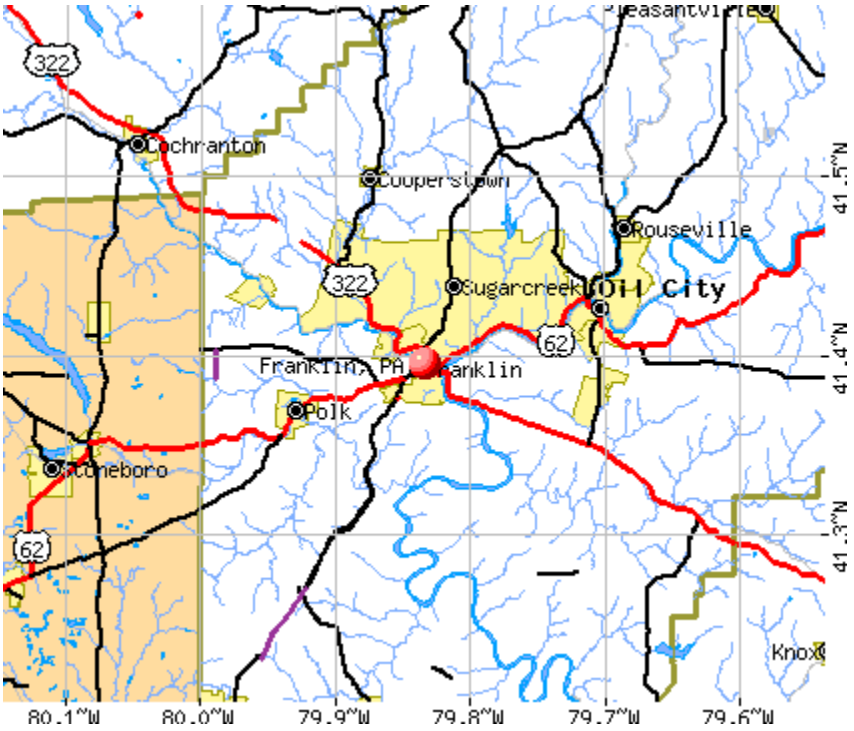
The Unico System®

ENGINEERING SPECIFICATIONS

Gabrys Residence

Prepared by Victor Carroll



DISCLAIMER

The attached sizing and layout design is for estimation purposes only. The actual size and performance of the system is the responsibility of the installing contractor and design engineer. Unico will only warrant the equipment capacity as shown in the ARI Unitary Directory under the specified conditions when properly installed using all of the installation instructions provided by Unico.

As such, the ***UNICOSYSTEM***® is a comfort heating and cooling system that has limitations as summarized below. Under certain conditions the system may require the use of special controls.

The following pages summarize the heat gain and heat loss of the building using the ACCA Manual J calculation procedure. The calculations are based on the information given to Unico in the form of drawings, sketches, and interviews. In certain cases, Unico may make assumptions about design conditions that may or may not be accurate for the location of concern. It is the responsibility of the installing contractor to verify the design conditions and to inform the building owner. Unico makes no claim that the information given to us is correct or complete.

LIMITATIONS

Ambient conditions:

- -10 to 110°F for the MB blowers (higher temperatures require a cooling tube)
- 32 to 160°F for water coils with standing water
- -10 to 160°F for all other units

Outdoor Conditions:

- 80 to 110°F for refrigerant cooling systems with air-cooled condensers (use a low ambient head pressure control for lower outdoor temperatures)
- 10 to 50°F for refrigerant heating (heat pump) systems with air-cooled condensers (use the UPC-65 mild weather control kit for higher temperatures)

Return Air Conditions:

- 72 to 95°F for refrigerant systems
- 32 to 120°F for hydronic systems

Water temperatures:

- 35 to 200°F except for the M1218 which is limited to 160°F maximum.

Electric Heaters:

- Refer to installation instructions. Maximum size is limited by airflow, especially for heat pump applications.

Unico warrants that the equipment will operate properly under these conditions. If conditions exceed these limitations, Unico will provide technical advice on the feasibility of adding special controls or modifying

the equipment to operate under said conditions. Unless otherwise stated, no express warranty is given for operating the equipment outside of these limitations.

Unico, Inc. is a manufacturer of heating and air conditioning equipment and ductwork. Unico, Inc., is not an architectural or engineering firm and does not provide architectural or engineering plans or diagrams for the public or for use by contractors or construction companies as final "construction documents"

Unico, Inc. works with architectural and engineering firms and with contractors in connection with their designs of heating and air conditioning systems and their specifications for particular applications and buildings, using Unico, Inc.'s equipment and products. Any load calculations, duct design and list of materials and equipment provided in the following pages are based upon information provided by the party referring a particular project to Unico, Inc. (copies of key portions of this material, which provided the basis for the various Design Support information included are attached as part of this package. Any other basic information about this Project used by Unico, Inc. is on file at the Unico, Inc. Customer Service Department under the file number listed).

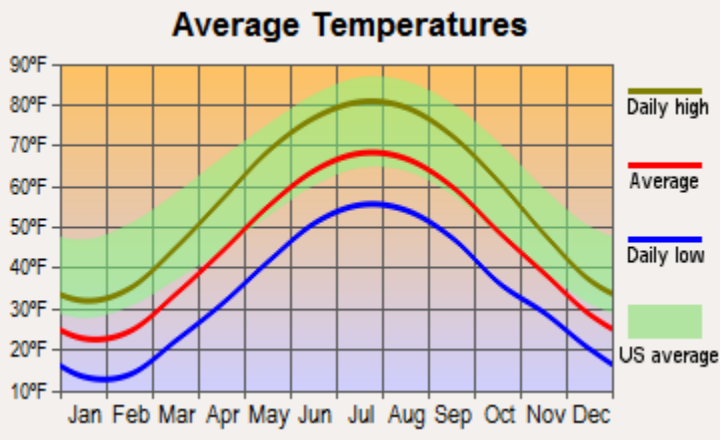
Unico, Inc. has not and does not independently verify that the data provided to Unico, Inc. is correct or complete, and any calculations made by Unico are based upon the information provided by third parties. Various modifications to the information provided to Unico, Inc. may have occurred after this Design Support information was prepared, which would require that this Design Support information be modified in order to be accurate.

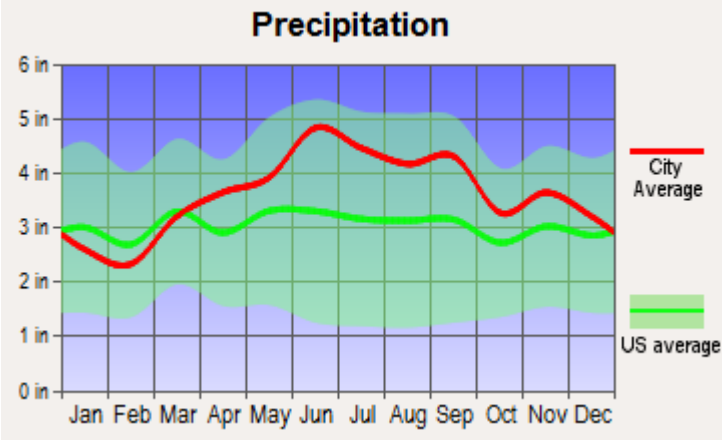
AS A RESULT, UNICO DOES NOT WARRANT THAT THE EQUIPMENT AND MATERIALS SUGGESTED IN THE FOLLOWING PAGES WILL HEAT OR COOL A PARTICULAR BUILDING TO ANY PARTICULAR LEVEL OF COMFORT, SINCE THAT DETERMINATION IS TO BE MADE BY THE ARCHITECT, ENGINEER OR CONTRACTOR FOR A PARTICULAR PROJECT.

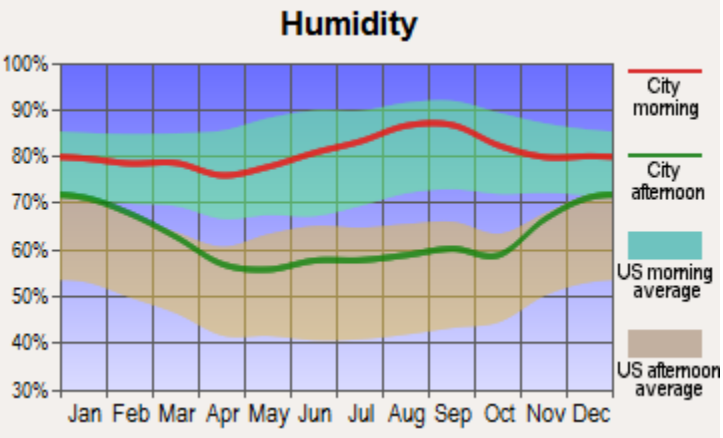
UNICO, INC.'S SOLE WARRANTY IS THAT ALL UNICO, INC. EQUIPMENT AND THE UNICO DUCT SYSTEM WILL PERFORM AS RATED, PROVIDED THAT THE INSTALLER OF THE UNICO, INC. EQUIPMENT AND DUCT SYSTEM FOLLOW THE WRITTEN INSTRUCTIONS FOR INSTALLATION PROVIDED BY UNICO, INC. ALL OTHER WARRANTIES ARE EXPRESSLY DISCLAIMED.

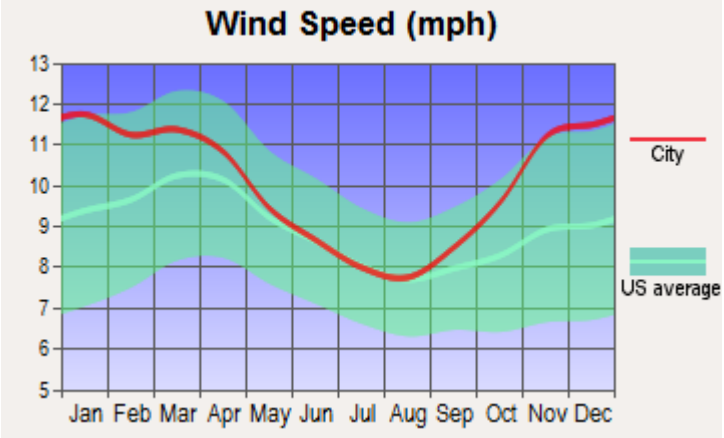
Average climate in Franklin, Pennsylvania

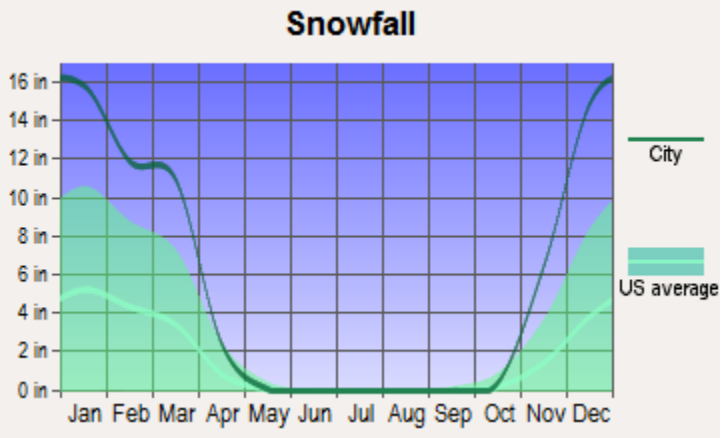
Based on data reported by over 4,000 weather stations

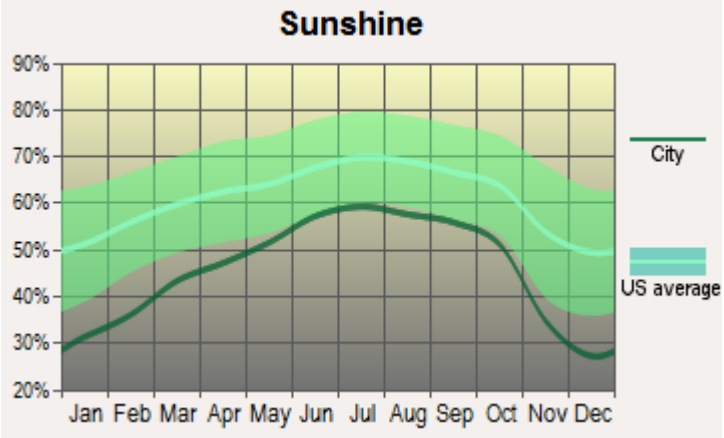


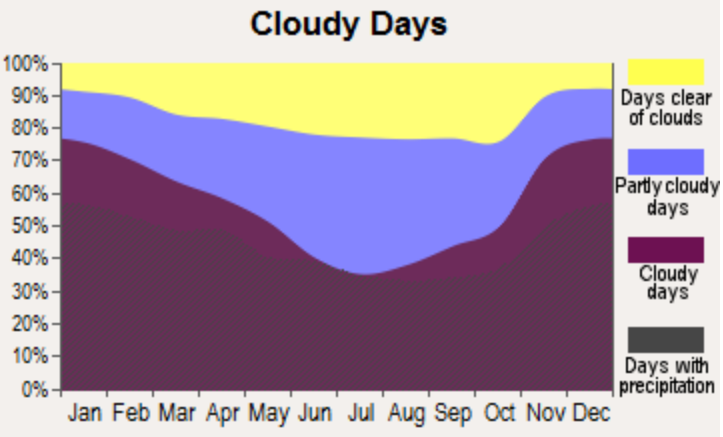












Read more: http://www.city-data.com/city/Franklin-Pennsylvania.html#ixzz1W3JGksUc

If the duct layout is altered onsite due to space and/or layout constraints, the Bill of Materials duct length quantities may not be accurate. The DUCT quantities are estimates ONLY. The attached Duct Layout and Bill of Materials are suggestions ONLY. Alterations may be necessary.

- In bathrooms: do not place outlets above or below the sink, toilet, or shower.
- While placing outlets be aware of how placement may cause draperies and blinds to move. May have to shift outlets to either side of windows.

The Unico System Green Series

Load Short Form
Ahu #1

Job: Project 0811-020 Gabrys
Date: Aug 24, 2011
By: Victor Carroll

Project Information

For: Tom Vincent

Design Information

	Htg	Clg
Outside db (°F)	6	89
Inside db (°F)	70	75
Design TD (°F)	64	14
Daily range	-	M
Inside humidity (%)	30	50
Moisture difference (gr/lb)	28	44

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	2 (Average)

HEATING EQUIPMENT

Make		
Trade		
Model		
AHRI ref no.		
Efficiency	0 HSPF	
Heating input		
Heating output	0	Btuh @ 47°F
Temperature rise	0	°F
Actual air flow	1000	cfm
Air flow factor	0.022	cfm/Btuh
Static pressure	0	in H2O
Space thermostat		

COOLING EQUIPMENT

Make		
Trade		
Cond		
Coil		
AHRI ref no.		
Efficiency	0 SEER	
Sensible cooling	0	Btuh
Latent cooling	0	Btuh
Total cooling	0	Btuh
Actual air flow	1000	cfm
Air flow factor	0.035	cfm/Btuh
Static pressure	0	in H2O
Load sensible heat ratio	0.86	

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Lau	42	548	814	12	28
Room13	192	1851	727	40	25
Room8	52	0	0	0	0
master bath	192	4968	5025	108	175
Bath	33	134	79	3	3
Kltchen	353	4580	4319	100	151
Room5	27	0	0	0	0
clo2	55	299	176	7	6
Room3	42	0	0	0	0
clo1	38	931	294	20	10
Master Bed	390	10709	6332	234	221
pantry	21	0	0	0	0
Room36	47	0	0	0	0
Cedar	36	0	0	0	0
Room37	348	11574	5233	253	182
Dining	158	3479	2648	76	92

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Great room		460	5256	2320	115	81
Foyer		68	1483	715	32	25
Ahu #1	d	2552	45813	28681	1000	1000
Other equip loads			4472	995		
Equip. @ 0.94 RSM				27955		
Latent cooling				4986		
TOTALS		2552	50285	32941	1000	1000

The Unico System Green Series

Load Short Form
Ahu #2

Job: Project 0811-020 Gabrys
Date: Aug 24, 2011
By: Victor Carroll

Project Information

For: Tom Vincent

Design Information

	Htg	Clg
Outside db (°F)	6	89
Inside db (°F)	70	75
Design TD (°F)	64	14
Daily range	-	M
Inside humidity (%)	30	50
Moisture difference (gr/lb)	28	44

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	2 (Average)

HEATING EQUIPMENT

Make		
Trade		
Model		
AHRI ref no.		
Efficiency	0 HSPF	
Heating input		
Heating output	0	Btuh @ 47°F
Temperature rise	0	°F
Actual air flow	1000	cfm
Air flow factor	0.021	cfm/Btuh
Static pressure	0	in H2O
Space thermostat		

COOLING EQUIPMENT

Make		
Trade		
Cond		
Coil		
AHRI ref no.		
Efficiency	0 SEER	
Sensible cooling	0	Btuh
Latent cooling	0	Btuh
Total cooling	0	Btuh
Actual air flow	1000	cfm
Air flow factor	0.034	cfm/Btuh
Static pressure	0	in H2O
Load sensible heat ratio	0.85	

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Room17	40	120	96	3	3
Room18	48	125	100	3	3
bath1	60	1952	1209	42	42
Bed1	161	2127	2229	46	77
Room21	38	0	0	0	0
Study	204	4050	3997	87	137
Room23	98	270	216	6	7
bed2	159	4338	2932	93	101
bath2	64	1270	1045	27	36
Room26	40	1624	703	35	24
Room27	236	9328	6422	200	221
Storage	240	0	0	0	0
Mech	430	0	0	0	0
Room31	47	0	0	0	0
Bath3	60	1987	1287	43	44
Room33	88	3627	790	78	27

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Sun room		716	15856	8043	340	277
Ahu #2	d	2727	46675	29068	1000	1000
Other equip loads			4442	989		
Equip. @ 0.94	RSM			28313		
Latent cooling				5251		
TOTALS		2727	51117	33564	1000	1000

Project Summary
Ahu #1

Job: Project 0811-020 Gabrys
Date: Aug 24, 2011
By: Victor Carroll

Project Information

For: Tom Vincent

Notes: DISCLAIMER

The attached sizing and layout design is for estimation purposes only. The actual size and performance of the system is the responsibility of the installing contractor and design under the specified conditions when properly installed using all of the installation instructions provided by Unico.

Design Information

Weather: Franklin, PA, US

Winter Design Conditions

Outside db	6	°F
Inside db	70	°F
Design TD	64	°F

Summer Design Conditions

Outside db	89	°F
Inside db	75	°F
Design TD	14	°F
Daily range	M	
Relative humidity	50	%
Moisture difference	44	gr/lb

Heating Summary

Structure	36018	Btuh
Ducts	9795	Btuh
Central vent (67 cfm)	4472	Btuh
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	50285	Btuh

Sensible Cooling Equipment Load Sizing

Structure	20813	Btuh
Ducts	7868	Btuh
Central vent (67 cfm)	995	Btuh
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	0.94	
Equipment sensible load	27955	Btuh

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	2 (Average)

	Heating	Cooling
Area (ft²)	2552	2552
Volume (ft³)	20418	20418
Air changes/hour	0.30	0.14
Equiv. AVF (cfm)	103	49

Latent Cooling Equipment Load Sizing

Structure	1374	Btuh
Ducts	1713	Btuh
Central vent (67 cfm)	1899	Btuh
Equipment latent load	4986	Btuh
Equipment total load	32941	Btuh
Req. total capacity at 0.70 SHR	3.3	ton

Heating Equipment Summary

Make		
Trade		
Model		
AHRI ref no.		
Efficiency	0	HSPF
Heating input		
Heating output	0	Btuh @ 47°F
Temperature rise	0	°F
Actual air flow	1000	cfm
Air flow factor	0.022	cfm/Btuh
Static pressure	0	in H2O
Space thermostat		

Cooling Equipment Summary

Make		
Trade		
Cond		
Coil		
AHRI ref no.		
Efficiency	0	SEER
Sensible cooling	0	Btuh
Latent cooling	0	Btuh
Total cooling	0	Btuh
Actual air flow	1000	cfm
Air flow factor	0.035	cfm/Btuh
Static pressure	0	in H2O
Load sensible heat ratio	0.86	

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

The Unico System Green Series

Project Summary
Ahu #2

Job: Project 0811-020 Gabrys
Date: Aug 24, 2011
By: Victor Carroll

Project Information

For: Tom Vincent

Notes: DISCLAIMER

The attached sizing and layout design is for estimation purposes only. The actual size and performance of the system is the responsibility of the installing contractor and design under the specified conditions when properly installed using all of the installation instructions provided by Unico.

Design Information

Weather: Franklin, PA, US

Winter Design Conditions

Outside db	6	°F
Inside db	70	°F
Design TD	64	°F

Summer Design Conditions

Outside db	89	°F
Inside db	75	°F
Design TD	14	°F
Daily range	M	
Relative humidity	50	%
Moisture difference	44	gr/lb

Heating Summary

Structure	36560	Btuh
Ducts	10115	Btuh
Central vent (67 cfm)	4442	Btuh
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	51117	Btuh

Sensible Cooling Equipment Load Sizing

Structure	20953	Btuh
Ducts	8115	Btuh
Central vent (67 cfm)	989	Btuh
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	0.94	
Equipment sensible load	28313	Btuh

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	2 (Average)

	Heating	Cooling
Area (ft²)	2727	2727
Volume (ft³)	21814	21814
Air changes/hour	0.33	0.16
Equiv. AVF (cfm)	121	57

Latent Cooling Equipment Load Sizing

Structure	1602	Btuh
Ducts	1762	Btuh
Central vent (67 cfm)	1886	Btuh
Equipment latent load	5251	Btuh
Equipment total load	33564	Btuh
Req. total capacity at 0.70 SHR	3.4	ton

Heating Equipment Summary

Make		
Trade		
Model		
AHRI ref no.		
Efficiency	0	HSPF
Heating input		
Heating output	0	Btuh @ 47°F
Temperature rise	0	°F
Actual air flow	1000	cfm
Air flow factor	0.021	cfm/Btuh
Static pressure	0	in H2O
Space thermostat		

Cooling Equipment Summary

Make		
Trade		
Cond		
Coil		
AHRI ref no.		
Efficiency	0	SEER
Sensible cooling	0	Btuh
Latent cooling	0	Btuh
Total cooling	0	Btuh
Actual air flow	1000	cfm
Air flow factor	0.034	cfm/Btuh
Static pressure	0	in H2O
Load sensible heat ratio	0.85	

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Parts Pull Order

Job: Project 0811-020 Gabrys
Date: Aug 24, 2011
By: Victor Carroll

BILL TO:

Attn:

Phone:
Fax:

Notes:

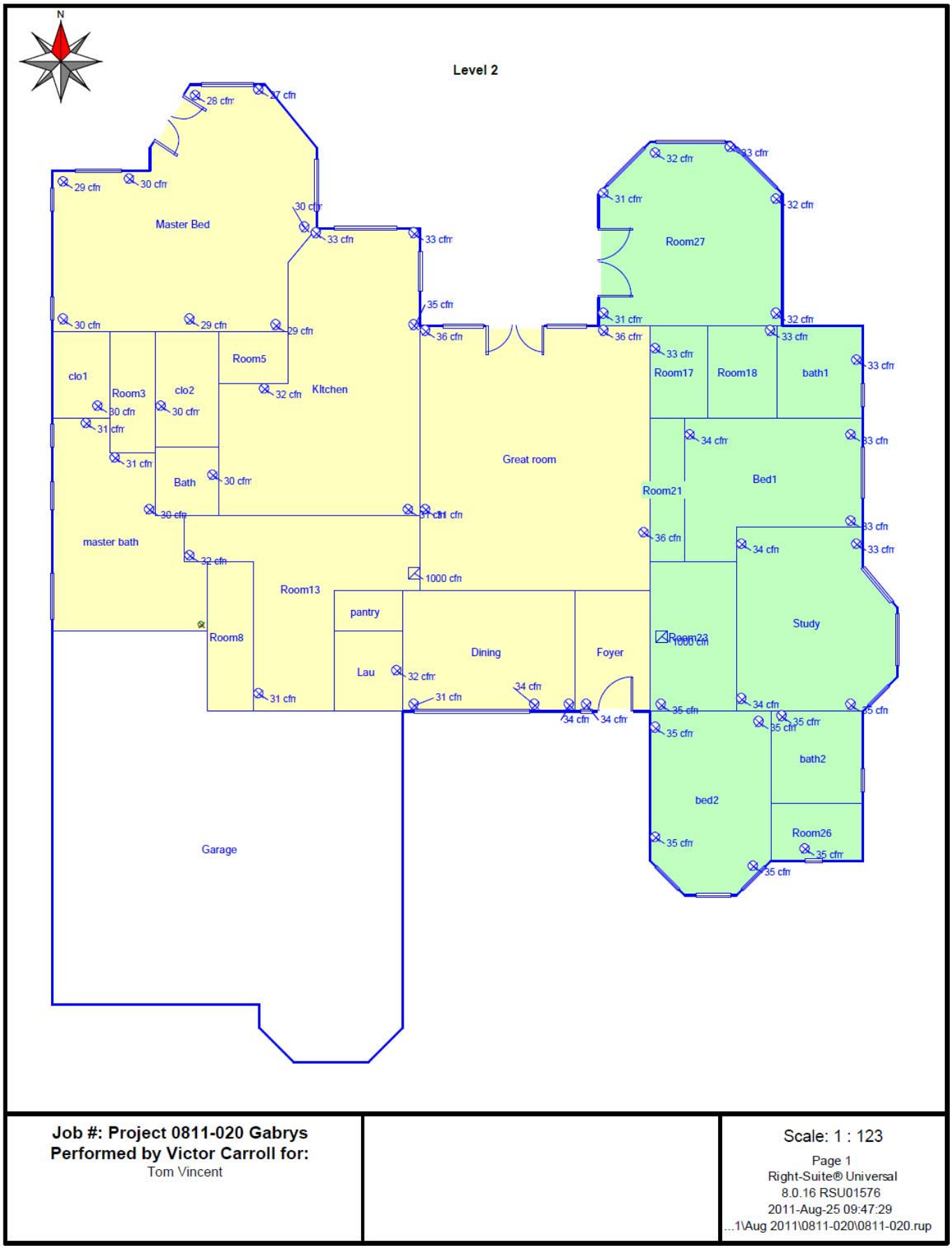
SHIP TO:

Attn:

Phone:
Fax:

Order date	Ordered by	Purchase order #	Date required	Ship via

Src	Part #	Description	Qty	Total pieces	Qty issued	Qty returned	
		Ahu #1					
UNC	M4860BL1-EC2	Module Blower with S.M.A.R.T. Control Board and E..	1.0	1.0			
UNC	MC4860 HX	Module, H Coil. Includes Spacer)	1.0	1.0			
UNC	MV 4860	Module Vertical Plenum with Filters	1.0	1.0			
UNC	UPC- 01- 4860	Return Air Box with Grille and Filter, 24"x30"	1.0	1.0			
UNC	UPC- 61- 4860	Adapter Supply Round 10"	1.0	1.0			
UNC	UPC-04- 4860	Return Air Duct. R-4.2 20"x 10'	1.0	1.0			
UNC	UPC-104 -4860	Return Air Adapter fits MV4860 MH 3660 for 20' duct	1.0	1.0			
UNC	WON2002	Furnace, Electric, 20 kW (matches 3642, 4860)**	1.0	1.0			
UNC	UPC-25-4	Supply Tubing, Aluminum, 2" ID x 25'L	1.0	4.0			
UNC	UPC-26C-6	Sound Attenuator Tubing, 2" ID x 12'L	6.0	36.0			
UNC	UPC-89M-6	Installation Kit, Metal Plenum (6 outlets)	6.0	36.0			
UNC	USM-13	10" OD, 28GA. Duct,5' LG	4.0	40.0			
UNC	USM-14	10" Elbow	1.0	4.0			
UNC	USM-15	10"x10"x10" Metal tee	1.0	4.0			
UNC	USM-16	10"x1" Insul.Sleeve	4.0	60.0			
UNC	USM-18	10" End CAps	1.0	12.0			
		Ahu #2					
UNC	M4860BL1-EC2	Module Blower with S.M.A.R.T. Control Board and E..	1.0	1.0			
UNC	MC4860 HX	Module, H Coil. Includes Spacer)	1.0	1.0			
UNC	MV 4860	Module Vertical Plenum with Filters	1.0	1.0			
UNC	UPC- 01- 4860	Return Air Box with Grille and Filter, 24"x30"	1.0	1.0			
UNC	UPC- 61- 4860	Adapter Supply Round 10"	1.0	1.0			
UNC	UPC-04- 4860	Return Air Duct. R-4.2 20"x 10'	1.0	1.0			
UNC	UPC-104 -4860	Return Air Adapter fits MV4860 MH 3660 for 20' duct	1.0	1.0			
UNC	WON2002	Furnace, Electric, 20 kW (matches 3642, 4860)**	1.0	1.0			
UNC	UPC-26C-6	Sound Attenuator Tubing, 2" ID x 12'L	6.0	36.0			
UNC	UPC-89M-6	Installation Kit, Metal Plenum (6 outlets)	6.0	36.0			
UNC	USM-13	10" OD, 28GA. Duct,5' LG	3.0	30.0			
UNC	USM-14	10" Elbow	1.0	4.0			
UNC	USM-15	10"x10"x10" Metal tee	1.0	4.0			
UNC	USM-16	10"x1" Insul.Sleeve	3.0	45.0			
UNC	USM-18	10" End CAps	1.0	12.0			



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Performed by Victor Carroll for:
Tom Vincent

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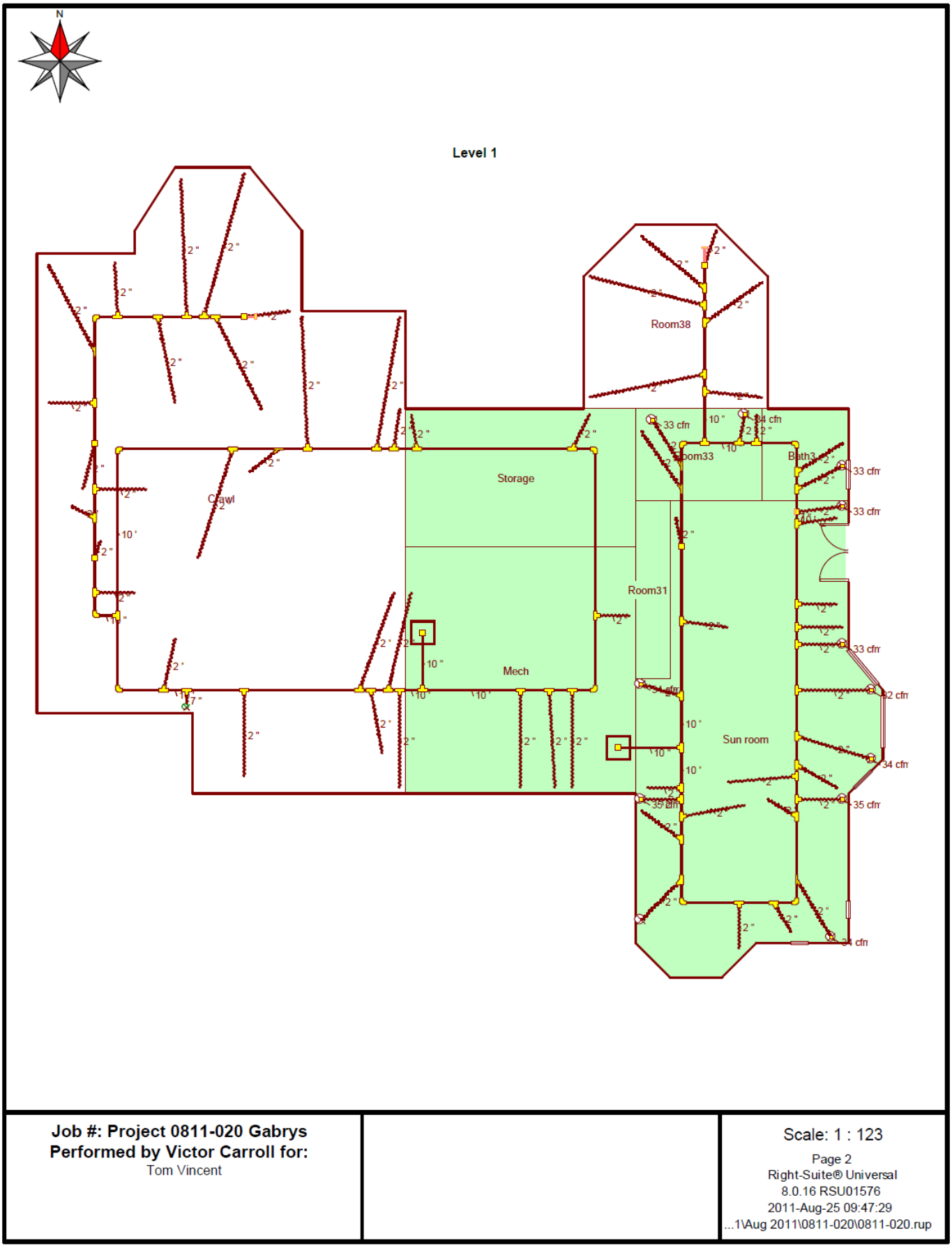

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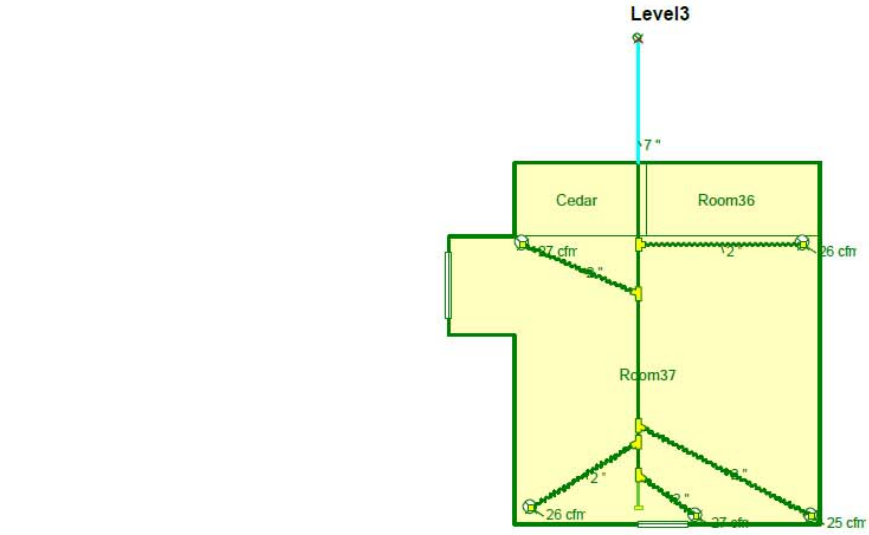

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