6"O)								(100%)	(100%)								
	DH	Partner's Office		1		4W	1.00				165	165								
	DH	Partner's Office		2		4W	1.00				155	155								
		Total									320	320								
		(Display)									(97)	(330)								
		Temp / RH								71.0	38.6	71.9	37.0							
		Cubic Feet						5016												
		Air Changes per hour (ACH)						6.0		3.82	3.82									
		TU-4	(As Found 150 / 108 / 130 Changed to 200 / 200 / 200)(4"O)								(100%)	(83%)								
	DH	Office - Headstart Mgr				4W	1.00				110	105								
	DH	Office				4W	1.00				100	95								
		Total									210	200								
		(Display)									(63)	(199)								
		Temp / RH								72.5	37.4	72.5	36.7							
		Cubic Feet Headstart Mgr.						891												
		Air Changes per hour (ACH)						6.0		7.41	7.07									
		Cubic Feet Office						972												
		Air Changes per hour (ACH)						6.0		6.17	5.86									

Ref	Ins	AREA SERVED	OUTLETS			Blow	AK	DESIGN		MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct	
			Rm.#	No.	Size			Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM		
			(Maximum / Minimum / Heating)(Inlet Size)																		
		AHU-1																			
		TU-13	(As Found 800 / 400 / 600 Changed to 2000 / 2000 / 2000)(14"O)							(100%)		(67%)									
	R	Common / Lunch	1	24x12	SW	1.50				325	488	273	410								
	R	Common / Lunch	2	24x12	SW	1.50				390	585	330	495								
	R	Common / Lunch	3	24x12	SW	1.50				397	596	354	531								
	R	Common / Lunch	4	24x12	SW	1.50				396	594	355	533								
		Total								2262		1968									
		(Display)								(635)		(1966)									
		Temp / RH								70.5 / 38.4		69.9 / 38.7									
		Cubic Feet							18392												
		Air Changes per hour (ACH)							6.0		7.38		6.42								
		TU-26	(As Found 600 / 250 / 400 Changed to 600 / 600 / 600)(8"O)							(100%)		(66%)									
	DH	Community Room	1		4W	1.00					345		310								
	DH	Community Room	2		4W	1.00					340		300								
		Total								685		610									
		(Display)								(199)		(612)									
		Temp / RH								70.8 / 38.5		71.2 / 37.7									
		Cubic Feet							5040												
		Air Changes per hour (ACH)							6.0		8.18		7.26								
		TU-27	(As Found 100 / 70 / 85 Changed to 100 / 100 / 100)(4"O)							(54%)		(48%)									
	DH	Conference			4W	1.00					125		100								
		(Display)								(93)		(99)									
		Temp / RH								70.3 / 39.2		70.3 / 40.2									
		Cubic Feet							990												
		Air Changes per hour (ACH)							6.0		7.58		6.06								

Ref	Ins	AREA SERVED	OUTLETS			Blow	AK	DESIGN		MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct
			Rm.#	No.	Size			Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	
			(Maximum / Minimum / Heating)(Inlet Size)																	
		AHU-1																		
		TU-20	(As Found 200 / 150 / 180 Changed to 200 / 200 / 200)(5"O)							(100%)		(58%)								
	DH	Work Room				4W	1.00				275		205							
		(Display)									(88)		(201)							
		Temp / RH									72.6 / 38.7		72.1 / 38.9							
		Cubic Feet						1944												
		Air Changes per hour (ACH)						6.0			8.49		6.33							
		TU-23	(As Found 400 / 280 / 320 Changed to 400 / 400 / 400)(6"O)							(100%)		(100%)								
	DH	Office G.C.C.F.		1		4W	1.00				140		140							
	DH	Office G.C.C.F.		2		4W	1.00				130		130							
	DH	Health				4W	1.00				100		100							
		Total									370		370							
		(Display)									(108)		(368)							
		Temp / RH									73.4 / 36.2		73.4 / 36.7							
		Cubic Feet						4104												
		Air Changes per hour (ACH)						6.0			5.41		5.41							
		TU-21	(As Found 100 / 70 / 85 Changed to 145 / 145 / 145)(4"O)							(100%)		(54%)								
	DH	Conference				4W	1.00				175		155							
		(Display)									(110)		(146)							
		Temp / RH									72.3 / 36.9		72.1 / 38.1							
		Cubic Feet						1454												
		Air Changes per hour (ACH)						6.0			7.22		6.40							

Ref	Ins	AREA SERVED	OUTLETS				DESIGN			MAX. TEST #1		MAX TEST #2		MIN. TEST #1		MIN. TEST #2		MAX FINAL		Pct		
			Rm.#	No.	Size	Blow	AK	Vel	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM	FPM	CFM			
			(Maximum / Minimum / Heating)(Inlet Size)																			
		AHU-1																				
		TU-22	(As Found 450 / 200 / 265 Changed to 200 / 200 / 200)(6"O)								(100%)		(61%)									
	DH	Staff Room				4W	1.00				285		210									
		(Display)									(127)		(205)									
		Temp / RH									71.2 / 38.7		70.8 / 40.1									
		Cubic Feet							1970													
		Air Changes per hour (ACH)							6.0		8.68		6.40									
		TU-18	(As Found 800 / 500 / 600 Changed to 800 / 800 / 800)(12"O)								(100%)		(40%)									
	R	Hall		1	10x10	SW	0.52				630	328	270	140								
	R	Hall		2	10x10	SW	0.52				780	406	400	208								
	R	Hall		3	10x10	SW	0.52				870	452	450	234								
	R	Hall		4	10x10	SW	0.52				800	416	400	208								
		Total									1602		790									
		(Display)									(700)		(790)									
		Temp / RH									70.1 / 38.3		70.3 / 37.9									
		Cubic Feet							NA													
		Air Changes per hour (ACH)							6.0		NA		NA									
1		TU-17	(As Found 1000 / 500 / 800 Changed to 1000 / 1000 / 1000)(10"O)								(100%)											
	DH				14"O	Sock	1.07				29	31										
		(Display)										(580)										
		Temp / RH									69.6 / 39.0											
		Cubic Feet							NA													
		Air Changes per hour (ACH)							6.0		NA		NA									
		TU-1	(As Found 350 / 250 / 300 Changed to 250 / 250 / 250)(6"O)								(100%)		(55%)									
	DH	Corridor			14"O		1.00				425		255									
		(Display)									(131)		(256)									
		Temp / RH									69.8 / 38.4		69.8 / 38.3									
		Cubic Feet							2333													
		Air Changes per hour (ACH)							6.0		10.93		6.56									

Ref. Note: (1) End cap is partially off.

AIR BALANCING SPECIALTY, INC. 3532 SE Milwaukie Avenue, Portland, OR 97202-2751

Phone 230-2332 Fax 230-2820

VARIABLE AIR VOLUME FPM

AIR BALANCE DATA SHEET

PROJECT NO. 20-4235-D

PROJECT: GLADSTONE CENTER FOR CHILDREN AND FAMILIES (G.C.C.F.) - GLADSTONE, OREGON

DATE START: 11/23/20 FINISH: 11/23/20

SYSTEM: AHU-1 (TU-22, TU-18, TU-17 & TU-1)

SECTION:

BY: DN

PAGE: 8 OF 8