Energy Audit

Sponsored by

EVERSOURCE ENERGY

Sunapee

July 25, 2021

Audit Prepared by

BUILDING STRATEGIES FOR AN AFFORDABLE FUTURE
S.E.E.D.S.
SUSTAINABLE ENERGY EDUCATION DEMONSTRATION SERVICES
Margaret Dillon—603-532-8979—MDILLON@myfairpoint.net

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Introduction

This Energy Audit has been paid for by Eversource as part of their municipal energy efficiency program. Funding may also be available to help reduce energy usage through weatherization efforts.

The purpose of an energy audit is to identify energy saving measures (ESM) in a building. Computer simulated and other energy models were developed for this project using multiple strategies and software. The models predict energy consumption based on the local climate conditions, physical dimensions and characteristics of a building, mechanical systems, lighting, equipment, and occupancy patterns, in addition to a number of other variables.

With the building modeled in existing conditions, called here Existing Conditions, energy savings can be estimated for improvements to the thermal envelope or mechanical systems. The cost of those measures can then be analyzed in terms of predicted energy saved. The primary objective is to evaluate the level of investment warranted by energy and dollars saved from those specific measures. There are often benefits to recommended measures beyond potential energy and dollars saved. Improved comfort, air quality, and reduced maintenance, are all potential non energy saving benefits.

This audit has been prepared with the best of intentions to assist the Eversource and the Town of Sunapee make informed decisions regarding improvements. We do not make any warranty, expressed or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed.

Executive Summary

Sunapee's Town Offices are housed in a two story, ranch style building constructed around 1990. The main level and parts of the lower (basement) level are heated by the original propane fired, direct vent, condensing furnace. Summer cooling is provided by an outdoor condensing unit manufactured in 2010. The meeting room in the basement is heated by a direct vent MPI space heater and has no summer cooling.

The building has a remarkably low Energy Utilization Index (EUI) as described on the next page. In fact, the EUI is one of the lowest in the State for Town Offices in the building, in large part due to a relatively efficient thermal envelope and high efficiency propane furnace. Using NH Saves 'Test Your Home' Heating Index calculator (by entering floor area, zip code, and amount of heating fuel), the resulting score is 2.08 on a scale range of 0 to 16.

Heating Energy Index Results from NHSaves.com

While this is certainly good news, it also means that at $1.00 per square foot energy costs, there are few opportunities for cost effective ESM. The insulation above the ceiling is far less effective than it could be and a recommended strategy is included to bring it to code based performance, though with a poor ROI at current propane prices.

Seventy percent of annual energy costs are due to electric usage and lighting has already been upgraded to LED. Eliminating 'phantom loads' by turning office equipment off is the first of two recommended ESM.

Summary of Cost and Energy Savings Analysis of Recommendations

ESM #1 reflects purchasing power strips capable of stopping power to all plug loads. Exception would be any device which has to remain on for security reasons. Computers which up-date on a regular basis could be scheduled to update on one night only. The purpose of this ESM is to eliminate electric energy usage when the office is unoccupied and equipment is not being used. "Sleep mode" still draws energy, and with so many devices on 24/7, 365 days a year, it adds up to an estimated 1830 kWh at a cost of $284 per year. Calculated by 13 stations drawing 21 watts, times 6680 hours of 'sleep mode'.

Some desks already have power strips, but the ESM allows for purchasing one for each station as needed. The simple pay back (excluding the extra few minutes each day turning devices back on) is less than one year with an overall investment gain of $6873 over the life of the measure and a 14.9% annualized return on investment (ROI).

A summary analysis of electric consumption can be found on the next page and in the Elite Software Report at the end of this report.

ESM #2 involves removing all the existing insulation material above the ceiling plane, air sealing above all wall top plates, (exterior and interior), and then blowing in 18" of cellulose in an even layer, and mounding insulation over the return ducts. The estimated cost is $7,116 though that may not reflect increased material costs or the added time related to the small access above a hallway in the locked, non public, portion of the building. At a price of $1.57 per gallon of propane, the estimated dollar savings is $288 a year with a barely positive annualized ROI over the 25 year life of measure. Annual propane savings is estimated at 183 gallons, or 16.7 million Btus.

The measure is recommended, in conjunction with the electric savings of ESM #1 because it can be expected that the price of burning fossil fuels will rise—perhaps dramatically– over the next decades and because of the very positive impact on comfort in both winter and summer.

Thermographic images of the ceiling and photos of the existing insulation and can be found on pages 8-11.

ESM #	ESM	Cost of Measure	Annual Savings	Simple Payback Years	Life of Measure	Invest-ment Gain	ROI	Annual ROI
1	Power Strips	$220	$284	0.8	25	$6,873	3124.0%	14.9%
2	Ceiling	$7,116	$288	24.7	25	$84	1.2%	0.1%
ESM 1-2	TOTALS	$7,336	$572	12.8	25	$6,957	94.8%	2.7%

Energy cost savings summary:

ESM #	ESM	Cost of Measure	Propane Gals Saved Annually	kWh Saved Annually	Site Energy Reduction	Source Energy Reduction	Tons CO2 Reductions Annually
1	Power Strips	$220	0	1830	6.2	20.8	0.8
2	Ceiling	$7,116	183	0	16.7	18.4	1.1
ESM 1-2	TOTALS	$7,336	183	1830	23.0	39	2

Existing Energy Use Analysis

The energy analysis below is based on the 2019 energy data provided for propane and electric.

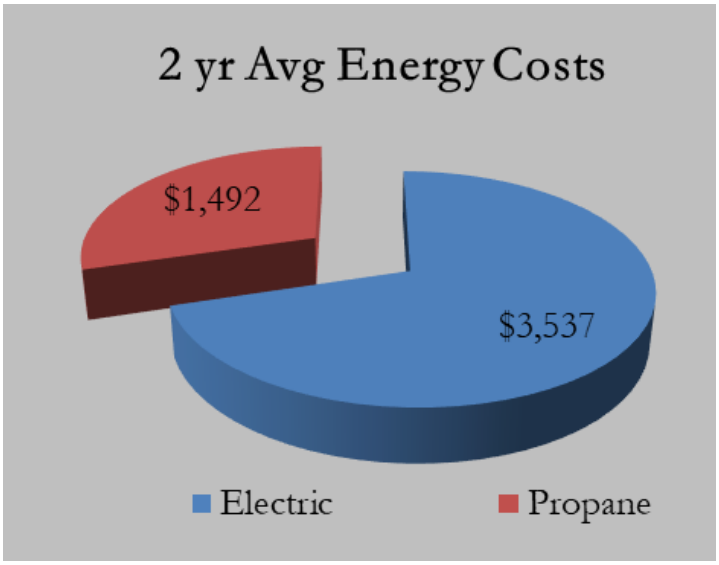
Energy	Units	Site Btus	Source Btus	$ Cost	CO2 Tons
Electric kWh	21,887	74,678,444	248,658,207	$3,537	9.7
Propane Gallons	950	86,735,000	99,745,250	$1,492	5.9
Totals		161,413,444	348,403,457	$5,029	15.6
EUI KBtu/FT2	5032	**32.1**	**69.2**	**$1.00**	

The Energy Utilization Index (EUI) offers a simple snapshot analysis of a building's energy use by looking at total amount of energy input (converted to Btu's) divided by the floor area of conditioned space. "Site Energy" refers to units of energy delivered to a site. Source energy includes transmission and some allowance for off site generation and other considerations. Source energy attempts to reflect the amount of energy is required to generate and deliver energy to the site, for a more accurate calculation of costs and carbon emissions.

Based on the information provided the Office Site EUI is 32.1KBtu/ft2, Source EUI of 69.2KBtu/FT2 and at a cost $1.00 per ft2 based on a two year average propane price of $1.57 per gallon.

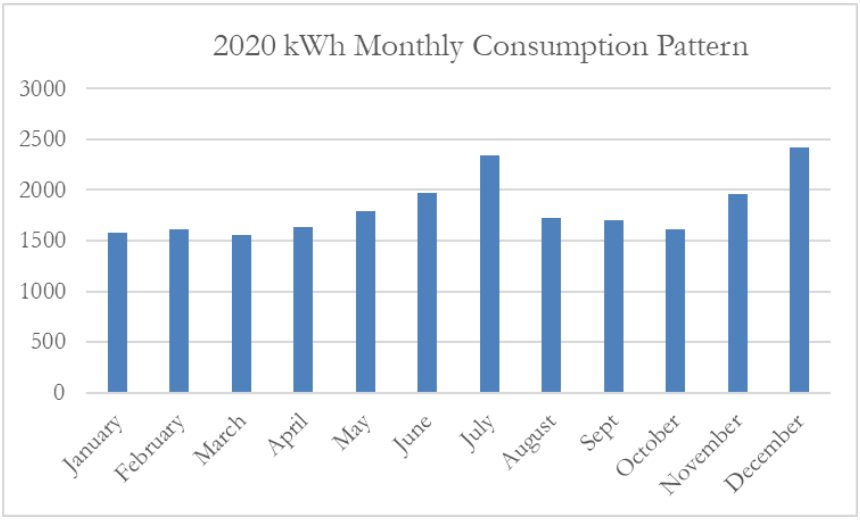
The pie chart to the right shows propane heating costs are currently under $1500 per year with electric costs over $3500 per year.

End Usage	Dollars
Heating	$1,492.05
Cooling	$570.08
Equipment	$2,708.72
Hot Water	$113.72
Service Charges	$195.00
TOTALS	$5,029.09

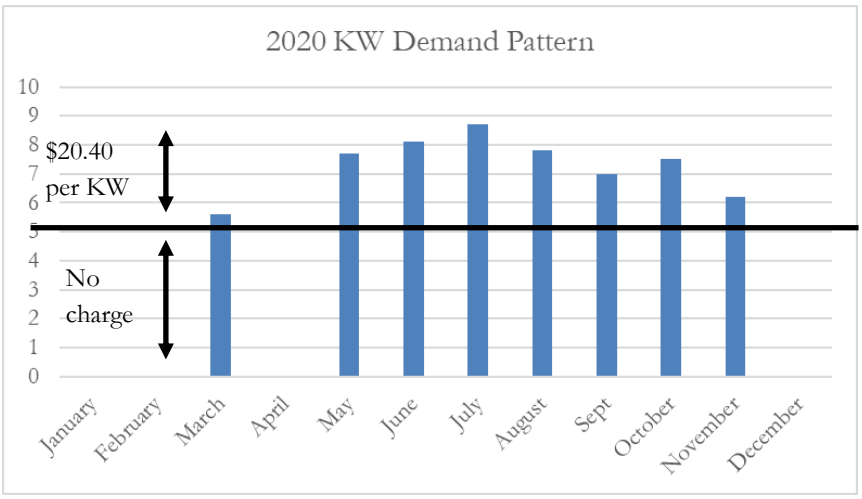


Electric Data

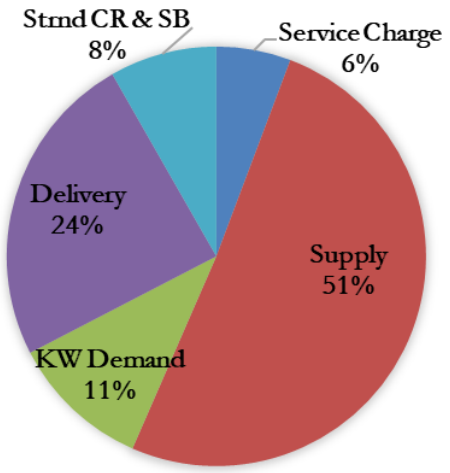
2020	kWh	KW
January	1578	
February	1618	
March	1555	5.6
April	1631	
May	1793	7.7
June	1967	8.1
July	2337	8.7
August	1722	7.8
Sept	1698	7
October	1613	7.5
Novem-ber	1956	6.2
December	2419	
	21887	



Service Charge	$194.52
Supply	$1,720.32
KW Demand	$367.20
Distribution	$824.03
Strnd Cost	$268.12
Systems Benefit	$162.62
	$3,537



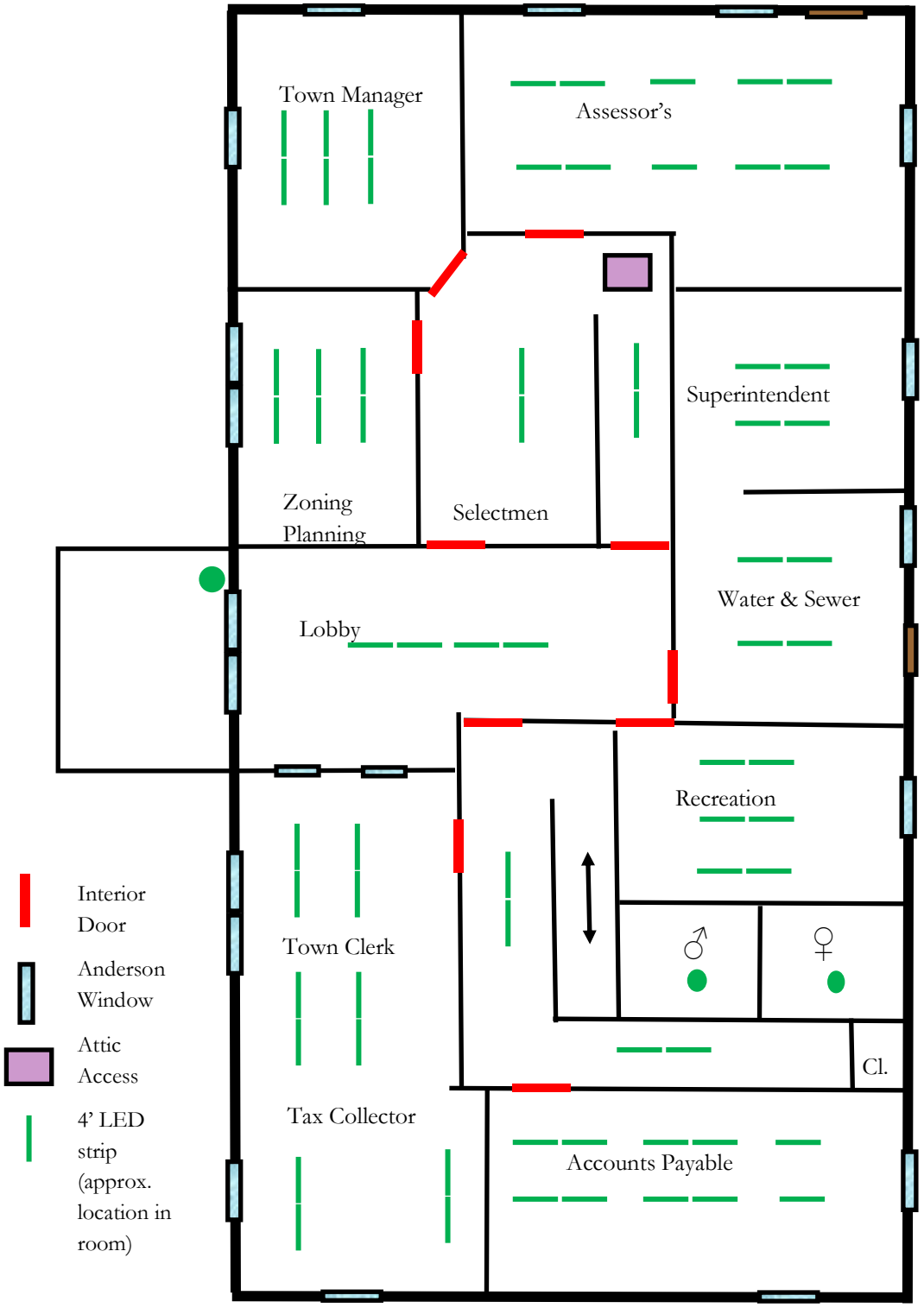
KW Demand Charges =
$20.40 per KW over 5.0



End Use	Electric $	kWh
Heating	$101.84	657
Cooling	$570.08	3678
Lighting	$1,240.55	7346
Hot Water	$113.71	734
Office Equipment	$1,023.00	6600
Appliances	$445.17	2872
	$3,494.35	21887

Meter # 74 928 968

Main Level


Town Manager
Assessor's
Superintendent
Zoning
Planning
Selectmen
Water & Sewer
Lobby
Recreation
Town Clerk
Cl.
Tax Collector
Accounts Payable
Interior Door
Anderson Window
Attic Access
4' LED strip (approx. location in room)

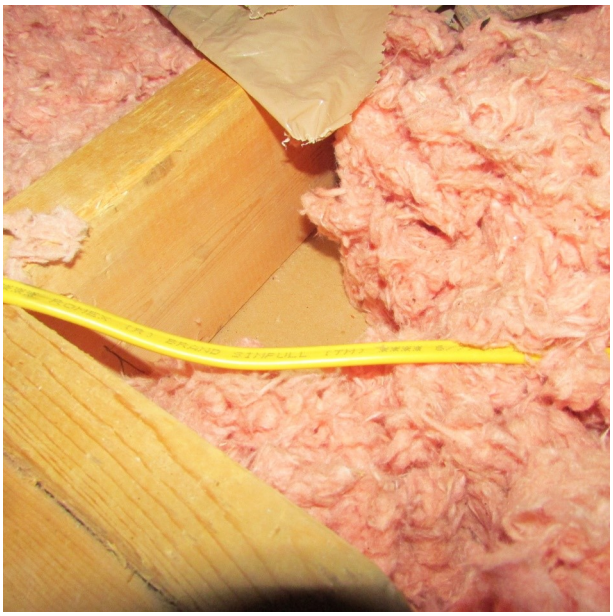
Ceiling Thermal Barrier

The sheetrock ceiling is attached directly to the ceiling joists, without the issues associated with strapping and the air gap created by a vapor retarder membrane. While there is no vapor retarder, there doesn't appear to be significant issues to date.

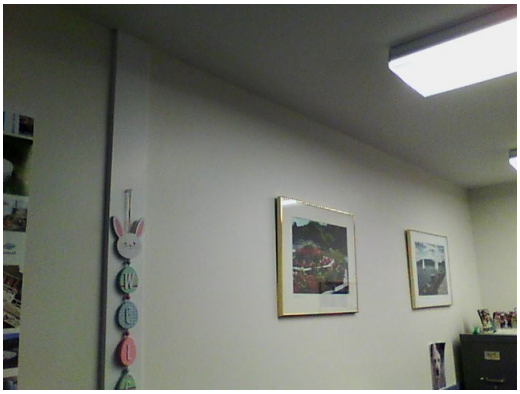
Loose fill, low density, fiberglass is blown in to thickness ranging from two to 10 inches, resulting in insulation effectiveness between R4 to R20.

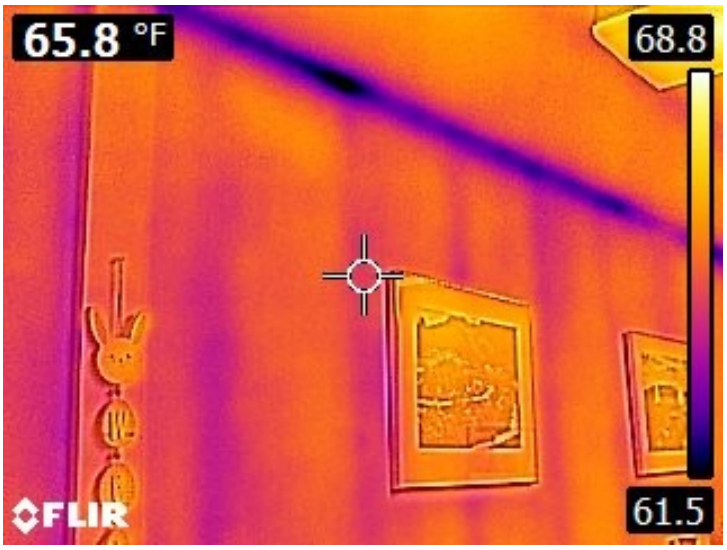
	Area FT2	R-Value	U-Value	UA
	2,400	16	0.06	150.0
	1,800	20	0.05	90.0
	200	4	0.25	50.0
	632	18	0.06	35.1
Totals	5,032			325.1
Average		16	0.06	

On site inspection to estimate insulation thicknesses by surface area resulted in overall u value of 0.06.



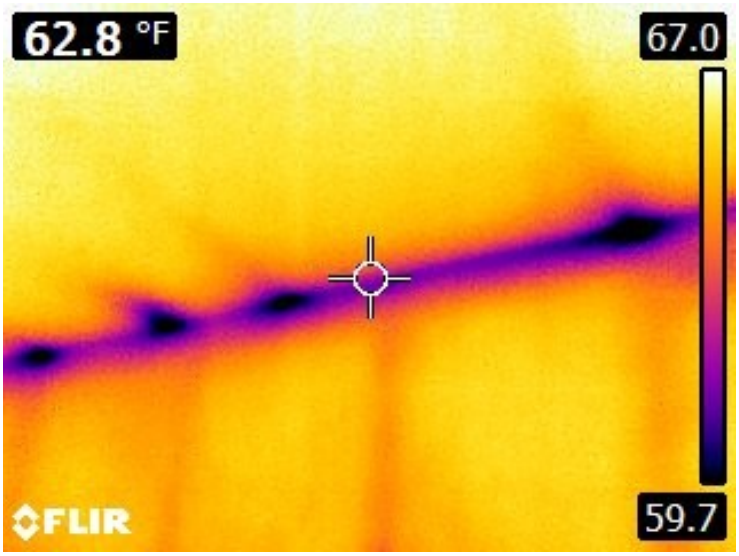
Thermographic Images

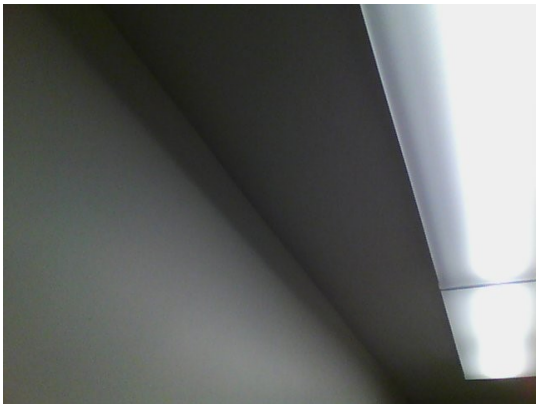


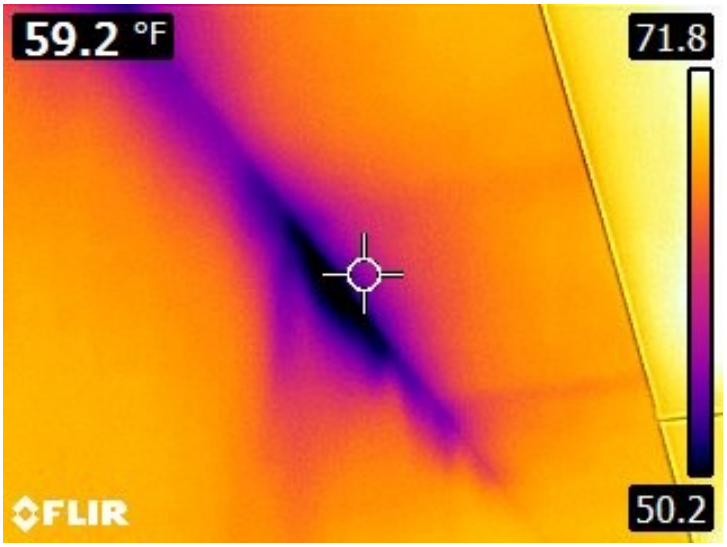


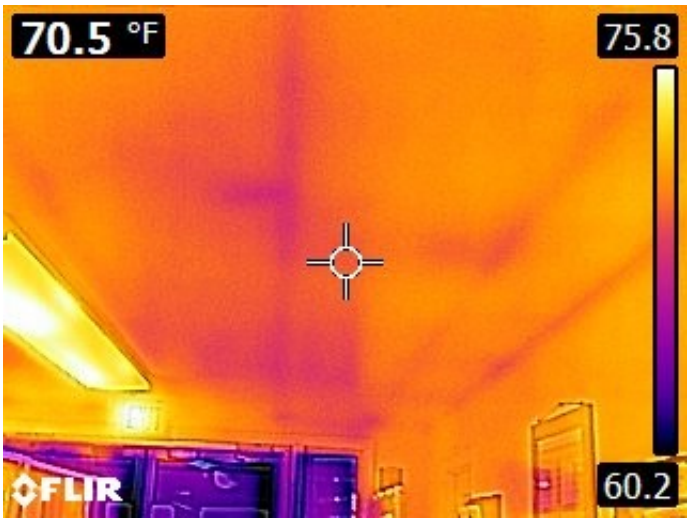
Thermographic (aka Infra Red or IR) images depict differences in surface temperatures. Darker colors indicate cooler surfaces. Dark streaks or 'blobs' can indicate outside cold air movement, either infiltrating into the building or wind washing through low density insulation materials like fiberglass.

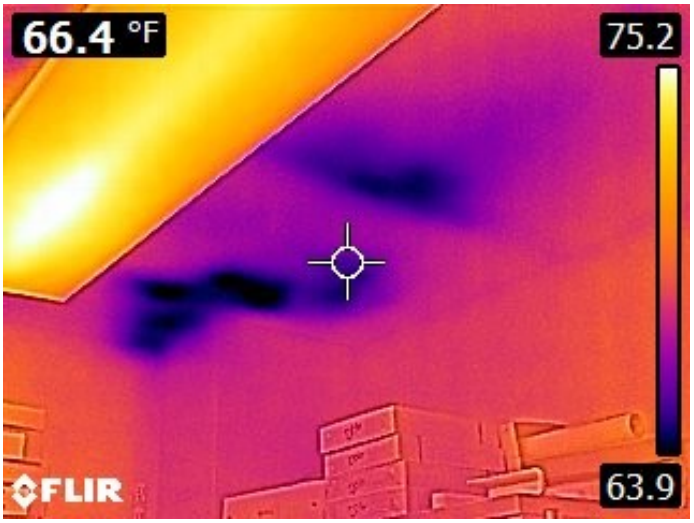
The images on these three pages show the deficiencies of the existing insulation above the ceiling on both exterior and interior walls and wiring penetrations and indicate the need for air sealing and replacing the existing insulation with a higher density material. A high quality cellulose is recommended.



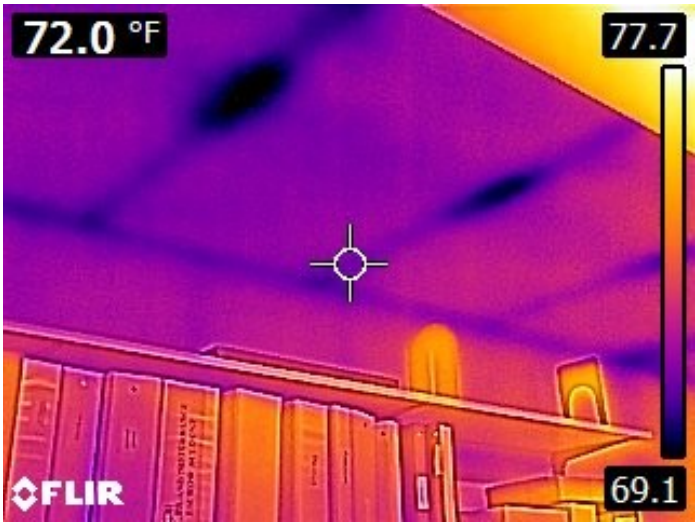


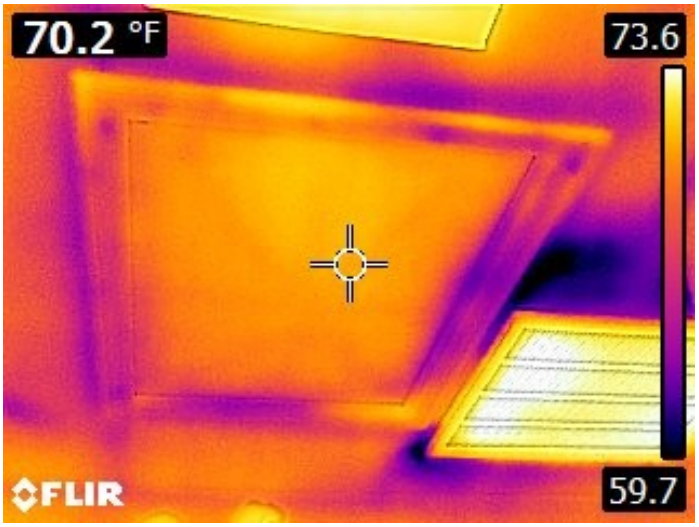


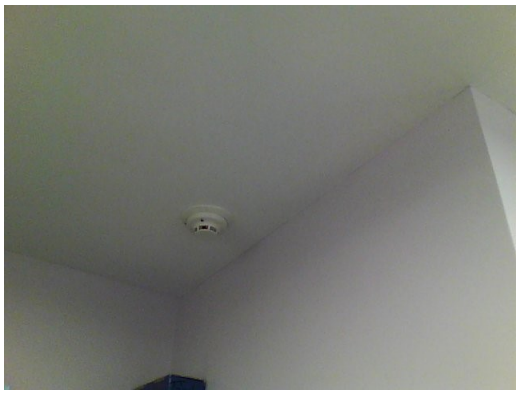

70.5 °F
75.8
60.2
FLIR

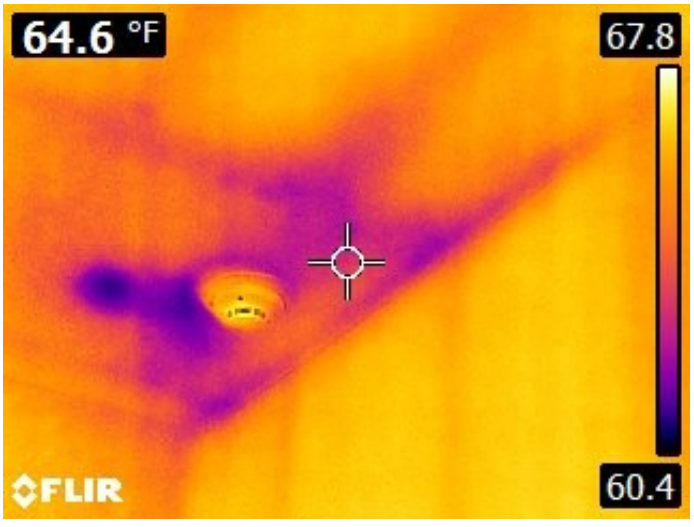

66.4 °F
75.2
63.9
FLIR


71.1 °F
74.4
66.7
FLIR


72.0 °F
77.7
69.1
FLIR

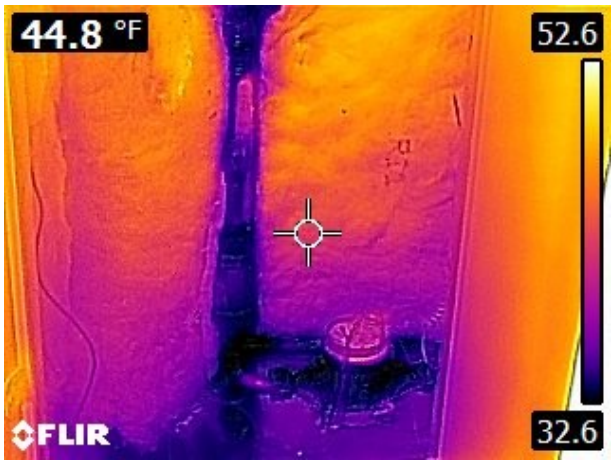

70.2 °F
73.6
59.7
FLIR




64.6 °F
67.8
60.4
FLIR

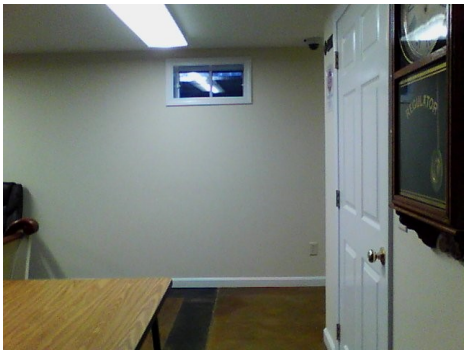
The Meeting Room—Lower Level

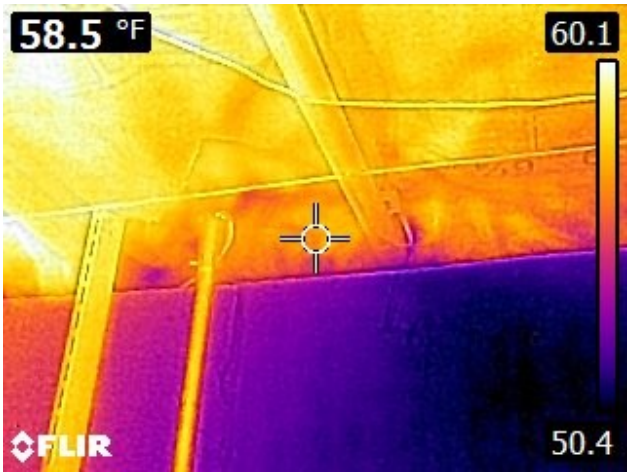
The meeting room appears to have several areas of outside air infiltration, notably in the corner cubby where the water line enters the building and the one window. Weatherstripping these areas will reduce infiltration, but with little impact on heat loss and potentially depriving the room with adequate air exchange during meetings.

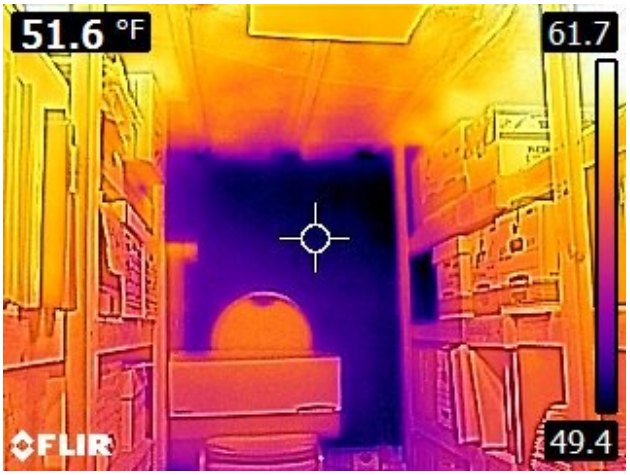


Basement Walls

Finished walls have been framed out with 2x4's, fiberglass batts, and sheetrock finished surfaces. Unfinished walls remain poured concrete and significant sources of heat loss, though not cost effective to insulate at this time. Removing fiberglass from rim and band joists and insulating with closed cell spray or rigid foam is normally recommended, but in this case would yield un-impressive energy savings. Noted here for future consideration.

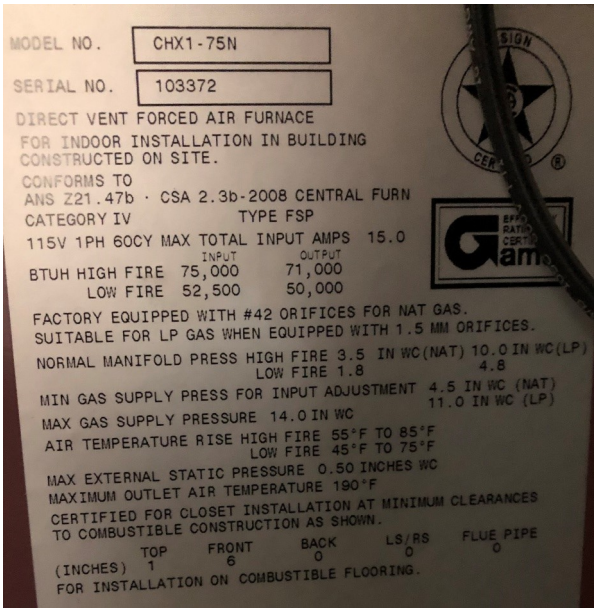




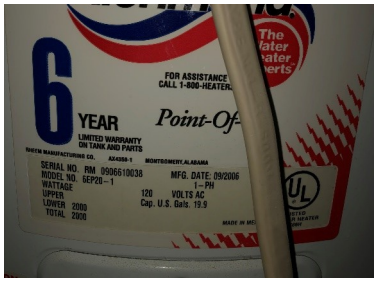


Heating Equipment

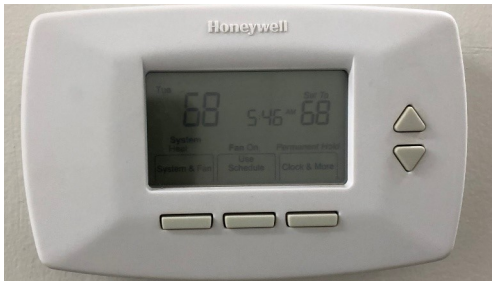
Direct vent forced air furnace with cool and warm air supplied to the first floor and kitchen, with return ducts in the attic.



Basement level meeting room is heated by a vented propane space heater. Name plate unavailable.



19 gallon hot water heater installed in 2006 with 2000 watt elements



Main level space heating controlled by Honeywell 7-day programmable thermostat.

A humidifier was installed in 2012, presumably to address a feeling of dry air in the winter. Dry air is typically associated with outside air infiltration and adding moisture can risk condensation issues.

Once the ceiling plane is air sealed and re-insulated, air leakage will be reduced and humidity levels rise. It is strongly advised to limit humidification in the ductwork to prevent moisture related issues in the building and impacting air quality.

Summer Cooling

An outside 4 ton condenser unit was installed in 2010 to provide cooling on the main level and kitchen / break room. Model 4AC13048ASA1T from Thermo Pace. When it is time to replace this unit, selecting a more efficient condenser with minimum 18 SEER is recommended.

Town Offices EXISTING
HVAC Load Calculations

for

Town Of Sunapee

Sunapee, NH, 03782

Elite Software

RHVAC Residential HVAC Loads

Prepared By:

Margaret Dillon
S.E.E.D.S.

603-532-8979
Sunday, July 25, 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:	Town Offices EXISTING
Project Date:	Wednesday, June 23, 2021
Client Name:	Town Of Sunapee
Client City:	Sunapee, NH, 03782
Company Name:	S.E.E.D.S.
Company Representative:	Margaret Dillon
Company Phone:	603-532-8979
Company E-Mail Address:	mdillon@myfairpoint.net

Design Data

Reference City:		Concord AP, New Hampshire
Building Orientation:		Front door faces Northwest
Daily Temperature Range:		High
Latitude:	43	Degrees
Elevation:	342	ft.
Altitude Factor:	0.988	

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	n/a	n/a	70	n/a
Summer:	87	70	43%	50%	75	19

Check Figures

Total Building Supply CFM:	1,049	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	5,032	Square ft. Per Ton:	1,295 **
Volume (ft³):	13,728***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

Building Loads

Total Heating Required Including Ventilation Air:	45,884	Btuh	45.884	MBH
Total Sensible Gain:	23,128	Btuh	86	%
Total Latent Gain:	3,877	Btuh	14	%
Total Cooling Required Including Ventilation Air:	27,005	Btuh	2.25	Tons (Based On Sensible + Latent)

Notes

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.
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 LP Condensing Furnace Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	80%	n/a	70	n/a
Summer:	87	70	43%	50%	75	18.65

System 2 Meeting Room Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	80%	n/a	70	n/a
Summer:	87	70	43%	50%	75	18.65

Duct Sizing Inputs

	Main Trunk		Runouts	
Calculate:	No		No	
Use Schedule:	No		No	
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:	0.553	AC/hr	0.509	AC/hr
	126	CFM	116	CFM
Infiltration Actual:	0.553	AC/hr	0.509	AC/hr
Building Volume:	X 13,728*	Cu.ft.	X 13,728*	Cu.ft.
	7,590	Cu.ft./hr	6,990	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	126	CFM	116	CFM
Total Building Ventilation:	0	CFM	0	CFM

*Indicated volume is based on custom building volume.

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 13.04 = (1.10 X 0.988 X 12.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 12.52 = (0.68 X 0.988 X 18.65 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 78.23 = (1.10 X 0.988 X 72.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.587 AC/hr (105 CFM)
Summer Infiltration Specified: 0.587 AC/hr (105 CFM)

---System 2---

Infiltration & Ventilation Sensible Gain Multiplier: 13.04 = (1.10 X 0.988 X 12.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 12.52 = (0.68 X 0.988 X 18.65 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 78.23 = (1.10 X 0.988 X 72.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.430 AC/hr (21 CFM), Construction: Semi-Loose
Summer Infiltration Specified: 0.230 AC/hr (11 CFM), Construction: Semi-Loose

Duct Load Factor Scenarios for System 1

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Supply		Cond. Space	-	0.12	6	200	No
1	Return		Attic	16B	0.12	6	157	No

Load Preview Report

Scope	Net Ton	ft.²/Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	2.25	1,295	5,032	23,128	3,877	27,005	45,884	580	996	1,049	
System 1	2.25	1,295	3,933	23,128	3,877	27,005	41,909	528	996	996	0*
Return Duct				1,477	162	1,639	1,744				
Zone 1			3,933	21,651	3,715	25,366	40,165	528	996	996	
1-Entry			270	3,560	80	3,640	3,823	50	164	164	2--0*
2-Zoning.Planning			150	1,746	280	2,026	2,148	28	80	80	1--0*
3-Town Manager			195	1,610	350	1,960	3,266	43	74	74	1--0*
4-Assessing			413	2,873	622	3,495	5,945	78	132	132	2--0*
5-Superintendant			169	1,879	334	2,213	2,775	36	86	86	1--0*
6-North Hall			56	148	0	148	242	3	7	7	1--0*
7-Selectmen's Office			140	614	200	814	605	8	28	28	1--0*
8-Water & Sewer			119	1,325	251	1,576	2,038	27	61	61	1--0*
9-Recreation			152	1,218	251	1,469	1,490	20	56	56	1--0*
10-Restroom			49	181	35	216	624	8	8	8	1--0*
11-Restroom 2			49	129	0	129	211	3	6	6	1--0*
12-Hallway			180	510	21	531	1,033	14	23	23	1--0*
13-AP			276	2,248	587	2,835	4,035	53	103	103	1--0*
14-Town Clerk & Tax Collector			299	3,301	592	3,893	4,719	62	152	152	2--0*
15-Kitchen			399	308	112	420	1,794	24	14	14	1--0*
17-Basement Storage			1,018	0	0	0	5,417	71	0	0	0--0
System 2	0.00	0	1,099	0	0	0	3,975	52	0	52	0*
Zone 1			1,099	0	0	0	3,975	52	0	52	
16-Meeting Room			1,099	0	0	0	3,975	52	0	52	1--0*

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cm-o: Glazing-Double pane, operable window, clear, metal frame no break, U-value 0.67, SHGC 0.67	36.7	1,771	0	2,600	2,600
Anderson DH: Glazing-Anderson Double Hung, U-value 0.32, SHGC 0.38	214.8	4,938	0	6,681	6,681
11L: Door-Metal - Paper Honeycomb Core, U-value 0.56	57.1	2,304	0	384	384
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs, U-value 0.068	948.2	4,642	0	218	218
12E-4sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, R-4 board insulation, siding finish, wood studs, U-value 0.055	573	2,269	0	148	148
13BA-0fcw: Wall-Block, framing with R-11 in 2 x 4 stud cavity, filled core, wood studs, U-value 0.088	436.8	2,768	0	68	68
15A-0oc-2: Wall-Basement, concrete block wall, no insulation or framing, no interior finish, open core, 2' floor depth, U-value 0.09	260	4,282	0	0	0
Blown in FG Poor-al: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Custom, Blown in 2 to 10 inches, no VB, no AS, light asphalt, U-value 0.06	2515.8	10,869	0	6,340	6,340
22A-ph: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, heavy moist soil, U-value 0.08	70	403	0	0	0
Subtotals for structure:		34,246	0	16,439	16,439
People:	18		2,400	2,760	5,160
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,744	162	1,477	1,639
Infiltration: Winter CFM: 126, Summer CFM: 116		9,894	1,315	1,368	2,683
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	1,084	1,084
Total Building Load Totals:		45,884	3,877	23,128	27,005

Check Figures

Total Building Supply CFM:	1,049	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	5,032	Square ft. Per Ton:	1,295 **
Volume (ft³):	13,728***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

Building Loads

Total Heating Required Including Ventilation Air:	45,884	Btuh	45.884	MBH
Total Sensible Gain:	23,128	Btuh	86	%
Total Latent Gain:	3,877	Btuh	14	%
Total Cooling Required Including Ventilation Air:	27,005	Btuh	2.25	Tons (Based On Sensible + Latent)

Notes

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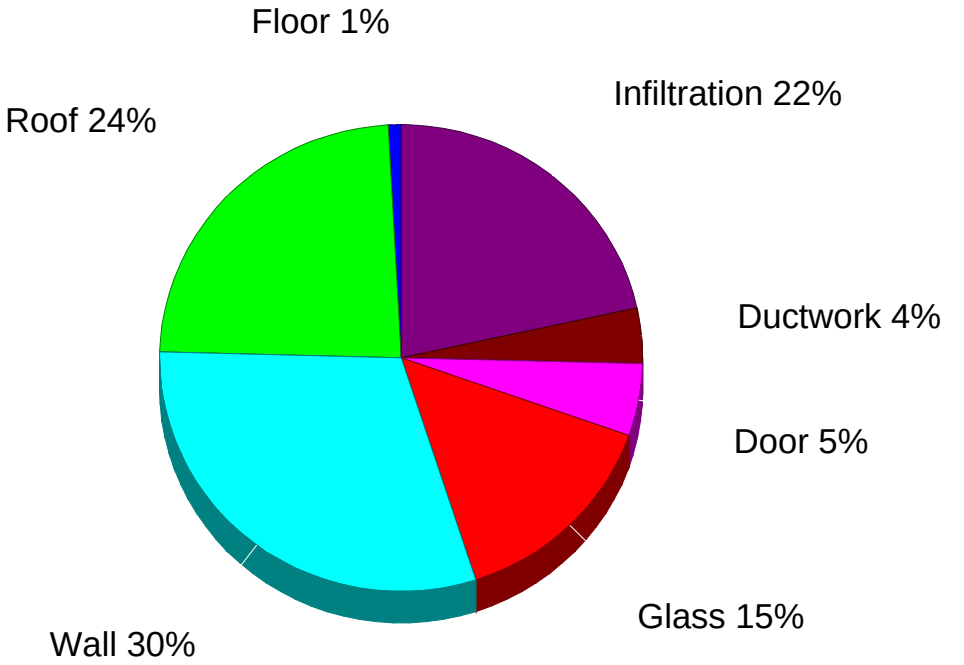
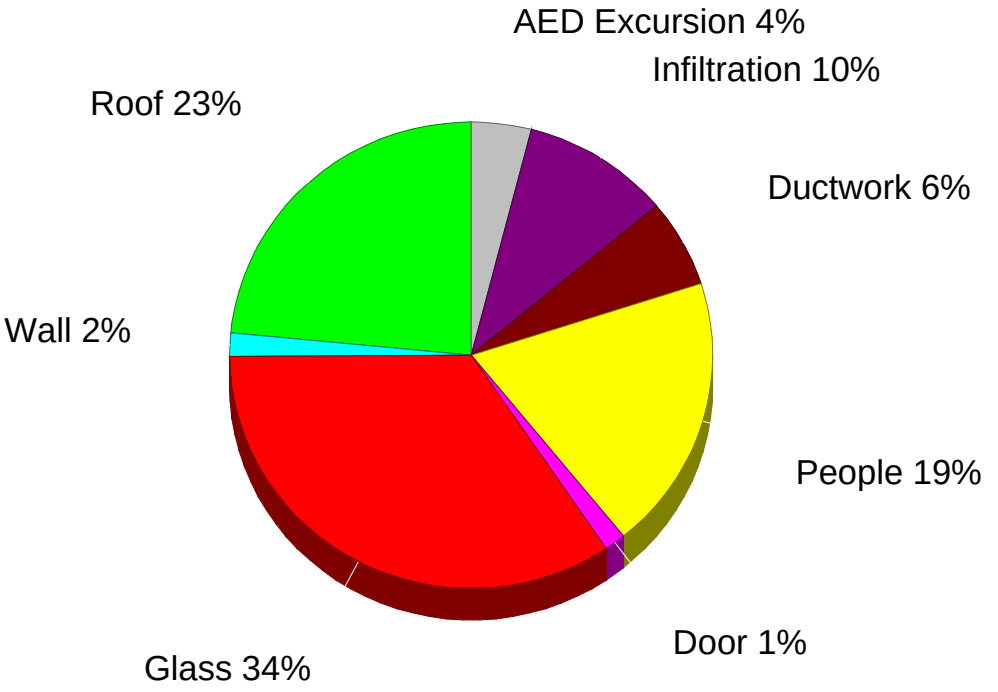
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

Building Pie Chart





System 1 LP Condensing Furnace Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cm-o: Glazing-Double pane, operable window, clear, metal frame no break, U-value 0.67, SHGC 0.67	36.7	1,771	0	2,600	2,600
Anderson DH: Glazing-Anderson Double Hung, U-value 0.32, SHGC 0.38	207.6	4,774	0	6,681	6,681
11L: Door-Metal - Paper Honeycomb Core, U-value 0.56	57.1	2,304	0	384	384
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs, U-value 0.068	948.2	4,642	0	218	218
12E-4sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, R-4 board insulation, siding finish, wood studs, U-value 0.055	573	2,269	0	148	148
13BA-0fcw: Wall-Block, framing with R-11 in 2 x 4 stud cavity, filled core, wood studs, U-value 0.088	164.4	1,042	0	68	68
15A-0oc-2: Wall-Basement, concrete block wall, no insulation or framing, no interior finish, open core, 2' floor depth, U-value 0.09	260	4,282	0	0	0
Blown in FG Poor-al: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Custom, Blown in 2 to 10 inches, no VB, no AS, light asphalt, U-value 0.06	2515.8	10,869	0	6,340	6,340
Subtotals for structure:		31,953	0	16,439	16,439
People:	12		2,400	2,760	5,160
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,744	162	1,477	1,639
Infiltration: Winter CFM: 105, Summer CFM: 105		8,212	1,315	1,368	2,683
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	1,084	1,084
System 1 LP Condensing Furnace Load Totals:		41,909	3,877	23,128	27,005

Check Figures

Supply CFM:	996	CFM Per Square ft.:	0.342 *
Square ft. of Room Area:	3,933	Square ft. Per Ton:	1,295 **
Volume (ft³):	10,729***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

System Loads

Total Heating Required Including Ventilation Air:	41,909	Btuh	41.909	MBH
Total Sensible Gain:	23,128	Btuh	86	%
Total Latent Gain:	3,877	Btuh	14	%
Total Cooling Required Including Ventilation Air:	27,005	Btuh	2.25	Tons (Based On Sensible + Latent)

Notes

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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.

System 2 Meeting Room Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Anderson DH: Glazing-Anderson Double Hung, U-value 0.32, SHGC 0.38	7.2	164	0	0	0
13BA-0fcw: Wall-Block, framing with R-11 in 2 x 4 stud cavity, filled core, wood studs, U-value 0.088	272.4	1,726	0	0	0
22A-ph: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, heavy moist soil, U-value 0.08	70	403	0	0	0
Subtotals for structure:		2,293	0	0	0
People:	6		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 21, Summer CFM: 11		1,682	0	0	0
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
System 2 Meeting Room Load Totals:		3,975	0	0	0

Check Figures

Supply CFM:	52	CFM Per Square ft.:	0.048 *
Square ft. of Room Area:	1,099	Square ft. Per Ton:	0 **
Volume (ft³):	2,999***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

System Loads

Total Heating Required Including Ventilation Air:	3,975	Btuh	3.975	MBH

Notes

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Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

Town Offices R50 And Sealed Ceiling
HVAC Load Calculations

for

Town Of Sunapee

Sunapee, NH, 03782

Elite Software

RHVAC Residential HVAC Loads

Prepared By:

Margaret Dillon
S.E.E.D.S.

603-532-8979
Sunday, July 25, 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:	Town Offices R50 And Sealed Ceiling
Project Date:	Wednesday, June 23, 2021
Client Name:	Town Of Sunapee
Client City:	Sunapee, NH, 03782
Company Name:	S.E.E.D.S.
Company Representative:	Margaret Dillon
Company Phone:	603-532-8979
Company E-Mail Address:	mdillon@myfairpoint.net

Design Data

Reference City:		Concord AP, New Hampshire
Building Orientation:		Front door faces Northwest
Daily Temperature Range:		High
Latitude:	43	Degrees
Elevation:	342	ft.
Altitude Factor:	0.988	

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	n/a	n/a	70	n/a
Summer:	87	70	43%	50%	75	19

Check Figures

Total Building Supply CFM:	833	CFM Per Square ft.:	0.208	*
Square ft. of Room Area:	5,032	Square ft. Per Ton:	1,602	**
Volume (ft³):	13,728***			

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

Building Loads

Total Heating Required Including Ventilation Air:	35,745	Btuh	35.745	MBH
Total Sensible Gain:	18,420	Btuh	84	%
Total Latent Gain:	3,414	Btuh	16	%
Total Cooling Required Including Ventilation Air:	21,834	Btuh	1.82	Tons (Based On Sensible + Latent)

Notes

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.
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 LP Condensing Furnace Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	80%	n/a	70	n/a
Summer:	87	70	43%	50%	75	18.65

System 2 Meeting Room Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-2	-2.6	80%	n/a	70	n/a
Summer:	87	70	43%	50%	75	18.65

Duct Sizing Inputs

	Main Trunk		Runouts	
Calculate:	No		No	
Use Schedule:	No		No	
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:	0.400	AC/hr	0.356	AC/hr
	91	CFM	81	CFM
Infiltration Actual:	0.400	AC/hr	0.356	AC/hr
Building Volume:	X 13,728*	Cu.ft.	X 13,728*	Cu.ft.
	5,490	Cu.ft./hr	4,890	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	91	CFM	81	CFM
Total Building Ventilation:	0	CFM	0	CFM

*Indicated volume is based on custom building volume.

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 13.04 = (1.10 X 0.988 X 12.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 12.52 = (0.68 X 0.988 X 18.65 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 78.23 = (1.10 X 0.988 X 72.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.391 AC/hr (70 CFM)
Summer Infiltration Specified: 0.391 AC/hr (70 CFM)

---System 2---

Infiltration & Ventilation Sensible Gain Multiplier: 13.04 = (1.10 X 0.988 X 12.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 12.52 = (0.68 X 0.988 X 18.65 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 78.23 = (1.10 X 0.988 X 72.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.430 AC/hr (21 CFM), Construction: Semi-Loose
Summer Infiltration Specified: 0.230 AC/hr (11 CFM), Construction: Semi-Loose

Duct Load Factor Scenarios for System 1

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Supply		Cond. Space	-	0.12	6	200	No
1	Return		Attic	16B	0.12	6	157	No

Load Preview Report

Scope	Net Ton	ft²/Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	1.82	1,602	5,032	18,420	3,414	21,834	35,745	449	781	833	
System 1	1.82	1,602	3,933	18,420	3,414	21,834	31,770	397	781	781	0*
Return Duct				1,448	138	1,586	1,587				
Zone 1			3,933	16,972	3,276	20,248	30,183	397	781	781	
1-Entry			270	3,100	53	3,153	2,887	38	143	143	2--0*
2-Zoning,Planning			150	1,474	253	1,727	1,557	20	68	68	1--0*
3-Town Manager			195	1,228	300	1,528	2,407	32	57	57	1--0*
4-Assessing			413	2,093	548	2,641	4,315	57	96	96	1--0*
5-Superintendant			169	1,555	289	1,844	2,024	27	72	72	1--0*
6-North Hall			56	50	0	50	81	1	2	2	1--0*
7-Selectmen's Office			140	372	200	572	202	3	17	17	1--0*
8-Water & Sewer			119	1,113	234	1,347	1,595	21	51	51	1--0*
9-Recreation			152	943	234	1,177	950	12	43	43	1--0*
10-Restroom			49	83	23	106	414	5	4	4	1--0*
11-Restroom 2			49	44	0	44	70	1	2	2	1--0*
12-Hallway			180	186	14	200	471	6	9	9	1--0*
13-AP			276	1,716	525	2,241	2,868	38	79	79	1--0*
14-Town Clerk & Tax Collector			299	2,743	528	3,271	3,476	46	126	126	2--0*
15-Kitchen			399	271	75	346	1,571	21	12	12	1--0*
17-Basement Storage			1,018	0	0	0	5,295	70	0	0	0--0
System 2	0.00	0	1,099	0	0	0	3,975	52	0	52	0*
Zone 1			1,099	0	0	0	3,975	52	0	52	
16-Meeting Room			1,099	0	0	0	3,975	52	0	52	1--0*

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cm-o: Glazing-Double pane, operable window, clear, metal frame no break, U-value 0.67, SHGC 0.67	36.7	1,771	0	2,600	2,600
Anderson DH: Glazing-Anderson Double Hung, U-value 0.32, SHGC 0.38	214.8	4,938	0	6,681	6,681
11L: Door-Metal - Paper Honeycomb Core, U-value 0.56	57.1	2,304	0	384	384
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs, U-value 0.068	948.2	4,642	0	218	218
12E-4sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, R-4 board insulation, siding finish, wood studs, U-value 0.055	573	2,269	0	148	148
13BA-0fcw: Wall-Block, framing with R-11 in 2 x 4 stud cavity, filled core, wood studs, U-value 0.088	436.8	2,768	0	68	68
15A-0oc-2: Wall-Basement, concrete block wall, no insulation or framing, no interior finish, open core, 2' floor depth, U-value 0.09	260	4,282	0	0	0
16B-50: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-50 insulation, U-value 0.02	270	389	0	227	227
16B-50-al: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), vented attic, no radiant barrier, R-50 insulation, light asphalt, U-value 0.02	2245.8	3,234	0	1,888	1,888
22A-ph: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, heavy moist soil, U-value 0.08	70	403	0	0	0
Subtotals for structure:		27,000	0	12,214	12,214
People:	18		2,400	2,760	5,160
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,587	138	1,448	1,586
Infiltration: Winter CFM: 91, Summer CFM: 81		7,158	876	914	1,790
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	1,084	1,084
Total Building Load Totals:		35,745	3,414	18,420	21,834

Check Figures

Total Building Supply CFM:	833	CFM Per Square ft.:	0.208 *
Square ft. of Room Area:	5,032	Square ft. Per Ton:	1,602 **
Volume (ft³):	13,728***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

Building Loads

Total Heating Required Including Ventilation Air:	35,745	Btuh	35.745	MBH
Total Sensible Gain:	18,420	Btuh	84	%
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Total Cooling Required Including Ventilation Air:	21,834	Btuh	1.82	Tons (Based On Sensible + Latent)

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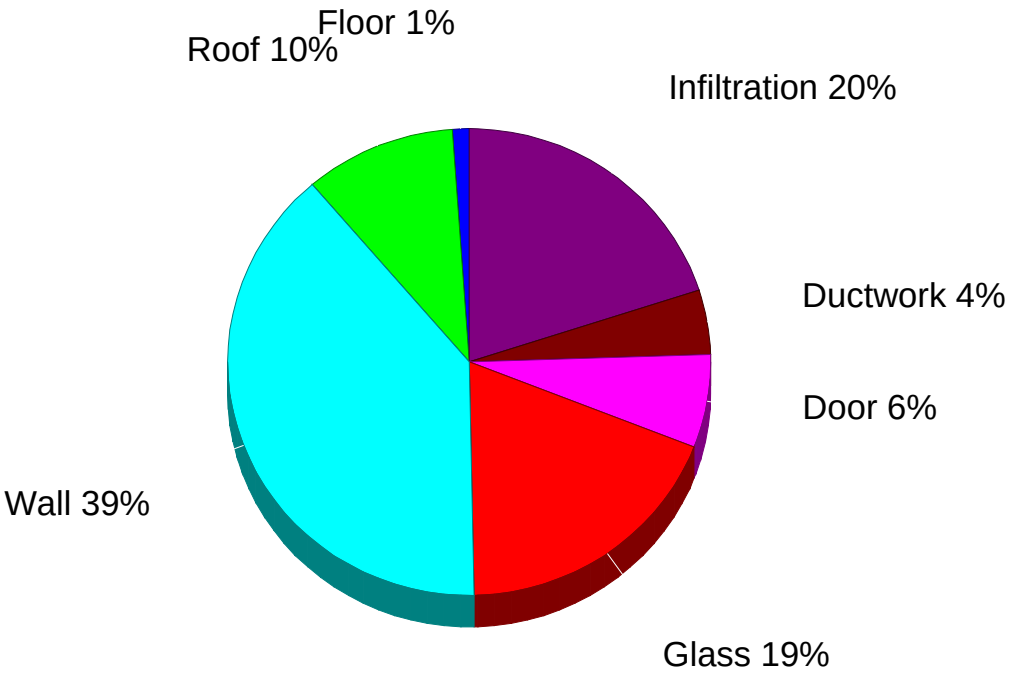
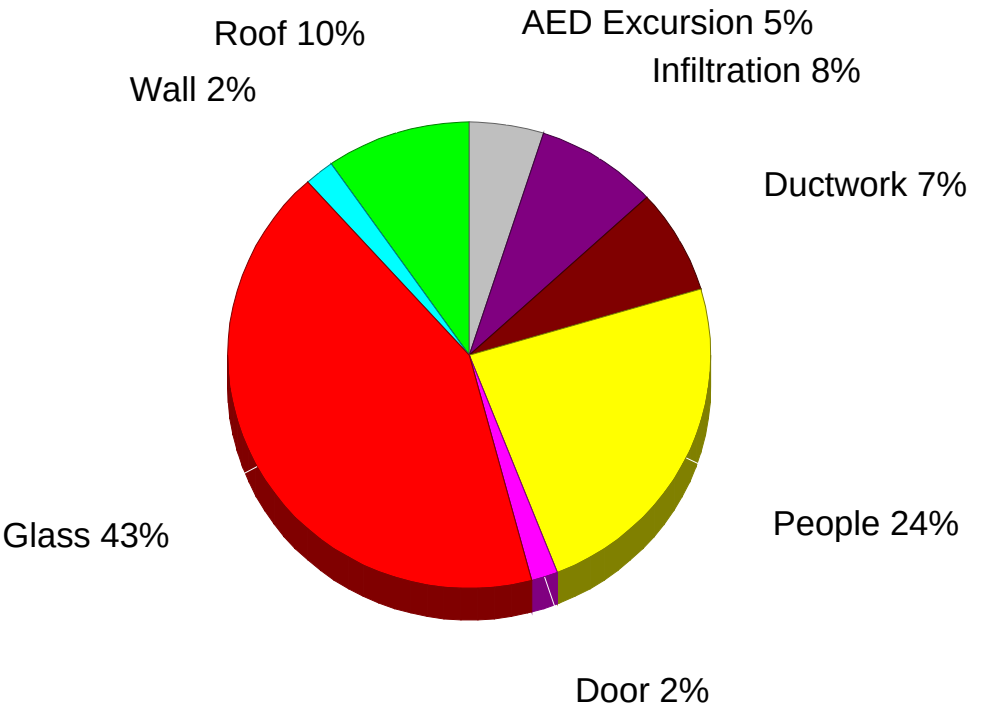
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

Building Pie Chart





System 1 LP Condensing Furnace Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cm-o: Glazing-Double pane, operable window, clear, metal frame no break, U-value 0.67, SHGC 0.67	36.7	1,771	0	2,600	2,600
Anderson DH: Glazing-Anderson Double Hung, U-value 0.32, SHGC 0.38	207.6	4,774	0	6,681	6,681
11L: Door-Metal - Paper Honeycomb Core, U-value 0.56	57.1	2,304	0	384	384
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs, U-value 0.068	948.2	4,642	0	218	218
12E-4sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, R-4 board insulation, siding finish, wood studs, U-value 0.055	573	2,269	0	148	148
13BA-0fcw: Wall-Block, framing with R-11 in 2 x 4 stud cavity, filled core, wood studs, U-value 0.088	164.4	1,042	0	68	68
15A-0oc-2: Wall-Basement, concrete block wall, no insulation or framing, no interior finish, open core, 2' floor depth, U-value 0.09	260	4,282	0	0	0
16B-50: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-50 insulation, U-value 0.02	270	389	0	227	227
16B-50-al: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), vented attic, no radiant barrier, R-50 insulation, light asphalt, U-value 0.02	2245.8	3,234	0	1,888	1,888
Subtotals for structure:		24,707	0	12,214	12,214
People:	12		2,400	2,760	5,160
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,587	138	1,448	1,586
Infiltration: Winter CFM: 70, Summer CFM: 70		5,476	876	914	1,790
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	1,084	1,084
System 1 LP Condensing Furnace Load Totals:		31,770	3,414	18,420	21,834

Check Figures

Supply CFM:	781	CFM Per Square ft.:	0.268 *
Square ft. of Room Area:	3,933	Square ft. Per Ton:	1,602 **
Volume (ft^3):	10,729***		

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.
** Based on area of rooms being cooled.
***Indicated volume is based on custom building volume.

System Loads

Total Heating Required Including Ventilation Air:	31,770	Btuh	31.770	MBH
Total Sensible Gain:	18,420	Btuh	84	%
Total Latent Gain:	3,414	Btuh	16	%
Total Cooling Required Including Ventilation Air:	21,834	Btuh	1.82	Tons (Based On Sensible + Latent)

Notes

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.
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.

Sunapee Town Offices
Energy Cost Analysis

for

Town Of Sunapee

Sunapee, NH, 03782

Elite Software
ENERGY AUDIT
Residential and Light Commercial Energy Analysis

Prepared By:

Margaret Dillon
S.E.E.D.S.

603-532-8979
Sunday, July 25, 2021

Project Information

Project Title:	Sunapee Town Offices	Company Name:	S.E.E.D.S.
Designed By:		Company Rep.:	Margaret Dillon
Project Date:	Wednesday, July 21, 2021	Company Address:	
Project Comment:		Company City:	
Client Name:	Town Of Sunapee	Company Phone:	603-532-8979
Client Address:		Company Fax:	
Client City:	Sunapee, NH, 03782	Company Comment:	
Client Phone:			
Client Fax:			
Client Comment:			

Cooling Equipment — System 1

Model Type:	Standard Air Conditioner
Model Number:	
Capacity:	48,000 Btuh
Efficiency:	9.5 SEER

Heating Equipment — System 1

Model Type:	Propane Furnace
Model Number:	CHX1-75N
Capacity:	50,000 Btuh
Efficiency:	95 AFUE
System Description:	Existing Building FHA

Cooling Equipment — System 2

Model Type:	Standard Air Conditioner
Model Number:	
Capacity:	48,000 Btuh
Efficiency:	9.5 SEER

Heating Equipment — System 2

Model Type:	Propane Furnace
Model Number:	CHX1-75N
Capacity:	50,000 Btuh
Efficiency:	95 AFUE
System Description:	R50 and Sealed Ceiling

Project Summary

General Project Information

Project Title:	Sunapee Town Offices	Company Name:	S.E.E.D.S.
Project Date:	Wednesday, July 21, 2021	Company Rep:	Margaret Dillon
Client Name:	Town Of Sunapee	Company Phone:	603-532-8979
Client City:	Sunapee, NH, 03782	Company E-Mail Address:	mdillon@myfairpoint.net

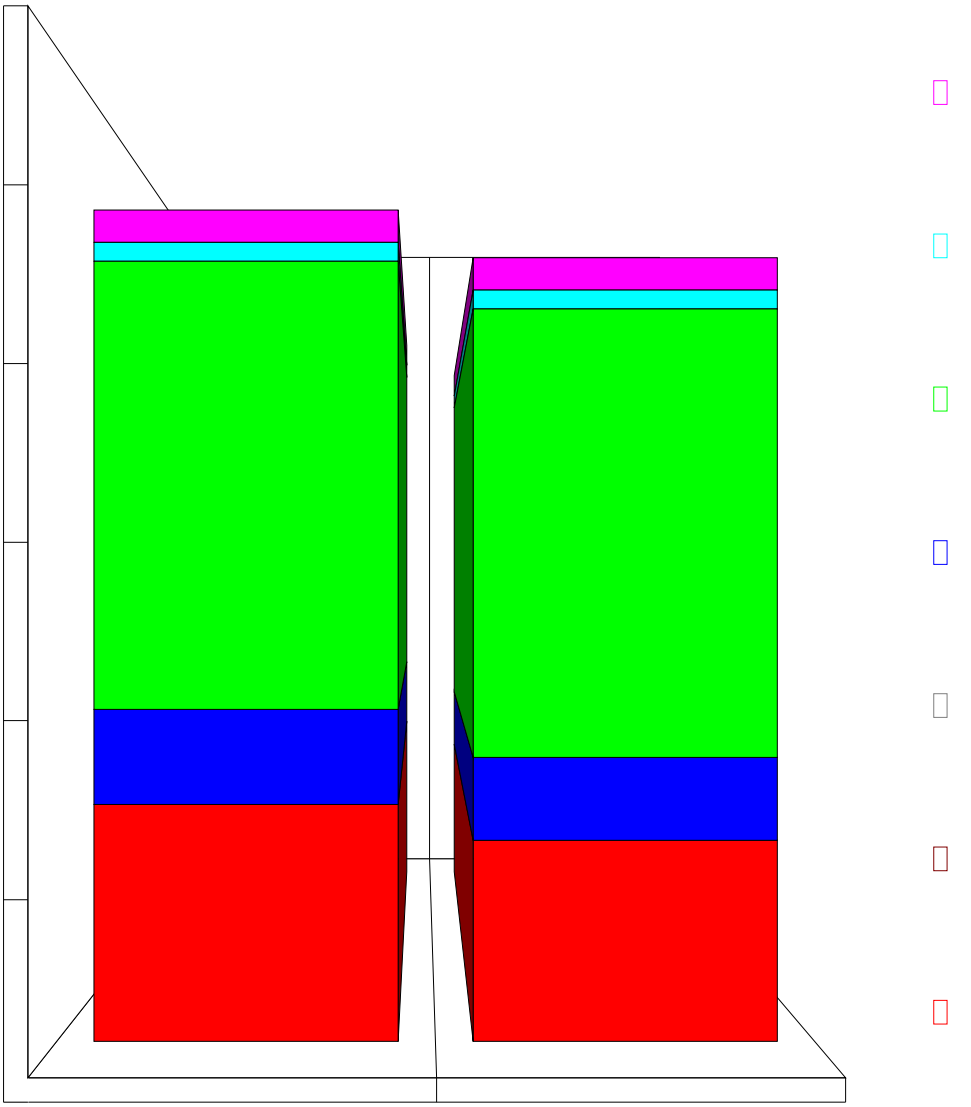
Design Data

Building Area:	5,032 sq.ft.	Cooling Load:	48,030 Btuh
People:	9	Heating Load:	89,003 Btuh
Occupancy:	8	Loads Adj. Factor:	0.72
		AC On Temp.:	70 °F
Actual City:	Concord AP, New Hampshire		
Weather Ref. City:	Concord AP, New Hampshire		
Summer Outdoor:	87 °F	Winter Outdoor:	-2 °F
Summer Indoor:	75 °F	Winter Indoor:	70 °F
Cooling Hours:	800	Degree Days:	7,200

Annual Operating Cost Estimate

System Description	Fuel Rates Set	Total Heating Cost	Total Cooling Cost	Water Heating Cost	Domes. Energy Cost	Annual Service Charges	Total Oper. Cost	Average Monthly Cost
Existing Building FHA	1	$1,432	$570	$114	$2,709	$195	$5,019	$418
R50 and Sealed Ceiling	1	$1,213	$501	$114	$2,709	$195	$4,731	$394

Project Summary Bar Chart



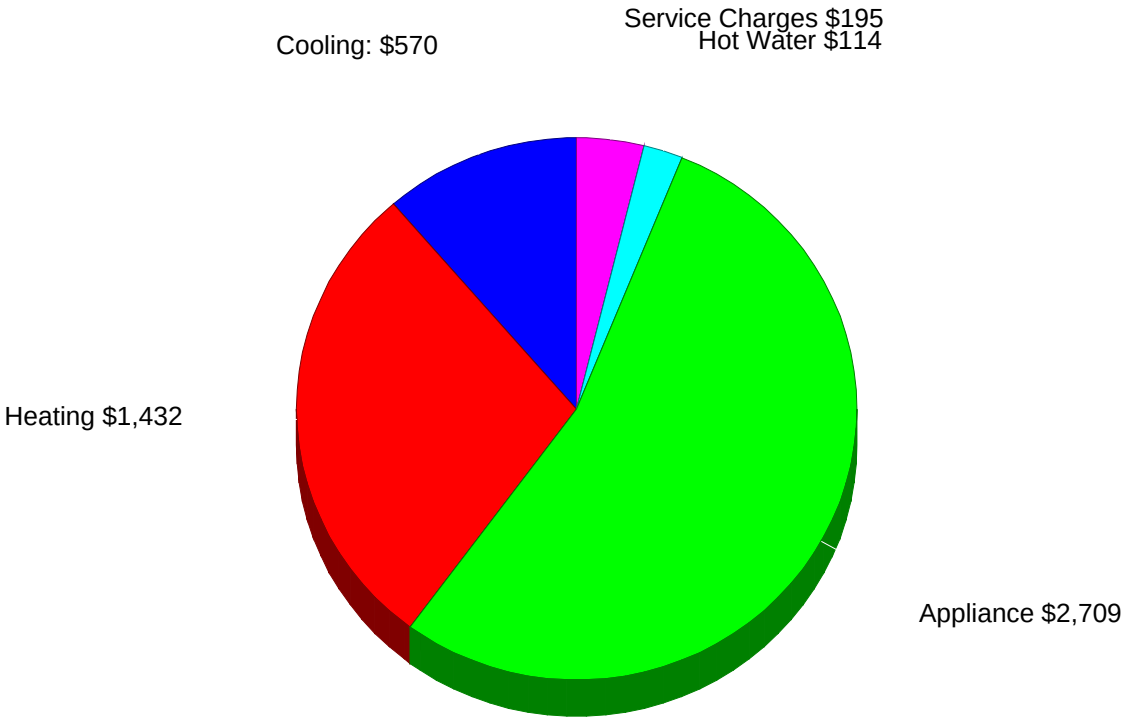
Input Data - System 1 - Existing Building FHA

		Estimated Cost
Cooling		
System Type:	Standard Air Conditioner	
Model:		
Efficiency:	9.50 SEER	
Capacity:	48,000 Btuh	
Cooling Load:	43,676 Btuh	
Annual Cost (Spec Cooling Hours Method):		$570.09
Heating		
System Type:	Propane Furnace	
Model:	CHX1-75N	
Efficiency:	95 AFUE	
Capacity:	50,000 Btuh	
Heating Load:	45,884 Btuh	
Annual Cost (Degree Days Method):		$1,432.06
Other Costs		
Appliances:		$2,708.71
Hot Water:		$113.71
Service Charges:		$194.52
Total Cost		
Total Annual Operating Cost:		$5,019.09

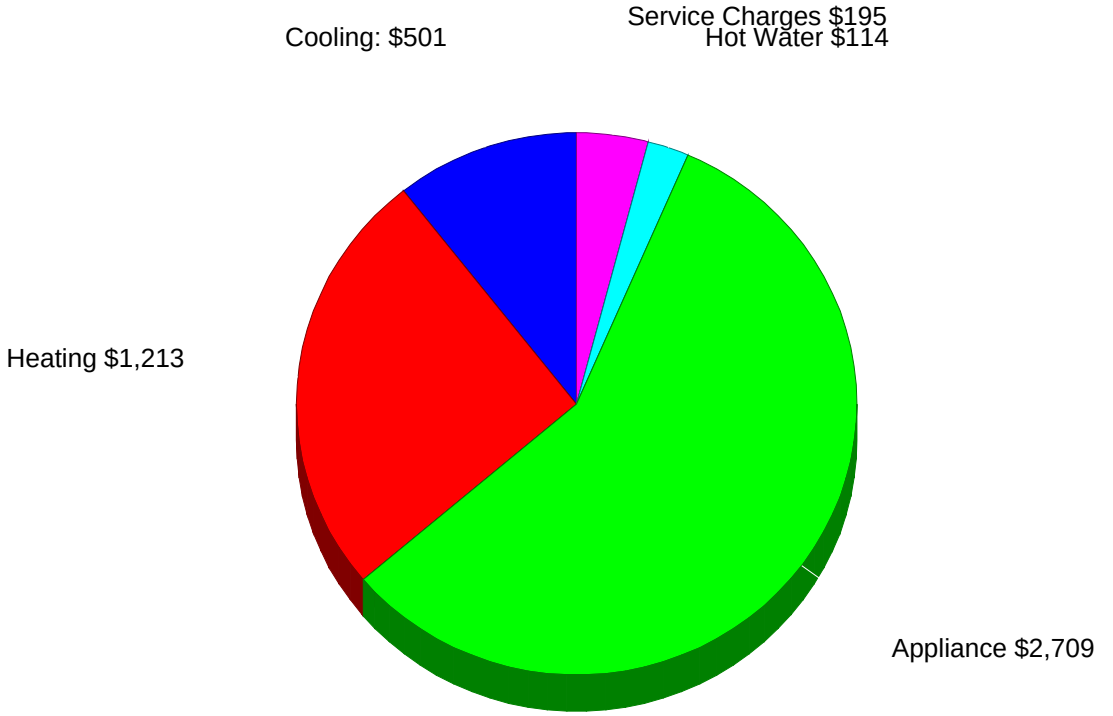
Input Data - System 2 - R50 and Sealed Ceiling

		Estimated Cost
Cooling		
System Type:	Standard Air Conditioner	
Model:		
Efficiency:	9.50 SEER	
Capacity:	48,000 Btuh	$477.63
Oversize Penalty:	1.05	$23.86
Cooling Load:	36,676 Btuh	
Annual Cost (Spec Cooling Hours Method):		$501.50
Heating		
System Type:	Propane Furnace	
Model:	CHX1-75N	
Efficiency:	95 AFUE	
Capacity:	50,000 Btuh	$1,107.18
Oversize Penalty:	1.09	$105.47
Heating Load:	35,745 Btuh	
Annual Cost (Degree Days Method):		$1,212.64
Other Costs		
Appliances:		$2,708.71
Hot Water:		$113.71
Service Charges:		$194.52
Total Cost		
Total Annual Operating Cost:		$4,731.09

Input Data Pie Chart - System 1 - Existing Building FHA



Input Data Pie Chart - System 2 - R50 and Sealed Ceiling



Monthly Costs - System 1 - Existing Building FHA

Monthly System Cost

	Cooling		Heating		Appliances		Hot Water		Total
Month	Cost	%	Cost	%	Cost	%	Cost	%	Cost
January	$0.00	0.0%	$286.41	54.9%	$225.73	43.3%	$9.48	1.8%	$521.61
February	$0.00	0.0%	$286.41	54.9%	$225.73	43.3%	$9.48	1.8%	$521.61
March	$0.00	0.0%	$286.41	54.9%	$225.73	43.3%	$9.48	1.8%	$521.61
April	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
May	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
June	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
July	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
August	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
September	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
October	$81.44	25.7%	$0.00	0.0%	$225.73	71.3%	$9.48	3.0%	$316.64
November	$0.00	0.0%	$286.41	54.9%	$225.73	43.3%	$9.48	1.8%	$521.61
December	$0.00	0.0%	$286.41	54.9%	$225.73	43.3%	$9.48	1.8%	$521.61
Service Chg	$22.99	11.8%	$57.74	29.7%	$109.21	56.1%	$4.58	2.4%	$194.52
Total	$593.07	11.8%	$1,489.79	29.7%	$2,817.93	56.1%	$118.30	2.4%	$5,019.09

Monthly Fuel Usage and Cost

	Electricity		Natural Gas		Propane		Fuel Oil	
Month	Cost	kWh	Cost	Therm	Cost	Gallons	Cost	Gallons
January	$235.20	1,517.4	$0.00	0.0	$286.41	182.4	$0.00	0.0
February	$235.20	1,517.4	$0.00	0.0	$286.41	182.4	$0.00	0.0
March	$235.20	1,517.4	$0.00	0.0	$286.41	182.4	$0.00	0.0
April	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
May	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
June	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
July	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
August	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
September	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
October	$316.64	2,042.9	$0.00	0.0	$0.00	0.0	$0.00	0.0
November	$235.20	1,517.4	$0.00	0.0	$286.41	182.4	$0.00	0.0
December	$235.20	1,517.4	$0.00	0.0	$286.41	182.4	$0.00	0.0
Service Chg:	$194.52	-	$0.00	-	-	-	-	-
Total	$3,587.04	21,887.2	$0.00	0.0	$1,432.06	912.1	$0.00	0.0

Average Electric Cost Per kWh:	$0.164/kWh
Average Propane Cost Per Gallon:	$1.570/Gallon
Total annual cooling load energy:	34,940,800 BTU
Total annual heating load energy:	110,121,600 BTU

Monthly Costs - System 2 - R50 and Sealed Ceiling

Monthly System Cost

	Cooling		Heating		Appliances		Hot Water		Total
Month	Cost	%	Cost	%	Cost	%	Cost	%	Cost
January	$0.00	0.0%	$242.53	50.8%	$225.73	47.2%	$9.48	2.0%	$477.73
February	$0.00	0.0%	$242.53	50.8%	$225.73	47.2%	$9.48	2.0%	$477.73
March	$0.00	0.0%	$242.53	50.8%	$225.73	47.2%	$9.48	2.0%	$477.73
April	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
May	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
June	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
July	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
August	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
September	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
October	$71.64	23.3%	$0.00	0.0%	$225.73	73.6%	$9.48	3.1%	$306.84
November	$0.00	0.0%	$242.53	50.8%	$225.73	47.2%	$9.48	2.0%	$477.73
December	$0.00	0.0%	$242.53	50.8%	$225.73	47.2%	$9.48	2.0%	$477.73
Service Chg	$21.50	11.1%	$52.00	26.7%	$116.14	59.7%	$4.88	2.5%	$194.52
Total	$523.00	11.1%	$1,264.64	26.7%	$2,824.86	59.7%	$118.59	2.5%	$4,731.09

Monthly Fuel Usage and Cost

	Electricity		Natural Gas		Propane		Fuel Oil	
Month	Cost	kWh	Cost	Therm	Cost	Gallons	Cost	Gallons
January	$235.20	1,517.4	$0.00	0.0	$242.53	154.5	$0.00	0.0
February	$235.20	1,517.4	$0.00	0.0	$242.53	154.5	$0.00	0.0
March	$235.20	1,517.4	$0.00	0.0	$242.53	154.5	$0.00	0.0
April	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
May	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
June	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
July	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
August	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
September	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
October	$306.84	1,979.6	$0.00	0.0	$0.00	0.0	$0.00	0.0
November	$235.20	1,517.4	$0.00	0.0	$242.53	154.5	$0.00	0.0
December	$235.20	1,517.4	$0.00	0.0	$242.53	154.5	$0.00	0.0
Service Chg:	$194.52	-	$0.00	-	-	-	-	-
Total	$3,518.45	21,444.7	$0.00	0.0	$1,212.64	772.4	$0.00	0.0

Average Electric Cost Per kWh:	$0.164/kWh
Average Propane Cost Per Gallon:	$1.570/Gallon
Total annual cooling load energy:	29,340,800 BTU
Total annual heating load energy:	85,788,000 BTU

Appliance Report - System 1 - Existing Building FHA

Appliance Set 1 - Town Offices

		Estimated Cost
Lighting		
Indoor:	0.5 Watts/Sq.ft.	
Indoor Annual Electrical Usage:	7,346.6 kWh	
Outdoor Lighting:	225.0 Watts	
Outdoor Lighting Use:	8 Hrs/Night	
Outdoor Lighting Annual Use:	657.0 kWh	
Annual Total Lighting Costs:		$1,240.55
Cooking		
Range Type:	Electricity	
Range Efficiency:	0%	
Range Electricity Usage:	0.00 kWh	
Annual Cooking Costs:		$0.00
Laundry		
Dryer Type:	Electricity	
Dryer Efficiency:	0%	
Dryer Electricity Usage:	0.00 kWh	
Annual Laundry Costs:		$0.00
Hot Water		
Water Heater Type:	Electricity	
Model Number:	Richmond 6EP20-1	
Water Heater Efficiency:	85%	
Water Heater Usage Level:	Calculated	
Water Heater Daily Usage:	10 Gallons	
Water Heater Peak Usage:	0 Gallons	
Temperature Difference:	70°F	
Electricity Usage:	733.64 kWh	
Annual Hot Water Costs:		$113.71
Gas Appliances		
Gas Appliances Annual Cost:		$0.00
Miscellaneous Appliances		
Refrig-Freezer (Auto Def.) Usage, Cost:	750 kWh, $116.25	
Coffee Maker Usage, Cost:	225 kWh, $34.88	
Cooking Usage, Cost:	345 kWh, $53.48	
Water Pump, shallow Usage, Cost:	360 kWh, $55.80	
ERV & Fans & Misc Usage, Cost:	1192 kWh, $184.76	
Office Equipment Usage, Cost:	6600 kWh, $1,023.00	
Miscellaneous Appliances Annual Cost:		$1,468.16
Total		
Appliances Plus Hot Water Annual Cost:		$2,822.43

Appliances Graph - System 1 - Existing Building FHA