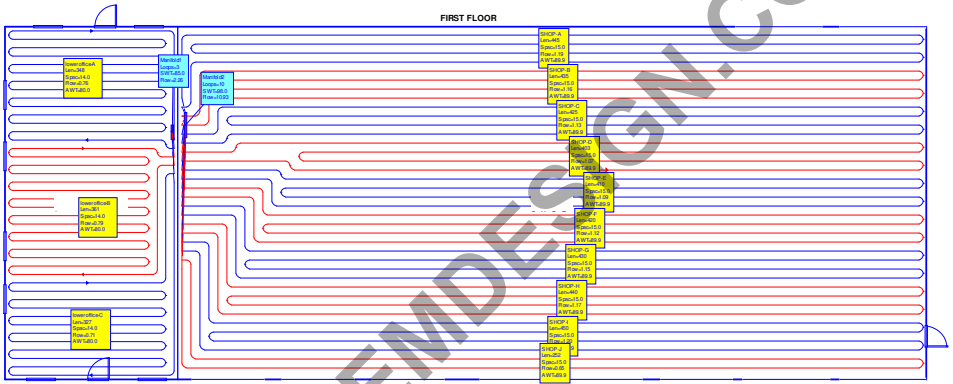




FIRST FLOOR



**Job #:**  
**Performed by Bobby Blough for:**

Fort Collins, Co 80524

**B&B System Design**

Vineland, NJ 08361

Scale: 1 : 213

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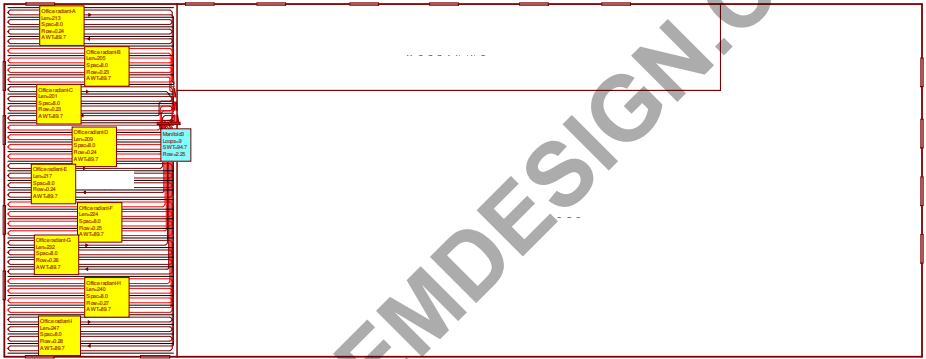
24.0.03 RSU64913

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...ednarik\2034 Vista Shores Ct.rup



SECOND FLOOR



**Job #:**  
**Performed by Bobby Blough for:**

Fort Collins, Co 80524

**B&B System Design**

Vineland, NJ 08361

Scale: 1 : 213

Page 2

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# Radiant Heating Tubing Requirements

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:  
Fort Collins, Co 80524

### Tubing Requirements

BBSYSTEMDESIGN.COM

# Radiant Heating Design Summary

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For: Fort Collins, Co 80524

### Design Information

Total floor area:	7448 ft <sup>2</sup>	Fluid:	Water
Radiantly heated area:	7448 ft <sup>2</sup>	Design temperature:	5 °F
Total panel area:	7448 ft <sup>2</sup>	Maximum supply temperature:	98 °F
Total tubing area:	7436 ft <sup>2</sup>	Total flow rate:	15.44 gpm
Total room load:	94591 Btuh	Maximum head loss:	11.31 ft H <sub>2</sub> O
Total panel output:	94591 Btuh	Total tubing required:	7135 ft
Total supplemental heat:	0 Btuh	Zones 1, Loops 22, Manifolds 3, Actuators 0, Zone Pumps 0, System Pumps 0, Mixing Valves 0, Injection Pumps 0	
Total back loss:	15507 Btuh		
Boiler output required:	110098 Btuh		

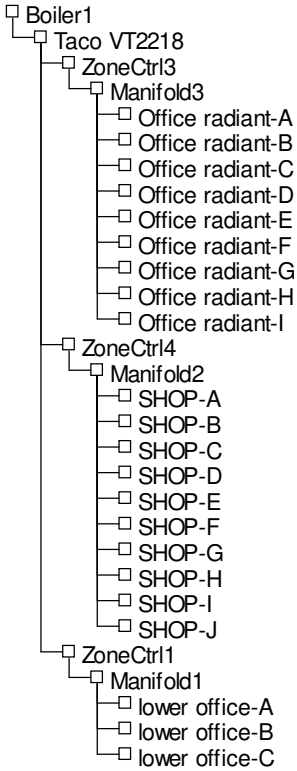
### Space Heating Information

Room name	Room area (ft <sup>2</sup> )	Air temp (°F)	Room load (Btuh)	Supp. heat (Btuh)	F/C	Panel area (ft <sup>2</sup> )	Tubing area (ft <sup>2</sup> )	Surf. temp. (°F)	Deliv. temp. (°F)	Panel output (Btuh /ft <sup>2</sup> )	Back loss (Btuh /ft <sup>2</sup> )
lower office	1176	70	8907	0	F	1176	1170	74	85	7.6	2.0
Office radiant	1176	70	10057	0	F	1176	1170	75	95	8.6	1.0
SHOP	5096	70	75627	0	F	5096	5096	79	98	14.8	2.4
<b>Totals</b>	<b>7448</b>		<b>94591</b>	<b>0</b>		<b>7448</b>	<b>7436</b>				

### Hydronic Devices

Device Name	Device type	Load (Btuh)	Flow (gpm)	Head (ft H <sub>2</sub> O)	S/R tubing or Size,Cv	SWT Req. (°F)	SWT Spld (°F)
Manifold3	Manifold	11199	2.2	2.16	1" BPEX	95	120
Manifold1	Manifold	11296	2.3	3.09	1" PEX	85	120
Manifold2	Manifold	87603	10.9	11.31	1" COPPER	98	120
ZoneCtrl3	Zone Valve	11199	2.2	0		95	120
ZoneCtrl4	Zone Valve	87603	10.9	0		98	120
ZoneCtrl1	Zone Valve	11296	2.3	0		85	120
Taco VT21218	Primary Pump	110098	22.3	1.95	1-1/4" COPPER	120	120

# Hydronic Navigator Tree



BBSYSTEMDESIGN.COM

# Pump Sizing Report

Taco VT2218

B&B System Design

Job:

Date: Dec 05, 2024

By: Bobby Blough

Vineland, NJ 08361

## Project Information

For:

Fort Collins, Co 80524

## Piping

Name	Tube size / type	Fluid	Num ftgs	1 Ftg EqLen	Ftg Cv	PipeLen (ft)	TotLen (ft)	Temp (°F)	Flow (gpm)	Head (ft H2O)
Pump piping	1-1/4" COPPER	Water	0	0	0	20	20	115	22.3	1.56

## Pump Information

Make  
Model

Flow (gpm) 22.3  
Add Head (ft H2O) 0.4  
Head (ft H2O) 1.9

**NOTE: All pipe sections assumed to be connected in series**

# Radiant Heating Manifold Summary

Job:

Date: Dec 05, 2024

By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:

Fort Collins, Co 80524

Manifold name: Manifold3  
 Manifold location: SECOND FLOOR

	Loop number							
	1	2	3	4	5	6	7	8
<b>Name</b>	Office radiant-A	Office radiant-B	Office radiant-C	Office radiant-D	Office radiant-E	Office radiant-F	Office radiant-G	Office radiant-H
<b>Heating zone</b>	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House
<b>Heated area (ft<sup>2</sup>)</b>	126	121	119	123	128	133	137	142
<b>Room temperature (°F)</b>	70	70	70	70	70	70	70	70
<b>Cover R (ft<sup>2</sup>-°F/Btuh)</b>	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
<b>Surface temperature (°F)</b>	75	75	75	75	75	75	75	75
<b>Radiant panel CST</b>	43A0	43A0	43A0	43A0	43A0	43A0	43A0	43A0
<b>Radiant panel type</b>	T-Fin plates	T-Fin plates	T-Fin plates	T-Fin plates	T-Fin plates	T-Fin plates	T-Fin plates	T-Fin plates
<b>Tube spacing (in)</b>	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
<b>Tube type/size</b>	1/2" PEX	1/2" PEX	1/2" PEX	1/2" PEX	1/2" PEX	1/2" PEX	1/2" PEX	1/2" PEX
<b>Distance to manifold (ft)</b>	3	3	3	3	3	3	3	3
<b>Loop length (ft)</b>	213	205	201	209	217	224	232	240
<b>Temperature drop (°F)</b>	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
<b>Flow (gpm)</b>	0.24	0.23	0.23	0.24	0.24	0.25	0.26	0.27
<b>Head loss (ft H2O)</b>	0.73	0.66	0.63	0.70	0.78	0.85	0.94	1.03
<b>Supply temperature (°F)</b>	95	95	95	95	95	95	95	95
<b>Balance valve (turns from closed)</b>								

### Totals for Manifold3

S/R tubing	1" BPEX	<b>Total flow (gpm)</b>	2.25
S/R Tubing length(ft)	100	<b>Total panel output (Btuh)</b>	10057
S/R Tubing head loss (ft H2O)	1.04	<b>Total tubing required (ft)</b>	1988
Max loop head loss (ft H2O)	1.12	<b>Max supply temp. (°F)</b>	94.7
Manifold head loss (ft H2O)	0		

# Radiant Heating Manifold Summary

Job:

Date: Dec 05, 2024

By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:

Fort Collins, Co 80524

Manifold name: Manifold3  
 Manifold location: SECOND FLOOR

	Loop number					
	9					
Name	Office radiant-I					
Heating zone	Entire House					
Heated area (ft <sup>2</sup> )	147					
Room temperature (°F)	70					
Cover R (ft <sup>2</sup> -°F/Btuh)	0.54					
Surface temperature (°F)	75					
Radiant panel CST	43A0					
Radiant panel type	T-Fin plates					
Tube spacing (in)	8.0					
Tube type/size	1/2" PEX					
Distance to manifold (ft)	3					
Loop length (ft)	247					
Temperature drop (°F)	10.0					
Flow (gpm)	0.28					
Head loss (ft H2O)	1.12					
Supply temperature (°F)	95					
Balance valve (turns from closed)						

### Totals for Manifold3

S/R tubing	1" BPEX	Total flow (gpm)	2.25
S/R Tubing length(ft)	100	Total panel output (Btuh)	10057
S/R Tubing head loss (ft H2O)	1.04	Total tubing required (ft)	1988
Max loop head loss (ft H2O)	1.12	Max. supply temp. (°F)	94.7
Manifold head loss (ft H2O)	0		



# Radiant Heating Manifold Summary

Job:

Date: Dec 05, 2024

By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:

Fort Collins, Co 80524

Manifold name: Manifold1  
 Manifold location: FIRST FLOOR

	Loop number						
	1	2	3				
Name	lower office-A	lower office-B	lower office-C				
Heating zone	Entire House	Entire House	Entire House				
Heated area (ft <sup>2</sup> )	395	410	371				
Room temperature (°F)	70	70	70				
Cover R (ft <sup>2</sup> -°F/Btuh)	0	0	0				
Surface temperature (°F)	74	74	74				
Radiant panel CST	44A0	44A0	44A0				
Radiant panel type	Slab embedded	Slab embedded	Slab embedded				
Tube spacing (in)	14.0	14.0	14.0				
Tube type/size	3/4" BPEX	3/4" BPEX	3/4" BPEX				
Distance to manifold (ft)	4	4	4				
Loop length (ft)	348	361	327				
Temperature drop (°F)	10.0	10.0	10.0				
Flow (gpm)	0.76	0.79	0.71				
Head loss (ft H2O)	1.81	2.01	1.53				
Supply temperature (°F)	85	85	85				
Balance valve (turns from closed)							

### Totals for Manifold1

S/R tubing	1" PEX	Total flow (gpm)	2.26
S/R Tubing length(ft)	100	Total panel output (Btuh)	8907
S/R Tubing head loss (ft H2O)	1.08	Total tubing required (ft)	1036
Max loop head loss (ft H2O)	2.01	Max supply temp. (°F)	85.0
Manifold head loss (ft H2O)	0		

# Radiant Heating Manifold Summary

Job:

Date: Dec 05, 2024

By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:

Fort Collins, Co 80524

Manifold name: Manifold2  
 Manifold location: FIRST FLOOR

	Loop number							
	1	2	3	4	5	6	7	8
<b>Name</b>	SHOP-A	SHOP-B	SHOP-C	SHOP-D	SHOP-E	SHOP-F	SHOP-G	SHOP-H
<b>Heating zone</b>	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House	Entire House
<b>Heated area (ft<sup>2</sup>)</b>	554	541	528	499	508	521	534	547
<b>Room temperature (°F)</b>	70	70	70	70	70	70	70	70
<b>Cover R (ft<sup>2</sup>-°F/Btuh)</b>	0	0	0	0	0	0	0	0
<b>Surface temperature (°F)</b>	79	79	79	79	79	79	79	79
<b>Radiant panel CST</b>	44A0	44A0	44A0	44A0	44A0	44A0	44A0	44A0
<b>Radiant panel type</b>	Slab embedded	Slab embedded	Slab embedded	Slab embedded	Slab embedded	Slab embedded	Slab embedded	Slab embedded
<b>Tube spacing (in)</b>	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
<b>Tube type/size</b>	3/4" BPEX	3/4" BPEX	3/4" BPEX	3/4" BPEX	3/4" BPEX	3/4" BPEX	3/4" BPEX	3/4" BPEX
<b>Distance to manifold (ft)</b>	8	8	8	8	8	8	8	8
<b>Loop length (ft)</b>	445	435	425	403	410	420	430	440
<b>Temperature drop (°F)</b>	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
<b>Flow (gpm)</b>	1.19	1.16	1.13	1.07	1.09	1.12	1.15	1.17
<b>Head loss (ft H2O)</b>	4.87	4.57	4.28	3.67	3.86	4.14	4.42	4.72
<b>Supply temperature (°F)</b>	98	98	98	98	98	98	98	98
<b>Balance valve (turns from closed)</b>								

### Totals for Manifold2

<b>S/R tubing</b>	<b>1" COPPER</b>	<b>Total flow (gpm)</b>	<b>10.93</b>
<b>S/R Tubing length(ft)</b>	<b>100</b>	<b>Total panel output (Btuh)</b>	<b>75627</b>
<b>S/R Tubing head loss (ft H2O)</b>	<b>6.29</b>	<b>Total tubing required (ft)</b>	<b>4111</b>
<b>Max loop head loss (ft H2O)</b>	<b>5.02</b>	<b>Max supply temp. (°F)</b>	<b>98.0</b>
<b>Manifold head loss (ft H2O)</b>	<b>0</b>		

# Radiant Heating Manifold Summary

Job:

Date: Dec 05, 2024

By: Bobby Blough

## B&B System Design

Vineland, NJ 08361

### Project Information

For:

Fort Collins, Co 80524

Manifold name: Manifold2  
 Manifold location: FIRST FLOOR

	Loop number					
	9	10				
Name	SHOP-I	SHOP-J				
Heating zone	Entire House	Entire House				
Heated area (ft <sup>2</sup> )	560	304				
Room temperature (°F)	70	70				
Cover R (ft <sup>2</sup> -°F/Btuh)	0	0				
Surface temperature (°F)	79	79				
Radiant panel CST	44A0	44A0				
Radiant panel type	Slab embedded	Slab embedded				
Tube spacing (in)	15.0	15.0				
Tube type/size	3/4" BPEX	3/4" BPEX				
Distance to manifold (ft)	8	8				
Loop length (ft)	450	252				
Temperature drop (°F)	16.1	16.1				
Flow (gpm)	1.20	0.65				
Head loss (ft H2O)	5.02	0.96				
Supply temperature (°F)	98	98				
Balance valve (turns from closed)						

### Totals for Manifold2

S/R tubing	1" COPPER	Total flow (gpm)	10.93
S/R Tubing length(ft)	100	Total panel output (Btuh)	75627
S/R Tubing head loss (ft H2O)	6.29	Total tubing required (ft)	4111
Max loop head loss (ft H2O)	5.02	Max supply temp. (°F)	98.0
Manifold head loss (ft H2O)	0		

**Manual S Compliance Report**  
*Entire House*  
**B&B System Design**

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

Vineland, NJ 08361

**Project Information**

For:  
Fort Collins, Co 80524

**Cooling Equipment**

**Design Conditions**

Outdoor design DB:	87.2°F	Sensible gain:	12095 Btuh	Entering coil DB:	0°F
Outdoor design WB:	60.4°F	Latent gain:	0 Btuh	Entering coil WB:	0°F
Indoor design DB:	70.0°F	Total gain:	12095 Btuh		
Indoor RH:	50%	Estimated airflow:	879 cfm		

**Manufacturer's Performance Data at Actual Design Conditions**

Equipment type:		Model:	
Manufacturer:			
Actual airflow:	879 cfm		
Sensible capacity:	0 Btuh	0% of load	
Latent capacity:	0 Btuh	0% of load	
Total capacity:	0 Btuh	0% of load	SHR: 0%

**Heating Equipment**

**Design Conditions**

Outdoor design DB:	4.8°F	Heat loss:	110098 Btuh	Entering coil DB:	70.0°F
Indoor design DB:	70.0°F				

**Manufacturer's Performance Data at Actual Design Conditions**

Equipment type:	Elec boiler	Model:	eb-cx-36
Manufacturer:			
Actual airflow:	0 cfm		
Output capacity:	0 Btuh	0% of load	

Meets all requirements of ACCA Manual S.





# Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)

Form  
RPER 2.0

## Header Information

Contractor B&B System Design  
Mechanical license# Bobby Blough  
Building plan # \_\_\_\_\_  
Home address (Street or Lot#, Block, Subdivision) Entire House

Applicable Attachments  
Manual J1 Form and Worksheet A:  Yes  No  
OEM performance data (heating, cooling, blower):  Yes  No  
Duct distribution sketch:  Yes  No  
IRC Table R301.2 (climate & geographic design criteria)  Yes  No

## HVAC LOAD CALCULATION (IRC M1401.3)

### Manual J Design Criteria and Loads

Location	Summer Design Conditions	Manual J Loads
Elevation 4939 ft	Outdoor Cooling Temp 87 °F	Total Heat Loss 110098 Btuh
Altitude Correction Factor 0.83	Indoor Cooling Temp 70 °F	
Latitude 41 °N	Cooling Temp Diff 17 °F	Sensible Heat Gain 12095 Btuh
	Indoor Summer Design RH 50 %	Latent Heat Gain 0 Btuh
	Coincident Wet Bulb Temp 60 °F	Total Heat Gain 12095 Btuh

### Winter Design Conditions

Outdoor Winter Temp 5 °F  
Indoor Winter Temp 70 °F  
Heating Temp Diff 65 °F

The heat loss/gain was calculated in accordance with ACCA Manual J?  Yes  No

## HVAC EQUIPMENT SELECTION (IRC M1401.3)

### Heating Equipment

Furnace  Boiler  Electric Heat  
 Single Speed  Multi Stage  Modulating

### Cooling Equipment

Air Conditioner  Heat Pump  
 Air-to-Air  Geothermal Open Loop  Geothermal Closed Loop  
 Single Speed  Multi Stage  Variable Speed

Model eb-cx-36  
Output 0 Btuh Sizing Value 110098 Btuh  
Supplemental 0 Btuh Sizing Limit 140.0 %  
Heat Load: Capacity 0 %

Model \_\_\_\_\_  
Sensible 0 Btuh Sizing Value 0 Btuh  
Latent 0 Btuh Sizing Limit 0 %  
Total 0 Btuh Load: Capacity 0 %

Size Factor is within Manual S Size Limit?  Yes  No

Size Factor is within Manual S Size Limit?  Yes  No

## HVAC DUCT DISTRIBUTION DESIGN (IRC M1601.1)

Design airflow 879 cfm	Longest Supply Duct 180 ft	Duct Materials Used
External Static Pressure (ESP) 0 in H2O	Longest Return Duct 159 ft	Trunk Duct: <input type="checkbox"/> Duct Board <input checked="" type="checkbox"/> Sheet Metal
Component Pressure Loss (CPL) 0.25 in H2O	Total Effective Length (TEL) 339 ft	<input type="checkbox"/> Flex <input type="checkbox"/> Lined Sheet Metal <input type="checkbox"/> Other
Available static pressure (ASP) -0.3 in H2O	Friction Rate -0.1 in/100ft	Branch Duct: <input type="checkbox"/> Duct Board <input type="checkbox"/> Sheet Metal
ESP - CPL = ASP	(ASP x 100) / TEL = Friction Rate	<input checked="" type="checkbox"/> Flex <input type="checkbox"/> Lined Sheet Metal <input type="checkbox"/> Other

Ducts are sized per Manual D?  Yes  No

I declare the load calculation, equipment selection, and duct system design were rigorously performed based on the building plan listed above and understand the claims made on these forms may be subject to review and verification.

Contractor's printed name: \_\_\_\_\_

Contractor's signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Load Short Form

## Entire House

### B&B System Design

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

Vineland, NJ 08361

## Project Information

For: Fort Collins, Co 80524

## Design Information

	Htg	Clg		Infiltration
Outside db (°F)	5	87	Method	Simplified
Inside db (°F)	70	70	Construction quality	Semi-tight
Design TD (°F)	65	17	Fireplaces	0
Daily range	-	M		
Inside humidity (%)	50	50		
Moisture difference (gr/lb)	59	-14		

### HEATING EQUIPMENT

Make	
Trade	Electro Industries
Model	eb-cx-36
AHRI ref	
Efficiency	100 AFUE
Heating input	122837 Btuh
Heating output	0 Btuh
Temperature rise	0 °F
Actual air flow	0 cfm
Air flow factor	0 cfm/Btuh
Static pressure	0 in H2O
Space thermostat	

### COOLING EQUIPMENT

Make	n/a
Trade	n/a
Cond	n/a
Coil	n/a
AHRI ref	n/a
Efficiency	n/a
Sensible cooling	0 Btuh
Latent cooling	0 Btuh
Total cooling	0 Btuh
Actual air flow	879 cfm
Air flow factor	0.073 cfm/Btuh
Static pressure	0 in H2O
Load sensible heat ratio	1.00

ROOM NAME	Area (ft <sup>2</sup> )	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
lower office	1176	8907	5808	0	422
Office radiant	1176	10057	6287	0	457
SHOP	5096	75627	0	0	0
Entire House	d 7448	94591	12095	0	879
Other equip loads		15507	0		
Equip. @ 0.92 RSM			11151		
Latent cooling			0		
<b>TOTALS</b>	<b>7448</b>	<b>110098</b>	<b>11151</b>	<b>0</b>	<b>879</b>

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



wrightsoft®  
A B&B System Design Company

Right-Suite® Universal 2024 24.0.03 RSU64913

2024-Dec-29 10:11:39

...DO:1.FINISHED\bednarik\2034 Vista Shores Ct.rup Calc = MJ8 Front Door faces: SW

Page 1

# Building Analysis

## Entire House

### B&B System Design

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

Vineand, NJ 08361

## Project Information

For: Fort Collins, Co 80524

## Design Conditions

### Location:

Fort Collins, CO, US  
Elevation: 4939 ft  
Latitude: 41°N

### Outdoor:

Drybulb (°F)  
Daily range (°F)  
Wet bulb (°F)  
Wind speed (mph)

### Heating

5  
-  
-  
15.0

### Cooling

87  
25 ( M )  
60  
7.5

### Indoor:

Indoor temperature (°F)  
Design TD (°F)  
Relative humidity (%)  
Moisture difference (gr/lb)

### Heating

70  
65  
50  
59.1

### Cooling

70  
17  
50  
-14.2

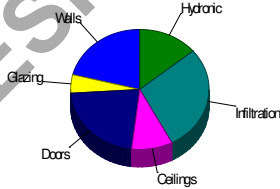
### Infiltration:

Method  
Construction quality  
Fireplaces

Simplified  
Semi-tight  
0

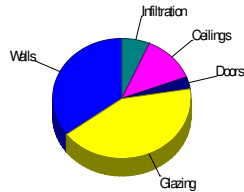
## Heating

Component	Btuh/ft²	Btuh	% of load
Walls	3.7	23382	21.0
Glazing	19.6	5513	5.0
Doors	19.9	24609	22.1
Ceilings	1.7	10632	9.6
Floors	0	0	0
Infiltration	4.5	31597	28.4
Ducts		0	0
Piping		15507	13.9
Humidification		0	0
Ventilation		0	0
Adjustments		-1142	
<b>Total</b>		<b>110098</b>	<b>100.0</b>



## Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	0.7	4258	35.2
Glazing	18.2	5132	42.4
Doors	0.3	389	3.2
Ceilings	0.2	1527	12.6
Floors	0	0	0
Infiltration	0.1	789	6.5
Ducts		0	0
Ventilation		0	0
Internal gains		0	0
Blower		0	0
Adjustments		0	0
<b>Total</b>		<b>12095</b>	<b>100.0</b>



Latent Cooling Load = 0 Btuh

Overall U-value = 0.047 Btuh/ft²·°F, Window / Floor Area = 3.8 %

WARNING: window to floor area ratio = 3.8% - less than 5%.

**Component Constructions**  
*Entire House*  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

**Project Information**

For: Fort Collins, Co 80524

**Design Conditions**

<b>Location:</b>		<b>Indoor:</b>		<b>Heating</b>	<b>Cooling</b>
Fort Collins, CO, US		Indoor temperature (°F)		70	70
Elevation: 4939 ft		Design TD (°F)		65	17
Latitude: 41°N		Relative humidity (%)		50	50
		Moisture difference (gr/lb)		59.1	-14.2
<b>Outdoor:</b>	<b>Heating</b>	<b>Cooling</b>	<b>Infiltration:</b>		
Drybulb (°F)	5	87	Method	Simplified	
Daily range (°F)	-	25 (M)	Construction quality	Semi-tight	
Wet bulb (°F)	-	60	Fireplaces	0	
Wind speed (mph)	15.0	7.5			

**Construction descriptions**

	Or	Area	U-value	Ins ul R	Htg HTM	Loss Clg HTM	Gain
		ft²	Btuh/ft²·F	ft²·F/Btuh	Btuh/ft²	Btuh	Btuh/ft²
<b>Walls</b>							
12F-0sw: Frm wall, mtl ext, 3/8" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x4" wood frm, 16" o.c. stud	ne	2186	0.065	21.0	4.24	9262 0.16	342
	se	970	0.065	21.0	4.24	4111 0	0
	sw	1625	0.065	21.0	4.24	6885 0.20	330
	nw	737	0.065	21.0	4.24	3123 0.99	731
	all	5517	0.065	21.0	4.24	23382 0.25	1403
<b>Partitions</b>							
16A-19ad: Knee wall, asphalt shingles roof mat, r-18 roof ins, r-19 kw ins, 1/2" gypsum board int fnsh		833	0.049	19.0	0	0 3.43	2855
<b>Windows</b>							
2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr innr, 1/4" gap, 1/8" thk; 2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.25); 6.67 ft head ht	ne	94	0.300	0	19.6	1839 9.21	866
	se	38	0.300	0	19.6	743 0	0
	sw	54	0.300	0	19.6	1053 25.0	1344
	nw	96	0.300	0	19.6	1878 20.6	1980
	all	282	0.300	0	19.6	5513 14.9	4189
<b>Doors</b>							
11N0: Door, mtl eps core type	ne	21	0.350	8.7	22.8	479 9.26	194
	se	21	0.350	8.7	22.8	479 0	0
	sw	21	0.350	8.7	22.8	479 9.26	194
	all	63	0.350	8.7	22.8	1438 6.17	389
11N0: Door, ovhd mtl, eps core type	ne	144	0.350	8.7	22.8	3286 0	0
	sw	100	0.350	8.7	22.8	2282 0	0
	all	244	0.350	8.7	22.8	5568 0	0
11P0: Door, ovhd mtl, pur core type	ne	143	0.290	10.5	18.9	2704 0	0
	sw	788	0.290	10.5	18.9	14900 0	0
	all	931	0.290	10.5	18.9	17603 0	0
<b>Ceilings</b>							
16B-38ad: Attic ceiling, asphalt shingles roof mat, r-38 cell ins, 1/2" gypsum board int fnsh		6272	0.026	38.0	1.70	10632 0.24	1527



**Floors**

43A0: Radiant panel over room, 3/4" ply subflr, staple up T-Fin heat xfer plates	1176	0	0	0	0	0	0
44A0: Radiant panel, concrete slab on grade, embedded tubing	6272	0	0	0	0	0	0

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**Component Constructions**  
*lower office*  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

**Project Information**

For: Fort Collins, Co 80524

**Design Conditions**

<b>Location:</b>		<b>Indoor:</b>		<b>Heating</b>	<b>Cooling</b>
Fort Collins, CO, US		Indoor temperature (°F)		70	70
Elevation: 4939 ft		Design TD (°F)		65	17
Latitude: 41°N		Relative humidity (%)		50	50
		Moisture difference (gr/lb)		59.1	-14.2
<b>Outdoor:</b>	<b>Heating</b>	<b>Cooling</b>	<b>Infiltration:</b>		
Drybulb (°F)	5	87	Method	Simplified	
Daily range (°F)	-	25 ( M )	Construction quality	Semi-tight	
Wet bulb (°F)	-	60	Fireplaces	0	
Wind speed (mph)	15.0	7.5			

**Construction descriptions**

	Or	Area	U-value	Ins ul R	Htg HTM	Loss	Clg HTM	HTM	Gain
		ft²	Btuh/ft²·F	ft²·F/Btuh	Btuh/ft²	Btuh	Btuh/ft²	Btuh	Btuh
<b>Walls</b>									
12F-0sw: Frm wall, mtl ext, 3/8" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x4" wood frm, 16" o.c. stud	ne	165	0.065	21.0	4.24	699	0.99	164	
	sw	165	0.065	21.0	4.24	701	0.99	164	
	nw	393	0.065	21.0	4.24	1666	0.99	390	
	all	723	0.065	21.0	4.24	3066	0.99	717	
<b>Partitions</b>									
16A-19ad: Knee wall, asphalt shingles roof mat, r-18 roof ins, r-19 kw ins, 1/2" gypsum board int fnsh		441	0.049	19.0	0	0	3.43	1512	
<b>Windows</b>									
2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr inner, 1/4" gap, 1/8" thk: 2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr inner, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.25); 6.67 ft head ht	ne	30	0.300	0	19.6	587	20.6	619	
	sw	30	0.300	0	19.6	579	25.0	738	
	nw	48	0.300	0	19.6	939	20.6	990	
	all	108	0.300	0	19.6	2104	21.8	2347	
<b>Doors</b>									
11N0: Door, mtl eps core type	ne	21	0.350	8.7	22.8	479	9.26	194	
	sw	21	0.350	8.7	22.8	479	9.26	194	
	all	42	0.350	8.7	22.8	958	9.26	389	
<b>Ceilings</b> (none)									
<b>Floors</b>									
44A0: Radiant panel, concrete slab on grade, embedded tubing		1176	0	0	0	0	0	0	



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**Component Constructions**  
*Office radiant*  
**B&B System Design**

Job:  
 Date: Dec 05, 2024  
 By: Bobby Blough

Vineyard, NJ 08361

**Project Information**

For: Fort Collins, Co 80524

**Design Conditions**

<b>Location:</b>		<b>Indoor:</b>		<b>Heating</b>	<b>Cooling</b>
Fort Collins, CO, US		Indoor temperature (°F)		70	70
Elevation: 4939 ft		Design TD (°F)		65	17
Latitude: 41°N		Relative humidity (%)		50	50
<b>Outdoor:</b>	<b>Heating</b>	<b>Cooling</b>	Moisture difference (gr/lb)		
Drybulb (°F)	5	87	59.1		
Daily range (°F)	-	25 ( M )			
Wet bulb (°F)	-	60			
Wind speed (mph)	15.0	7.5			
		<b>Infiltration:</b>		Simplified	
		Method		Semi-tight	
		Construction quality		0	
		Fireplaces		0	

**Construction descriptions**

	Or	Area	U-value	Ins ul R	Htg HTM	Loss	Clg HTM	HTM	Gain
		ft²	Btu/h·ft²·F	ft²·F/Btu/h	Btu/h/ft²	Btu/h	Btu/h/ft²	Btu/h	Btu/h
<b>Walls</b>									
12F-0sw: Frm wall, mtl ext, 3/8" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x4" wood frm, 16" o.c. stud	ne	180	0.065	21.0	4.24	763	0.99	178	
	sw	168	0.065	21.0	4.24	711	0.99	166	
	nw	344	0.065	21.0	4.24	1458	0.99	341	
	all	692	0.065	21.0	4.24	2932	0.99	686	
<b>Partitions</b>									
16A-19ad: Knee wall, asphalt shingles roof mat, r-18 roof ins, r-19 kw ins, 1/2" gypsum board int fnsh		392	0.049	19.0	0	0	3.43	1344	
<b>Windows</b>									
2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr inner, 1/4" gap, 1/8" thk; 2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr inner, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.25); 6.67 ft head ht	ne	12	0.300	0	19.6	235	20.6	247	
	sw	24	0.300	0	19.6	474	25.0	605	
	nw	48	0.300	0	19.6	939	20.6	990	
	all	84	0.300	0	19.6	1648	21.9	1843	
<b>Doors</b>									
(none)									
<b>Ceilings</b>									
16B-38ad: Attic ceiling, asphalt shingles roof mat, r-38 cel ins, 1/2" gypsum board int fnsh		1176	0.026	38.0	1.70	1994	1.30	1527	
<b>Floors</b>									
43A0: Radiant panel over room; 3/4" ply subflr, staple up T-Fin heat xfer plates		1176	0	0	0	0	0	0	



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**Component Constructions**  
**SHOP**  
**B&B System Design**

Job:  
 Date: Dec 05, 2024  
 By: Bobby Blough

Vineland, NJ 08361

**Project Information**

For: Fort Collins, Co 80524

**Design Conditions**

<b>Location:</b>		<b>Indoor:</b>		<b>Heating</b>	<b>Cooling</b>
Fort Collins, CO, US		Indoor temperature (°F)		70	70
Elevation: 4939 ft		Design TD (°F)		65	17
Latitude: 41°N		Relative humidity (%)		50	50
		Moisture difference (gr/lb)		59.1	-14.2
<b>Outdoor:</b>	<b>Heating</b>	<b>Cooling</b>	<b>Infiltration:</b>		
Drybulb (°F)	5	87	Method	Simplified	
Daily range (°F)	-	25 ( M )	Construction quality	Semi-tight	
Wet bulb (°F)	-	60	Fireplaces	0	
Wind speed (mph)	15.0	7.5			

**Construction descriptions**

	Or	Area ft²	U-value Btuh/ft²·F	Ins ul R ft²·F/Btuh	Htg HTM Btuh/ft²	Loss Clg HTM Btuh	Btuh/ft²	Gain Btuh
<b>Walls</b>								
12F-0sw: Frm wall, mtl ext, 3/8" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x4" wood frm, 16" o.c. stud	ne	1841	0.065	21.0	4.24	7800	0	0
	se	970	0.065	21.0	4.24	4111	0	0
	sw	1292	0.065	21.0	4.24	5473	0	0
	all	4102	0.065	21.0	4.24	17384	0	0
<b>Partitions</b>								
(none)								
<b>Windows</b>								
2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr innr, 1/4" gap, 1/8" thk; 2 glazing, clr low-e outr, argon gas, insulated vinyl frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.25); 6.67 ft head ht	ne	52	0.300	0	19.6	1017	0	0
	se	38	0.300	0	19.6	743	0	0
	all	90	0.300	0	19.6	1760	0	0
<b>Doors</b>								
11N0: Door, mtl eps core type	se	21	0.350	8.7	22.8	479	0	0
11N0: Door, ovhd mtl, eps core type	ne	144	0.350	8.7	22.8	3286	0	0
	sw	100	0.350	8.7	22.8	2282	0	0
	all	244	0.350	8.7	22.8	5568	0	0
11P0: Door, ovhd mtl, pur core type	ne	143	0.290	10.5	18.9	2704	0	0
	sw	788	0.290	10.5	18.9	14900	0	0
	all	931	0.290	10.5	18.9	17603	0	0
<b>Ceilings</b>								
16B-38ad: Attic ceiling, asphalt shingles roof mat, r-38 cell ins, 1/2" gypsum board int fnsh		5096	0.026	38.0	1.70	8639	0	0
<b>Floors</b>								
44A0: Radiant panel, concrete slab on grade, embedded tubing		5096	0	0	0	0	0	0



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# Project Summary

## Entire House

### B&B System Design

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

Vineland, NJ 08361

## Project Information

For: Fort Collins, Co 80524

Notes:

## Design Information

Weather: Fort Collins, CO, US

### Winter Design Conditions

Outside db	5 °F
Inside db	70 °F
Design TD	65 °F

Ventilation Method MJ8

### Heating Summary

Structure	94591 Btuh
Ducts	0 Btuh
Central vent (0 cfm)	0 Btuh
Humidification	0 Btuh
Piping	15507 Btuh
Equipment load	110098 Btuh

### Infiltration

Method	Simplified
Construction quality	Semi-tight
Fireplaces	0

	Heating	Cooling
Area (ft <sup>2</sup> )	7448	2352
Volume (ft <sup>3</sup> )	126787	19992
Air changes/hour	0.25	0.15
Equiv. AVF (cfm)	528	50

### Heating Equipment Summary

Make	
Trade	Electro Industries
Model	eb-cx-36
AHRI ref	
Efficiency	100 AFUE
Heating input	122837 Btuh
Heating output	0 Btuh
Temperature rise	0 °F
Actual air flow	0 cfm
Air flow factor	0 cfm/Btuh
Static pressure	0 in H2O
Space thermostat	

### Summer Design Conditions

Outside db	87 °F
Inside db	70 °F
Design TD	17 °F
Daily range	M
Relative humidity	50 %
Moisture difference	-14 gr/lb

### Sensible Cooling Equipment Load Sizing

Structure	12095 Btuh
Ducts	0 Btuh
Central vent (0 cfm)	0 Btuh
Blower	0 Btuh
Use manufacturer's data	n
Rate/swing multiplier	0.92
Equipment sensible load	11151 Btuh

### Latent Cooling Equipment Load Sizing

Structure	-402 Btuh
Ducts	0 Btuh
Central vent (0 cfm)	0 Btuh
Equipment latent load	0 Btuh

<b>Equipment Total Load (Sen+Lat)</b>	11151 Btuh
Req. total capacity at 0.70 SHR	1.3 ton

### Cooling Equipment Summary

Make	n/a
Trade	n/a
Cond	n/a
Coil	n/a
AHRI ref	n/a
Efficiency	n/a
Sensible cooling	0 Btuh
Latent cooling	0 Btuh
Total cooling	0 Btuh
Actual air flow	879 cfm
Air flow factor	0.073 cfm/Btuh
Static pressure	0 in H2O
Load s ensib le heat ratio	1.00

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



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# AED Assessment

## Entire House

### B&B System Design

Job:  
Date: Dec 05, 2024  
By: Bobby Blough

Vineland, NJ 08361

## Project Information

For:  
Fort Collins, Co 80524

## Design Conditions

### Location:

Fort Collins, CO, US  
Elevation: 4939 ft  
Latitude: 41°N

### Indoor:

Indoor temperature (°F)  
Design TD (°F)  
Relative humidity (%)  
Moisture difference (gr/lb)

### Heating

70  
65  
50  
59.1

### Cooling

70  
17  
50  
-14.2

### Outdoor:

Drybulb (°F)  
Daily range (°F)  
Wet bulb (°F)  
Wind speed (mph)

### Heating

5  
-  
-  
15.0

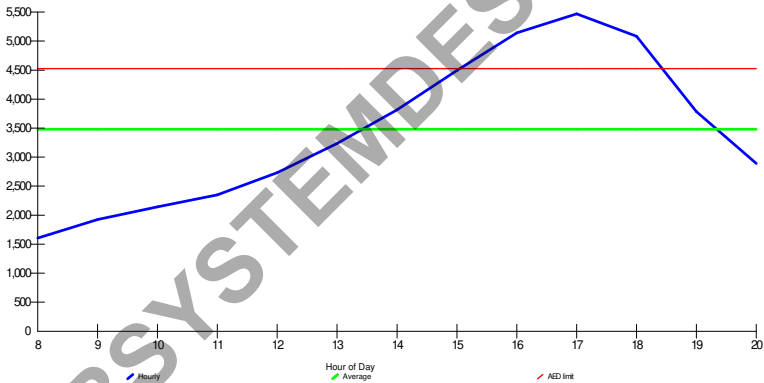
### Cooling

87  
25 ( M )  
60  
7.5

### Infiltration:

## Test for Adequate Exposure Diversity

Hourly Glazing Load



Maximum hourly glazing load exceeds average by 57.1%

House does not have adequate exposure diversity (AED), based on AED limit of 30%.

AED excursion: 943 Btuh (PGF - 1.3\*AFG)

**Right-J® Worksheet**  
**Entire House**  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

1 Room name				Entire House				lower office						
2 Exposed wall				17.0 ft				97.0 ft						
3 Room height				d				heat/cool						
4 Room dimensions				7448.0 ft²				1176.0 ft²						
5 Room area								24.0 x 49.0 ft						
Ty	Construction number	U-v value (Btuh/ft²·°F)	Or	HTM (Btuh/ft²)		Area or perimeter (ft)		Load (Btuh)		Area or perimeter (ft)		Load (Btuh)		
				Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	
6	W 12F-0sw	0.065	ne	4.24	0.16	2588	2186	9262	342		216	165	699	164
	G 2 glazing, clr low-e	0.300	ne	19.56	9.21	94	0	1839	866	30	0	587	619	
	D 11N0	0.350	ne	22.82	9.26	21	21	479	194	21	21	479	194	
	D 11N0	0.350	ne	22.82	0.00	144	144	3286	0	0	0	0	0	
	D 11P0	0.290	ne	18.91	0.00	143	143	2704	0	0	0	0	0	
	W 12F-0sw	0.065	se	4.24	0.00	1029	970	411	0	0	0	0	0	
	D 2 glazing, clr low-e	0.300	se	19.56	0.00	38	0	743	0	0	0	0	0	
	D 11N0	0.350	se	22.82	0.00	21	21	479	0	0	0	0	0	
	W 12F-0sw	0.065	sw	4.24	0.20	2588	1625	6885	330	216	165	701	164	
	G 2 glazing, clr low-e	0.300	sw	19.56	24.96	54	0	1053	1344	30	0	579	738	
	D 11N0	0.350	sw	22.82	9.26	21	21	479	194	21	21	479	194	
	D 11N0	0.350	sw	22.82	0.00	100	100	2282	0	0	0	0	0	
	D 11P0	0.290	sw	18.91	0.00	788	788	14900	0	0	0	0	0	
	W 12F-0sw	0.065	nw	4.24	0.99	833	737	3123	731	441	393	1666	390	
	G 2 glazing, clr low-e	0.300	nw	19.56	20.62	96	0	1878	1980	48	0	939	990	
	P 16A-19ad	0.049	-	0.00	3.43	833	833	0	2855	441	441	0	1512	
	C 16B-38ad	0.026	-	1.70	0.24	6272	6272	10632	1527	0	0	0	0	
	F 43A0	0.053	-	0.00	0.00	1176	1176	0	0	0	0	0	0	
	F 44A0	n/a	-	0.00	0.00	6272	6272	0	0	1176	1176	0	0	
6	c) AED excursion								943				426	
	Env elope loss/gain							64136	11306			6129	5391	
12	a) Infiltration							31597	789			3920	417	
	b) Room ventilation							0	0			0	0	
13	Internal gains:	Occupants @		230		0				0	0		0	
		Appliances/other								0			0	
	Subtotal (lines 6 to 13)							95733	12095			10049	5808	
	Less external load							0	0			0	0	
	Less transfer							1142	0			1142	0	
	Redistribution							0	0			0	0	
14	Subtotal							94591	12095			8907	5808	
15	Duct loads					0%	0%	0	0	-0%	0%	0	0	
	Total room load							94591	12095			8907	5808	
	Air required (cf.m)							0	679			0	422	

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



**Right-J® Worksheet**  
**Entire House**  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

1 Room name		Office radiant						SHOP					
2 Exposed wall		97.0 ft						21.0 ft					
3 Room height		8.0 ft						257.0 ft					
4 Room dimensions		heat/cool						heat only					
5 Room area		1176.0 ft²						5096.0 ft²					
Ty	Construction number	U-v value (Btuh/ft²·°F)	Or	HTM (Btuh/ft²)		Area (ft²) or perimeter (ft)		Load (Btuh)		Area (ft²) or perimeter (ft)		Load (Btuh)	
				Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
6	W 12F-0sw	0.065	ne	4.24	0.16	192	180	763	178	2180	1841	7800	0
	G 2 glazing, clr low-e	0.300	ne	19.56	9.21	12	0	235	247	52	0	1017	0
	D 11N0	0.350	ne	22.82	9.26	0	0	0	0	0	0	0	0
	D 11N0	0.350	ne	22.82	0.00	0	0	0	0	144	144	3286	0
	D 11P0	0.290	ne	18.91	0.00	0	0	0	0	143	143	2794	0
	W 12F-0sw	0.065	se	4.24	0.00	0	0	0	0	1029	970	4111	0
	G 2 glazing, clr low-e	0.300	se	19.56	0.00	0	0	0	0	38	0	743	0
	D 11N0	0.350	se	22.82	0.00	0	0	0	0	21	21	479	0
	W 12F-0sw	0.065	sw	4.24	0.20	192	168	711	166	2180	1292	5473	0
	G 2 glazing, clr low-e	0.300	sw	19.56	24.96	24	0	474	605	0	0	0	0
	D 11N0	0.350	sw	22.82	9.26	0	0	0	0	0	0	0	0
	D 11N0	0.350	sw	22.82	0.00	0	0	0	0	100	100	2282	0
	D 11P0	0.290	sw	18.91	0.00	0	0	0	0	788	788	14900	0
	W 12F-0sw	0.065	nw	4.24	0.99	392	344	1458	341	0	0	0	0
	G 2 glazing, clr low-e	0.300	nw	19.56	20.62	48	0	939	990	0	0	0	0
	P 16A-19ad	0.049	-	0.00	3.43	392	392	0	1344	0	0	0	0
	C 16B-38ad	0.026	-	1.70	0.24	1176	1176	1994	1527	5096	5096	8639	0
	F 43A0	0.053	-	0.00	0.00	1176	1176	0	0	0	0	0	0
	F 44A0	n/a	-	0.00	0.00	0	0	0	0	5096	5096	0	0
6	c) AED excursion								517				0
	Envelope loss/gain							6573	5916			51434	0
12	a) Infiltration							3484	371			24193	0
	b) Room ventilation							0	0			0	0
13	Internal gains:	Occupants @	230			0				0	0		0
		Appliances/other								0			0
	Subtotal (lines 6 to 13)							10057	6287			75627	0
	Less external load							0	0			0	0
	Less transfer							0	0			0	0
	Redistribution							0	0			0	0
14	Subtotal							10057	6287			75627	0
15	Duct loads					-0%	0%	0	0	0%	0%	0	0
	Total room load							10057	6287			75627	0
	Air required (cf.m)							0	457			0	0

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





**Right-J8® Form J1**  
*Entire House*  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

1 Name of Room			Entire House			lower office						
2 Running Feet of Exposed Wall			451.0 ft			97.0 ft						
3 Ceiling Ht (Ft) and Gross Wall Area (SqFt)			17.0 ft	9098.4 ft <sup>2</sup>	9.0 ft	1314.0 ft <sup>2</sup>						
4 Room Dimensions (Ft) and Floor Plan Area (SqFt)			0 °	7448.0 ft <sup>2</sup>	24.0 x 49.0 ft	1176.0 ft <sup>2</sup>						
5 Ceiling Slope (Deg.) and Gross Ceiling Area (SqFt)			0 °	12519.5 ft <sup>2</sup>	0 °	1176.0 ft <sup>2</sup>						
Type of Exposure	Const., Number	Panel Faces	HTM		Area or Length	Btuh			Area or Length	Btuh		
			Htg.	Clg.		Heating	S-C lq	L-C lq		Heating	S-C lq	L-C lq
6 Wall	12F-0sw	ne	4.24	0.16	2588	9262	342		216	699	164	
Glaz	2 glazing, clr low-e	ne	19.56	9.21	94	1839	866		30	587	619	
Door	11N0	ne	22.82	9.26	21	479	194		21	479	194	
Door	11N0	ne	22.82	0.00	144	3286	0		0	0	0	
Door	11P0	ne	18.91	0.00	143	2704	0		0	0	0	
Wall	12F-0sw	se	4.24	0.00	1029	4111	0		0	0	0	
Glaz	2 glazing, clr low-e	se	19.56	0.00	38	743	0		0	0	0	
Door	11N0	se	22.82	0.00	21	479	0		0	0	0	
Wall	12F-0sw	sw	4.24	0.20	2588	6885	330		216	701	164	
Glaz	2 glazing, clr low-e	sw	19.56	24.96	54	1053	1344		30	579	738	
Door	11N0	sw	22.82	9.26	21	479	194		21	479	194	
Door	11N0	sw	22.82	0.00	100	2292	0		0	0	0	
Door	11P0	sw	18.91	0.00	788	14900	0		0	0	0	
Wall	12F-0sw	nw	4.24	0.99	833	3123	731		441	1666	390	
Glaz	2 glazing, clr low-e	nw	19.56	20.62	96	1878	1980		48	939	990	
Wall	16A-19ad	-	0.00	3.43	833	0	2855		441	0	1512	
Ceil	16B-38ad	-	1.70	0.24	6272	10632	1527		0	0	0	
Floor	43A0	-	0.00	0.00	1176	0	0		0	0	0	
Floor	44A0	-	0.00	0.00	6272	0	0		1176	0	0	
12 Infiltration	Heating Load (Btuh)	Effect	0.25		WAR	31597			WAR	3920		
	Sensible Load (Btuh)	ACH	0.15		1.00		789		0.12		417	
	Latent Load (Btuh)										-402	
13 Internal	a Occupants at 230 and 200 Btuh				0	0	0	0	0	0	0	
	b Scenario number					0				0		
	c Default Adjustments					0				0		
	d Custom Appliances					0	0	0		0	0	
	e Plants					0	0	0		0	0	
14 Subtotals	Sum lines 6 through 12					94591	12095	-402		8907	5808	
15 Duct Loads	EHLF & ESGF		0	0		0	0			0	0	
	ELG										0	
16 Ventilation Loads	Vent Cf m	0	E Cf m	0		0	0	0				
17 Winter Humidification Load	Gal/Day		0			0						
18 Piping Load						15507						
19 Blower Heat							0					
20 AED Excursion & Latent Moisture Migration Load							943				426	
21 Total Load	Sum lines 13 through 19					110098	12095	0		8907	5808	

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



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Right-Suite® Universal 2024 24.0.0.3 RSU64913

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Page 1

**Right-J8® Form J1**  
*Entire House*  
**B&B System Design**

**Job:**  
**Date:** Dec 05, 2024  
**By:** Bobby Blough

Vineland, NJ 08361

1 Name of Room			Office radiant				SHOP					
2 Running Feet of Exposed Wall			97.0 ft				257.0 ft					
3 Ceiling Ht (Ft) and Gross Wall Area (SqFt)			8.0 ft		1168.0 ft <sup>2</sup>		21.0 ft		5973.9 ft <sup>2</sup>			
4 Room Dimensions (F-T) and Floor Plan Area (SqFt)			24.0 x 49.0 ft		1176.0 ft <sup>2</sup>		104.0 x 49.0 ft		5096.0 ft <sup>2</sup>			
5 Ceiling Slope (Deg.) and Gross Ceiling Area (SqFt)			0 °		1176.0 ft <sup>2</sup>		0 °		10167.5 ft <sup>2</sup>			
Type of Exposure	Const., Number	Panel Faces	HTM		Area or Length	Btuh			Area or Length	Btuh		
			Htg.	Clg.		Heating	S-Clg	L-Clg		Heating	S-Clg	L-Clg
6 Wall	12F-0sw	ne	4.24	0.16	192	763	178		2180	7800	0	0
Glaz	2 glazing, clr low-e	ne	19.56	9.21	12	235	247		52	1017	0	0
Door	11N0	ne	22.82	9.26	0	0	0		0	0	0	0
Door	11N0	ne	22.82	0.00	0	0	0		144	3266	0	0
Door	11P0	ne	18.91	0.00	0	0	0		143	2704	0	0
Wall	12F-0sw	se	4.24	0.00	0	0	0		1029	4111	0	0
Glaz	2 glazing, clr low-e	se	19.56	0.00	0	0	0		38	743	0	0
Door	11N0	se	22.82	0.00	0	0	0		21	479	0	0
Wall	12F-0sw	sw	4.24	0.20	192	711	166		2180	5473	0	0
Glaz	2 glazing, clr low-e	sw	19.56	24.96	24	474	605		0	0	0	0
Door	11N0	sw	22.82	9.26	0	0	0		0	0	0	0
Door	11N0	sw	22.82	0.00	0	0	0		100	2282	0	0
Door	11P0	sw	18.91	0.00	0	0	0		788	14900	0	0
Wall	12F-0sw	nw	4.24	0.99	392	1458	341		0	0	0	0
Glaz	2 glazing, clr low-e	nw	19.56	20.62	48	939	990		0	0	0	0
Wall	16A-19ad	-	0.00	3.43	392	0	1344		0	0	0	0
Ceil	16B-38ad	-	1.70	0.24	1176	1994	1527		5096	8639	0	0
Floor	43A0	-	0.00	0.00	1176	0	0		0	0	0	0
Floor	44A0	-	0.00	0.00	0	0	0		5096	0	0	0
12 Infiltration	Heating Load (Btuh)	Effect	0.25		WAR	3484			WAR	24193		
	Sensible Load (Btuh)	ACH	0.15				371			0		
	Latent Load (Btuh)											
13 Internal	a Occupants at 230 and 200 Btuh				0	0	0	0	0	0	0	0
	b Scenario number					0				0		
	c Default Adjustments									0		
	d Custom Appliances					0	0	0		0	0	0
	e Plants							0		0		0
14 Subtotals	Sum lines 6 through 12					10057	6287			75627	0	
15 Duct Loads	EHLF & ESGF		0	0		0	0			0	0	
	ELG							0				0
16 Ventilation Loads	Vent Cfm	0	E Cfm	0								
17 Winter Humidification Load	Gal/Day		0									
18 Piping Load												
19 Blower Heat												
20 AED Excursion & Latent Moisture Migration Load							517			0		
21 Total Load	Sum lines 13 through 19					10057	6287			75627	0	

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



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Right-Suite® Universal 2024.24.0.03 RSU64913

2024-Dec-29 10:11:39

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Page 2

# Loads for Multiple Orientations

## Entire House

### B&B System Design

Job:  
 Date: Dec 05, 2024  
 By: Bobby Blough

Vineland, NJ 08361

## Project Information

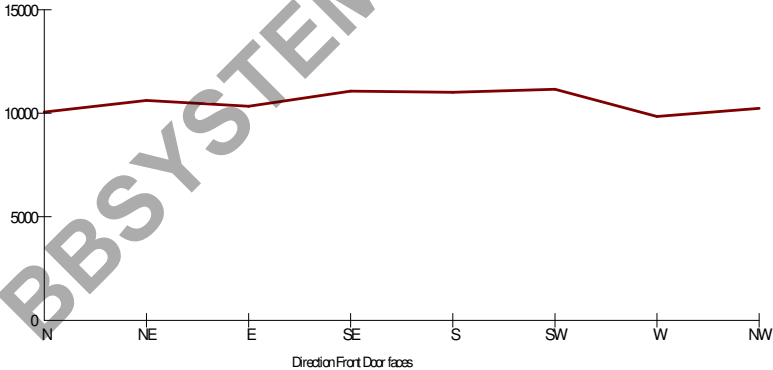
For:  
 Fort Collins, Co 80524

## Design Conditions

<b>Location:</b>		<b>Indoor:</b>		<b>Heating</b>	<b>Cooling</b>
Fort Collins, CO, US		Indoor temperature (°F)		70	70
Elevation: 4939 ft		Design TD (°F)		65	17
Latitude: 41°N		Relative humidity (%)		50	50
		Moisture difference (gr/lb)		59.1	-14.2
<b>Outdoor:</b>	<b>Heating</b>	<b>Cooling</b>	<b>Infiltration:</b>		
Drybulb (°F)	5	87			
Daily range (°F)	-	25 ( M )			
Wet bulb (°F)	-	60			
Wind speed (mph)	15.0	7.5			

Front Door	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Sensible Load (Btuh)	10060	10619	10337	11063	11008	11151	9839	10235
Latent Load (Btuh)	0	0	0	0	0	0	0	0
Total Load (Btuh)	10060	10619	10337	11063	11008	11151	9839	10235
Heating AVF (cfm)	0	0	0	0	0	0	0	0
Cooling AVF (cfm)	793	837	815	872	868	879	776	807

Building Orientation Cooling Load



Current Orientation: Front Door faces Southwest  
 Highest Cooling Load: Front Door faces Southwest

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

**J1 Form - Worksheet A**  
*Entire House*  
**B&B System Design**

Job:  
 Date: Dec 05, 2024  
 By: Bobby Blough

Vineland, NJ 08361

Supporting Detail	
Project Name: 2034 Vista Shores Ct	Date: Dec 05, 2024
Address: Fort Collins, Co 80524	
Phone:	Job ID:

Worksheet A Location and Design Conditions	
Weather Location: Fort Collins, CO, US	Elevation = 4939 Latitude = 41
Indoor Conditions, Heating: DB = 70 °F RH = 50 %	Indoor Conditions, Cooling: DB = 70 °F RH = 50 %
Table 1 Conditions 99% DB = 5 °F 1% DB = 87 °F	Grains Difference = -14 gr/lb Daily Range = M
Design Temperature Differences	HTD = 65 °F CTD = 17 °F

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