FRIDAY, NOVEMBER 15, 2024

# LET'S DISCUSS GEOTHERMAL FOR HEATING & COOLING

PINE HILL ELEMENTARY SCHOOL
WESTWOOD

## PROJECT INFORMATION INDEX FOR FEATURED SCHOOLS


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| **School Name:** | **Pine Hill Elementary School** |
|---|---|
| School Location: | Westwood |
| School Type: | Elementary School (Grades K-5) |
| Opening Date: | February 27, 2024 |
| Design Enrollment Number: | 560 |
| Square Footage: | 112,888 |
| EUI: | Predicted EUI: 22.6<br>As of Sept. 30, 2024, tracking below 25 |
| Number of Geothermal Wells: | 60 (closed loop) |
| Depth of Geothermal Wells: | 600’ |
| Emergency Fuel Backup: | Natural Gas Generator |
| Geothermal System Cost: | $3.65 M construction cost of geothermal wells only. Does not include GC OH+P, site excavation and blasting work associated with the wells, related MEP systems or geothermal consultant costs |
| Expected Operational Cost (Electricity): | LEED Baseline: $265,209<br>Design: $162,348 |
| Expected Savings Against Baseline Design that Meets ASHRAE Standard 90.1-2010 (Electricity): | Expected Energy Savings against baseline: 367,574 kWh (35.3%)<br>Expected Cost Savings against baseline: $102,861 (38.8%) |
| Received Mass Save or Federal Inflation Act Incentive | Mass Save, Path 1, NZE: Received $141,426.25 to date. Expecting additional $123,141.00 at the successful completion of 1-year in operation below 25 EUI. Total of expected Incentives: $264,567.25<br>IRA: Application has been submitted |

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| School Name: | **Boardwalk Campus** (includes both the **Douglas Elementary and Gates Elementary School**, as well as a preschool program). |
| School Location: | 75 Spruce Street, Acton MA 01720 |
| School Type: | K-6, preschool |
| Opening Date: | 8/27/22 |
| Design Enrollment Number: | 990 |
| Square Footage: | 175,000 |
| EUI: | 23 |
| Number of Geothermal Wells: | 65 wells |
| Depth of Geothermal Wells: | 600 feet |
| Emergency Fuel Backup: | Diesel generator |
| Geothermal System Cost: | $5.4 million (geothermal only) |
| Expected Operational Cost (Electricity): | Operational costs:<br>• Energy: Utility cost is $300,000 per year for electricity. (Because of extremely high efficiency of all-electric geothermal heat pump system, the utility costs are roughly the same as a gas-fired system.)<br>• Maintenance costs: roughly the same as gas-fired system.<br>• Equipment replacement costs: substantially lower over time vs. gas-fired system. |
| Expected Savings Against Baseline Design that Meets ASHRAE Standard 90.1-2010 (Electricity): | Building is projected to be cheaper to operate than a high-efficiency gas-fired system.<br>• Energy costs similar.<br>• Maintenance costs similar.<br>• Equipment replacement costs substantially lower over time. |
| Received Mass Save or Federal Inflation Act Incentive | Mass Save: the building was part of an earlier framework which has since been updated. We received ~$200K for the initial portion of the Mass Save incentive, and have submitted for the second portion of the incentive. |

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| | Federal IRA incentive: The District is about to submit an application for the 30% geothermal tax credit in the Inflation Reduction Act. |

| **School Name:** | **Belmont Middle and High School** |
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| School Location: | Belmont |
| School Type: | Middle and High School |
| Opening Date: | 9/2021 High School 9/2023 Middle School |
| Design Enrollment Number: | 2,215 |
| Square Footage: | 445,100 |
| EUI: | 30.3 kBtu/sf Modeled; 26.0 kBtu/sf Operational |
| Number of Geothermal Wells: | 283 |
| Depth of Geothermal Wells: | 500ft |
| Emergency Fuel Backup: | Generator Diesel kW 1160- 1600 kVA 1450- 2000<br>Controlling:<br>All life safety<br>Elevator<br>Various lighting including emergency lighting and exit signs<br>Various receptacles (would imagine these are mainly MDF and IDF rooms)<br>HVAC equipment<br>Kitchen refrigeration<br>Fire Curtains<br>BDA<br>Door Hardware<br>Exterior connections available for temporary Boiler if needed. |
| Geothermal System Cost: | $1,500,000 |
| Expected Operational Cost: | $756,409 |
| Expected Savings Over Time: | $69,477 Savings |
| Received Mass Save or Federal Inflation Act Incentive | Investigation is underway to see how this project qualifies for IRA since it was created after the building was under construction. Belmont has a Municipal Light Company—Mass Save is not applicable. |

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| School Name: | **Maria Hastings Elementary School** |
| School Location: | Lexington |
| School Type: | K-5 |
| Opening Date: | 2/20/20 |
| Design Enrollment Number: | 645 |
| Square Footage: | 110,000 |
| EUI: | 26.7 |
| Number of Geothermal Wells: | 80 |
| Depth of Geothermal Wells: | 500 feet |
| Emergency Fuel Backup: | gas |
| Geothermal System Cost: | $3,200,000 |
| Expected Operational Cost (Electricity): | 791,275 kWh * .022= $174,080.5<br>Based on DD energy model |
| Expected Savings Against Baseline Design that Meets ASHRAE Standard 90.1-2010 (Electricity): | Geo vs baseline from DD energy Model<br>Electric use: 791,275 kWh vs 665,533<br>Gas use: 146 therms vs 31,,620<br>Total Energy cost $174,246 vs $182,665<br>However we are now paying a fixed solar rate of .1874 and producing 950,000 kWh = $178,030<br>So we're net zero on power and have some net meter credits. |
| Received Mass Save or Federal Inflation Act Incentive | Eversource, NGrid, Others<br>Approx. $200,000 |

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| School Name: | **Watertown High School** |
| School Location: | 50 Columbia Street, Watertown |
| School Type: | High School |
| Opening Date: | Spring 2026 |
| Design Enrollment Number: | 720 |
| Square Footage: | 201,000 (without garage below) |
| EUI: | 23.9 |
| Number of Geothermal Wells: | 14 |
| Depth of Geothermal Wells: | 900 feet |
| Emergency Fuel Backup: | Diesel |
| Geothermal System Cost: | $850,000 |
| Expected Operational Cost (Electricity): | +/-$500,000 (without PV) |
| Expected Savings Against Baseline Design that Meets ASHRAE Standard 90.1-2010 (Electricity): | 34% |
| Received Mass Save or Federal Inflation Act Incentive | Enrolled in Mass Save Path 1 Program – estimated rebate +/- $450K; IRA TBD |