

# Air Leakage

## Property

156 Nason Hill Rd  
Sherborn, MA 01770

## Organization

Tom Barnes, HERS Energy Rater  
508-631-6633  
Tom Barnes

## HERS

ProjectedWorstCase  
2022-03-09  
Rater ID:4583495

Weather:Norwood Mem AP, MA  
Sherborn Nason Hill Rd 156 SC  
PRE 3-9-22.blg

## Builder

Mark Carroll - 7 Hill Builders

## Whole House Infiltration

	Blower Door Test	
	Heating	Cooling
Natural ACH	0.17	0.12
ACH @ 50 Pascals	3.00	3.00
CFM @ 25 Pascals	1347	1347
CFM @ 50 Pascals	2114	2114
Eff. Leakage Area (sq.in)	116.0	116.0
Specific Leakage Area	0.00019	0.00019
ELA/100 sf shell (sq.in)	1.11	1.11
CFM50/sf shell	0.20	0.20

## Duct Leakage

	<u>1st</u>	<u>2nd</u>
<b>Leakage to Outside Units</b>		
CFM @ 25 Pascals	45	45
CFM25 / CFMfan	0.0547	0.0547
CFM25 / CFA	0.0201	0.0225
CFM per Std 152	N/A	N/A
CFM per Std 152 / CFA	N/A	N/A
CFM @ 50 Pascals	71	71
Eff. Leakage Area (sq.in)	3.88	3.88
Thermal Efficiency	N/A	N/A
<b>Total Duct Leakage Units</b>	<b>CFM25/CFA</b>	<b>CFM25/CFA</b>
Total Duct Leakage	0.0000	0.0000

## Ventilation

Mechanical	Exhaust Only	ASHRAE	ASHRAE
Adj. Sensible Recovery Eff. (%)	0.0	62.2-2010	62.2-2013
Adj. Total Recovery Eff. (%)	0.0		
Rate (cfm)	85	80	83
Hours/Day	24.0	24.0	24.0
Fan Watts	30.0		
Cooling Ventilation	Natural Ventilation		

## ASHRAE 62.2 - Ventilation Requirements

The ASHRAE 62.2 flow rates shown above are the CONTINUOUS mechanical fresh air ventilation which will meet the 'whole-building' requirement under that version of the standard. The 62.2-2013 rate incorporates any appropriate 'infiltration credit'. Intermittent mechanical ventilation may be used if the flow rate is adjusted accordingly. For example, the runtime can be reduced to 12 hours per day using a doubled flow rate, as long as the system provides ventilation at least once every 3 hours. For more detail, refer to the appropriate standard.

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## Property/Builder Information

Building Name

Owner's Name

Property Address

156 Nason Hill Rd

City, St, Zip

Sherborn, MA 01770

Phone Number

Builder's Name

Mark Carroll - 7 Hill Builders

Phone Number

Email Address

Plan/Model Name

Community/Development

Identifier/Other

## Organization Information

Organization Name

Tom Barnes, HERS Energy Rater

Address

72 Spring Street

City, St, Zip

Millis, MA 02054

Phone Number

508-631-6633

Website

www.HERSsenergy.net

## Rating/RESNET Information

Provider ID

1998-072

Sample Set ID

00000000

Registry ID

Registry Date Registered

Rater's Name

Tom Barnes

Rater's ID

4583495

Rater's Email

tom@hersenergy.net

Last Field Insp

2022-03-09

Rating Type

ProjectedWorstCase

Reason for Rating

New Home

Rating Number

Rating Permit Date

12/31/2020

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## General Building Information

Area of Conditioned. Space(sq ft)	4242
Volume of Conditioned. Space	42275
Year Built	2023
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	4
Foundation Type	Unconditioned basement
Foundation is w/in Infiltration Volume:	FALSE
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	2
Thermal Boundary Location	REM Default

## Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
To Amb	R0,10**	Uncond bsmt->amb/grnd	197.00	8.00	7.00	1.00	0.200	1.203
To Garage	R0,10**	Uncond bsmt->garage/grnd	31.00	8.00	7.00	1.00	0.200	1.203

\* Uo Value Combo combines wall, airfilm, and soil path

## Foundation Wall Library List

### Foundation Wall: R0,10\*\*

Type	Solid concrete or stone
Thickness(in)	10.0
Studs	None
Interior Insulation	
Continuous R-Value	0.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	1
Ins top	0.00 ft from top of wall
Ins Bottom	0.00 ft from top of wall

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## Foundation Wall Library List

### Exterior Insulation

R-Value	0.0
Ins top	0.00 ft from top of wall
Ins bottom	0.00 ft from top of wall

Note

## Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Over Basement	R30,FG1, 10-16*	Btwn cond & uncond bsmt	2204	0.036
Over Garage	R30,FG1, 10-16*	Btwn cond & uncond bsmt	720	0.036
Over Amb	R30,FG1, 10-16*	Btwn cond & ambient	64	0.036

## Frame Floor Library List

Floor: R30,FG1, 10-16\*

### Information From Quick Fill Screen

Continous Insulation R-Value	0.0
Cavity Insulation R-Value	30.0
Cavity Insulation Thickness (in.)	9.0
Cavity Insulation Grade	1
Joist Size (w x h, in)	1.5 x 9.3
Joist Spacing (in oc)	16.0
Framing Factor - (default)	0.1300
Floor Covering	HARDWOOD

Note

## Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
To Ambient	Cond -> ambient	51.00	0.0	21.0	5.5	16.0	1	0.047

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## Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
To Ambient	R21,FG1,6-16***	Cond -> ambient	Medium	3765.00	0.054
To Garage	R21,FG1,6-16***	Cond -> garage	Medium	281.00	0.054
To Attic	R21,FG1,6-16***	Cond -> attic	Medium	131.00	0.054
To Basement	R15,FG1,4-16*	Cond -> uncond bsmt	Medium	160.00	0.071

## Above-Grade Wall Library List

### Above-Grade Wall: R21,FG1,6-16\*\*\*

Information From Quick Fill Screen

Wall Construction Type	Standard Wood Frame
Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	21.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (defined)	0.1700
Gypsum Thickness (in)	0.5

Note

### Above-Grade Wall: R15,FG1,4-16\*

Information From Quick Fill Screen

Wall Construction Type	Standard Wood Frame
Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	15.0
Frame Cavity Insulation Thickness (in)	3.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 3.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (defined)	0.1400
Gypsum Thickness (in)	0.5

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## Window Information

Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Overhang			Interior		Adjacent	
						Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
Front	AGWall 1	North	0.280	0.330	192.00	0.0	0.0	0.0	0.85	0.70	None	None
Right Slider	AGWall 1	West	0.300	0.300	40.00	0.0	0.0	0.0	0.85	0.70	None	None
Back	AGWall 1	South	0.280	0.330	160.00	0.0	0.0	0.0	0.85	0.70	None	None
Back Slider	AGWall 1	South	0.300	0.300	40.00	0.0	0.0	0.0	0.85	0.70	None	None
Left	AGWall 1	East	0.280	0.330	24.00	0.0	0.0	0.0	0.85	0.70	None	None

## Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Front Door	Fiberglass**	AGWall 1	24.0	0.168	5.0	No
To Garage	R5 steel insul*	AGWall 2	18.0	0.168	5.0	No
To Basement	1-3/4 Wd solid core	AGWall 4	18.0	0.329	2.1	No

## Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Flat	R49,CE13",8-16*	2418.00	3023.00	Medium	No	Attic	0.021	No	No
Cath Celings	R38,CE,10-16,	674.00	674.00	Medium	No	Vaulted	0.031	No	No

## Roof Library List

### Ceiling: R49,CE13",8-16\*

Information From Quick Fill Screen

Continous Insulation (R-Value)	21.0
Cavity Insulation (R-Value)	28.0
Cavity Insulation Thickness (in)	8.0
Cavity Insulation Grade	1
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 8.0
Insulated Framing Spacing (in o.c.)	16.0
Framing Factor - (default)	0.1412

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## Roof Library List

Ceiling Type	Attic
Note	
<b>Ceiling: R38,CE,10-16,C***</b>	
Information From Quick Fill Screen	
Continous Insulation (R-Value)	0.0
Cavity Insulation (R-Value)	38.0
Cavity Insulation Thickness (in)	9.3
Cavity Insulation Grade	1
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 9.3
Insulated Framing Spacing (in o.c.)	16.0
Framing Factor - (default)	0.1412
Ceiling Type	Vaulted
Note	

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## Mechanical Equipment

Number of Mechanical Systems	5
Heating SetPoint(F)	72.0
Heating Setback Thermostat	Present
Cooling SetPoint(F)	75.0
Cooling Setup Thermostat	Present
DHW SetPoint(F)	125.0

## Heat: Prop Furn 961% 38

SystemType	Fuel-fired air distribution
Fuel Type	Propane
Rated Output Capacity (kBtuh)	38.0
Seasonal Equipment Efficiency	96.1 AFUE
Auxiliary Electric	497 Eae
Note	
Number Of Units	1
Location	Uncond bsmnt/enclosed crawl
Performance Adjustment	100
Percent Load Served	50

## Heat: Prop Furn 961% 38

SystemType	Fuel-fired air distribution
Fuel Type	Propane
Rated Output Capacity (kBtuh)	38.0
Seasonal Equipment Efficiency	96.1 AFUE
Auxiliary Electric	497 Eae
Note	
Number Of Units	1
Location	Attic
Performance Adjustment	100
Percent Load Served	50

## Cool: 13S 2T

System Type	Air conditioner
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## Mechanical Equipment

Fuel Type	Electric
Rated Output Capacity (kBtuh)	24.0
Seasonal Equipment Efficiency	13.0 SEER
Sensible Heat Fraction (SHF)	0.70
Note	
Number Of Units	1
Location	Uncond bsmnt/enclosed crawl
Performance Adjustment	100
Percent Load Served	50

## Cool: 13S 2T

System Type	Air conditioner
Fuel Type	Electric
Rated Output Capacity (kBtuh)	24.0
Seasonal Equipment Efficiency	13.0 SEER
Sensible Heat Fraction (SHF)	0.70
Note	
Number Of Units	1
Location	Attic
Performance Adjustment	100
Percent Load Served	50

## DHW: Prop Instant 95%

Water Heater Type	Instant water heater
Fuel Type	Propane
Energy Factor	0.95
Recovery Efficiency	0.00
Water Tank Size (gallons)	0
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Uncond bsmnt/enclosed crawl
Performance Adjustment	100

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## Mechanical Equipment

Percent Load Served 100

## DHW Efficiencies

All bath faucets & showers <= 2gpm false  
All DHW pipes fully insulated >= R-3 true  
Recirculation type None (standard system)  
Farthest fixture to DHW heater 60  
TOTAL Pipelength for longest DHW run 85  
DWHR unit present? false

## DHW Diagnostics

dhwGpd 50.09  
peRatio 0.73  
dishwasherGpd 2.09  
clothesWasherHotWaterGPD -0.09  
EDeff 0.94  
ewaste 22.88  
tmains 56.10  
dwhrWhInletTempAdj 0.00  
pumpConsKwh 0.00  
pumpConsMmbtu 0.00

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## Duct Systems

<b>Name</b>	<b>1st</b>
Conditioned Floor Area(sq ft)	2238.0
# of Returns	8
Heating System	Prop Furn 961% 38
Cooling System	13S 2T
Supply Duct Surface Area(sq ft)	453.2
Return Duct Surface Area(sq ft)	419.6
No bldg cavities used as ducts	TRUE

Type	Location	Percent Location	R-Value
Supply	Unconditioned basement	100.0	8.0
Return	Unconditioned basement	100.0	8.0

## Test Exemptions

IECC	FALSE
RESNET 2019	FALSE
ENERGY STAR LtO	FALSE

## Duct Leakage

Input Type	Measured
Test Type	Leakage to Outside

	LtO (Leakage to Outside)	Total Duct Leakage
Supply & Return	45.00 CFM @ 25 Pascals	Not Applicable
Supply Only	Not Applicable	
Return Only	Not Applicable	

<b>Name</b>	<b>2nd</b>
Conditioned Floor Area(sq ft)	2004.0
# of Returns	8
Heating System	Prop Furn 961% 38
Cooling System	13S 2T
Supply Duct Surface Area(sq ft)	405.8
Return Duct Surface Area(sq ft)	375.8

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## Duct Systems

No bldg cavities used as ducts      TRUE

Type	Location	Percent Location	R-Value
Supply	Attic, exposed	100.0	8.0
Return	Attic, exposed	100.0	8.0

**Test Exemptions**

IECC                                      FALSE  
 RESNET 2019                          FALSE  
 ENERGY STAR LtO                    FALSE

**Duct Leakage**

Input Type                              Measured  
 Test Type                                Leakage to Outside

	LtO (Leakage to Outside)	Total Duct Leakage
Supply & Return	45.00 CFM @ 25 Pascals	Not Applicable
Supply Only	Not Applicable	
Return Only	Not Applicable	

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## Infiltration and Mechanical Ventilation

### Whole Dwelling Infiltration

Input Type	Blower door
Heating Season Infiltration Value	3.00 ACH @ 50 Pascals
Cooling Season Infiltration Value	3.00 ACH @ 50 Pascals
Shelter Class	4
Code Verification	Tested

### Mechanical Ventilation for IAQ

Type	Exhaust Only
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	85
Adjusted Sensible Recovery Efficiency(%)	0.00
Adjusted Total Recovery Efficiency(%)	0.00
Hours per Day	24.0
Fan Power (watts)	30.00
ECM Fan Motor	false

### Ventilation Strategy for Cooling

Cooling Season Ventilation	Natural Ventilation
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### Good Air Exchange for Multi-Family

NA

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## Lights and Appliances

### Rating/RESNET audit

Ceiling Fan CFM / Watt	96.00
Refrigerator kWh/yr	690
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Propane
Induction Range	No
Convection Oven	No

### Dishwasher

Energy Factor	0.00
Dishwasher kWh/yr	270
Place Setting Capacity	14

### Clothes Dryer

Fuel Type	Electric
Location	Conditioned
Moisture Sensing	Yes
CEF	2.62

### Clothes Washer

Location	Conditioned
LER (kWh/yr)	96
IMEF	3.060
Capacity (CU.Ft)	3.810
Electricity Rate	0.11
Gas Rate	1.22
Annual Gas Cost	11.00

### Qualifying Light Fixtures

Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	100.0
Exterior LEDs %	100.0
Garage LEDs %	100.0

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## Mandatory Requirements

### IECC Requirements

Verified IECC 06	false
Verified IECC 09	false
Verified IECC 12	false
Verified IECC 15	false
Verified IECC 18	true
Verified NY-ECCC 2020	false
Verified IECC MI	false
Verified IECC NC 2018	false

### EPA Requirements

Rater certifies that the home complies with the following requirements for:

None

### ENERGY STAR Version 3 Appliances

Amount

Refrigerators	0
Ceiling Fans	0
Exhaust Fans	0
Dishwashers	0

### ENERGY STAR Multi-Family Checks

Clothes washer is in a category with no ENERGY STAR options.	NA
Clothes dryer is in a category with no ENERGY STAR options.	NA
Apt or Townhome uses 'Class AW' Windows.	NA

### ENERGY STAR Version 3 Basements

Basement Wall Area 50% Below Grad:	false
Basement Floor Area	0.00
Slab Insulation Exemption:	false
Indoor airPlus Verification Checklist	false
EPA Field App ID	

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## DOE Zero Energy Ready Home

Home Builder ID Number

### Mandatory Requirements

Verified Fenestration	false
Verified Insulation	false
Verified Duct Location	false
Verified Appliance	false
Verified Lighting	false
Verified Fan Efficiency	false
Verified Water Efficiency	false
Verified EPA Indoor airPLUS	false
Verified Renewable Energy Ready Solar Electric	false

### Optional Home Builder Commitments for Recognition

Certified under the EPA WaterSense for New Homes Program	No
Certified under the IBHS fortified for Safer Living Program	No
Followed the DOE Zero Energy Ready Home Quality Management Guidelines	No
The buyer of this home signed a waiver giving DOE Zero Energy Ready Home access to utility bill data for one year.	No

## Active Solar

System Type	None
Collector Loop Type	None
Collector Type	None
Collector Orientation	None
Area(sq ft)	0.0
Tilt(degrees)	0.0
Volume(cu ft/gal)	0.0

# Building Summary

**Property**

156 Nason Hill Rd  
Sherborn, MA 01770

Weather:Norwood Mem AP, MA  
Sherborn Nason Hill Rd 156 SC  
PRE 3-9-22.blg

**Organization**

Tom Barnes, HERS Energy Rater  
508-631-6633  
Tom Barnes

**Builder**

Mark Carroll - 7 Hill Builders

**HERS**

ProjectedWorstCase  
2022-03-09  
Rater ID:4583495

## Notes

tb 3-9-22

b12 - 0, 2238, 2004 = 4242

vol - 22214, 1290, 18770 = 42275

7 Hill Builders, LLC  
PO Box 395  
Foxboro, MA 02035

# Home Energy Rating Certificate

## Property

156 Nason Hill Rd  
Sherborn, MA 01770

HERS

Rating Type: ProjectedWorstCase  
Rating Date: 2022-03-09  
Registry ID:

Certified Energy Rater: Tom Barnes  
Rating Number:

**Projected Rating: Based on Plans - Field Confirmation Required.**

**HERS Index: 55**

## General Information

Conditioned Area	4242 sq. ft.	House Type	Single-family detached
Conditioned Volume	42275 cubic ft.	Foundation	Unconditioned basement
Bedrooms	4		

## Mechanical Systems Features

Heating:	Fuel-fired air distribution, Propane, 96.1 AFUE.
Heating:	Fuel-fired air distribution, Propane, 96.1 AFUE.
Cooling:	Air conditioner, Electric, 13.0 SEER.
Duct Leakage to Outside	90.00 CFM25
Ventilation System	Exhaust Only: 85 cfm, 30.0 watts.
Programmable Thermostat	Heat=Yes; Cool=Yes

## Building Shell Features

Ceiling Flat	R-49.0	Slab	None
Sealed Attic	NA	Exposed Floor	R-30.0
Vaulted Ceiling	R-38.0	Window Type	U-Value: 0.280, SHGC: 0.330
Above Grade Walls	R-21.0	Infiltration Rate	3.00 ACH50
Foundation Walls	R-0.0	Method	Blower door

## Lights and Appliance Features

Interior Fluor Lighting (%)	0.0	Range/Oven Fuel	Propane
Interior LED Lighting (%)	100.0	Clothes Dryer Fuel	Electric
Refrigerator (kWh/yr)	690	Clothes Dryer CEF	2.62
Dishwasher (kWh/yr)	270	Ceiling Fan (cfm/Watt)	96.00

## Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	89.4	\$4486	60%
Cooling	3.8	\$275	4%
Hot Water	11.3	\$558	8%
Lights/Appliances	28.7	\$2023	27%
Photovoltaics	-0.0	\$-0	-0%
Service Charges		\$84	1%
<b>Total</b>	<b>133.2</b>	<b>\$7426</b>	<b>100%</b>

## Criteria

This home meets or exceeds the minimum criteria for the following:  
This dwelling unit meets Massachusetts Stretch Energy Code, 2018 IECC with MASS amendments.\*

\* Compliance is determined by the rater.

TITLE

Company

Address

City, State, Zip

Phone #

Fax #

**REM/Rate - Residential Energy Analysis and Rating Software v16.0.6**

This information does not constitute any warranty of energy costs or savings. © 1985-2021 NORESCO, Boulder, Colorado.  
The Home Energy Rating Standard Disclosure for this home is available from the rating provider.