August 9, 2022

# HUD/RAD ASHRAE Level II ENERGY AUDIT REPORT

**Property Identification:**
125 Elm Hill Avenue
Roxbury, Suffolk County, Massachusetts 02121

AEI Project No. 463354
Client Reference Name: Holgate

**Prepared For:**
Boston Housing Authority
52 Chauncy Street
Boston, Massachusetts 02111

**Prepared By:**
AEI Consultants
112 Water Street, 5th Floor
Boston, MA 02109
AEI Main Contact: Karla King
(857) 350-3519
kking@aeiconsultants.com

August 9, 2022

Boston Housing Authority
52 Chauncy Street
Boston, Massachusetts 02111

**Subject:** **ENERGY AUDIT REPORT**
125 Elm Hill Avenue
Roxbury, Massachusetts 02121
AEI Project No. 463354
Client Reference Name: Holgate

Dear Rick Jegorow:

AEI Consultants is pleased to provide the *Energy Audit Report* of the above referenced property. This assessment was authorized and performed in accordance with the scope of services outlined in HUD RAD SOW requirements.

We appreciate the opportunity to provide services to you. If you have any questions concerning this report, or if we can assist you in any other matter, please contact me at (857) 350-3519 or kking@aeiconsultants.com.

Sincerely,

Karla King
AEI Consultants

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# 1.0 CERTIFICATION/DISCLAIMER

AEI has completed an Energy Audit for the property located at 125 Elm Hill Avenue, Roxbury, Suffolk County, Massachusetts (the "Property").

This report has been prepared for, and may be relied upon exclusively by, the specific Client and for specific application to the subject property. The energy conservation opportunities contained in this report have been reviewed for technical accuracy. The reader is reminded that energy savings ultimately depend on variable factors including occupant behavior, weather, and quality of installation. Estimated installation costs are based on a variety of sources, including our own experience at similar facilities, our own pricing research using local contractors and vendors, and cost handbooks such as those produced by RS Means. The cost estimates represent the best judgment of the auditors for the proposed action. The Owner is encouraged to confirm these cost estimates independently since actual installed costs can vary widely for a particular installation. AEI does not guarantee installed cost estimates and shall in no event be liable should actual installed costs vary from the estimated costs herein.

AEI does not guarantee the costs savings estimated in this report. AEI shall in no event be liable should the actual energy savings vary from the savings estimated herein.

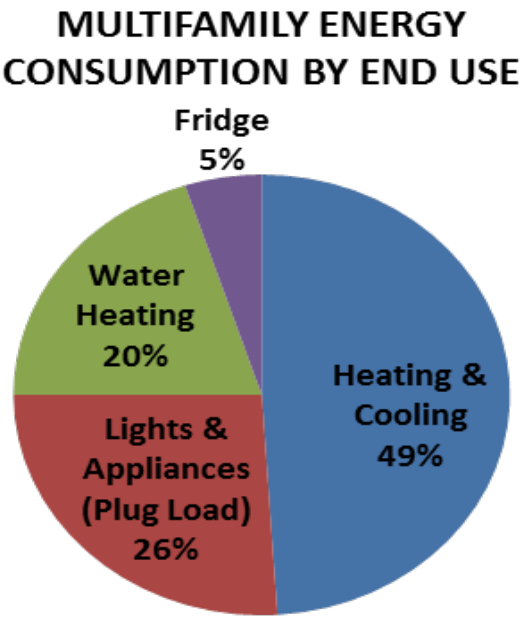
AEI certifies that it has no undisclosed interest in the subject property and that AEI's employment and compensation are not contingent upon the findings or estimated costs to remedy any deficiencies due to deferred maintenance and any noted component or system replacements.

# 2.0 EXECUTIVE SUMMARY

AEI Consultants (AEI) was retained by Boston Housing Authority to conduct an ASHRAE Level II Energy Audit, in conformance with the scope and limitations of ASHRAE *Procedures for Commercial Building Energy Audits*, Second Edition (2011) and HUD RAD Notice Revision 4, 2019 for Holgate located at 125 Elm Hill Avenue in Roxbury,Massachusetts.

## 2.1 Analysis of Energy and Water Efficiency

It is important to analyze the whole building as a system in order to understand the best opportunities for potential utility savings. This information along with information gathered during the site inspection can inform the prioritized opportunities for the subject property. The largest consumers for energy consumption are typically Heating and Cooling, followed by the provision of domestic hot water, appliances, lighting and plug load. Water consumption is divided among a greater variety of end uses. Often an overdue water efficiency upgrade will also address hidden leaks as components are newly replaced and fittings addressed and tightened. The pie chart below outlines typical energy use in multifamily properties.


MULTIFAMILY ENERGY CONSUMPTION BY END USE
Fridge 5%
Water Heating 20%
Heating & Cooling 49%
Lights & Appliances (Plug Load) 26%

## 2.2 Energy Audit - Purpose and Scope

AEI has performed the following analysis to identify possible areas where Energy and Water may be conserved. This report will provide recommendations for cost effective efficiency improvements that will reduce energy and water costs, improve property market value by reducing operation and maintenance costs, and increase resident comfort and indoor environmental conditions. The study is not an exhaustive technical evaluation which would require a significantly larger scope of work than was determined for this project.

### Utility Analysis

AEI utilizes provided data to perform a utility analyses determining the Energy and Water consumption of the subject property. Analyzing 12 months of contiguous utility consumption data allows baseline and seasonal loads to be determined. This data combined with on-site observations helps to determine the most effective targets for improvement.

### Energy Audit Process

In addition to the data analysis, AEI physically inspects the property to review and understand mechanical, electrical, and plumbing (MEP) equipment, operating and maintenance schedules, equipment condition, estimations of remaining useful life, and overall performance. Inspection observations also consider indicators of system efficacy such as humidity, space temperature operational control, and occupant comfort concerns. Building system evaluations are conducted in accordance with; Fannie Mae "Physical Needs Assessment Guidance to the Property Evaluator" requirements as well as ASTM Standard E2018-15, Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process. The Energy Audit then recommends cost-effective energy and water efficiency measures prioritized by payback. Simple payback calculations are based on the labor and incremental material cost of the new equipment divided by the cost savings per year. Savings to Investment Ratio (SIR) is the ratio of economic performance to the capital investment based on the energy or water savings. Lifetime Savings / Additional investment = SIR.

### Accuracy of Analysis

This ASHRAE Level II Report was prepared in accordance with generally accepted industry standards of practice for energy audits and building inspections. AEI shall not be responsible for equipment that may not reach the end of its useful life or costs more to operate than noted in the EWEMs. All recommendations are made in good faith and without any present or contemplated interest in the subject property. No other expressed or implied warranty is made.

## 2.3 Energy Benchmarking

Benchmarking can be valuable when used to compare subject property energy and water consumption to other similar properties. Provided utility data representing the subject property is used to compare and grade against like properties as well as generate a baseline score to monitor continued performance. Energy use is input into Energy Star Portfolio Manager to produce a benchmark. The property provided data for a 5 year period, Any gaps in that data could be estimated adequately along the expected consumption curve to extrapolate whole data.

# ENERGY STAR® Statement of Energy Performance

**1**

**ENERGY STAR® Score[1]**

## Holgate

**Primary Property Type:** Multifamily Housing
**Gross Floor Area (ft²):** 73,950
**Built:** 1962

**For Year Ending:** December 31, 2020
**Date Generated:** August 09, 2022

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

## Property & Contact Information

| Property Address | Property Owner | Primary Contact |
|---|---|---|
| Holgate<br>125 Elm Hill Avenue<br>Roxbury, Massachusetts 02121 | _____<br>,<br>(____)____-_____ | ____ _____<br>,<br>(____)____-_____<br>_____ |

**Property ID**: 21926078

## Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**
168 kBtu/ft²

**Source EUI**
209.1 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Electric - Grid (kBtu) | 1,383,498 (11%) |
| Natural Gas (kBtu) | 11,038,600 (89%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 94.2 |
| National Median Source EUI (kBtu/ft²) | 117.2 |
| % Diff from National Median Source EUI | 78% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 677 |

## Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____Date: _____

**Licensed Professional**

____ _____
,
(____)____-_____
_____

**Professional Engineer or Registered Architect Stamp (if applicable)**

## 2.4 SUMMARY OF EWEMS

The following Energy and Water Efficiency Measures (EWEMs) have been analyzed using calculations based on occupant usage, localized climate conditions, and HVAC operating hours, as well as lighting hours. The HVAC operating hours are approximations which vary depending on weather. Water consumption is based on the number of occupants and assumed running times for water consuming devices. The property has been carefully evaluated for EWEMs. The chart shows the initial additional investment, utility savings, utility cost savings, and paybacks for each EWEM. Savings are based on current costs. Recommendations are prioritized by SIR. Recommendations are property-wide unless noted otherwise.

# Prioritized EWEM Recommendations

| Category | Cost | Upgrade cost | total cost | O=Owner T=Tenant | EUL | Savings per annum | Simple Payback (years) | SIR |
|---|---|---|---|---|---|---|---|---|
| Energy Star Refrigerators (older) | $ 20,685 | $ 2,065 | $ 22,750 | O=Owner | 15 | $ 1,519 | 1.36 | 11.03 |
| **Future consideration should be given to:** | | | | | | | | |
| Energy Star Refrigerators (newer) | $ 27,186 | $ 2,714 | $ 29,900 | O=Owner | 15 | $ 994 | 2.73 | 5.50 |
| Water Sense® Water Savers | $ 24,189 | $ 2,868 | $ 27,057 | O=Owner | 20 | $ 1,262 | 21.44 | 0.93 |
| Increase Attic Insulation to R-35ci | $ 29,325 | $ 13,345 | $ 42,670 | O=Owner | 50 | $ 94 | 141.97 | 0.35 |

# 3.0 EXISTING CONDITIONS AND RECOMMENDATIONS

## 3.1 PROPERTY DESCRIPTION

The property consists of eighty-one (81) apartment units located within 1 seven-story apartment building.

The property features tenant supplied window-mounted air conditioners for cooling and radiator distribution for heating. Domestic hot water (DHW) is provided by high efficiency commercial gas-fired water heaters.

The Project Team assessed a representative sample of the tenant spaces. The assessment also included all parking areas and exterior areas.

*Dwelling Unit Breakdown*

| Unit Type | Area Per Unit (square feet) | Number of Units |
|---|---|---|
| 1br/1ba | 500 | 80 |
| 2br/2ba | 1000 | 1 |

### 3.1.1 BUILDING ENVELOPE

The façade of the building consists of brick siding. The building fenestrations include double-paned aluminum windows and steel clad doors. The flat roof of the building consists of poured in place concrete deck. Based on the site inspection and date of construction, the roof deck rigid insulation was estimated to be approximately R-20ci.

*Framing*

| Item | Description |
|---|---|
| Roof Design | Low-slope with no attic space |
| Roof Framing | Poured in place concrete deck |
| Roof Deck or Sheathing | Poured in place concrete deck |
| Wall Structure | Concrete frame |
| Secondary Framing Members | Steel lintels at window and door openings |
| Windows | Single hung double pane aluminum windows |
| Exterior Doors | Steel clad insulated door |

#### 3.1.1.1 WINDOWS

The windows appeared to be in good condition with metal-framed assemblies. Whenever replacement of the windows occurs, it is recommended that Energy Star windows are utilized. Energy Star windows in this climate zone require < 0.27 U-factor; and any Solar Heat Gain Coefficient to be Energy Star threshold.

## WINDOWS

| CLIMATE ZONE | U-FACTOR[1] | SHGC[2] | |
|---|---|---|---|
| Northern | ≤0.27 | Any | Prescriptive |
| | =0.28 | ≥0.32 | Equivalent Energy Performance |
| | =0.29 | ≥0.37 | |
| | =0.30 | ≥0.42 | |
| North Central | ≤ 0.30 | ≤ 0.40 | |
| South Central | ≤ 0.30 | ≤ 0.25 | |
| Southern | ≤ 0.40 | ≤ 0.25 | |

## SKYLIGHTS

| CLIMATE ZONE | U-FACTOR[1] | SHGC[2] |
|---|---|---|
| Northern | ≤ 0.50 | Any |
| North Central | ≤ 0.53 | ≤ 0.35 |
| South Central | ≤ 0.53 | ≤ 0.28 |
| Southern | ≤ 0.60 | ≤ 0.28 |

Air Leakage ≤ 0.3 cfm/ft2

1 Btu/h ft2·°F
2 Solar Heat Gain Coefficient

#### 3.1.1.2 Insulation

Whenever the exterior envelope is going to be exposed, additional insulation should be considered and in some cases this addition will address air loss as well as heat flow. Potential future upgrade opportunities would include installation of additional rigid insulation to reach DOE recommended levels of R-35ci at the time of roof replacement.

#### 3.1.1.3 Weather Sealing and Air Tightness

Reducing air leakage can benefit indoor air quality as well as reduce heating and cooling costs. Routine weather sealing should be a regular maintenance practice. Professional weather sealing should take place at rehabilitation and renovation construction events. Select improvements can provide a positive synergistic effect on air leakage such as converting atmospheric combustion appliances to high efficiency sealed-combustion devices.

#### 3.1.1.4 Energy Star Cool Roofing

Energy Star Cool Roofing is typically at its most beneficial in cooling dominant climates. Cool roofing can provide ancillary benefits outside of cost payback analysis, especially in concentrated areas of highly impermeable radiating surfaces (heat island effect). No recommendation for Energy Star roofing is made at the time of this report due to the heating dominant climate.

#### 3.1.1.5 Load Loss Calculations

It is recommended that Manual J calculations be required by the performing contractor, Engineer of Record, or Architect of Record, with any HVAC equipment replacement, or significant HVAC modification. Recommended cooling equipment (including heat pumps) should be oversized by no more than 15% of the actual Manual J Heat gain calculations without inflation factors. Heating equipment should be oversized by no more than 25% of actual Manual J Heat loss calculations without inflation factors. For the purpose of this evaluation, HVAC-Calc 4.0 software was utilized to provide load loss calculations in accordance with ACCA Manual J. This software program is most applicable for HVAC sizing when window sizing is not abnormal (less than 15% of exterior envelope) and structures are typical single-family construction. The following are load-loss calculations executed by unit type/exposure at the property in varying worst-case scenarios:

| BEDROM TYPE | VOLUME | HEAT GAIN | HEAT LOSS | HVAC SYSTEM CURRENTLY PROVIDED |
|---|---|---|---|---|
| 1 BR ground | 4,000 | 3,754 | 10,240 | Steam Boiler |
| 1 BR top | 4,000 | 4,660 | 11,027 | Steam Boiler |

### 3.1.2 Building Mechanical Systems

The heating system for the apartment units in the building consists of steam boilers with radiator distribution throughout. Cooling is provided to the dwelling units by tenant supplied window AC units.

Domestic hot water is provided to the building via high efficiency commercial gas-fired water heaters.

The property features a diesel-fueled emergency generator.

*Mechanical Equipment*

| Location Serviced | Description |
|---|---|
| Apartment Domestic Hot Water | High Efficiency Commercial Gas Water Heaters |
| Apartment Heating | Steam Boilers with Radiators |
| Apartment Cooling | Tenant Supplied Window AC Units |

#### Steam Boiler Recommendation

There are reported issues on-site. Boiler #2 reportedly was permanently down. Repairing the boiler is required. A leak was observed from Boiler #1. The system is recommended to undergo balancing with assessment and replacement of steam vents throughout. This balancing service will require the replacement of steam vents and deeper investigation. It is likely the system can offer a large efficiency benefit via balancing and replacement of the necessary steam vents. This is not a quantifiable upgrade, therefore not possible to put in payback calculations at the time of this report. Consideration was given to conversion of whole system steam heat to hydronic hot water; however, that was considered infeasible due to the infrastructure upgrades required to convert the radiators and closed loop hot water return boiler feed.

#### Domestic Hot Water Recommendation

The recommendation is made to continue to specify high efficiency commercial water heaters at the time of replacement.

#### Photographs

Steam Boiler #1


Steam Boiler #2 inoperable

Dwelling unit radiator

High efficiency commercial hot water heaters

### 3.1.3 LIGHTING

Lighting at the property has predominantly been upgraded to high efficiency fixtures and lamps. Compact, T-8 fluorescent lighting, and LED lighting were observed throughout.

#### 3.1.3.1 LIGHTING RECOMMENDATION

Lighting improvements present an excellent upgrade opportunity. LED technology offers longevity and high efficiency. Fluorescent lighting allows some direct replacement in much higher efficiency (e.g. T-12 to T-8 fixtures with higher efficiency ballasts). It is recommended to replace all interior dwelling unit lighting with high efficiency LEDs and/or continued use of higher efficiency fluorescent lighting. Recent LED technology has improved greatly in corrected color temperature and lumen output. Great results can be achieved with newer fixtures in higher efficiency in different design as well. Modern LED fixtures may be more desirable and show even greater savings. Bathroom lighting is recommended for replacement with an Energy Star light bar, rather than just replacing the individual bulbs within existing fixtures where those exist.

**Photographs**

Hallway Lighting

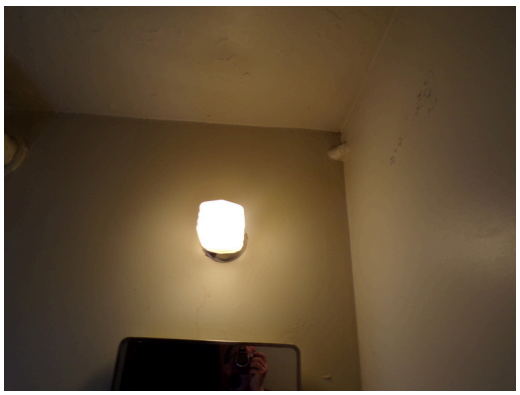
Storage Room Lighting

Hallway Lighting

Maintenance Shop Lighting

Bathroom Light Fixture

Kitchen Light Fixtures



Bathroom Light Fixture

### 3.1.4 APPLIANCES

Appliances would typically be replaced at the end of their useful life, either at tenant turnover or at any individual appliance failure. Repair and or replacement would be typically within operations replacement. Refrigerators were observed to be primarily installed between 2012-2019.

#### 3.1.4.1 Refrigerator Recommendation

It is recommended to replace the existing standard efficiency refrigerators with Energy Star certified refrigerators. The incremental cost for upgrading to Energy Star refrigerators is nominal at the present market saturation for Energy Star appliances. It is recommended to utilize Energy Star Refrigerators for all future replacements. All future replacement should feature Energy Star Appliances. Recommendations reflect both future replacement of newer and older models based on these usages and are shown in the savings above.

#### 3.1.4.2 Laundry Equipment Recommendation

The property features 3 washers and 3 dryers located on the first floor near the property management office with leased equipment. If the property chooses to install laundry equipment in the future, they should specify Energy Star washers. Future lease agreement should also specify Energy Star Clothes Washers.

#### 3.1.4.3 Other Appliances, Recommendations, and Future Options

The property does not feature ceiling fans in the dwelling units. If the property chooses to install ceiling fans, Energy Star ceiling fans are recommended). The property does not feature dishwashers. If the property chooses to install dishwashers throughout the property, Energy Star appliances are recommended.

### 3.1.5 Water Savers

The property features predominantly code minimum efficiency water fixtures including 1.28 gallon per flush (gpf) water closets. Based on the site observations it was determined that the bathroom faucet aerators were determined to be 1.5 gallon per minute (gpm) kitchen faucet aerators, 1.2 gpm bathroom faucet aerators, and 2.5 gpm showerheads. Water Sense cautions that too drastic a reduction in kitchen aerators (where volume fill is required) can create frustration and therefore resistance to conservation efforts. This can be true of showerhead recommendations as well, and better investment up front can increase longer term acceptance and savings with positive tenant buy-in. With the upgraded water fixtures observed during the site visit, the remaining upgrades are not critical. Kitchen sink efficiency should not be strained past the 1.2-1.5 gpm flow rates. Bath faucets can be further reduced to 1.0 or 0.5 gpm. Showerheads could be reduced from the current 2.5 gpn code minimum to Water Sense fixtures at < 2.0 gpm. These potential savings will be shown in the table below and the EWEM summary of the report but are not critical needs based on the efficiency improvement the property has already undertaken.

**Photographs**


Typical 2.5 gpm Showerhead

Typical Bathroom Faucet

Typical Kitchen Faucet

Typical 1.28 gpf Water Closet

| Number of Fixtures | Description | Flow Rate (gpf or gpm) | | Savings | | |
|---|---|---|---|---|---|---|
| | | Current | Proposed | Avg Gal/Day | $/Month | $/Year |
| 82 | Water Closet | 1.28 | 1.28 | 0.00 | $0.00 | $0 |
| 1 | Kitchen Faucet | 2.2 | 1.5 | 2.8 | $0.90 | $11 |
| 80 | Kitchen Faucet | 1.5 | 1.5 | 0.0 | $0.00 | $0 |
| 80 | Bathroom Faucet | 1.2 | 1 | 0.8 | $20.47 | $246 |
| 2 | Laundry Faucet | 1.5 | 1 | 2.0 | $1.28 | $15 |
| 82 | Shower Head | 2.5 | 1.75 | 3.0 | $78.67 | $944 |
| 1 | Common Area Kitchen Faucet | 1.5 | 1.5 | 0.0 | $0.00 | $0 |
| 5 | Common Area Bath Faucet | 2.2 | 1 | 2.4 | $3.84 | $46 |
| 2 | Common Area Water Closet | 1.28 | 1.28 | 6.4 | $0.00 | $0 |
| | | | | | **Total** | **$1,262** |

### 3.1.6 VENTILATION

Good ventilation helps decrease moisture and is a key component to maintaining property indoor air quality. The property currently features exterior venting kitchen ranges through a kitchen window. It was observed that the bathroom ventilation was vented to the exterior through windows.

## 4.0 ALTERNATIVE ENERGY EVALUATIONS AT THE PROPERTY

There currently are no renewable energy installations at the subject property. Improving on-site efficiencies should be given priority prior to any consideration of renewable energy generation as conservation is the most cost effective, and effective, means for efficiency improvement. With technologies constantly improving the efficiencies and effectiveness of renewable on-site generation, these areas would merit on-going consideration. The following options were considered for this report.

- **Wind Energy**:

NREL (National Renewable Energy Labs) wind resource maps and data suggest the subject property capability of providing wind energy as fair. This information is per-screened to exclude some areas based on land use such as dense urban development or environmental restrictions. No recommendation is made to further explore renewable energy wind generation at the time of this report.

- **Solar Energy**:

NREL (National Renewable Energy Labs) Solar Resource Maps and data suggest the subject property only capable of providing poor to fair solar energy resource. Solar thermal often provides stronger payback opportunity. Solar thermal DHW was considered as an option for the subject property, however, due to availability of high-efficiency natural gas and first-cost considerations that recommendation is not made at the time of this report.

- **Geothermal**:

Drilling for ground-loop geothermal is potentially cost-prohibitive. Based on the increased first-cost and the availability of natural gas on-site; no further recommendation for geothermal buffering is made at the time of this report.

- **Fuel Cells and CoGen** (Co-generation of Heat and Power):

Fuel Cells were considered as too capital intense and majority tied to conventional non-renewable source fuels for further consideration at the subject property.

Co-generation of Heat and Power (CoGen) was considered at the property; however, there is not the critical mass for this to be a feasible option.

No further recommendation for renewable alternative energy generation is made at the time of this report.

## 5.0 SIGNATURES OF PARTICIPATING PROFESSIONALS

AEI Consultants performed this ASHRAE Level II Energy Audit for the property located at 125 Elm Hill Avenue, Roxbury, Suffolk County, Massachusetts, in conformance with the scope and limitations of ASHRAE Standards and HUD RAD Version 4, 2019.

Prepared By:

John Bucci
Senior Project Manager

Reviewed By:

Matthew Snow
Vice President – HUD Energy and Sustainability

# APPENDIX A

# APPENDIX: Energy Star SEP Report and Water Scorecard

# ENERGY STAR® Statement of Energy Performance

**1**

**ENERGY STAR® Score[1]**

## Holgate

**Primary Property Type:** Multifamily Housing
**Gross Floor Area (ft²):** 73,950
**Built:** 1962

**For Year Ending:** December 31, 2020
**Date Generated:** August 09, 2022

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

## Property & Contact Information

| Property Address | Property Owner | Primary Contact |
|---|---|---|
| Holgate<br>125 Elm Hill Avenue<br>Roxbury, Massachusetts 02121 | _____<br>,<br>(____)____-_____ | ____ _____<br>,<br>(____)____-_____<br>_____ |

**Property ID**: 21926078

## Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**
168 kBtu/ft²

**Source EUI**
209.1 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Electric - Grid (kBtu) | 1,383,498 (11%) |
| Natural Gas (kBtu) | 11,038,600 (89%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 94.2 |
| National Median Source EUI (kBtu/ft²) | 117.2 |
| % Diff from National Median Source EUI | 78% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 677 |

## Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____Date: _____

**Licensed Professional**

____ _____
,
(____)____-_____
_____

**Professional Engineer or Registered Architect Stamp (if applicable)**

# WATER SCORECARD

**25**

out of 100

## Holgate

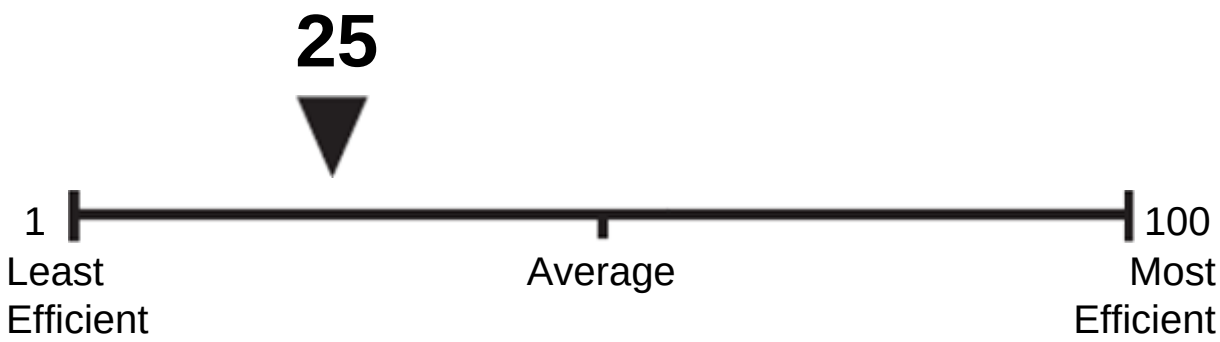
**Primary Function**: Multifamily Housing
**Gross Floor Area (ft²):** 73,950
**Built**: 1962

**For Year Ending:** December 31, 2020

**Property Address:**
125 Elm Hill Avenue
Roxbury, Massachusetts 02121

**Date Generated:** August 09, 2022

For the year ending December 2020, this building used **45.62 gallons of water per square feet.** Here's how that compares to similar buildings nationwide:




**About this Score**
The U.S. Environmental Protection Agency's (EPA) Water Score is generated by the ENERGY STAR® Portfolio Manager® tool and supported by WaterSense®. The Score offers a 1 - 100 measurement of how efficiently this property uses water, compared to similar properties nationwide, when normalized for climate and operational characteristics. Learn more at www.epa.gov/WaterSense.

EPA WaterSense

ENERGY STAR® Portfolio Manager®

## VERIFICATION (Optional)

I, _____, verify that the information regarding water use and property use details is true and correct to the best of my knowledge.

_____ _____
Signature Date

# APPENDIX B

# APPENDIX: Manual J Calculation Sheets

In accordance with ACCA Manual J

Report Prepared By:

AEI Consultants
John Bucci

For: Holgate (1 BR ground)
125 Elm Hill Avenue
Roxbury, MA 02121

Design Conditions: Boston

| Indoor: | | Outdoor: | |
|---|---|---|---|
| Summer temperature: | 75 | Summer temperature: | 88 |
| Winter temperature: | 72 | Winter temperature: | 9 |
| Relative humidity: | 50 | Summer grains of moisture: | 88 |
| | | Daily temperature range: | Medium |

| Building Component | Sensible Gain (BTUH) | Latent Gain (BTUH) | Total Heat Gain (BTUH) | Total Heat Loss (BTUH) |
|---|---|---|---|---|
| Whole House | 2,750 | 1,004 | 3,754 | 10,240 |
| Main Floor | 2,750 | 1,004 | 3,754 | 10,240 |
| All Rooms | 2,750 | 1,004 | 3,754 | 10,240 |
| Infiltration | 477 | 544 | 1,021 | 5,544 |
| People | 600 | 460 | 1,060 | 0 |
| Miscellaneous | 500 | 0 | 500 | 0 |
| Floor | 0 | 0 | 0 | 756 |
| S Wall | 109 | 0 | 109 | 737 |
| Window | 599 | 0 | 599 | 1,233 |
| E Wall | 109 | 0 | 109 | 737 |
| Window | 356 | 0 | 356 | 1,233 |
| Whole House | 2,750 | 1,004 | 3,754 | 10,240 |

In accordance with ACCA Manual J

Report Prepared By:

AEI Consultants
John Bucci

For: Holgate (1 BR top)
125 Elm Hill Avenue
Roxbury, MA 02121

Design Conditions: Boston

| Indoor: | | Outdoor: | |
|---|---|---|---|
| Summer temperature: | 75 | Summer temperature: | 88 |
| Winter temperature: | 72 | Winter temperature: | 9 |
| Relative humidity: | 50 | Summer grains of moisture: | 88 |
| | | Daily temperature range: | Medium |

| Building Component | Sensible Gain (BTUH) | Latent Gain (BTUH) | Total Heat Gain (BTUH) | Total Heat Loss (BTUH) |
|---|---|---|---|---|
| Whole House | 3,656 | 1,004 | 4,660 | 11,027 |
| Main Floor | 3,656 | 1,004 | 4,660 | 11,027 |
| All Rooms | 3,656 | 1,004 | 4,660 | 11,027 |
| Infiltration | 477 | 544 | 1,021 | 5,544 |
| People | 600 | 460 | 1,060 | 0 |
| Miscellaneous | 500 | 0 | 500 | 0 |
| Floor | 0 | 0 | 0 | 0 |
| S Wall | 109 | 0 | 109 | 737 |
| Window | 599 | 0 | 599 | 1,233 |
| E Wall | 109 | 0 | 109 | 737 |
| Window | 356 | 0 | 356 | 1,233 |
| Ceiling | 906 | 0 | 906 | 1,543 |
| Whole House | 3,656 | 1,004 | 4,660 | 11,027 |

# APPENDIX C

# APPENDIX: QUALIFICATIONS

# John Bucci

## Senior Project Manager

### EDUCATION

- B.S. Integrated Science and Technology – James Madison University, Harrisonburg, VA

### SUMMARY OF PROFESSIONAL EXPERIENCE

Mr. Bucci has been involved in the HUD Energy and Sustainability Assessments since 2016. He has 5+ years of experience in commercial energy and utility data analysis, as well as 5 years of experience performing HUD multifamily energy audits and Energy Star Certifications. Mr. Bucci has successfully completed BPI MFBA and is a HUD Qualified Energy Professional

### PROJECT EXPERIENCE

Project experience for Mr. Bucci includes:

Energy Audits

- Kings Court Apartments, San Antonio, TX
- Housing Authority of the City of Annapolis, Annapolis, MD
- Rochester Housing Authority, Rochester, NY
- Quincy Housing Authority, Quincy, MA
- Palm Beach County Housing Authority, Boynton Beach, FL
- Rockingham Housing Authority, Rockingham, NC
- Housing Authority of the City of El Paso, El Paso, TX

Statement of Energy Performance (SEP)

- Luna Apartments, Seattle, WA
- Champions Vue Apartments, Davenport, FL
- Tower 280, Rochester, NY
- Colony Village Apartments, North Chesterfield, VA
- The Flats at Professional Arts Building, Baltimore, MD
- Prosper Azalea, Valdosta, GA
- 571 E 19 St, Brooklyn, NY

Data Acquisition and Reporting Plans

- Colony Village Apartments, North Chesterfield, VA
- Luna Apartments, Seattle, WA
- Alloy Apartments, Seattle, WA
- The Flats at Professional Arts Building, Baltimore, MD
- Mustang Station Apartments, Farmers Branch, TX

- Tower 280, Rochester, NY

Energy Star Certification

- Luna Apartments, Seattle, WA
- Champions Vue Apartments, Davenport, FL
- Tower 280, Rochester, NY
- Colony Village Apartments, North Chesterfield, VA
- The Flats at Professional Arts Building, Baltimore, MD
- Prosper Azalea, Valdosta, GA
- Mallard Landing, Hurricane, WV

# Matt Snow, LEED AP, BPI-MFBA

## Vice President, HUD Energy and Sustainability Services

### EDUCATION

- BSBA – Christopher Newport, Newport News, VA

### CERTIFICATIONS

- BPI – MFBA – Multifamily Building Analyst Professional, Building Performance Institute

### SUMMARY OF PROFESSIONAL EXPERIENCE

Mr. Snow has been involved in the HUD Energy and Sustainability Assessments since 2007. He has been active in conducting ASHRAE Level I and II Energy Audits and technical energy program management and review as well as Energy Star benchmarking and Certification services. Matt has years of experience in HUD energy protocols including M2M, ARRA, GERA and Green MIP projects and has performed hundreds of Energy Audits.

### PROJECT EXPERIENCE

Project experience for Mr. Snow includes:

- Utility system condition assessments consisting of various multifamily and mixed-use properties
- Energy and Water demand and use reduction studies, planning and implementation of conservation measures, as well as measurement & verification of improvements for funds release
- Building systems analyses for complex HVAC, electrical, and plumbing systems in large and small facilities
- Management of energy and condition assessment projects for municipalities, state and federal governments, as well as private entities
- Management of Technical Review teams for condition assessments and energy audits
- Collaborative development of data collection tools and protocols for large programs
- Substantial work in Housing and Urban Development programs in Green Mark-to-Market Assessments, Rental Assistance Demonstration (RAD) projects, Capital Needs Assessments, Physical Needs Assessments, Green Retrofit Physical Needs Assessments, ARRA Green Multifamily assessments, Low Income Housing Tax Credit assessments, and Fannie Mae assessments
- Construction monitoring services