

DEPARTMENT OF INSPECTIONS,  
 LICENSES & PERMITS  
 230 COURT HOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 PERMITS (410) 313-2455  
 INSPECTIONS (410) 313-1850

HOWARD COUNTY  
**RESIDENTIAL  
 HEATING-VENTILATION-AIR  
 CONDITIONING AND  
 REFRIGERATION PERMIT  
 APPLICATION**

HVACR PERMIT # M21000490  
 BUILDING PERMIT #

BUILDING ADDRESS: SUITE/APT:  
7270 Meadow Wood Way  
 SUBDIVISION:  
 CENSUS TRACT: SECTION: AREA:  
 LOT: TAX MAP: PARCEL:  
 BLOCK: ZONE:  
 PROPERTY ID: MAP COORDINATES:  
 TYPE OF IMPROVEMENTS: USE:

OWNERS NAME: Andrew Campbell  
 ADDRESS: 7270 Meadow Wood Way  
 CITY: CLARKSVILLE  
 STATE: MD ZIP CODE: 21029  
 HOME PHONE: 301-257-8007 WORK PHONE:

	<u>CHECK ONE</u>	<u>HOW MANY</u>
SINGLE FAMILY DWELLING	<input checked="" type="checkbox"/>	<u>2</u> ZONES
SINGLE FAMILY TOWNHOUSE	<input type="checkbox"/>	___ ZONES
MULTI-FAMILY / HOTEL/MOTEL	<input type="checkbox"/>	___ ROOMS
ASSISTED LIVING HOMES (16 OR FEWER RESIDENTS)	<input type="checkbox"/>	___ ROOMS

COMPANY NAME: WaterVale Heating & A.C.  
 LICENSEE NAME: Joseph F. O'Dyke  
 ADDRESS: 2116 WATERVALE, RD.  
 CITY: FALLSTON  
 STATE: MD ZIP CODE: 21047  
 PHONE: 410-879-0292 HVACR LICENSE NO: 7629

- New
- Heating and Air Conditioning
  - Geo Thermal System
  - Heating System Only
  - Ductless Mini Splits
  - Other Work (Describe):
  - Thru The Wall Systems
- Replacement
- Heating
  - Air Conditioning
  - Heating and Air Conditioning
- Replaces two heat pumps, with two geothermal systems, 3 TON + 2-TON No outside work.
- Additions and Alterations
- Heating
  - Air Conditioning
  - Heating and Air Conditioning

\*\*\*\*Replacement Geo Thermal Systems are not required; However, if a tax credit is being sought a permit is required\*\*\*\*

Zones

Permit Fee = # of Zones x \$40 = 80.00  
 Technology Fee (10% of Permit Fee) = 8.00  
 Plus Application Fee 50.00  
 Total Fees Due = 138.00

Rooms

Permit Fee = # of Rooms x \$80 = \_\_\_\_\_  
 Technology Fee (10% of Permit Fee) = \_\_\_\_\_  
 Plus Application Fee \$50 50.00  
 Total Fees Due = \_\_\_\_\_

I HAVE CAREFULLY EXAMINED AND READ THIS APPLICATION AND KNOW IT IS TRUE AND CORRECT. THE WORK DESCRIBED HEREIN WILL BE PERFORMED BY A STATE HVACR LICENSED PERSON(S), AND ALL WORK WILL BE PERFORMED IN COMPLIANCE WITH APPLICABLE CODES AND STANDARDS OF HOWARD COUNTY THE STATE OF MARYLAND.

SIGNATURE OF LICENSEE: Joseph F. O'Dyke DATE: 4-28-21

PRINT NAME OF LICENSEE: Joseph F. O'Dyke  
 Email Address: WaterValeGeo@gmail.com

Make check payable to: DIRECTOR OF FINANCE OF HOWARD COUNTY

**Validation**

Check Number: 26159  
 Cash: \_\_\_\_\_  
 Receipt Number: 1061795

Approved by John Jones 07/15/2021  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Howard County Health Department

M21000490

*Ariel Campble*  
*HVAC Load Calculations*

for

Mr. & Mrs. Campbell  
7270 Meadow Wood, Way  
Clarksville, Md.



**RHVAC RESIDENTIAL  
HVAC LOADS**

Prepared By:

Watervale Geothermal  
2116 Watervsale , Rd.  
Fallston, Md. 21047  
410-879-0292  
Wednesday, April 28, 2021

Rhvac is an ACCA approved Manual J, D and S computer program.  
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.



## Project Report

### General Project Information

Project Title: Ariel Campble  
 Project Date: Friday, April 16, 2021  
 Client Name: Mr. & Mrs. Campbell  
 Client Address: 7270 Meadow Wood, Way  
 Client City: Clarksville, Md.  
 Client Phone: 301-257-8007  
 Company Name: Watervale Geothermal  
 Company Address: 2116 Watervsale , Rd.  
 Company City: Fallston, Md. 21047  
 Company Phone: 410-879-0292  
 Company Fax: 410-803-0223

### Design Data

Reference City: Baltimore, Maryland  
 Building Orientation: Front door faces North  
 Daily Temperature Range: Medium  
 Latitude: 39 Degrees  
 Elevation: 148 ft.  
 Altitude Factor: 0.995

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	5	11.86	n/a	n/a	70	n/a
Summer:	95	75	40%	50%	75	34

### Check Figures

Total Building Supply CFM:	2,218	CFM Per Square ft.:	0.499
Square ft. of Room Area:	4,448	Square ft. Per Ton:	1,014
Volume (ft³):	29,616		

### Building Loads

Total Heating Required Including Ventilation Air:	60,756 Btuh	60.756 MBH
Total Sensible Gain:	49,775 Btuh	95 %
Total Latent Gain:	2,849 Btuh	5 %
Total Cooling Required Including Ventilation Air:	52,624 Btuh	4.39 Tons (Based On Sensible + Latent)

### Notes

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 Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.  
 All computed results are estimates as building use and weather may vary.  
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



### Miscellaneous Report

System 1 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	5	11.86	100%	n/a	70	n/a
Summer:	95	75	40%	50%	75	34.25

System 2 Copy of system 1 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	5	11.86	100%	n/a	70	n/a
Summer:	95	75	40%	50%	75	34.25

System 3 Copy of system 1 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	5	11.86	100%	n/a	70	n/a
Summer:	95	75	40%	50%	75	34.25

### Duct Sizing Inputs

	Main Trunk	Runouts
Calculate:	Yes	Yes
Use Schedule:	Yes	Yes
Roughness Factor:	0.00300	0.01000
Pressure Drop:	0.1000 in.wg./100 ft.	0.1000 in.wg./100 ft.
Minimum Velocity:	0 ft./min	0 ft./min
Maximum Velocity:	900 ft./min	750 ft./min
Minimum Height:	0 in.	0 in.
Maximum Height:	0 in.	0 in.

### Outside Air Data

	Winter	Summer
Infiltration Specified:	0.302 AC/hr 149 CFM	0.160 AC/hr 79 CFM
Infiltration Actual:	0.302 AC/hr	0.160 AC/hr
Above Grade Volume:	X 29,616 Cu.ft. 8,934 Cu.ft./hr X 0.0167	X 29,616 Cu.ft. 4,743 Cu.ft./hr X 0.0167
Total Building Infiltration:	149 CFM	79 CFM
Total Building Ventilation:	0 CFM	0 CFM

#### ---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 21.88 = (1.10 X 0.995 X 20.00 Summer Temp. Difference)  
 Infiltration & Ventilation Latent Gain Multiplier: 23.17 = (0.68 X 0.995 X 34.25 Grains Difference)  
 Infiltration & Ventilation Sensible Loss Multiplier: 71.12 = (1.10 X 0.995 X 65.00 Winter Temp. Difference)  
 Winter Infiltration Specified: 0.260 AC/hr (66 CFM), Construction: Semi-Tight  
 Summer Infiltration Specified: 0.140 AC/hr (36 CFM), Construction: Semi-Tight

#### ---System 2---

Infiltration & Ventilation Sensible Gain Multiplier: 21.88 = (1.10 X 0.995 X 20.00 Summer Temp. Difference)  
 Infiltration & Ventilation Latent Gain Multiplier: 23.17 = (0.68 X 0.995 X 34.25 Grains Difference)  
 Infiltration & Ventilation Sensible Loss Multiplier: 71.12 = (1.10 X 0.995 X 65.00 Winter Temp. Difference)  
 Winter Infiltration Specified: 0.410 AC/hr (35 CFM), Construction: Semi-Tight  
 Summer Infiltration Specified: 0.220 AC/hr (19 CFM), Construction: Semi-Tight

#### ---System 3---

Infiltration & Ventilation Sensible Gain Multiplier: 21.88 = (1.10 X 0.995 X 20.00 Summer Temp. Difference)  
 Infiltration & Ventilation Latent Gain Multiplier: 23.17 = (0.68 X 0.995 X 34.25 Grains Difference)  
 Infiltration & Ventilation Sensible Loss Multiplier: 71.12 = (1.10 X 0.995 X 65.00 Winter Temp. Difference)  
 Winter Infiltration Specified: 0.310 AC/hr (47 CFM), Construction: Semi-Tight  
 Summer Infiltration Specified: 0.160 AC/hr (24 CFM), Construction: Semi-Tight

### Duct Load Factor Scenarios for System 2

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Supply		Attic	16B	0.12	4	175	No



*Miscellaneous Report (cont'd)*

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Return		Attic	16B	0.24	4	65	No



## Load Preview Report

Scope	Net Ton	ft <sup>2</sup> /Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	4.39	1,014	4,448	49,775	2,849	52,624	60,756	778	2,218	2,218	
System 1	2.10	1,267	2,660	23,768	1,428	25,196	30,577	399	1,086	1,086	12x16
Zone 1 - Clg.: 8%, Htg.: 25%			1,140	2,055	192	2,247	7,690	100	94	94	5x6
1-Basement			1,140	2,055	192	2,247	7,690	100	94	94	1-6
Zone 2 - Clg.: 92%, Htg.: 75%			1,520	25,134	1,236	26,370	22,887	299	1,149	1,149	12x17
2-Main First Floor			1,520	25,134	1,236	26,370	22,887	299	1,149	1,149	11-7
System 2	1.03	630	648	11,494	858	12,352	16,358	198	469	469	9x11
Supply Duct Latent					131	131					
Return Duct				1,234	287	1,521	1,173				
Zone 1			648	10,261	440	10,701	15,184	198	469	469	9x11
3-2nd Floor, Over Gradge			648	10,261	440	10,701	15,184	198	469	469	5-6
System 3	1.26	907	1,140	14,513	563	15,076	13,821	180	663	663	10x13
Zone 1			1,140	14,513	563	15,076	13,821	180	663	663	10x13
4-Second Floor			1,140	14,513	563	15,076	13,821	180	663	663	7-6

Sum of room airflows may be greater than system airflow because system has multiple zones.



## Duct Size Preview

Room or Duct Name	Source	Minimum Velocity	Maximum Velocity	Rough. Factor	Design L/100	SP Loss	Duct Velocity	Duct Length	Htg Flow	Clg Flow	Act. Flow	Duct Size
<b>System 1</b>												
<b>Supply Runouts</b>												
Zone 1												
1-Basement	Built-In	0	750	0.01	0.1		478.4	100	94	94		1-6
Zone 2												
2-Main First Floor	Built-In	0	750	0.01	0.1		390.7	299	1,149	1,149		11-7
<b>Other Ducts in System 1</b>												
Supply Main Trunk	Built-In	0	900	0.003	0.1		814.6	399	1,086	1,086		12x16
<b>System 2</b>												
<b>Supply Runouts</b>												
Zone 1												
3-2nd Floor, Over Gradge	Built-In	0	750	0.01	0.1		477.6	198	469	469		5-6
<b>Other Ducts in System 2</b>												
Supply Main Trunk	Built-In	0	900	0.003	0.1		682	198	469	469		9x11
<b>System 3</b>												
<b>Supply Runouts</b>												
Zone 1												
4-Second Floor	Built-In	0	750	0.01	0.1		482.5	180	663	663		7-6
<b>Other Ducts in System 3</b>												
Supply Main Trunk	Built-In	0	900	0.003	0.1		734.6	180	663	663		10x13

### Summary

<b>System 1</b>	
Heating Flow:	399
Cooling Flow:	1086
<b>System 2</b>	
Heating Flow:	198
Cooling Flow:	469
<b>System 3</b>	
Heating Flow:	180
Cooling Flow:	663



### Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cw-o: Glazing-Double pane, operable window, clear, wood frame, U-value 0.57, SHGC 0.56	366	13,561	0	23,553	23,553
11J: Door-Metal - Fiberglass Core, U-value 0.6	63	2,457	0	1,172	1,172
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091	2531	14,972	0	6,104	6,104
15A-8sffc-10: Wall-Basement, concrete block wall, R-8 foam board to floor, no framing, no interior finish, filled core, 10' floor depth, U-value 0.044	304	869	0	0	0
15A-10sffc-6: Wall-Basement, concrete block wall, R-10 foam board to floor, no framing, no interior finish, filled core, 6' floor depth, U-value 0.046	544	1,883	0	181	181
16A-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Unvented Attic, No Radiant Barrier, Any Roofing Material, Any Roof Color, R-30 insulation, U-value 0.032	1788	3,719	0	4,291	4,291
21A-32: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, no insulation below floor, any floor cover, shortest side of floor slab is 32' wide, U-value 0.02	1140	1,482	0	0	0
19A-19p: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, passive, R-19 blanket, U-value 0.049	1520	3,794	0	1,167	1,167
20P-19: Floor-Over open crawl space or garage, Passive, R-19 blanket insulation, any cover, U-value 0.05	648	2,106	0	486	486
Subtotals for structure:		44,843	0	36,954	36,954
People:	3		600	690	1,290
Equipment:			0	1,200	1,200
Lighting:	0			0	0
Ductwork:		5,324	418	3,443	3,861
Infiltration: Winter CFM: 149, Summer CFM: 79		10,589	1,831	1,730	3,561
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	5,758	5,758
<b>Total Building Load Totals:</b>		<b>60,756</b>	<b>2,849</b>	<b>49,775</b>	<b>52,624</b>

#### Check Figures

Total Building Supply CFM:	2,218	CFM Per Square ft.:	0.499
Square ft. of Room Area:	4,448	Square ft. Per Ton:	1,014
Volume (ft³):	29,616		

#### Building Loads

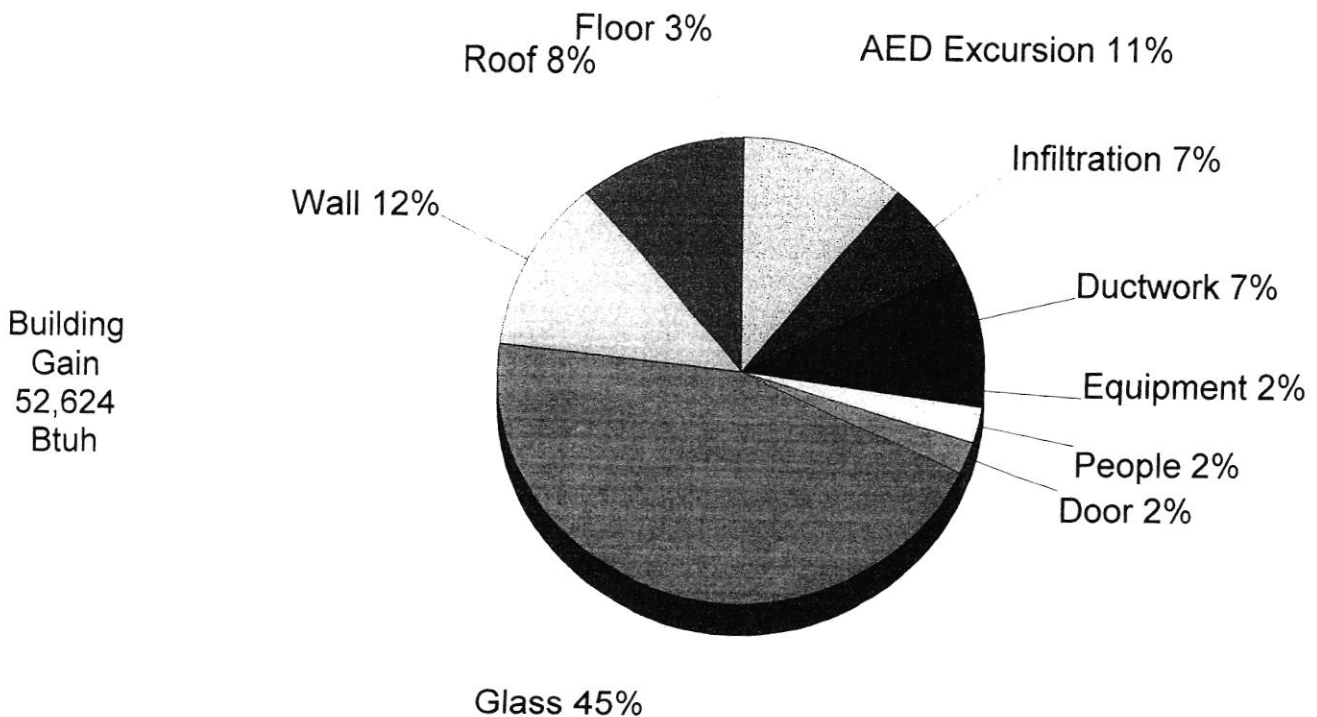
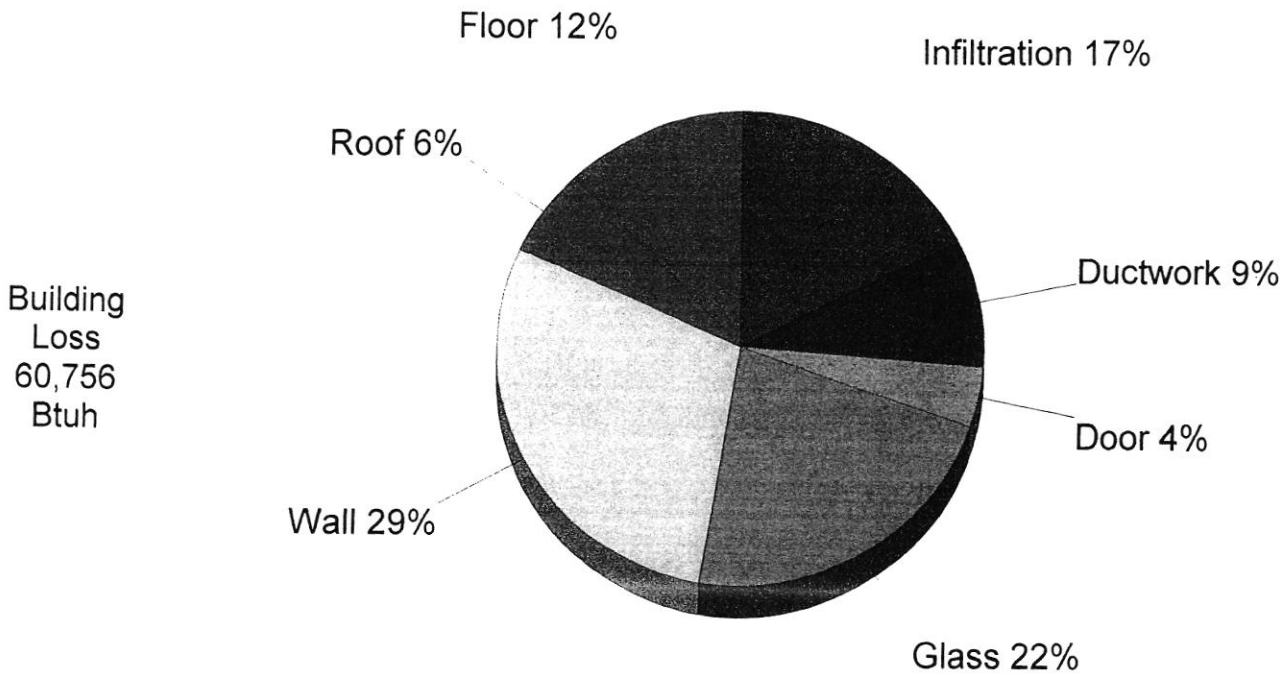
Total Heating Required Including Ventilation Air:	60,756 Btuh	60.756 MBH
Total Sensible Gain:	49,775 Btuh	95 %
Total Latent Gain:	2,849 Btuh	5 %
Total Cooling Required Including Ventilation Air:	52,624 Btuh	4.39 Tons (Based On Sensible + Latent)

#### Notes

Rhvac is an ACCA approved Manual J, D and S computer program.  
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 All computed results are estimates as building use and weather may vary.  
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



### Building Pie Chart





**Detailed Room Loads - Room 1 - Basement (Peak Fenestration Gain Procedure)**

**General**

Room is in zone 1, which peaks at 10 am

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	38.0 ft.	System Number:	1
Room Width:	30.0 ft.	Zone Number:	1
Area:	1,140.0 sq.ft.	Supply Air:	94 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	0.6 AC/hr
Volume:	9,120 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	94 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	478 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	478 ft./min.	Actual Winter Infil.:	15 CFM
Actual Loss:	0.146 in.wg./100 ft.	Actual Summer Infil.:	8 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12C-0sw 30 X 8	211	0.091	5.9	1,248	2.4	0	509
N -Wall-15A-8sffc-10 38 X 8	304	0.044	2.9	869	0.0	0	0
W -Wall-15A-10sffc-6 30 X 8	240	0.046	3.5	831	0.3	0	80
S -Wall-15A-10sffc-6 38 X 8	304	0.046	3.5	1,052	0.3	0	101
E -Door-11J 3 X 7	21	0.600	39.0	819	18.6	0	391
E -Gls-1D-cw-o shgc-0.56 0%S	8	0.570	37.1	296	86.6	0	693
Floor-21A-32 30 X 38	1140	0.020	1.3	1,482	0.0	0	0
<b>Subtotals for Structure:</b>				<b>6,597</b>		<b>0</b>	<b>1,774</b>
Infil.: Win.: 15.4, Sum.: 8.3	376		2.907	1,093	0.481	192	181
AED Excursion:							100
<b>Room Totals:</b>				<b>7,690</b>		<b>192</b>	<b>2,055</b>



## Detailed Room Loads - Room 2 - Main First Floor (Peak Fenestration Gain Procedure)

### General

Room is in zone 2, which peaks at 5 pm

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	40.0 ft.	System Number:	1
Room Width:	38.0 ft.	Zone Number:	2
Area:	1,520.0 sq.ft.	Supply Air:	1,149 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	5.7 AC/hr
Volume:	12,160 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	11	Actual Winter Vent.:	0 CFM
Runout Air:	104 CFM	Percent of Supply.:	0 %
Runout Duct Size:	7 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	391 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	391 ft./min.	Actual Winter Infil.:	51 CFM
Actual Loss:	0.079 in.wg./100 ft.	Actual Summer Infil.:	27 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12C-0sw 40 X 8	245	0.091	5.9	1,449	2.4	0	591
N -Wall-12C-0sw 38 X 8	304	0.091	5.9	1,798	2.4	0	733
W -Wall-12C-0sw 40 X 8	180	0.091	5.9	1,065	2.4	0	434
S -Wall-12C-0sw 38 X 8	262	0.091	5.9	1,550	2.4	0	632
S -Door-11J 6 X 7	42	0.600	39.0	1,638	18.6	0	781
E -Gls-1D-cw-o shgc-0.56 0%S	75	0.570	37.1	2,779	41.3	0	3,099
W -Gls-1D-cw-o shgc-0.56 0%S (4)	140	0.570	37.1	5,188	99.9	0	13,980
Floor-19A-19p 38 X 40	1520	0.049	2.5	3,794	0.8	0	1,167
Subtotals for Structure:				19,261		0	21,417
Infil.: Win.: 51.0, Sum.: 27.5	1,248		2.905	3,626	0.482	636	601
AED Excursion:							1,226
People: 200 lat/per, 230 sen/per:	3					600	690
Equipment:						0	1,200
Room Totals:				22,887		1,236	25,134



## Detailed Room Loads - Room 3 - 2nd Floor, Over Gradge (Average Load Procedure)

### General

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	27.0 ft.	System Number:	2
Room Width:	24.0 ft.	Zone Number:	1
Area:	648.0 sq.ft.	Supply Air:	469 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	5.4 AC/hr
Volume:	5,184 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	5	Actual Winter Vent.:	0 CFM
Runout Air:	94 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	478 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	478 ft./min.	Actual Winter Infil.:	35 CFM
Actual Loss:	0.146 in.wg./100 ft.	Actual Summer Infil.:	19 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain	
E -Wall-12C-0sw 27 X 8	216	0.091	5.9	1,278	2.4	0	521	
N -Wall-12C-0sw 24 X 8	192	0.091	5.9	1,136	2.4	0	463	
W -Wall-12C-0sw 27 X 8	172	0.091	5.9	1,017	2.4	0	415	
W -Gls-1D-cw-o shgc-0.56 0%S	44	0.570	37.1	1,630	64.4	0	2,832	
UP-Ceil-16A-30 27 X 24	648	0.032	2.1	1,348	2.4	0	1,555	
Floor-20P-19 24 X 27	648	0.050	3.3	2,106	0.8	0	486	
Subtotals for Structure:							0	6,272
Infil.: Win.: 35.4, Sum.: 19.0		624	4.037	2,519	0.667	440	416	
Ductwork:								2,209
AED Excursion:								1,363
Room Totals:				15,184		440	10,261	



**Detailed Room Loads - Room 4 - Second Floor (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	38.0 ft.	System Number:	3
Room Width:	30.0 ft.	Zone Number:	1
Area:	1,140.0 sq.ft.	Supply Air:	663 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	4.4 AC/hr
Volume:	9,120 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	7	Actual Winter Vent.:	0 CFM
Runout Air:	95 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	483 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	483 ft./min.	Actual Winter Infil.:	47 CFM
Actual Loss:	0.149 in.wg./100 ft.	Actual Summer Infil.:	24 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12C-0sw 38 X 8	304	0.091	5.9	1,798	2.4	0	733
N -Wall-12C-0sw 30 X 8	240	0.091	5.9	1,420	2.4	0	579
W -Wall-12C-0sw 38 X 8	205	0.091	5.9	1,213	2.4	0	494
W -Gls-1D-cw-o shgc-0.56 0%S	99	0.570	37.1	3,668	64.4	0	6,371
UP-Ceil-16A-30 38 X 30	1140	0.032	2.1	2,371	2.4	0	2,736
Subtotals for Structure:				10,470		0	10,913
Infil.: Win.: 47.1, Sum.: 24.3	848		3.952	3,351	0.627	563	532
AED Excursion:							3,068
Room Totals:				13,821		563	14,513



### System 1 Room Load Summary

Room No	Room Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---										
1	Basement	1,140	7,690	100	1-6	478	2,055	192	94	94
Zone 1 subtotal		1,140	7,690	100			2,055	192	94	94
---Zone 2---										
2	Main First Floor	1,520	22,887	299	11-7	391	25,134	1,236	1,149	1,149
Zone 2 subtotal		1,520	22,887	299			25,134	1,236	1,149	1,149
System 1 total		2,660	30,577	399			23,768	1,428	1,086	1,086

System 1 Main Trunk Size: 12x16 in.  
 Velocity: 815 ft./min  
 Loss per 100 ft.: 0.099 in.wg

Note: Since the system is multizone, the Peak Fenestration Gain Procedure was used to determine glass sensible gains at the room and zone levels, so the sums of the zone sensible gains and airflows for cooling shown above are not intended to equal the totals at the system level. Room and zone sensible gains and cooling CFM values are for the hour in which the glass sensible gain for the zone is at its peak. Sensible gains at the system level are based on the "Average Load Procedure + Excursion" method.

### Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	2.10	94% / 6%	23,768	1,428	25,196

### Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		
Indoor Model:		
Brand:		
Efficiency:	0 AFUE	0 SEER
Sound:	0	0
Capacity:	0 Btuh	0 Btuh
Sensible Capacity:	n/a	0 Btuh
Latent Capacity:	n/a	0 Btuh



### System 2 Room Load Summary

Room No	Room Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---										
3	2nd Floor, Over Gradge	648	15,184	198	5-6	478	10,261	440	469	469
	Duct Latent Return Duct		1,173				1,234	131 287		
System 2 total		648	16,358	198			11,494	858	469	469

System 2 Main Trunk Size: 9x11 in.  
 Velocity: 682 ft./min  
 Loss per 100 ft.: 0.106 in.wg

### Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	1.03	93% / 7%	11,494	858	12,352

### Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		
Indoor Model:		
Brand:		
Efficiency:	0 AFUE	0 SEER
Sound:	0	0
Capacity:	0 Btuh	0 Btuh
Sensible Capacity:	n/a	0 Btuh
Latent Capacity:	n/a	0 Btuh



### System 3 Room Load Summary

Room No	Room Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---										
4	Second Floor	1,140	13,821	180	7-6	483	14,513	563	663	663
System 3 total		1,140	13,821	180			14,513	563	663	663

System 3 Main Trunk Size: 10x13 in.  
 Velocity: 735 ft./min  
 Loss per 100 ft.: 0.103 in.wg

### Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	1.26	96% / 4%	14,513	563	15,076

### Equipment Data

	<u>Heating System</u>	<u>Cooling System</u>
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		
Indoor Model:		
Brand:		
Efficiency:	0 AFUE	0 SEER
Sound:	0	0
Capacity:	0 Btuh	0 Btuh
Sensible Capacity:	n/a	0 Btuh
Latent Capacity:	n/a	0 Btuh

M21000490

**Manning, Lorri**

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**From:** Watervale Heating and Air <watervalehvac@verizon.net>  
**Sent:** Wednesday, June 2, 2021 12:24 PM  
**To:** Manning, Lorri  
**Subject:** 7270 Meadow Wood Way

[Note: This email originated from outside of the organization. Please only click on links or attachments if you know the sender.]

Ms. Manning,

We are installing 2 new geothermal systems in Mr. and Mrs. Campbell's home at 7270 Meadow Wood Way in Clarksville.

The first floor will be a Waterfurnace 5 Series, model NDV038J and on the second floor the geothermal split unit is a Waterfurnace 5 Series, model NDZ026100 with matching air handler SAH026

Reading through the contract, it looks to be a new geo system to replace a conventional heating and air system.

Kimberly Z.

**Watervale Heating and Air, Inc.**

**Watervale Geothermal & Radiant Heating, LLC**

**2116 Watervale Road**

**Fallston, Maryland 21047**

**410-879-4998**