Local Government Energy Audit Report

High School and Eisenhower Middle School

August 28, 2023

Prepared for:

Roxbury Township Public Schools
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Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities and help prioritize specific measures for implementation. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC reviewed the energy conservation measures and estimates of energy savings for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor estimates.

Incentive values provided in this report are estimated based on previously run state efficiency programs. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available utility program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

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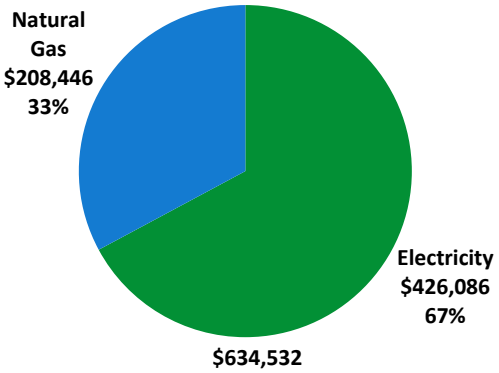
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for High School & Eisenhower Middle School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $634,532 Electricity: 4,220,671 kWh Natural Gas: 141,011 Therms	
ENERGY STAR® Benchmarking Score	33 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

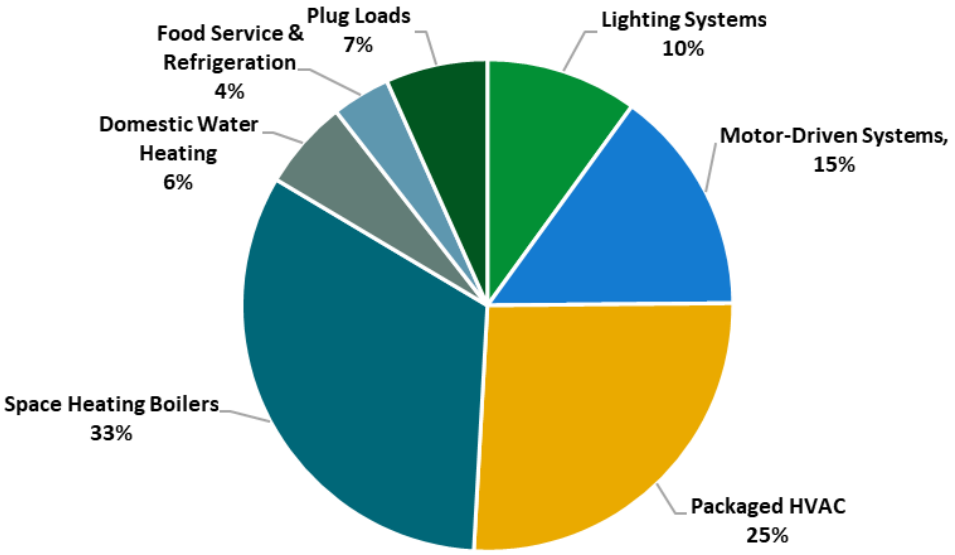


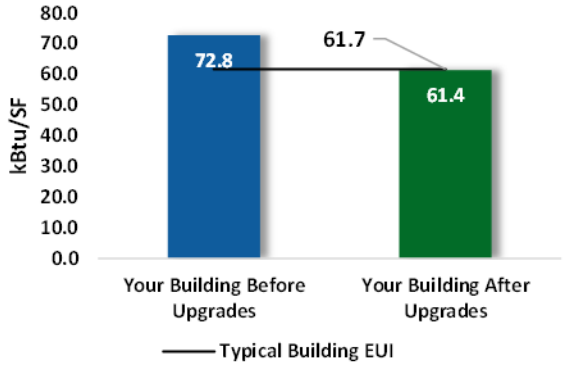
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

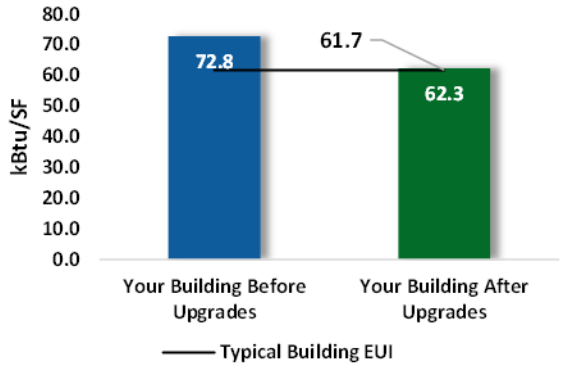
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$1,863,309
Potential Rebates & Incentives[1]	$141,705
Annual Cost Savings	$121,531
Annual Energy Savings	Electricity: 1,108,495 kWh Natural Gas: 6,512 Therms
Greenhouse Gas Emission Savings	596 Tons
Simple Payback	14.2 Years
Site Energy Savings (All Utilities)	16%



Scenario 2: Cost Effective Package[2]

Installation Cost	$686,848
Potential Rebates & Incentives	$74,625
Annual Cost Savings	$112,447
Annual Energy Savings	Electricity: 1,030,358 kWh Natural Gas: 5,703 Therms
Greenhouse Gas Emission Savings	552 Tons
Simple Payback	5.4 Years
Site Energy Savings (all utilities)	14%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**4,239**	**0.6**	**-1**	**$415**	**$1,051**	**$258**	**$793**	**1.9**	**4,165**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	4,239	0.6	-1	$415	$1,051	$258	$793	1.9	4,165
Lighting Control Measures			**258,449**	**37.5**	**-54**	**$25,292**	**$124,681**	**$28,200**	**$96,481**	**3.8**	**253,929**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	234,965	34.1	-49	$22,994	$107,376	$13,965	$93,411	4.1	230,855
ECM 3	Install High/Low Lighting Controls	Yes	23,484	3.4	-5	$2,298	$17,305	$14,235	$3,070	1.3	23,073
Variable Frequency Drive (VFD) Measures			**501,609**	**98.3**	**0**	**$50,639**	**$413,372**	**$43,050**	**$370,322**	**7.3**	**505,116**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	463,545	94.4	0	$46,796	$372,109	$38,450	$333,659	7.1	466,787
ECM 5	Install VFDs on Heating Water Pumps	Yes	38,063	3.9	0	$3,843	$41,263	$4,600	$36,663	9.5	38,329
Unitary HVAC Measures			**78,137**	**64.3**	**81**	**$9,084**	**$1,176,461**	**$67,080**	**$1,109,381**	**122.1**	**88,154**
ECM 6	Install High Efficiency Air Conditioning Units	No	75,509	62.9	81	$8,818	$1,167,714	$66,580	$1,101,134	124.9	85,507
ECM 7	Install High Efficiency Heat Pumps	No	2,629	1.4	0	$265	$8,747	$500	$8,247	31.1	2,647
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**167**	**$2,470**	**$14,795**	**$900**	**$13,895**	**5.6**	**19,568**
ECM 8	Install Infrared Heaters	Yes	0	0.0	167	$2,470	$14,795	$900	$13,895	5.6	19,568
HVAC System Improvements			**9,756**	**0.0**	**43**	**$1,617**	**$11,834**	**$156**	**$11,678**	**7.2**	**14,834**
ECM 9	Implement Demand Control Ventilation (DCV)	Yes	1,315	0.0	43	$765	$10,875	$0	$10,875	14.2	6,334
ECM 10	Install Pipe Insulation	Yes	8,441	0.0	0	$852	$958	$156	$802	0.9	8,500
Domestic Water Heating Upgrade			**39,873**	**0.0**	**12**	**$4,199**	**$1,040**	**$506**	**$534**	**0.1**	**41,525**
ECM 11	Install Low-Flow DHW Devices	Yes	39,873	0.0	12	$4,199	$1,040	$506	$534	0.1	41,525
Food Service & Refrigeration Measures			**28,312**	**2.2**	**0**	**$2,858**	**$18,072**	**$1,555**	**$16,517**	**5.8**	**28,510**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	4,458	0.5	0	$450	$5,156	$680	$4,476	9.9	4,489
ECM 13	Refrigeration Controls	Yes	11,322	0.2	0	$1,143	$9,926	$525	$9,401	8.2	11,402
ECM 14	Vending Machine Control	Yes	12,532	1.4	0	$1,265	$2,990	$350	$2,640	2.1	12,620
Custom Measures			**188,120**	**0.0**	**404**	**$24,957**	**$102,004**	**$0**	**$102,004**	**4.1**	**236,695**
ECM 15	Retro-Commissioning Study	Yes	65,025	0.0	404	$12,531	$91,409	$0	$91,409	7.3	112,739
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	123,095	0.0	0	$12,426	$10,595	$0	$10,595	0.9	123,956
TOTALS (COST EFFECTIVE MEASURES)			**1,030,358**	**138.6**	**570**	**$112,447**	**$686,848**	**$74,625**	**$612,224**	**5.4**	**1,104,340**
TOTALS (ALL MEASURES)			**1,108,495**	**202.9**	**651**	**$121,531**	**$1,863,309**	**$141,705**	**$1,721,605**	**14.2**	**1,192,494**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 2 – Evaluated Energy Improvements

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures.**

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

- How will the project be funded and/or financed?
- Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

Utility-run energy efficiency programs and New Jersey's Clean Energy Programs, give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives *before* purchasing materials or starting installation.

Options from Your Utility Company

Prescriptive and Custom Rebates

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the Prescriptive and Custom Rebates program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering. services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs.

For more details on these programs please contact your utility provider.

Options from New Jersey's Clean Energy Program

Financing and Planning Support with the Energy Savings Improvement Program (ESIP)

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

Resiliency with Return on Investment through Combined Heat and Power (CHP)

The CHP program provides incentives for combined heat and power (i.e., cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Successor Solar Incentive Program (SuSI)

New Jersey is committed to supporting solar energy. Solar projects help the state reach the renewable goals outlined in the state's Energy Master Plan. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available, but certified solar projects are able to earn one SREC II (Solar Renewable Energy Certificates II) for each megawatt-hour of solar electricity produced from a qualifying solar facility.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable, and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

Large Energy User Program (LEUP)

LEUP is designed to promote self-investment in energy efficiency. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

For more details on these programs please visit New Jersey's Clean Energy Program website .

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for High School & Eisenhower Middle School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On February 24, 2023, TRC performed an energy audit at High School & Eisenhower Middle School complex located in Succasunna, New Jersey. TRC met with Chris Banes to review the facility operations and help focus our investigation on specific energy-using systems.

The Roxbury High School located at 1 Bryant Dr. is a regional, four-year comprehensive public high school serving students in ninth through twelfth grades. The facility is comprised of a school building that includes typical educational, administrative, assembly, and recreation spaces. The school is a 281,740 square foot building originally built in 1971 and expanded in 2003 to accommodate additional spaces. Spaces include classrooms, administrative offices, gymnasiums, locker rooms, training rooms, auditorium, library, kitchen, cafeteria, conference rooms, corridors, lobbies, restrooms, storage, closets, woodshop, staircases, and mechanical spaces.

Apart from the high school building, the facility also has a 105,840 square foot middle school called Eisenhower Middle School. Eisenhower Middle School serves approximately 500 7th and 8th-grade students. The facility consists of a school building that includes typical education, administrative, assembly, and recreation spaces. The facility was originally built in 1961 and expanded in 2004 to accommodate additional spaces. Spaces include classrooms, corridors, restrooms, storage, closets, auditorium, locker rooms, cafeteria, administrative offices, fitness room, kitchen, gym, and library.

The complex comprises not only the high school and middle school buildings, but also a maintenance office totaling 3,224 square feet, and a transportation building covering an area of 923 square feet.

The high school, middle school, transportation, and maintenance buildings share the same electric meter while each building has a dedicated gas meter.

Facility lighting systems consist of a mix of linear LED tubes, LED fixtures, linear fluorescent T8, and compact fluorescent lamps (CFL). The high school and middle school are heated by hot water boilers and cooled by rooftop units (RTUs) and split-system air source heat pumps. The transportation building is outfitted with a forced air furnace that provides both heating and cooling, while the maintenance shop has no cooling, only unit heaters.

Recent Improvements and Facility Concerns

The facility has replaced nearly all its existing T12 fluorescent fixtures with LED tubes and LED fixtures.

Facility concerns include boilers and HVAC systems that are approaching the end of their useful life.

2.2 Building Occupancy

The high school and middle school operates on a 10-month schedule. During a typical weekday, the high school and middle school are occupied by 1,748 students and 284 staff. There are some Saturday activities and after school programs. The high school and middle school are shut down around 11:00 PM after the cleaning process.

The maintenance office and the transportation building operate on a 12-month schedule. The typical weekday occupancy for the maintenance office is 12 staff, while the occupancy for the transportation building is seven staff.

It should be noted that the energy and economic analysis for the facilities is based on the use of the building during the utility billing period, and that results will vary based on changes to building use patterns.

Building Name	Weekday/Weekend	Operating Schedule
Roxbury High School - General Operating Hours	Weekday	5:00 AM - 11:00 PM
	Saturday	8:00 AM - 4:00 PM
Roxbury High School - Classes Hours	Weekday	7:20 AM - 2:30 PM
	After School Program	2:30 PM - 9:30 PM
Eisenhower Middle School - General Operating Hours	Weekday	5:00 AM - 11:00 PM
	Saturday	8:00 AM - 2:00 PM
Eisenhower Middle School - Classes Hours	Weekday	7:20 AM - 2:30 PM
	After School Program	2:30 PM - 6:00 PM
Maintenance Building	Weekday	4:30 AM - 2:30 PM
	Weekend	Closed
Transportation Building	Weekday	6:30AM - 5:30 PM
	Weekend	Closed

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete masonry units (CMU) block over structural steel with a stone façade, with gypsum drywall and painted CMU interior finish. The level of exterior wall insulation is unknown. The high school and middle school buildings have flat roofs with gravel finish and are in good condition. The roof areas of the transportation maintenance buildings are pitched and covered with asphalt shingles. They are in good condition.

Most of the windows are double-paned and have aluminum frames with a thermal break. The operable window weather seals are in good condition, showing little evidence of excessive wear. Exterior doors are mostly FRP (fiberglass-reinforced polymers) rated doors and are in good condition. The maintenance and transportation buildings have overhead metal-framed motorized doors that appear in good condition. Degraded window and door seals increase drafts and outside air infiltration.

High School Building Walls

Middle School Building Walls

High School Flat Roof

Middle School Flat Roof

Maintenance Building

Transportation Building

High School Windows

Middle School Windows

High School Exterior Doors

Middle School Exterior Doors

2.4 Lighting Systems

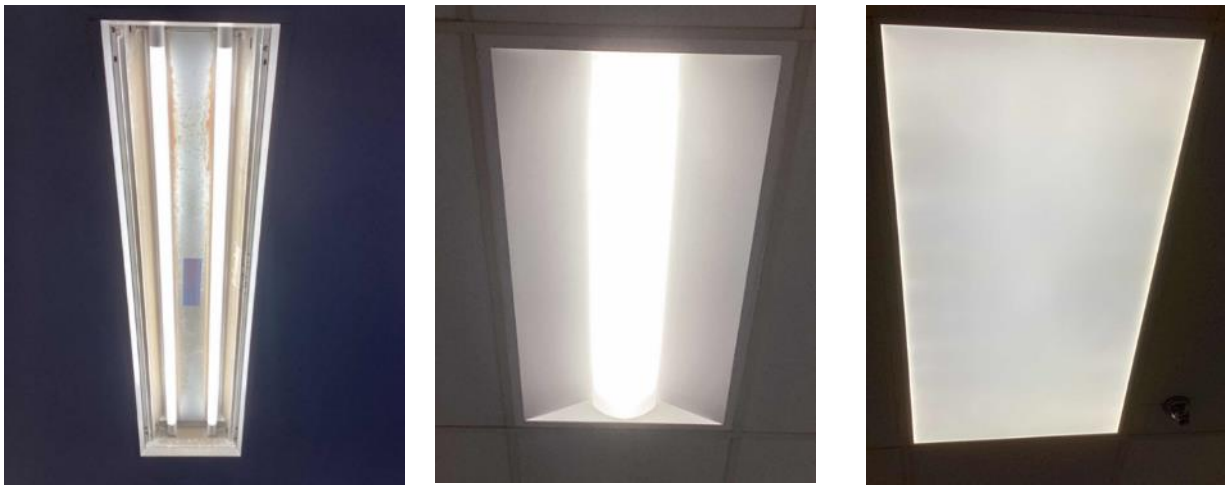
The primary interior lighting system throughout the entire complex uses LED linear tubes and LED fixtures. There are a few linear fluorescent T8 and compact fluorescent lamps (CFL). Fixture types include 4-foot-long LED tubes, T8 fluorescent lamps, LED 2-foot x 2-foot and 2-foot x 4-foot troffers, and LED surface mounted fixtures.

Typically, T8 fluorescent lamps use electronic ballasts. CFLs are found in the high school auditorium storage room while T8 fluorescent lamps are used in the high school kitchen and some storage rooms. Gymnasium fixtures have manually controlled LED high bay fixtures and LED linear tubes. Auditorium fixtures are equipped with recessed LED "corn cob" lamps, LED linear tubes, and LED ceiling-mounted fixtures, all of which are manually controlled. All exit signs are LED.

Most fixtures are in fair condition. Interior lighting levels were generally sufficient. Most lighting fixtures in the classrooms and offices are controlled by wall switches, while some are equipped with occupancy sensors. The lights in the hallway and lobbies are controlled by wall switches.

The transportation and maintenance building lights are controlled by wall switches.

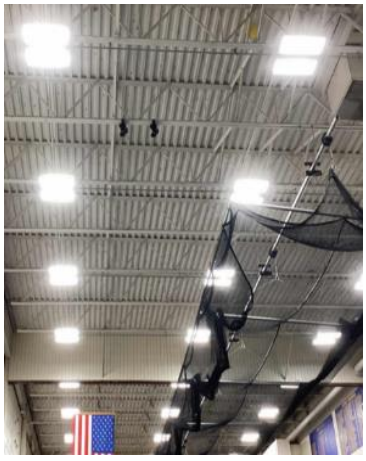
Exterior fixtures use LED sources. Fixture types include wall packs, floodlights, pole top lighting, ceiling mounted fixtures, and fuel pump canopy fixtures. They are mostly controlled by timeclock, while some are controlled by photocells.



LED Linear Tubes and 2-foot x 4-foot LED Troffers

2-foot x 2-foot LED Troffers

Recessed LED Corn Cob Bulb



LED High Bay Fixtures

LED Exit Sign.

Wall Switches

Wall Mounted Occupancy Sensors

Wall Mounted Occupancy Sensors

LED Pole Fixture

LED Floodlight

LED Wall Pack

LED Canopy Fixture, LED Wall Pack & LED Ceiling Mounted Fixtures.

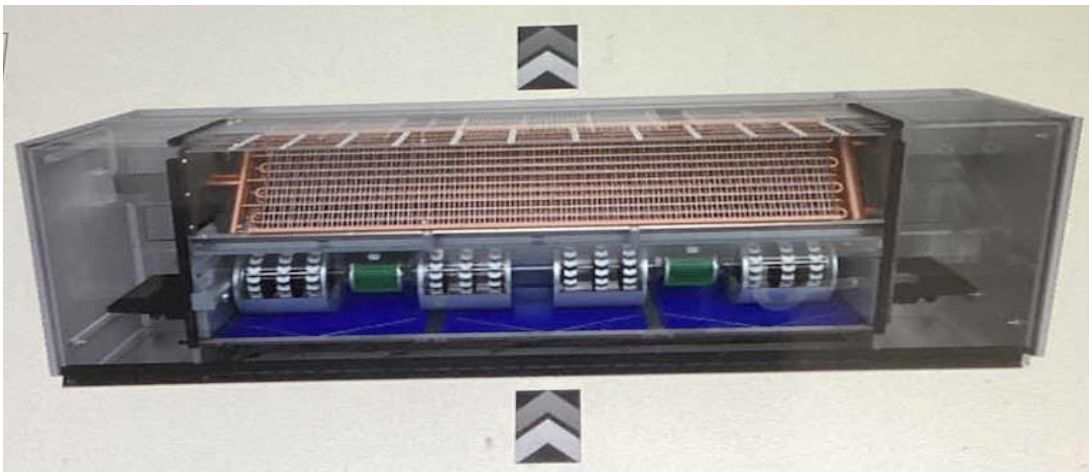
2.5 Air Handling Systems

Unit Ventilators

The middle school unit ventilators and cabinet heaters are equipped with supply fan motors and fan coil valves connected to the hot water distribution system. They provide heating and ventilation to classrooms and other spaces. The units are original to the building and have been updated to good operating condition. The units are controlled by the building automation system (BAS).

Classrooms 36 and 37 are cooled by horizontal Airedale units with direct expansion cooling and connected to the hot water distribution system for heating. They are in good condition and controlled by the BAS.

Middle School Unit Ventilators



BAS Screenshot - Unit Ventilator

Unitary Electric HVAC Equipment

Spaces including the high school kitchen office and server room and the middle school main office and rooms 15, 16, 17, 18 and 19; are air conditioned by nine split ACs that vary in size between 2 tons and 3.5 tons. Five units appear in fair condition and have been evaluated for replacement. The units are controlled by programmable thermostats.

The high school faculty dining room and cafeteria, and the middle school computer lab, main office, security vestibule, and guidance room are cooled and heated by split air source heat pumps. The units vary in cooling capacity between 1 ton and 12 tons with heating capacities ranging between 16 Mbh and 160 MBh. They all appear in good working condition and are controlled by programmable thermostats.

High School Outdoor Condensing Units

High School Mitsubishi 12 Ton Heat Pump

Unitary Heating Equipment

The transportation building is conditioned by a furnace equipped with a direct expansion coil connected to a 1.5 ton outside condensing unit. The furnace has a gas-fired heating output capacity of 32 MBh with an efficiency rating of 80%. The system is controlled by a local thermostat and is in good condition.

The transportation building shop and maintenance building shop are heated by four, 175 MBh suspended gas-fired Reznor unit heaters. The units are in good condition and controlled by local thermostats.

The high school locker room offices, loading dock, and main electrical room are heated by suspended electric resistance heaters that are controlled by manual thermostats. The units are in good condition.

Transportation Building Furnace

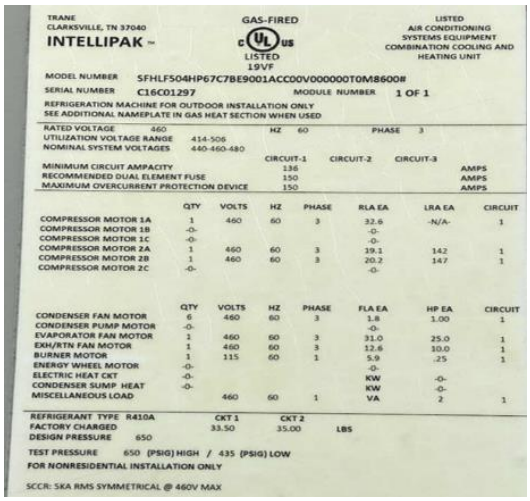
Its Condensing Unit

High School Electric Resistance Heaters

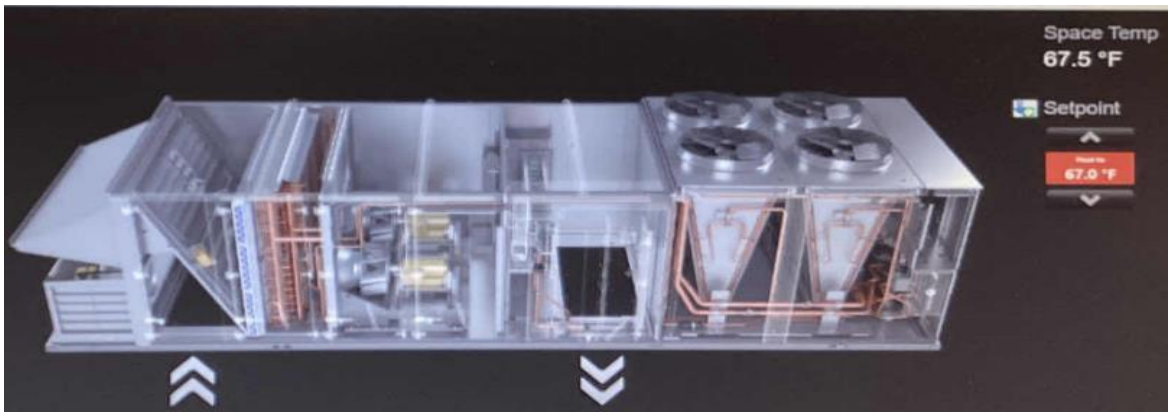
Packaged Units

Some of the larger high school spaces are conditioned by 32 roof mounted units equipped with economizers. They provide cooling through direct expansion (DX) coils, and most are equipped with gas-fired sections for heating. These units vary in cooling capacity between 3 tons and 33 tons with heating capacities between 162 MBh to 420 MBh. Most of the units are constant volume systems except for RTU-11 serving the auditorium which is equipped with variable frequency drives (VFDs) to control the speed of the supply and return fans. The two RTUs serving the locker rooms are equipped with electric resistance coils. Twenty-one of the roof mounted units labeled as "AC" are Season 4 custom manufactured units equipped with supply fans and return fans.

Only four of the RTUs appear in good condition. The remaining units have either reached or passed their useful life and appear in fair or poor condition. They have been evaluated for replacement. The RTUs are controlled by the BAS. Please refer to the table below the photos and diagrams for system details.

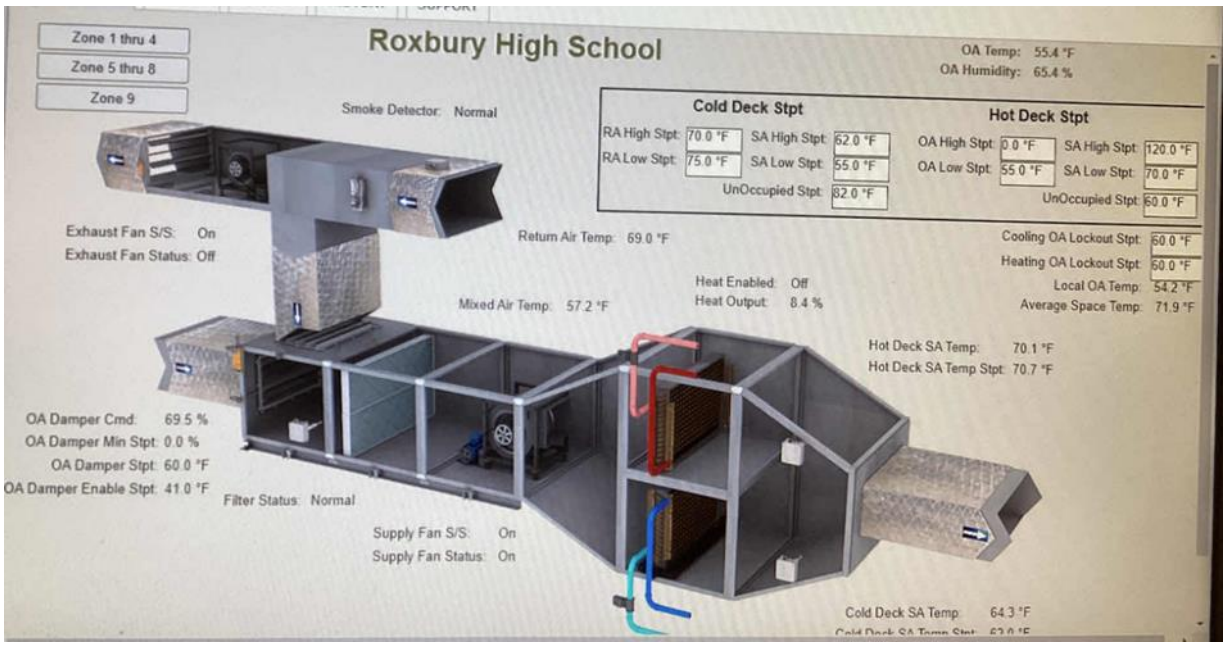


High School - RTU-11



High School BAS Screenshot - RTU-11

High School - AC-22



High School BAS Screenshot - AC-15

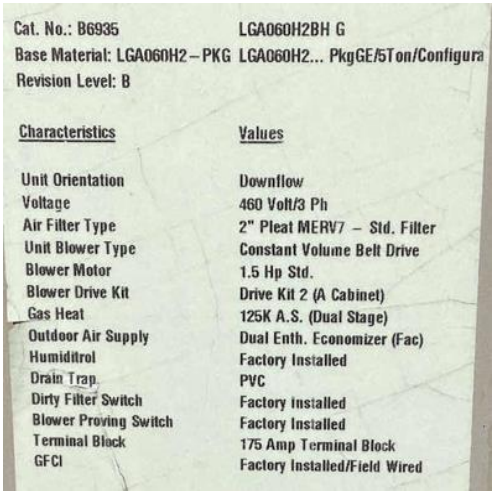
Location	Unit ID	Areas Served	Cooling Capacity (Tons)	Heating Capacity (MBh)	Supply Fan (hp)	Return Fan (hp)	Condition
Roof	RTU-1	Robotic Classroom	3.00	None	1.00	N/A	Fair
Roof	RTU-2	Woodshop	10.00	162.00	3.00	N/A	Fair
Roof	RTU-3	Training Room	13.00	208.00	3.00	N/A	Poor
Roof	RTU-Unlabeled	Weight Room	20.00	187.00	7.50	N/A	Poor
Roof	RTU-Unlabeled	Girls Locker Room	4.00	Electric Resistance Heat	1.55	N/A	Poor
Roof	RTU-Unlabeled	Boys Locker Room	4.00	Electric Resistance Heat	1.50	N/A	Poor
Roof	RTU-Unlabeled	Custodian Break Room	5.00	None	2.00	N/A	Poor
Roof	RTU-5	Building & Ground IT Office	12.50	203.00	5.00	N/A	Fair
Roof	RTU-11	Auditorium	42.00	420.00	25.00	10.00	Fair
Roof	AC-1	Band Room 100	20.00	187.00	7.50	N/A	Poor
Roof	AC-2	Band Room 101	20.00	187.00	7.50	N/A	Poor
Roof	AC-3	Hallways & Classrooms	28.00	280.00	5.00	1.50	Poor
Roof	AC-4	P Hallway & Classrooms	33.00	320	7.55	2.00	Poor
Roof	AC-5	P Hallway & Classrooms	30.00	280.00	7.50	3.00	Poor
Roof	AC-6	Main Office	23.00	280.00	5.00	1.50	Poor
Roof	AC-7	B Hallway & Classrooms	32.00	320.00	7.50	1.50	Poor
Roof	AC-8	D Hallway & Classrooms	33.00	400.00	7.50	1.50	Poor

Location	Unit ID	Areas Served	Cooling Capacity (Tons)	Heating Capacity (MBh)	Supply Fan (hp)	Return Fan (hp)	Condition
Roof	AC-9	Q Hallway & Classrooms	33.00	400.00	7.50	1.50	Poor
Roof	AC-10	Classrooms 124 – 127 & 226 - 229	32.00	320.00	5.00	1.50	Poor
Roof	AC-11	B Hallway & Classrooms	32.00	160.00	5.00	1.00	Poor
Roof	AC-12	Q Hallway & Classrooms	22.00	240.00	5.00	1.00	Poor
Roof	AC-13	M & O Hallway & Classrooms	32.00	320.00	7.50	1.50	Poor
Roof	AC-14	L Hallway & Classrooms	32.00	280.00	7.50	0.50	Poor
Roof	AC-15	N Hallway & Classrooms	32.00	400.00	7.50	1.50	Poor
Roof	AC-16	O Hallway & Classrooms	27.00	240.00	5.00	1.00	Poor
Roof	AC-17	M & O Hallway & Classrooms	32.00	320.00	7.50	1.50	Poor
Roof	AC-18	N Hallway & Classrooms	32.00	280.00	7.50	1.50	Poor
Roof	AC-20	Classrooms 105, 163, 260, 208, 209	32.00	320.00	7.50	1.50	Poor
Roof	AC-22	Woodshop	16.00	160.00	5.00	1.00	Poor
Roof	AC-23	A Hallway & Classrooms	31.00	320.00	7.50	2.00	Poor
Roof	AC-24	Choir Room	30.00	240.00	10.00	2.00	Poor
Roof	AC-25	1st Floor Hallway	25.00	280.00	5.00	1.50	Poor

Larger middle school spaces including the main and E wing hallways, library, music room, and rooms 41 and 42 are conditioned by six roof mounted packaged units (RTUs) equipped with economizers. They provide cooling through direct expansion coils. The cooling capacities vary between 5 tons and 12 tons. The Trane units (RTU-5 and RTU-6) serving the library are equipped with electric resistance coils while the remaining four units are equipped with gas-fired sections with output heating capacities that vary between 125 MBh and 188 MBh. The units provide a constant volume of air. They have passed their respective useful lives and appear in poor condition. They have been evaluated for replacement.

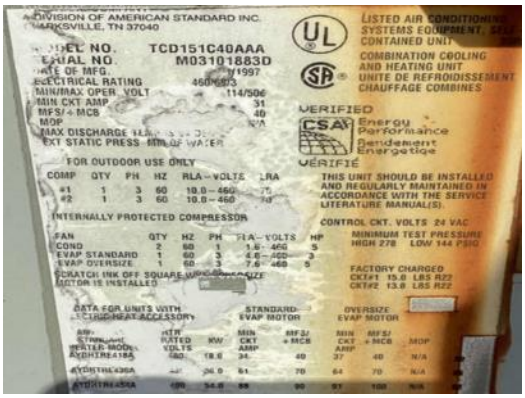
The middle school E wing hallway is conditioned by a 5-ton Carrier packaged heat pump (RTU-7) with a heating capacity of 47 MBh. The unit is in poor condition and has been evaluated for replacement.

The middle school RTUs are controlled via the BAS. Refer to table below for detailed system information.



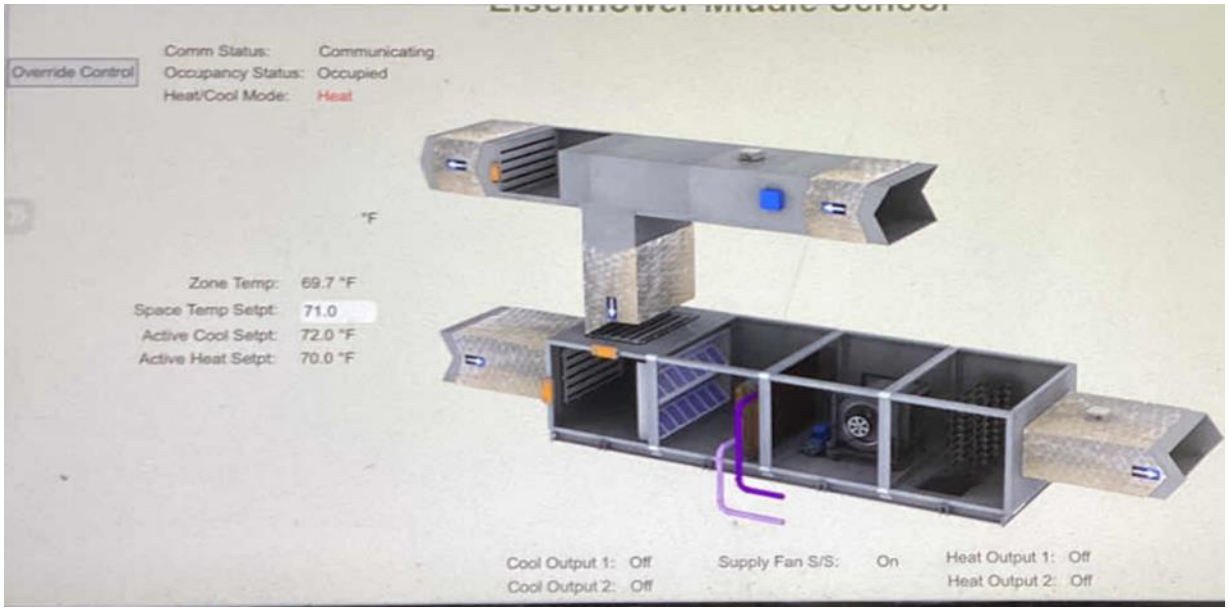
Cat. No.: B6935	LGA060H2BH G
Base Material: LGA060H2–PKG	LGA060H2... PkgGE/5Ton/Configura
Revision Level: B	
Characteristics	**Values**
Unit Orientation	Downflow
Voltage	460 Volt/3 Ph
Air Filter Type	2" Pleat MERV7 – Std. Filter
Unit Blower Type	Constant Volume Belt Drive
Blower Motor	1.5 Hp Std.
Blower Drive Kit	Drive Kit 2 (A Cabinet)
Gas Heat	125K A.S. (Dual Stage)
Outdoor Air Supply	Dual Enth. Economizer (Fac)
Humiditrol	Factory Installed
Drain Trap	PVC
Dirty Filter Switch	Factory Installed
Blower Proving Switch	Factory Installed
Terminal Block	175 Amp Terminal Block
GFCI	Factory Installed/Field Wired

Middle School RTU-3 - Middle School Room 41



Middle School RTU-5 – Library

Middle School RTU-7 (Heat Pump) - E Wing Hallway



Middle School BAS Screenshot - RTU-6

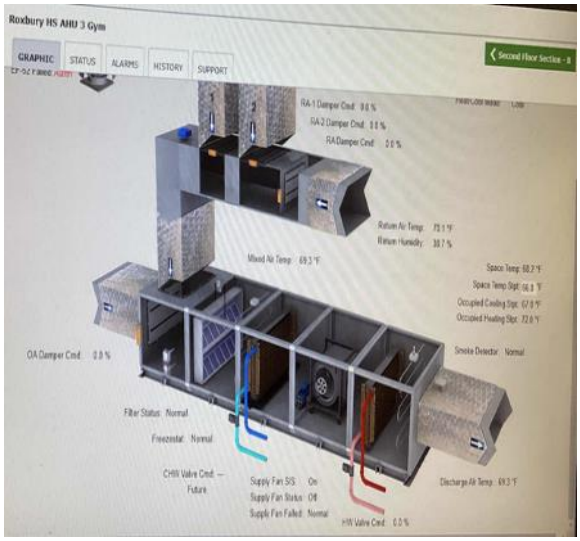
Location	Unit ID	Areas Served	Cooling Capacity (Tons)	Heating Capacity (MBh)	Supply Fan (hp)	Return Fan (hp)	Condition
Roof	RTU-1	Main Hallway	10.00	188.00	3.00	N/A	Poor
Roof	RTU-2	Room 42	5.00	125.00	0.50	N/A	Poor
Roof	RTU-3	Room 41	5.00	125.00	1.50	N/A	Poor
Roof	RTU-4	Music Room	10.00	188.00	3.00	N/A	Poor
Roof	RTU-5	Library	12.50	Electric Resistance Heat	5.00	N/A	Poor
Roof	RTU-6	Library	12.50	Electric Resistance Heat	5.00	N/A	Poor

Air Handling Units (AHUs)

Some larger high school building spaces including gymnasiums, cafeteria, auditorium, and the teacher's lounge are conditioned by nine air handling units (AHUs). The units are equipped with supply fan motors, return fan motors (AHU-12 and AHU-13 only), and hot water heating coils. Some units are difficult to access; as such, the fan capacities have been estimated. The AHUs are all constant volume units and appear to be original to the building. They are in poor condition and controlled by the BAS.

Air distribution is provided to supply air registers by ducts concealed above ceilings. The heating air distribution setpoints are 68°F when occupied and 55°F when unoccupied.

AHU-8 – Teacher Lounge



BAS Screenshot AHU-

Location	Unit ID	Areas Served	Supply Fan (hp)	Return Fan (hp)	Condition
South Boiler Room	AHU-1	Auxiliary Gym	3.00*	N/A	Poor
South Boiler Room	AHU-2	Main Gym	10.00	N/A	Fair
North Mechanical Room	AHU-3	Main Gym	10.00	N/A	Fair
North Mechanical Room	AHU-4	Auxiliary Gym	1.00	N/A	Fair
Kitchen Storage	AHU-6	Cafeteria Field Side	7.50	N/A	Fair
Kitchen Storage	AHU-7	Cafeteria Front Side	7.50	N/A	Fair
Kitchen Storage	AHU-8	Teacher Lounge	3.00	N/A	Poor
High School	AHU-12	Auditorium	7.50	5.00	Poor
High School	AHU-13	Auditorium	7.50	5.00	Poor
*(hp estimated)					

Some larger middle school spaces including locker rooms, weight room, kitchen, auditorium, and tech lab are heated by ten heating and ventilation units (HV). They are equipped with supply fans and heating coils connected to the hot water distribution loop. They provide heating and ventilation. The units appear in fair condition and are controlled by the BAS.

BAS Screenshot - HV-4

Location	Unit ID	Areas Served	Supply Fan (hp)	Condition
Middle School	HV-1	Auditorium	0.80*	Fair
Middle School	HV-2	Weight Room	0.50*	Fair
Middle School	HV-3	Boys Locker Room	0.50*	Fair
Middle School	HV-4	Girls Locker Room	0.50*	Fair
Middle School	HV-5	Library	0.50*	Fair
Middle School	HV-6	Library	0.50*	Fair
Middle School	HV-7	Auditorium	0.80*	Fair
Middle School	HV-8	Auditorium	0.80*	Fair
Middle School	HV-9	Auditorium	0.80*	Fair
Middle School	HV-10	Kitchen	0.50*	Fair
*(hp estimated)				

2.6 Building Exhaust Air Systems

The high school and middle school restrooms, hallways, classrooms, and other areas are exhausted by motor driven exhaust fans. The kitchens have exhaust fans which serve all the kitchen hoods. Equipment is in good condition, controlled by BAS or manual switches, depending on the system.

Middle School Kitchen Hood Exhaust Fan

High School Kitchen Hood Exhaust Fan

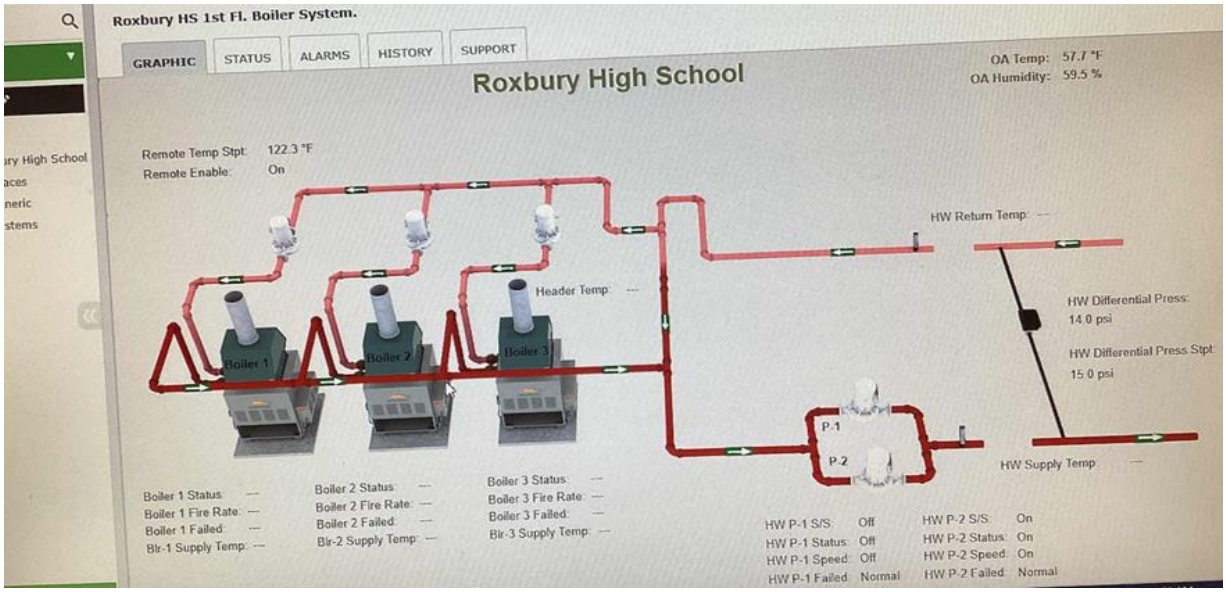
BAS Screenshot - Exhaust Fans

2.7 Heating Hot Water Systems

Roxbury High School has four boiler plants with a total of ten non-condensing hot water boilers. Boiler output heating capacities vary between 218 and 1,487 MBh. The burners are non-modulating with nominal efficiencies ranging from 81% to 85%. Each boiler plant serves a specific building area.

The boilers are configured in an automated sequence, and they all run together to meet the heating demand and they stage based on outside air temperature. Installed between 2005 and 2014, the boilers are in good condition. The hydronic distribution system is a two-pipe heating-only system. Six variable flow and ten constant flow pumps distribute heating hot water to AHUs, HV units, UVs, FCUs, hydronic baseboards, and unit heaters. The pumps vary in size between 0.5 hp and 7.5 hp. The boilers operate based on outside air temperature. The boilers and the hot water loop are controlled by the BAS. The building occupied heating setpoint is 68°F and the unoccupied heating setpoint is 55°F.

Hot Water Boilers



BAS Screenshot - RBI Boilers Plant Hot Water Loop

7.5 hp Hot Water Pumps

VFDs

High school boiler information is summarized below.

Location	Unit ID	Areas Served	Output Capacity (MBh)	Efficiency (%)	Manufacturer	Condition
Band Wing Boiler - 58	Boiler #1 & 2	Band Wing	314.00	83.00	BUDERUS	Good
Loading Dock Boiler Room	Boiler #1, 2 & 3	HS Cafeteria & Faculty Lounge	1,487	84.00	RBI	Good
Mechanical South Boiler Room	Boiler #1, 2 & 3	High School Building	638.00	85.00	RBI	Good
Weight Room Boiler Room	Boiler #1 & 2	Weight Room & Restroom	218.00	81.00	BUDERUS	Good

High school hot water system pumping is provided by the following equipment:

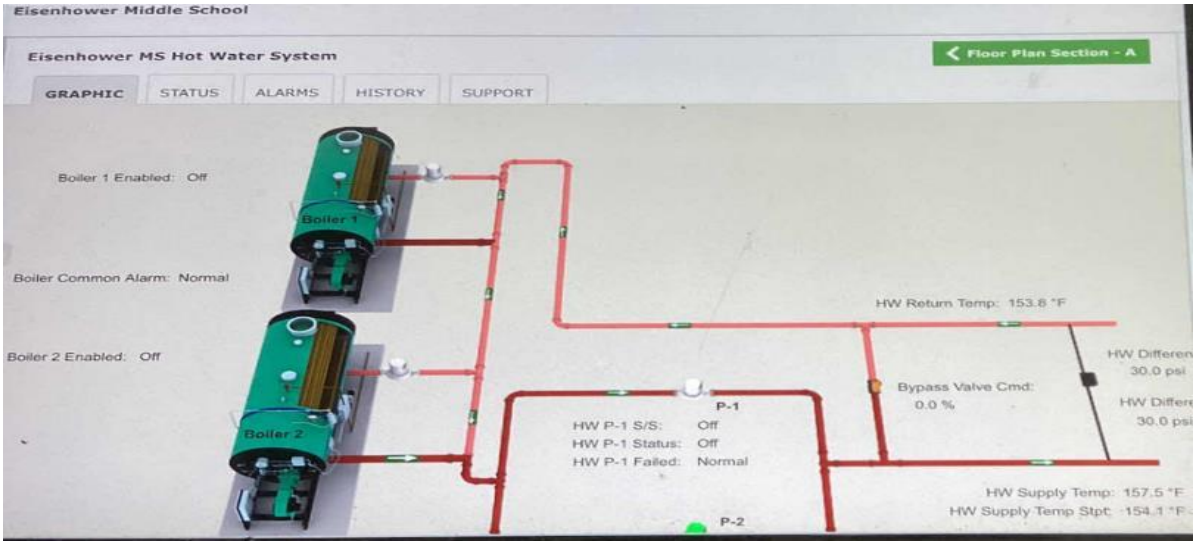
Location	Unit ID	Areas Served	Size (hp)	VFD	Condition
Loading Dock Boiler Room	Distribution Pumps - P-HWS1 & 2	Band Wing	7.5.0	Yes	Good
Mechanical South Boiler Room	Distribution Pumps - P-HWS3 & 4	High School	7.5.0	Yes	Good
Boiler Room - 58	Distribution Pumps – P1 & P2	High School	3.00	No	Good
Loading Dock Boiler Room	Distribution Pumps -	High School	0.50	Yes	Good
Loading Dock Boiler Room	HW Recirculation Pumps – PHWB1, 2, & 3	High School	1.00	No	Good
Mechanical South Boiler Room	HW Recirculation Pumps – PHWB 4, 5, & 6	High School	0.50	No	Good
Weight Room Boiler Room	Distribution Pumps – P1 & P2	High School	3.00	No	Good

Roxbury Eisenhower Middle School has two boiler plants with a total of five non-condensing hot water boilers. The main boiler room has three boilers each with a capacity of 1,062 MBh while the two Band Wing system boilers each have a heating output capacity of 314 MBh. The burners are non-modulating with nominal efficiencies of 83% and 85%. Each boiler plant serves a specific building area.

The boilers are configured in an automated sequence, and they all run together to meet the demand and stage based on the outside air temperature. Installed in 2005 and 2014, the boilers are in good condition. The hydronic distribution system is a two-pipe heating-only system. Nine constant flow pumps distribute heating hot water to HV units, UVs, FCUs, hydronic baseboards, and unit heaters. The pumps vary in size between 0.1 hp and 7.5 hp. The boilers operate based on outside air temperature. The boilers and the hot water loop are controlled by the BAS. The building occupied heating setpoint is 68°F, and the unoccupied heating setpoint is 55°F.

RBI Hot Water Boilers

Boderus Hot Water Boilers



Middle School BAS Screenshot - RBI Boilers

5 hp Hot Water Pumps

Middle School boiler is information is provided below:

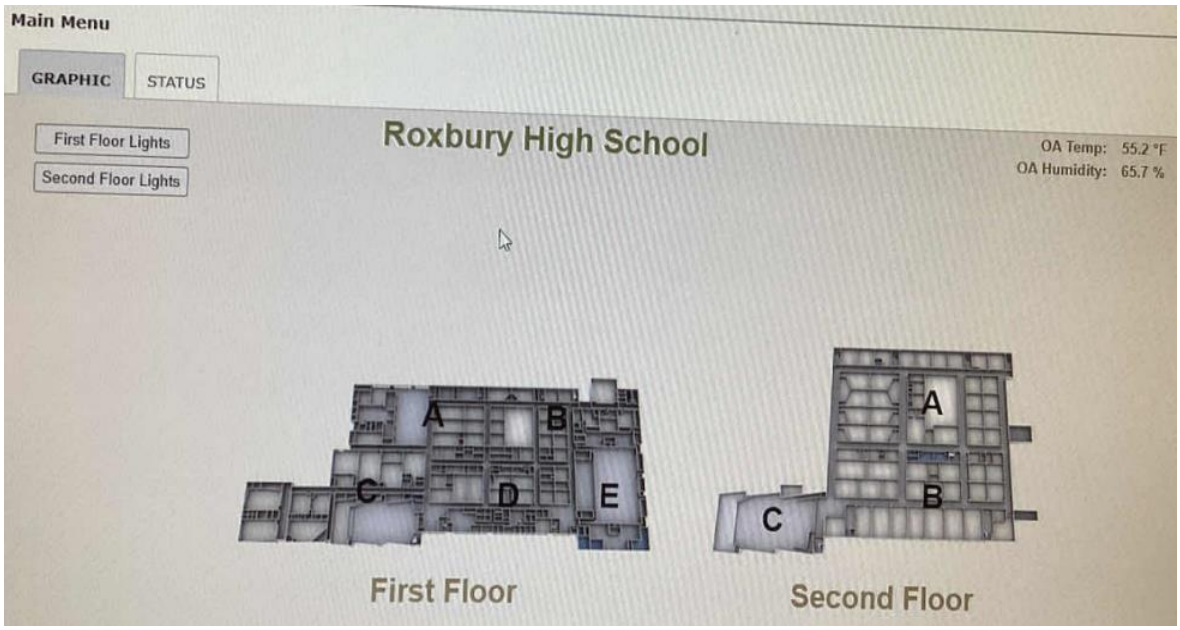
Location	Unit ID	Areas Served	Output Capacity (MBh)	Efficiency (%)	Manufacturer	Condition
Band Wing Boiler Room	Boiler #1 & 2	Middle School	314	83	Buderus	God
Boiler Room	Boiler #1, 2 & 3	Middle School	1,062	85	RBI	Good

Middle school hot water system pumping is provided by the following equipment:

Location	Unit ID	Areas Served	Size (hp)	VFD	Condition
Band Wing Boiler Room	Recirculation Pumps	Buderus Boilers	0.10	No	Good
Boiler Room	Recirculation Pumps	RBI Boilers	0.80	No	Good
Boiler Room	Distribution Pumps - P1P2	Middle School	5.00	No	Good
Boiler Room	Distribution Pumps - P1P2	Middle School	7.50	No	Good

2.8 Building Automation System (BAS)

A Trane tracer ensemble version 6.3 controls the HVAC equipment, heat and ventilation units (HVs), AHUs, RTUs, and exhaust fans for both the high school and middle school. The BAS provides equipment scheduling control, monitors and controls space temperatures, supply air temperatures, humidity, and hot water loop temperatures.



Main Screen – BAS Controls

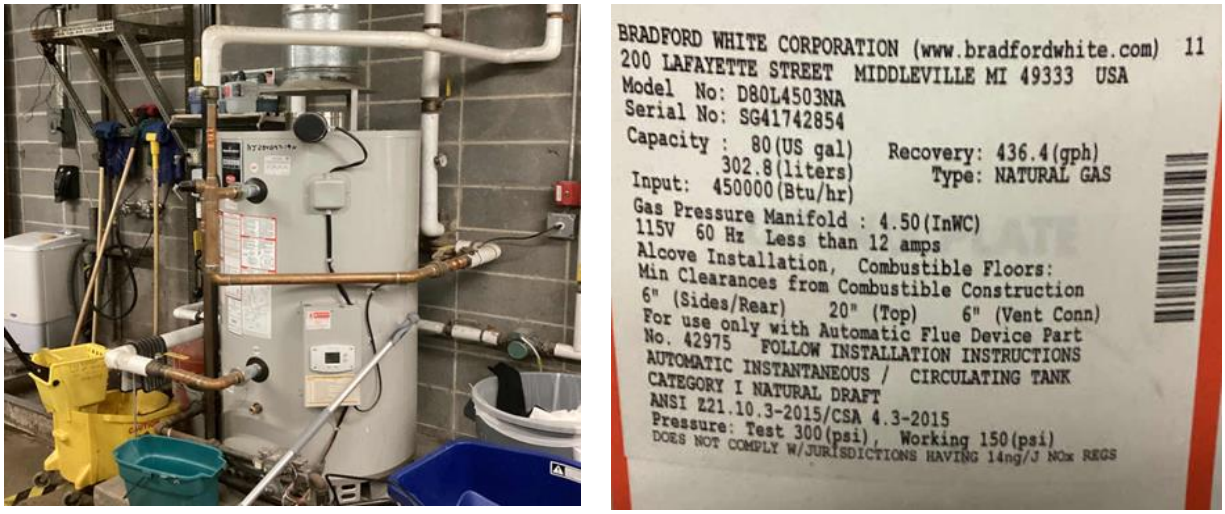
2.9 Domestic Hot Water

Domestic hot water for the high school is produced by five electric storage tank water heaters that range from 6 kW to 180 kW and one gas-fired 450 MBh storage tank water heater with an 80 % efficiency rating. The electric storage tanks serve the high school restrooms and locker rooms, while the natural gas-fired unit serves the high school kitchen's main hot water needs. The units vary in storage capacities from 50 gallons to 100 gallons.

Domestic hot water in the middle school is provided by six electric storage tank water heaters, with capacities varying from 1.50 kW to 36 kW. They range from 19 gallons to 120 gallons, serving restrooms and kitchen hot water needs.

The transportation building is equipped with one, 40-gallon, 5 kW electric storage tank water heater.

Approximately nine fractional horsepower pumps circulate water to the end users throughout the complex. Most of the domestic hot water pipes are not insulated, and the insulation that does exist is in poor condition.



Roxbury High School Gas-Fired Water Heater

Eisenhower Middle School Electric Water Heater

2.10 Food Service Equipment

The high school houses a commercial kitchen and a cafeteria while the middle school uses a medium size kitchen. The kitchen equipment is mostly electric with multiple equipment used to prepare breakfast and lunch for students. Bulk prepared foods are held in six electric holding cabinets. Equipment is not high efficiency and is in acceptable condition.

There is a newly installed ENERGY STAR high temperature dishwasher in the high school kitchen. The unit is served by an electric booster heater.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Gas Fryer

Electric Convection Oven

Insulated Food Cabinet

2.11 Refrigeration

Combined, the kitchens have six stand-up refrigerators with solid doors. There are eight refrigerator chests and one freezer chest. Most equipment is standard efficiency and in fair condition.

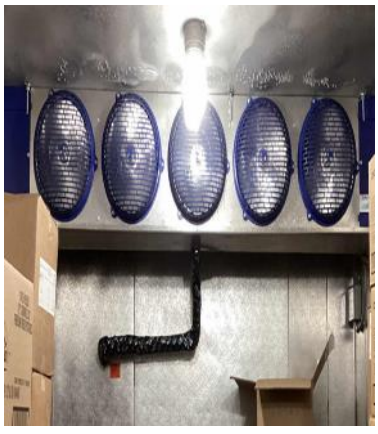
The middle school kitchen has a walk-in medium temperature freezer with a 1-ton compressor and a 3-fan evaporator. There is also a walk-in cooler with a two-fan evaporator.

The high school kitchen has a walk-in cooler with a two-fan evaporator and two walk-in low temperature freezers, each with a 1-ton compressor and a 5-fan evaporator.

There are three self-contained ice machines, one in the high school's athletic training room and one in the kitchen. The third is in the elementary school kitchen. They are not ENERGY STAR rated equipment.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Freezer Temperature



Evaporator Fans

Stand-up Refrigerator

Walk-in Freezer

Walk-in Condensing Box

2.12 Plug Load and Vending Machines

There are 579 computer workstations throughout the complex. Plug loads include general cafe and office equipment. There are classroom typical loads such as smartboards, projectors, scanner/copier, small printer, microwaves, mini refrigerators, and television. Shops and STEM classrooms have plug loads that include pottery equipment, 3D printers, and wood shop equipment.

There are several residential-style refrigerators, and these vary in condition and efficiency.

There are seven refrigerated beverage vending machines, six non-refrigerated vending machines, and several ice machines. The vending machines are not equipped with occupancy-based controls.

Scanner/Copier

Desktops

2.13 Water-Using Systems

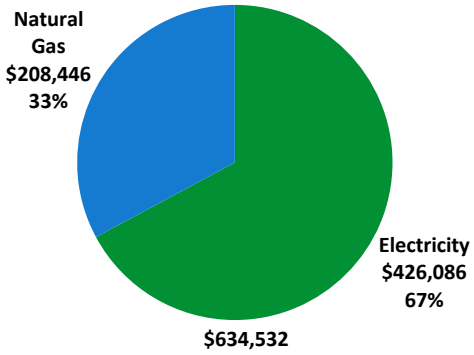
There are several restrooms with sinks, toilets and/or urinals. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Some restrooms have low flow devices.

Lavatory Sinks

3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	4,220,671 kWh	$426,086
Natural Gas	141,011 Therms	$208,446
Total		**$634,532**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

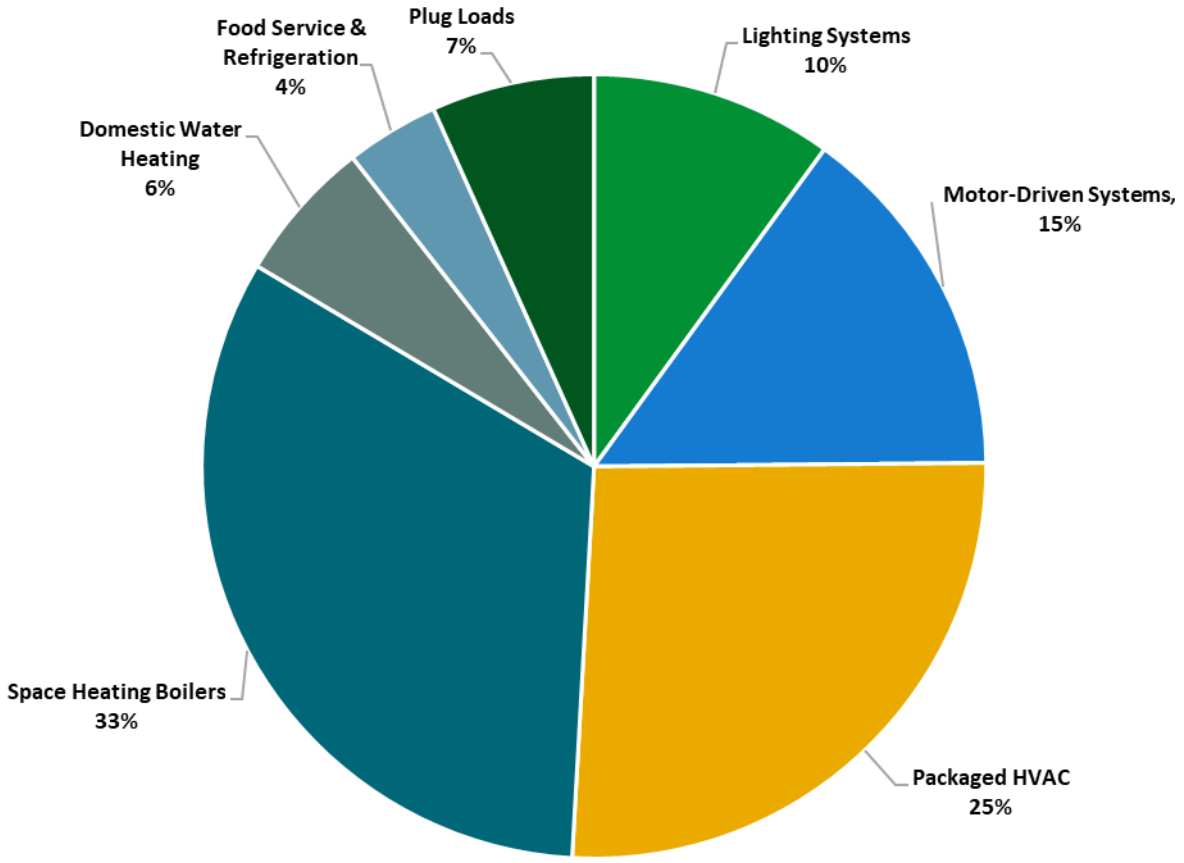
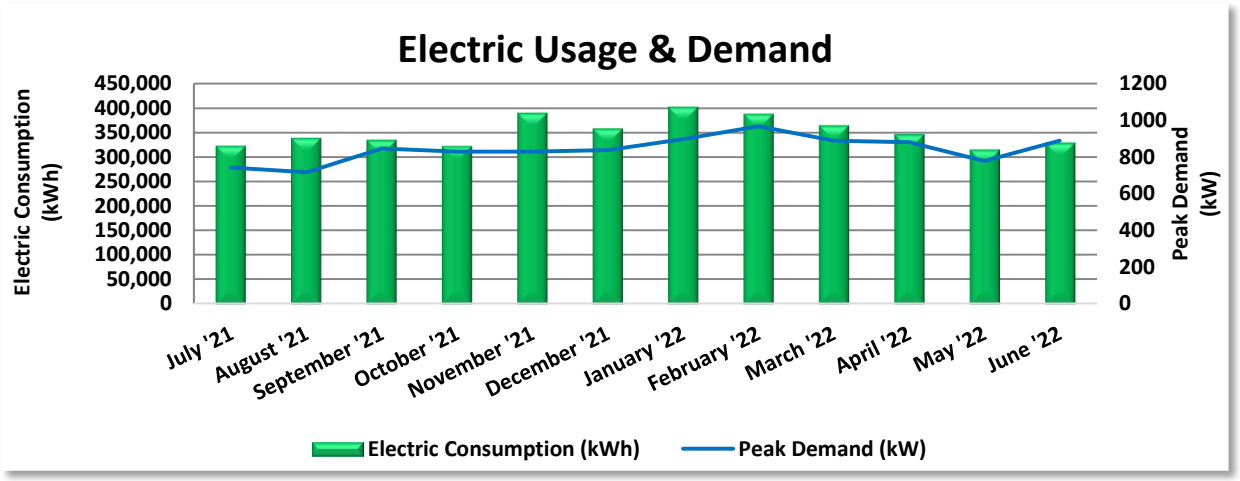


Figure 4 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Primary JC_GP _010, with electric production provided by Freepoint Energy, a third-party supplier.



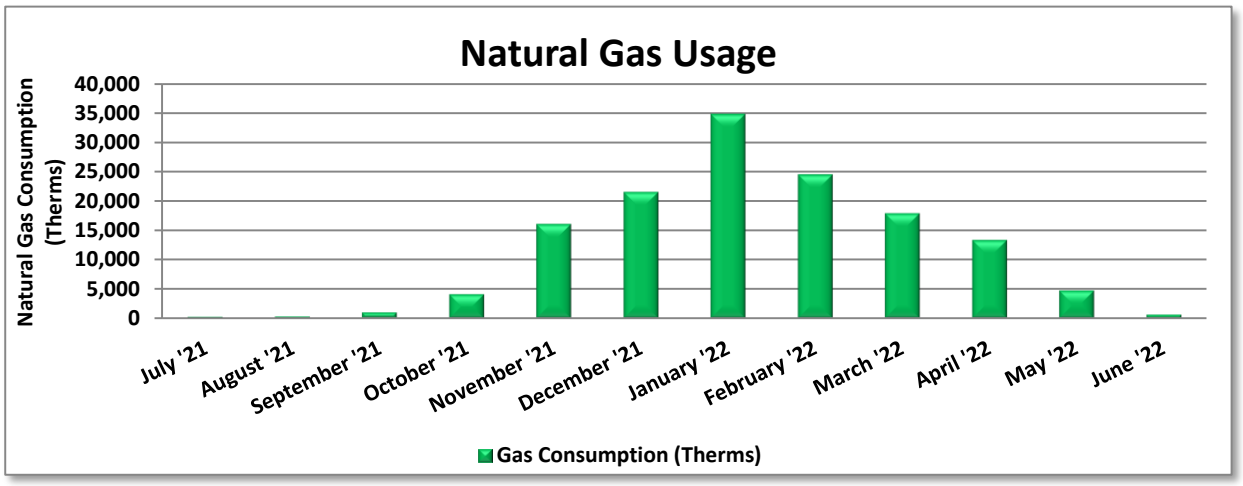
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/18/21	30	323,595	742	$4,431	$31,710
8/18/21	31	339,472	717	$4,282	$32,976
9/18/21	31	335,860	847	$5,058	$33,395
10/18/21	30	322,708	829	$4,950	$32,035
11/18/21	31	390,462	829	$4,950	$38,381
12/18/21	30	358,930	838	$5,004	$36,051
1/18/22	31	402,781	899	$5,368	$40,171
2/18/22	31	389,093	968	$5,780	$39,761
3/18/22	28	364,919	890	$5,315	$37,606
4/18/22	31	347,181	881	$5,261	$36,062
5/18/22	30	315,559	778	$5,232	$32,772
6/18/22	31	330,111	890	$5,315	$35,166
Totals	**365**	**4,220,671**	**968**	**$60,946**	**$426,086**
Annual	**365**	**4,220,671**	**968**	**$60,946**	**$426,086**

Notes:

- Peak demand of 968 kW occurred in February '22.
- Average demand over the past 12 months was 842 kW.
- The average electric cost over the past 12 months was $0.101/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

NJ Natural Gas delivers natural gas under rate class GSL, with natural gas supply provided by UGI, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
7/27/21	29	234	$4,807
8/26/21	30	305	$4,873
9/27/21	32	1,013	$5,419
10/25/21	28	4,117	$8,433
11/19/21	25	16,065	$20,062
12/23/21	34	21,495	$27,278
1/27/22	35	34,810	$42,912
2/23/22	27	24,476	$31,254
3/25/22	30	17,851	$24,365
4/23/22	29	13,329	$19,606
5/24/22	31	4,756	$11,696
6/23/22	30	629	$4,886
Totals	**360**	**139,079**	**$205,591**
Annual	**365**	**141,011**	**$208,446**

Notes:

- The average gas cost for the past 12 months is $1.478/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy, and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

Benchmarking Score	33

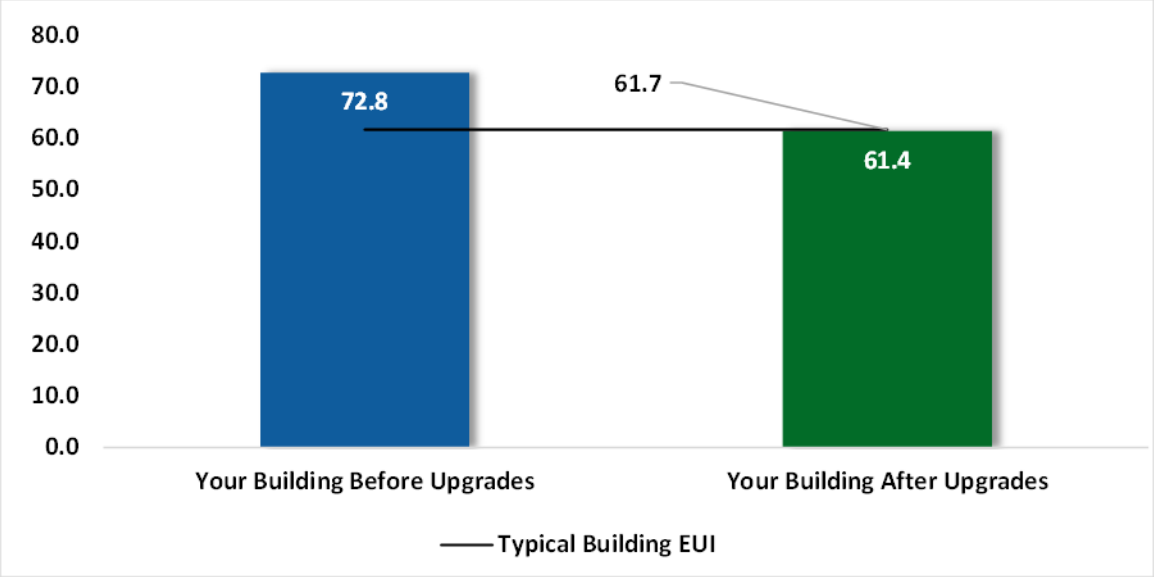


Figure 5 - Energy Use Intensity Comparison[3]

This building performs at, or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. Several factors can cause a building to vary from typical energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance.

We have created a Portfolio Manager account for your facility and have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

Free online training is available to help you use ENERGY STAR Portfolio Manager to track your building's performance at: https://www.energystar.gov/buildings/training.

For more information on ENERGY STAR and Portfolio Manager, visit their website.

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements and provide information about the cost effectiveness of those improvements. Most energy conservation measures have received preliminary analysis of feasibility, which identifies expected ranges of savings. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the NJCEP website for more information.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see Appendix A: Equipment Inventory & Recommendations.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**4,239**	**0.6**	**-1**	**$415**	**$1,051**	**$258**	**$793**	**1.9**	**4,165**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	4,239	0.6	-1	$415	$1,051	$258	$793	1.9	4,165
Lighting Control Measures			**258,449**	**37.5**	**-54**	**$25,292**	**$124,681**	**$28,200**	**$96,481**	**3.8**	**253,929**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	234,965	34.1	-49	$22,994	$107,376	$13,965	$93,411	4.1	230,855
ECM 3	Install High/Low Lighting Controls	Yes	23,484	3.4	-5	$2,298	$17,305	$14,235	$3,070	1.3	23,073
Variable Frequency Drive (VFD) Measures			**501,609**	**98.3**	**0**	**$50,639**	**$413,372**	**$43,050**	**$370,322**	**7.3**	**505,116**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	463,545	94.4	0	$46,796	$372,109	$38,450	$333,659	7.1	466,787
ECM 5	Install VFDs on Heating Water Pumps	Yes	38,063	3.9	0	$3,843	$41,263	$4,600	$36,663	9.5	38,329
Unitary HVAC Measures			**78,137**	**64.3**	**81**	**$9,084**	**$1,176,461**	**$67,080**	**$1,109,381**	**122.1**	**88,154**
ECM 6	Install High Efficiency Air Conditioning Units	No	75,509	62.9	81	$8,818	$1,167,714	$66,580	$1,101,134	124.9	85,507
ECM 7	Install High Efficiency Heat Pumps	No	2,629	1.4	0	$265	$8,747	$500	$8,247	31.1	2,647
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**167**	**$2,470**	**$14,795**	**$900**	**$13,895**	**5.6**	**19,568**
ECM 8	Install Infrared Heaters	Yes	0	0.0	167	$2,470	$14,795	$900	$13,895	5.6	19,568
HVAC System Improvements			**9,756**	**0.0**	**43**	**$1,617**	**$11,834**	**$156**	**$11,678**	**7.2**	**14,834**
ECM 9	Implement Demand Control Ventilation (DCV)	Yes	1,315	0.0	43	$765	$10,875	$0	$10,875	14.2	6,334
ECM 10	Install Pipe Insulation	Yes	8,441	0.0	0	$852	$958	$156	$802	0.9	8,500
Domestic Water Heating Upgrade			**39,873**	**0.0**	**12**	**$4,199**	**$1,040**	**$506**	**$534**	**0.1**	**41,525**
ECM 11	Install Low-Flow DHW Devices	Yes	39,873	0.0	12	$4,199	$1,040	$506	$534	0.1	41,525
Food Service & Refrigeration Measures			**28,312**	**2.2**	**0**	**$2,858**	**$18,072**	**$1,555**	**$16,517**	**5.8**	**28,510**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	4,458	0.5	0	$450	$5,156	$680	$4,476	9.9	4,489
ECM 13	Refrigeration Controls	Yes	11,322	0.2	0	$1,143	$9,926	$525	$9,401	8.2	11,402
ECM 14	Vending Machine Control	Yes	12,532	1.4	0	$1,265	$2,990	$350	$2,640	2.1	12,620
Custom Measures			**188,120**	**0.0**	**404**	**$24,957**	**$102,004**	**$0**	**$102,004**	**4.1**	**236,695**
ECM 15	Retro-Commissioning Study	Yes	65,025	0.0	404	$12,531	$91,409	$0	$91,409	7.3	112,739
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	123,095	0.0	0	$12,426	$10,595	$0	$10,595	0.9	123,956
TOTALS			**1,108,495**	**202.9**	**651**	**$121,531**	**$1,863,309**	**$141,705**	**$1,721,605**	**14.2**	**1,192,494**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**4,239**	**0.6**	**-1**	**$415**	**$1,051**	**$258**	**$793**	**1.9**	**4,165**
ECM 1	Retrofit Fixtures with LED Lamps	4,239	0.6	-1	$415	$1,051	$258	$793	1.9	4,165
Lighting Control Measures		**258,449**	**37.5**	**-54**	**$25,292**	**$124,681**	**$28,200**	**$96,481**	**3.8**	**253,929**
ECM 2	Install Occupancy Sensor Lighting Controls	234,965	34.1	-49	$22,994	$107,376	$13,965	$93,411	4.1	230,855
ECM 3	Install High/Low Lighting Controls	23,484	3.4	-5	$2,298	$17,305	$14,235	$3,070	1.3	23,073
Variable Frequency Drive (VFD) Measures		**501,609**	**98.3**	**0**	**$50,639**	**$413,372**	**$43,050**	**$370,322**	**7.3**	**505,116**
ECM 4	Install VFDs on Constant Volume (CV) Fans	463,545	94.4	0	$46,796	$372,109	$38,450	$333,659	7.1	466,787
ECM 5	Install VFDs on Heating Water Pumps	38,063	3.9	0	$3,843	$41,263	$4,600	$36,663	9.5	38,329
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**167**	**$2,470**	**$14,795**	**$900**	**$13,895**	**5.6**	**19,568**
ECM 8	Install Infrared Heaters	0	0.0	167	$2,470	$14,795	$900	$13,895	5.6	19,568
HVAC System Improvements		**9,756**	**0.0**	**43**	**$1,617**	**$11,834**	**$156**	**$11,678**	**7.2**	**14,834**
ECM 9	Implement Demand Control Ventilation (DCV)	1,315	0.0	43	$765	$10,875	$0	$10,875	14.2	6,334
ECM 10	Install Pipe Insulation	8,441	0.0	0	$852	$958	$156	$802	0.9	8,500
Domestic Water Heating Upgrade		**39,873**	**0.0**	**12**	**$4,199**	**$1,040**	**$506**	**$534**	**0.1**	**41,525**
ECM 11	Install Low-Flow DHW Devices	39,873	0.0	12	$4,199	$1,040	$506	$534	0.1	41,525
Food Service & Refrigeration Measures		**28,312**	**2.2**	**0**	**$2,858**	**$18,072**	**$1,555**	**$16,517**	**5.8**	**28,510**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	4,458	0.5	0	$450	$5,156	$680	$4,476	9.9	4,489
ECM 13	Refrigeration Controls	11,322	0.2	0	$1,143	$9,926	$525	$9,401	8.2	11,402
ECM 14	Vending Machine Control	12,532	1.4	0	$1,265	$2,990	$350	$2,640	2.1	12,620
Custom Measures		**188,120**	**0.0**	**404**	**$24,957**	**$102,004**	**$0**	**$102,004**	**4.1**	**236,695**
ECM 15	Retro-Commissioning Study	65,025	0.0	404	$12,531	$91,409	$0	$91,409	7.3	112,739
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	123,095	0.0	0	$12,426	$10,595	$0	$10,595	0.9	123,956
TOTALS		**1,030,358**	**138.6**	**570**	**$112,447**	**$686,848**	**$74,625**	**$612,224**	**5.4**	**1,104,340**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**4,239**	**0.6**	**-1**	**$415**	**$1,051**	**$258**	**$793**	**1.9**	**4,165**
ECM 1	Retrofit Fixtures with LED Lamps	4,239	0.6	-1	$415	$1,051	$258	$793	1.9	4,165

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources is proposed, we suggest converting all of a specific lighting type (e.g., linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Retrofit Fixtures with LED Lamps

Replace existing fluorescent T8 lamps and CFLs with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

This measure saves energy by installing LEDs, which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected Building Areas: first and second floor girls' restroom, auditorium storage room, fan room, kitchen, and wood shop storage closet

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**258,449**	**37.5**	**-54**	**$25,292**	**$124,681**	**$28,200**	**$96,481**	**3.8**	**253,929**
ECM 2	Install Occupancy Sensor Lighting Controls	234,965	34.1	-49	$22,994	$107,376	$13,965	$93,411	4.1	230,855
ECM 3	Install High/Low Lighting Controls	23,484	3.4	-5	$2,298	$17,305	$14,235	$3,070	1.3	23,073

Lighting controls reduce energy use by turning off or lowering lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 2: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend that lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off, as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

Affected Building Areas: offices, conference rooms, classrooms, gymnasium, library, restrooms, corridors, and storage rooms

ECM 3: Install High/Low Lighting Controls

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety code requirements for egress. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be considered when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage must be provided to ensure that lights turn on in each area as occupants approach the area.

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected Building Areas: hallways, stairwells, main lobby, and first floor auditorium lobby

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**501,609**	**98.3**	**0**	**$50,639**	**$413,372**	**$43,050**	**$370,322**	**7.3**	**505,116**
ECM 4	Install VFDs on Constant Volume (CV) Fans	463,545	94.4	0	$46,796	$372,109	$38,450	$333,659	7.1	466,787
ECM 5	Install VFDs on Heating Water Pumps	38,063	3.9	0	$3,843	$41,263	$4,600	$36,663	9.5	38,329

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new inverter duty rated motor to conservatively account for the cost of an inverter duty rated motor.

ECM 4: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

Affected Air Handlers: AHUs, HV units, RTUs, Acs, and large exhaust fans as indicated in Appendix A

Note: ECM 6 evaluates replacement of many of these same units. If replacing units in the short term, consider selecting models with advanced on-board speed controls instead of installing separate VFDs.

ECM 5: Install VFDs on Heating Water Pumps

Install variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils, and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution, they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Affected Pumps: four high school 3 hp, two middle school 5 hp and two 7.5 hp

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**78,137**	**64.3**	**81**	**$9,084**	**$1,176,461**	**$67,080**	**$1,109,381**	**122.1**	**88,154**
ECM 6	Install High Efficiency Air Conditioning Units	75,509	62.9	81	$8,818	$1,167,714	$66,580	$1,101,134	124.9	85,507
ECM 7	Install High Efficiency Heat Pumps	2,629	1.4	0	$265	$8,747	$500	$8,247	31.1	2,647

Replacing the unitary HVAC units has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the unitary HVAC units are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 6: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency split and packaged air conditioning units with high efficiency split and packaged air conditioning units. Some of the replacement units will incorporate efficient gas furnaces. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling and heating load, and the estimated annual operating hours.

Affected Units: mostly all RTUs and ACs

ECM 7: Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system, and a higher HSPF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.

Affected Units: RTU-7 (middle school E wing hallway)

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**167**	**$2,470**	**$14,795**	**$900**	**$13,895**	**5.6**	**19,568**
ECM 8	Install Infrared Heaters	0	0.0	167	$2,470	$14,795	$900	$13,895	5.6	19,568

ECM 8: Install Infrared Heaters

Replace forced air heating equipment with low-intensity infrared heating units with an enclosed flame, rather than an open flame on a ceramic or metal surface.

Forced air furnaces heat all of the air in the space served, which is inefficient for large volume spaces with relatively few occupants, areas with high ceilings, or areas with high outside air infiltration. Infrared heaters heat objects and surfaces directly, including the occupants of the space, rather than heating large

volumes of air. Infrared heaters also heat the floor, which then re-radiates the heat. As a result, infrared heaters are more effective and efficient at maintaining occupant comfort at significantly lower cost for certain space types.

For the purposes of this report, the proposed capacity of the infrared heaters is 80% of the existing capacity for forced air heating equipment. This is a conservative estimate based on collaboration with an expert in infrared heating technology. We recommend that you work with a mechanical contractor who specializes in the installation of infrared heaters for exact system sizing and costs.

Affected Building Areas: transportation and maintenance buildings

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**9,756**	**0.0**	**43**	**$1,617**	**$11,834**	**$156**	**$11,678**	**7.2**	**14,834**
ECM 9	Implement Demand Control Ventilation (DCV)	1,315	0.0	43	$765	$10,875	$0	$10,875	14.2	6,334
ECM 10	Install Pipe Insulation	8,441	0.0	0	$852	$958	$156	$802	0.9	8,500

ECM 9: Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) is a control strategy that monitors the indoor air's carbon dioxide (CO_2) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

Standard ventilation systems often provide outside air based on a space's estimated maximum occupancy but not actual occupancy. During low occupancy periods, the space may then be over ventilated. This wastes energy through heating and cooling the excess outside air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels. DCV is most suited for facilities where occupancy levels vary significantly from hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning. Implementation of this measure is dependent upon having a building automation system (BAS) or other smart building control system connected to the space conditioning equipment serving the noted areas.

Affected Building Areas: high school auditorium, training room, weight room

ECM 10: Install Pipe Insulation

Install insulation on domestic hot water system piping. Distribution system losses are dependent on system fluid temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: high school and middle school domestic hot water piping; primarily at or near the various units

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**39,873**	**0.0**	**12**	**$4,199**	**$1,040**	**$506**	**$534**	**0.1**	**41,525**
ECM 11	Install Low-Flow DHW Devices	39,873	0.0	12	$4,199	$1,040	$506	$534	0.1	41,525

ECM 11: Install Low-Flow DHW Devices

Install low-flow devices to reduce overall hot water demand. The following low-flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**28,312**	**2.2**	**0**	**$2,858**	**$18,072**	**$1,555**	**$16,517**	**5.8**	**28,510**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	4,458	0.5	0	$450	$5,156	$680	$4,476	9.9	4,489
ECM 13	Refrigeration Controls	11,322	0.2	0	$1,143	$9,926	$525	$9,401	8.2	11,402
ECM 14	Vending Machine Control	12,532	1.4	0	$1,265	$2,990	$350	$2,640	2.1	12,620

ECM 12: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in coolers and freezers. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

ECM 13: Refrigeration Controls

Install additional controls to optimize the operation of walk-in coolers and freezers.

Many walk-in coolers and freezers have continuously operating electric heaters on the doors to prevent condensation formation. This measure adds a control system feature to shut off the door heaters when the humidity level is low enough that condensation will not occur if the heaters are off. This is done by measuring the ambient humidity and temperature of the store, comparing that to the dewpoint, and using pulse width modulation to control the anti-sweat door heaters.

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, which reduces annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric de-frost mechanism.

Many walk-in coolers and freezers have evaporator fans that run continuously. The measure adds a control system feature to automatically shut off evaporator fans when not needed.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

ECM 14: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and the power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

4.9 Custom Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures		**188,120**	**0.0**	**404**	**$24,957**	**$102,004**	**$0**	**$102,004**	**4.1**	**236,695**
ECM 15	Retro-Commissioning Study	65,025	0.0	404	$12,531	$91,409	$0	$91,409	7.3	112,739
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	123,095	0.0	0	$12,426	$10,595	$0	$10,595	0.9	123,956

ECM 15: Retro-Commissioning Study

Due to the complexity of today's HVAC systems and controls a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications at this site that systems may not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm that specializes in energy control systems and retro-commissioning. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The retro-commissioning agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after reviewing the findings.

The implementation phase puts the selected processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments—although more expensive sophisticated programming and building control system upgrades may be warranted. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in HVAC control improvements. Based on industry standards and previous project experience, the potential energy savings may be up to 15% of existing HVAC energy use. We estimate the cost of retro-commissioning studies and control improvements of $0.30 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to perform the study. For the purposes of this report, we have conservatively estimated savings to be 3.0% of the HVAC energy consumption baseline.

CM 16: Replace Electric Water Heater with Heat Pump Water Heater

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. Air source heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. The typical average COP for a HPWH is about 2.5, so they require significantly less electricity to produce the same amount of hot water as a traditional electric water heater. There are two types of HPWH, those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The following addresses integrated HPWH.

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room.[4] The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

Most HPWH operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the

[4] https://basc.pnnl.gov/code-compliance/heat-pump-water-heaters-code-compliance-brief#:~:text=HPWH%20must%20have%20unrestricted%20airflow,depending%20on%20size%20of%20system

overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank in order to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save 5% –20% of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, and planned capital upgrades, and it incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and outline procedures for measuring and reporting whether goals have been achieved.

You may already be doing some of these things—see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR Portfolio Manager

You've heard it before—you cannot manage what you do not measure. ENERGY STAR Portfolio Manager is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. Materials used may include caulk, polyurethane foam, and other weather-stripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange, which will in turn reduce the load on the buildings heating and cooling equipment, providing energy savings and increased occupant comfort.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

[5] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.

Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly. Adjust exterior lighting time clock controls seasonally as needed to match your lighting requirements.

Motor Controls

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less, and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Ductwork Maintenance

Duct maintenance has two primary goals: keep the ducts clean to avoid air quality problems and seal leaks to save energy. Check for cleanliness, obstructions that block airflow, water damage, and leaks. Ducts should be inspected at least every two years.

The biggest symptoms of clogged air ducts are differing temperatures throughout the building and areas with limited airflow from supply registers. If a particular air duct is clogged, then air flow will only be cut off to some rooms in the building—not all of them. The reduced airflow will make it more difficult for those areas to reach the temperature setpoint, which will cause the HVAC system to run longer to cool or heat that area properly. If you suspect clogged air ducts, ensure that all areas in front of supply registers are clear of items that may block or restrict air flow, and you should check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5%–25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Distribution system losses are dependent on-air system temperature, the size of the distribution system, and the level of insulation of the ductwork. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is missing or worn, the system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

Furnace Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Label HVAC Equipment

For improved coordination in maintenance practices, we recommend labeling or re-labeling the site HVAC equipment. Maintain continuity in labeling by following labeling conventions as indicated in the facility drawings or BAS building equipment list. Use weatherproof or heatproof labeling or stickers for permanence, but do not cover over original equipment nameplates, which should be kept clean and readable whenever possible. Besides equipment, label piping for service and direction of flow when possible. Ideally, maintain a log of HVAC equipment, including nameplate information, asset tag designation, areas served, installation year, service dates, and other pertinent information.

This investment in your equipment will enhance collaboration and communication between your staff and your contracted service providers and may help you with regulatory compliance.

Optimize HVAC Equipment Schedules

Energy management systems (BAS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The BAS monitors and reports operational status, schedules equipment start and stop times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These BAS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your BAS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the *optimal start* feature of the BAS (if available) to optimize the building warmup sequence. Most BAS scheduling programs provide for holiday schedules, which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function, which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

Water Heater Maintenance

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

Also, preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5% and 10% on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense® ratings for urinals is 0.5 gallons per flush (gpf) and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense website[6] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

[6] https://www.epa.gov/watersense.

[7] https://www.epa.gov/watersense/watersense-work-0.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the facility is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR or WaterSense products where available.

6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the facility's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions, and reduced customer electricity purchases, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

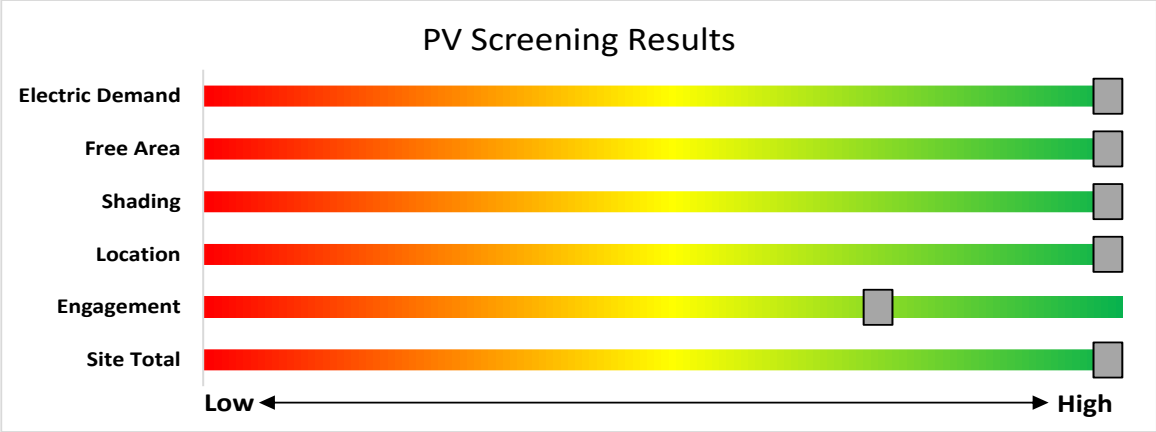
6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has high potential for installing a PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.



Potential	High	
System Potential	172	kW DC STC
Electric Generation	204,916	kWh/yr
Displaced Cost	$20,690	/yr
Installed Cost	$447,200	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects. Solar projects may qualify to earn SREC- IIs (Solar Renewable Energy Certificates-II), however, the project owners *must* register their solar projects prior to the start of construction to establish the project's eligibility.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

Successor Solar Incentive Program (SuSI): https://www.njcleanenergy.com/renewable-energy/programs/susi-program

- **Basic Info on Solar PV in NJ**: www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs.
- **Approved Solar Installers in the NJ Market**: www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

Combined heat and power (CHP) generate electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

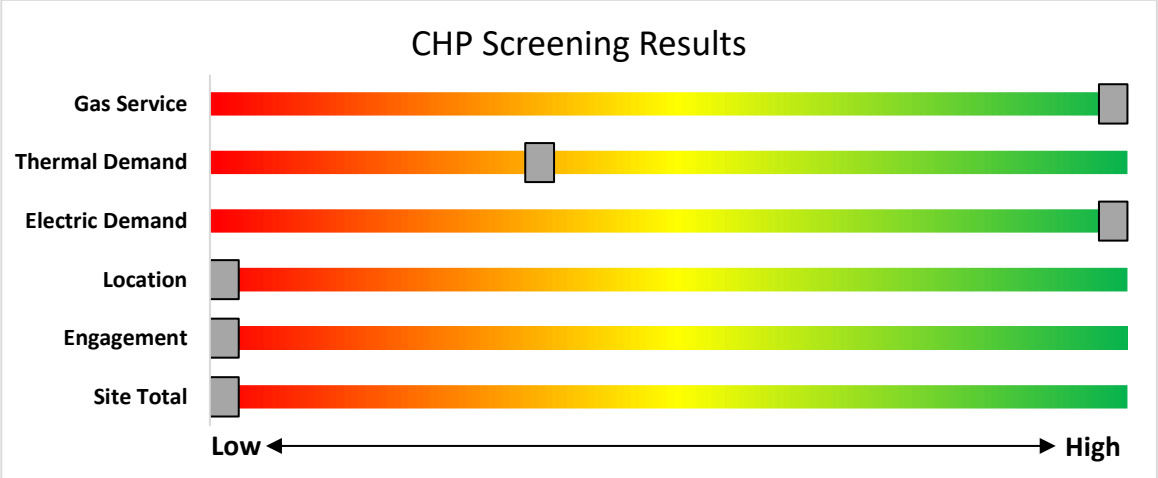


Figure 9 - Combined Heat and Power Screening

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

7 Electric Vehicles (EV)

All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives.

7.1 Electric Vehicle Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.

The preliminary assessment of EV charging at the facility shows that there is high potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.

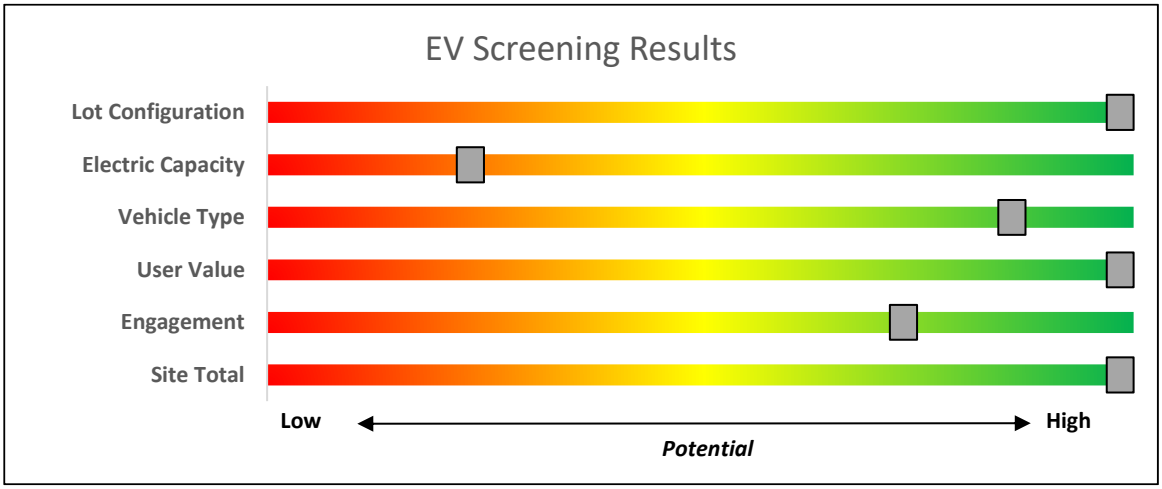


Figure 10 – EV Charger Screening

Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE) or Public Service Electric & Gas Company (PSE&G), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE or PSE&G, up to 90% of the combined charger purchase and installation costs. Please check ACE or PSE&G program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

For more information and to keep up to date on all EV programs please visit https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs

8 Project Funding and Incentives

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in.

8.1 Utility Energy Efficiency Programs

The Clean Energy Act, signed into law by Governor Murphy in 2018, requires New Jersey's investor-owned gas and electric utilities to reduce their customers' use by set percentages over time. To help reach these targets the New Jersey Board of Public Utilities approved a comprehensive suite of energy efficiency programs to be run by the utility companies.

Prescriptive and Custom

The Prescriptive and Custom rebate program through your utility provider offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW or less over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures.

How to Participate

To participate in Direct Install, you will work with a participating contractor. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Incentives for this program are based on project scope and energy savings achieved.

For more information on any of these programs, contact your local utility provider or visit https://www.njcleanenergy.com/transition.

8.2 New Jersey's Clean Energy Programs

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers that annually contribute at least $200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly $5 million in energy costs in the prior fiscal year.

Incentives

Incentives are based on the specifications below. The maximum incentive per entity is the lesser of:

- $4 million
- 75% of the total project(s) cost
- 90% of total NJCEP fund contribution in previous year
- $0.33 per projected kWh saved; $3.75 per projected Therm saved annually.

How to Participate

To participate in LEUP, you will first need submit an enrollment application. This program requires all qualified and approved applicants to submit an energy plan that outlines the proposed energy efficiency work for review and approval. Applicants may submit a Draft Energy Efficiency Plan (DEEP), or a Final Energy Efficiency Plan (FEEP). Once the FEEP is approved, the proposed work can begin.

Detailed program descriptions, instructions for applying, and applications can be found at www.njcleanenergy.com/LEUP.

Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

Incentives

Eligible Technologies	Size (Installed Rated Capacity)[1]	Incentive ($/kW)	% of Total Cost Cap per Project[3]	$ Cap per Project[3]
Powered by non-renewable or renewable fuel source[4]	≤500 kW	$2,000	30-40%[2]	$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	$550	30%	$3 million
Microturbine Fuel Cells with Heat Recovery	>3 MW	$350		
Waste Heat to Power*	<1 MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

How to Participate

You will work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at www.njcleanenergy.com/CHP.

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

Administratively Determined Incentive (ADI) Program

The ADI Program provides administratively set incentives for net metered residential projects, net metered non-residential projects 5 MW or less, and all community solar projects.

After the registration is accepted, construction is complete, and a complete final as-built packet has been submitted, the project is issued a New Jersey certification number, which enables it to generate New Jersey SREC- IIs.

Market Segments	Size MW dc	Incentive Value ($/SREC II)	Public Entities Incentive Value - $20 Adder ($/SRECII)
Net Metered Residential	All types and sizes	$90	N/A
Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	$100	$120
Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	$90	$110
Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	$85	$105
Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	$80	$100
LMI Community Solar	Up to 5 MW	$90	N/A
Non-LMI Community Solar	Up to 5 MW	$70	N/A
Interim Subsection (t)	All types and sizes	$100	N/A

Eligible projects may generate SREC-IIs for 15 years following the commencement of commercial operations which is defined as permission to operate (PTO) from the Electric Distribution Company. After 15 years, projects may be eligible for a NJ Class I REC.

SREC-IIs will be purchased monthly by the SREC-II Program Administrator who will allocate the SREC-IIs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

The ADI Program online portal is now open to new registrations.

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW (dc). The program is currently under development. For updates, please continue to check the Solar Proceedings page on the New Jersey's Clean Energy Program website.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan.

If you are considering installing solar photovoltaics on your building, visit the following link for more information: https://njcleanenergy.com/renewable-energy/programs/susi-program.

Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities, and other public and state entities enter into contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the energy conservation measures (ECMs), ensuring that ESIP projects are cash flow positive for the life of the contract.

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an energy services company or "ESCO."

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the energy savings plan can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program descriptions and application can be found at www.njcleanenergy.com/ESIP.

ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site, and their energy and economic analyses are provided within this LGEA report. Note that some of the identified projects may be mutually exclusive, such as replacing equipment versus upgrading motors or controls. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning that includes the review of multiple bids for project work, incorporates potential operations and maintenance (O&M) cost savings, and maximizes your incentive potential.

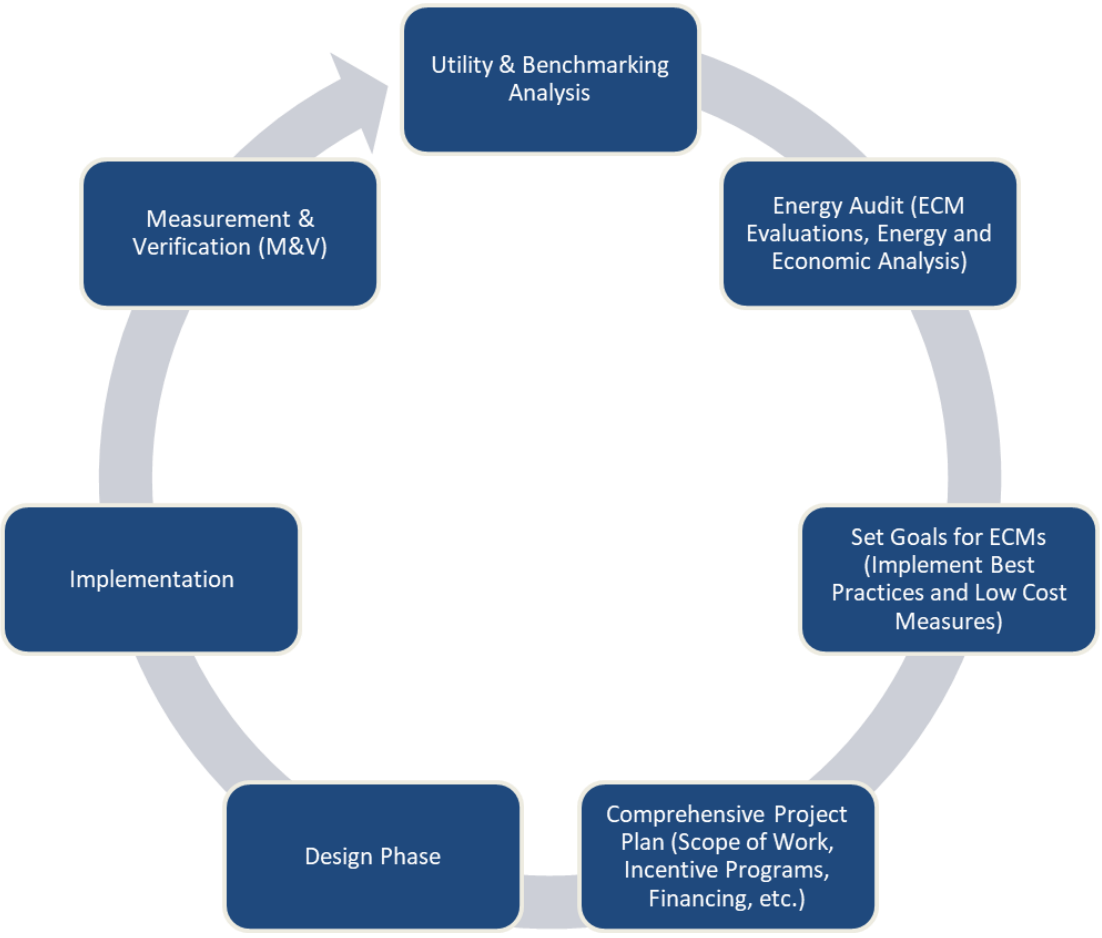


Figure 11 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. Though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[8].

10.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market based and fluctuate monthly. The utility provides basic gas supply service to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier typically depends on whether a customer prefers budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[9].

[8] www.state.nj.us/bpu/commercial/shopping.html.

[9] www.state.nj.us/bpu/commercial/shopping.html.

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - 1st Choir Room Patchy office	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$116	$20	8.4
1st Choir Room Patchy office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
1st Faculty Men's Bath	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$270	$35	20.6
1st Faculty Men's Bath	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,111	0.0	52	0	$5	$0	$0	0.0
1st Floor Auditorium Lobby	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Auditorium Lobby	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.1	701	0	$69	$450	$420	0.4
1st Floor Faculty Women's Bath	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	4,508	0.0	0	0	$0	$0	$0	0.0
1st Floor Girls Bath	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,111	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	113	0	$11	$37	$10	2.4
1st Floor Gym Public Baths	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$35	13.5
1st Floor H Hallway Bath	5	LED - Fixtures: Ambient - 4' - Indirect Fixture	Wall Switch	S	15	4,508	2	None	Yes	5	LED - Fixtures: Ambient - 4' - Indirect Fixture	Occupancy Sensor	15	3,111	0.0	111	0	$11	$270	$35	21.5
1st Floor H Hallway Female Bath	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	175	0	$17	$270	$35	13.7
1st Floor Hallway A	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway A	16	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	16	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	787	0	$77	$675	$560	1.5
1st Floor Hallway B	16	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	16	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	787	0	$77	$675	$560	1.5
1st Floor Hallway C	16	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	16	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	787	0	$77	$675	$560	1.5
1st Floor Hallway D	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway D	16	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	16	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	787	0	$77	$675	$560	1.5
1st Floor Hallway E	13	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	13	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	639	0	$63	$675	$455	3.5
1st Floor Hallway F	21	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	21	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	1,033	0	$101	$900	$735	1.6
1st Floor Hallway G	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway G	21	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	21	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	1,033	0	$101	$880	$140	7.3
1st Floor Hallway H	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway H	24	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	24	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.2	1,181	0	$116	$900	$840	0.5
1st Floor Hallway I	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway I	22	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	22	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,285	0	$126	$900	$770	1.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
1st Floor Hallway J	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway J	12	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	S	32	4,508	3	None	Yes	12	LED - Fixtures: Ambient 1x4 Fixture	High/Low Control	32	3,111	0.1	590	0	$58	$450	$420	0.5
1st Floor Hallway K	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway K	7	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	7	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.1	409	0	$40	$225	$225	0.0
1st Floor K Hallway Choir Room	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	3	None	Yes	20	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,111	0.1	892	0	$87	$675	$675	0.0
1st Floor K Hallway Choir Room Closets	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	89	0	$9	$116	$20	11.0
1st Floor Main office Male Bath	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$116	$20	8.4
1st Floor Main office Male Bath	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,111	0.0	52	0	$5	$116	$20	18.8
1st Main Boys Bath	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	267	0	$26	$270	$35	9.0
2nd Floor Boys Bath	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	267	0	$26	$270	$35	9.0
2nd Floor Custodial Closet	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$0	15.5
2nd Floor Girls Bath	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,508	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	164	0	$16	$37	$10	1.7
2nd Floor Hallway L	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Floor Hallway L	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway M	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway N	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway O	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway P	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Floor Hallway P	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway Q	19	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,110	0	$109	$675	$665	0.1
2nd Floor Hallway R	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Floor Hallway R	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	4,508	0.0	0	0	$0	$0	$0	0.0
2nd Floor Men's Faculty Bath	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	175	0	$17	$270	$35	13.7
2nd Floor Women's Faculty Bath	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	175	0	$17	$270	$35	13.7
A V Storage	16	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.1	357	0	$35	$540	$0	15.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
A V Studio	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	713	0	$70	$270	$35	3.4
Assistant Principal's Office	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	467	0	$46	$270	$35	5.1
Athletic Director's Office	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$116	$20	8.4
Athletic Director's Office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
Athletic Training Room	6	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	6	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	332	0	$32	$270	$35	7.2
Athletic Training Room	1	LED - Fixtures: (6) 4' Lamps	Wall Switch	S	87	4,508		None	No	1	LED - Fixtures: (6) 4' Lamps	Wall Switch	87	4,508	0.0	0	0	$0	$0	$0	0.0
Attendance Office E143	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
Auditorium	10	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	10	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium	84	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	4,508	2	None	Yes	84	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	3,111	0.2	1,291	0	$126	$1,320	$210	8.8
Auditorium	105	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Wall Switch	S	40	4,508	2	None	Yes	105	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Occupancy Sensor	40	3,111	0.9	6,456	-1	$632	$1,540	$245	2.0
Auditorium	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.1	892	0	$87	$440	$70	4.2
Auditorium Dressing Room	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$116	$20	8.4
Auditorium Green Room	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
Auditorium Lobby Display	9	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	201	0	$20	$270	$35	12.0
Auditorium Storage Room	8	Compact Fluorescent: (1) 14W A19 Screw-In Lamp	Wall Switch	S	14	4,508	1, 2	Relamp	Yes	8	LED Lamps: A19 Lamps	Occupancy Sensor	10	3,111	0.0	282	0	$28	$408	$43	13.2
Auditorium Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,508	1, 2	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	218	0	$21	$153	$10	6.7
Auxiliary Gym	27	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	27	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.2	1,494	0	$146	$540	$70	3.2
Auxiliary Gym	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.1	357	0	$35	$270	$35	6.7
Band Room Computer Music Theory	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	3,111		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	0	0	$0	$0	$0	0.0
Band room I-100	40	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	40	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.3	2,337	0	$229	$810	$105	3.1
Band Room I-101	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Band Room I-101	38	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	38	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.3	2,220	0	$217	$810	$105	3.2
Band Room I-101 Booths	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.1	357	0	$35	$270	$35	6.7
Band Room I-101 Storage	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Band Room Jeffrey Conrad Office	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	3,111		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	0	0	$0	$0	$0	0.0

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Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Band Room Music Office 2	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	3,111		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	0	0	$0	$0	$0	0.0
Boy Locker Room Training Closet	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	4,508	2	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,111	0.0	134	0	$13	$116	$0	8.9
Boys Locker Laundry Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	89	0	$9	$116	$20	11.0
Boys Locker Room	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Boys Locker Room	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	55	0	$5	$0	$0	0.0
Boys Locker Room	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	664	0	$65	$270	$35	3.6
Boys Locker Room	6	LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture	Wall Switch	S	32	4,508	2	None	Yes	6	LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture	Occupancy Sensor	32	3,111	0.0	295	0	$29	$270	$35	8.1
Boys Locker Room	8	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Wall Switch	S	30	4,508	2	None	Yes	8	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Occupancy Sensor	30	3,111	0.1	369	0	$36	$270	$35	6.5
Boys Locker Room	73	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	73	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.2	1,627	0	$159	$1,620	$210	8.9
Boys Locker Room	25	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.2	1,114	0	$109	$540	$70	4.3
Boys Locker Room Closet	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Cafeteria	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Cafeteria	70	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	70	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.6	4,089	-1	$400	$1,620	$210	3.5
Choir Room #2	36	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	36	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.3	2,103	0	$206	$810	$105	3.4
Choir Room Choir Council Room	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$116	$20	8.9
Choir Room H-176	20	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	20	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.2	1,168	0	$114	$540	$70	4.1
Choir Room Music Office	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
Choir Room Storage 1	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	89	0	$9	$270	$0	30.9
Choir Room Storage 2	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Choir Room Storages	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	89	0	$9	$116	$0	13.3
Choir RoomHallway	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,508	0.0	0	0	$0	$0	$0	0.0
Classroom 0233	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 0234	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 0235	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 0236	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0

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Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 0237	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 0238	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 114	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom 116	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom A102	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom A103	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom A105	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom A106	21	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,872	0	$183	$540	$70	2.6
Classroom B113	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	67	0	$7	$0	$0	0.0
Classroom B113	14	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,248	0	$122	$540	$70	3.8
Classroom B115	15	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,337	0	$131	$270	$35	1.8
Classroom B117	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom C121	16	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,427	0	$140	$540	$70	3.4
Classroom C122	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom C123	16	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,427	0	$140	$540	$70	3.4
Classroom C124	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	467	0	$46	$270	$35	5.1
Classroom C124	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	89	0	$9	$0	$0	0.0
Classroom C125	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom C126	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom C127	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom D131 Yoga Room	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom D133	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom D134	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom D135	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom D138	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0

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Classroom D139	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom E141	24	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	2,140	0	$209	$540	$70	2.2
Classroom E142	24	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	2,140	0	$209	$540	$70	2.2
Classroom E144	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	10	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	584	0	$57	$270	$35	4.1
Classroom F104	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom F105 No Label	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	221	0	$22	$270	$35	10.8
Classroom F105 No Label	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	58	0	$6	$0	$0	0.0
Classroom F105 No Label	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$35	13.5
Classroom F153	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	467	0	$46	$270	$35	5.1
Classroom G161	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom G162	19	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	19	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,694	0	$166	$540	$70	2.8
Classroom G163	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,605	0	$157	$540	$70	3.0
Classroom G164	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom G165	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,605	0	$157	$540	$70	3.0
Classroom G166	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,605	0	$157	$540	$70	3.0
Classroom G167	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom G168	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom L201	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom L203	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom L204	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,605	0	$157	$540	$70	3.0
Classroom L206	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom L206	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom L206	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom L206	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom L207	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom L207	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom L207	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom L207	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom L208	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom L208	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom L208	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom L208	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom L209	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom L209	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom L209	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom L209	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom M211	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom M212	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom M213	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,605	0	$157	$540	$70	3.0
Classroom M214	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom M214WL	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	357	0	$35	$270	$35	6.7
Classroom M215	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom M215	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom M215	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom M215	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom M216	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom M216	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom M216	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom M216	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom M217	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom M217	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom M217	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom M217	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom M218	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$0	$0	0.0
Classroom M218	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom M218	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	223	0	$22	$270	$35	10.8
Classroom M218	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom N221	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N222	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N223	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N224	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N226	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N227	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N228	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom N229	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom O231	13	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,159	0	$113	$270	$35	2.1
Classroom P241	24	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	2,140	0	$209	$540	$70	2.2
Classroom P242	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom P243	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.2	1,070	0	$105	$270	$35	2.2
Classroom P244	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom P245	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom P247	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom P248	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom P249	20	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.3	1,783	0	$175	$540	$70	2.7
Classroom R260	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom R261	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R262	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	10	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	584	0	$57	$270	$35	4.1
Classroom R262	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Classroom R263	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R265	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R266	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R267	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R268	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Classroom R269	9	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	802	0	$79	$270	$35	3.0
Copy Room	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Custodial Area	8	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	178	0	$17	$270	$35	13.5
Custodial Area	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	45	0	$4	$0	$0	0.0
Custodial Bath	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	175	0	$17	$270	$35	13.7
Custodial Lunch Room	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	267	0	$26	$270	$35	9.0
Exterior Gym Parking Lot	2	LED - Fixtures: Wall Pack	Timeclock		25	4,380		None	No	2	LED - Fixtures: Wall Pack	Timeclock	25	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Gym Parking Lot	8	LED Lamps: (1) 13W A19 Screw-In Lamp	Timeclock		13	4,380		None	No	8	LED Lamps: (1) 13W A19 Screw-In Lamp	Timeclock	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Gym Parking Lot	2	LED - Fixtures: Flood Fixture	Timeclock		250	4,380		None	No	2	LED - Fixtures: Flood Fixture	Timeclock	250	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Gym Parking Lot	8	LED - Fixtures: Flood Fixture	Timeclock		250	4,380		None	No	8	LED - Fixtures: Flood Fixture	Timeclock	250	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Gym Side	30	LED - Fixtures: Flood Fixture	Timeclock		40	4,380		None	No	30	LED - Fixtures: Flood Fixture	Timeclock	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Main Entrance	19	LED - Fixtures: Downlight Surface Mount	Timeclock		13	4,380		None	No	19	LED - Fixtures: Downlight Surface Mount	Timeclock	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Main Parking Lot	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		300	4,380		None	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	300	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Main Parking Lot	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		300	4,380		None	No	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	300	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Rear	4	LED - Fixtures: Flood Fixture	Timeclock		250	4,380		None	No	4	LED - Fixtures: Flood Fixture	Timeclock	250	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Rear	25	LED - Fixtures: Wall Pack	Timeclock		25	4,380		None	No	25	LED - Fixtures: Wall Pack	Timeclock	25	4,380	0.0	0	0	$0	$0	$0	0.0
Faculty Dining Area	15	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	830	0	$81	$270	$35	2.9

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Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Lounge	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	221	0	$22	$0	$0	0.0
Faculty Lounge	6	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	350	0	$34	$270	$35	6.9
Fan Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,508	1	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	174	0	$17	$37	$10	1.6
Fan Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,508	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	164	0	$16	$37	$10	1.7
Fan Wing Boiler - 58	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
Fitness Room	9	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	498	0	$49	$270	$35	4.8
Front Stairs 1	10	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	4,508	2	None	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,111	0.0	261	0	$26	$270	$35	9.2
Front Stairs 2	10	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	4,508	2	None	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,111	0.0	261	0	$26	$270	$35	9.2
Girl's Locker Room	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$0	$0	0.0
Girls Locker Room	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Girls Locker Room	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	55	0	$5	$0	$0	0.0
Girls Locker Room	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	664	0	$65	$270	$35	3.6
Girls Locker Room	6	LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture	Wall Switch	S	32	4,508	2	None	Yes	6	LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture	Occupancy Sensor	32	3,111	0.0	295	0	$29	$270	$35	8.1
Girls Locker Room	8	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Wall Switch	S	30	4,508	2	None	Yes	8	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Occupancy Sensor	30	3,111	0.1	369	0	$36	$270	$35	6.5
Girls Locker Room	73	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	73	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.2	1,627	0	$159	$1,350	$175	7.4
Girls Locker Room	25	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.2	1,114	0	$109	$540	$70	4.3
Graphic Arts H171	50	LED - Fixtures: Ambient - 4' - Indirect Fixture	Wall Switch	S	15	4,508	2	None	Yes	50	LED - Fixtures: Ambient - 4' - Indirect Fixture	Occupancy Sensor	15	3,111	0.2	1,114	0	$109	$1,080	$140	8.6
Guidance Conference Offices	18	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	18	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.2	1,051	0	$103	$540	$70	4.6
Guidance Conference Room	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Guidance Director's Office	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	175	0	$17	$270	$35	13.7
Guidance Principal's Office	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
Guidance Principle Conference Room	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
IT Storage A104	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Kitchen	47	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	47	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.3	2,095	0	$205	$1,080	$140	4.6
Kitchen	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,508	1, 2	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.5	3,748	-1	$367	$1,197	$250	2.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Weight Room Hallway	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Wood Shop	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	4,508	0.0	0	0	$0	$0	$0	0.0
Wood Shop	125	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	125	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.4	2,786	-1	$273	$2,700	$350	8.6
Wood Shop #2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Wood Shop #2	39	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Occupancy Sensor	S	40	3,111		None	No	39	LED - Fixtures: Ambient - 8' - Direct/Indirect Fixture	Occupancy Sensor	40	3,111	0.0	0	0	$0	$0	$0	0.0
Wood Shop Storage Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,508	1, 2	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.1	436	0	$43	$343	$20	7.6
Eisenhower MS - Nurse's Office Bath	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508	2	None	Yes	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	13	3,111	0.0	40	0	$4	$116	$20	24.5
A Hallway	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
A Hallway	19	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	3	None	Yes	19	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	36	3,111	0.2	1,051	0	$103	$675	$665	0.1
A Hallway	13	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	13	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.1	759	0	$74	$675	$455	3.0
A Hallway Boy's Bathroom	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	3,111		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	0	0	$0	$0	$0	0.0
A Hallway Custodial Closet	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508		None	No	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	13	4,508	0.0	0	0	$0	$0	$0	0.0
A Hallway Girl's Bathroom	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	3,111		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	0	0	$0	$0	$0	0.0
Auditorium	8	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	8	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium	1	LED Lamps: (1) 13W A19 Screw-In Lamp	None	S	13	4,508		None	No	1	LED Lamps: (1) 13W A19 Screw-In Lamp	None	13	4,508	0.0	0	0	$0	$0	$0	0.0
Auditorium	45	LED - Fixtures: Ceiling Mount	Wall Switch	S	40	4,508	2	None	Yes	45	LED - Fixtures: Ceiling Mount	Occupancy Sensor	40	3,111	0.4	2,767	-1	$271	$660	$105	2.0
Auditorium	8	LED - Fixtures: Downlight Pendant	Wall Switch	S	60	4,508	2	None	Yes	8	LED - Fixtures: Downlight Pendant	Occupancy Sensor	60	3,111	0.1	738	0	$72	$270	$35	3.3
B Hallway	20	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	3	None	Yes	20	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	38	3,111	0.2	1,168	0	$114	$900	$700	1.7
B Hallway Bath	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	117	0	$11	$116	$20	8.4
Band Wing Electric Room	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	3,111		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	0	0	$0	$0	$0	0.0
Boiler Room	7	LED - Fixtures: Linear Strip	Wall Switch	S	64	4,508	2	None	Yes	7	LED - Fixtures: Linear Strip	Occupancy Sensor	64	3,111	0.1	689	0	$67	$270	$35	3.5
Boy's Locker Room Storage Closet	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,111		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	0	0	$0	$0	$0	0.0
C Hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
C Hallway	18	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	18	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	996	0	$97	$540	$70	4.8
C Hallway Closet	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	89	0	$9	$116	$20	11.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 26	6	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	350	0	$34	$270	$35	6.9
Classroom 27	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 28	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 3	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Classroom 31	28	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	28	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.2	1,636	0	$160	$540	$70	2.9
Classroom 31	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$35	13.5
Classroom 32	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7
Classroom 33	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 33	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7
Classroom 34	11	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	11	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	643	0	$63	$270	$35	3.7
Classroom 35	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 36	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 37	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Classroom 38	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 39	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7
Classroom 4	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 40	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7
Classroom 41	17	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	17	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	993	0	$97	$540	$70	4.8
Classroom 42	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7
Classroom 43	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 43	27	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	27	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.2	1,577	0	$154	$540	$70	3.0
Classroom 5	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Classroom 6	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	526	0	$51	$270	$35	4.6
Classroom 7	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Classroom 8	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	876	0	$86	$270	$35	2.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 9	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Computer Lab	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Computer Lab	35	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	35	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.5	3,121	-1	$305	$810	$105	2.3
Computer Lab Closet	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,508	0.0	0	0	$0	$0	$0	0.0
Computer Lab Office	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.0	178	0	$17	$116	$20	5.5
Custodian Office	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	134	0	$13	$270	$35	18.0
D Hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
D Hallway	18	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	18	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	996	0	$97	$540	$70	4.8
D Hallway Closet	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$35	13.5
D Hallway Custodian Closet	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
D Hallway Custodian Supply Room	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	89	0	$9	$270	$35	26.9
D Hallway Storage	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	89	0	$9	$116	$20	11.0
E Hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
E Hallway	25	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	25	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.2	1,384	0	$135	$540	$70	3.5
Electrical Equipment Room	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
EMS Garage	16	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.1	357	0	$35	$540	$70	13.5
Exterior - Band Area	2	LED - Fixtures: Wall Pack	Timeclock		40	4,380		None	No	2	LED - Fixtures: Wall Pack	Timeclock	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking	8	LED - Fixtures: Flood Fixture	Timeclock		25	4,380		None	No	8	LED - Fixtures: Flood Fixture	Timeclock	25	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking	1	LED - Fixtures: Fuel Pump Canopy	Timeclock		25	4,380		None	No	1	LED - Fixtures: Fuel Pump Canopy	Timeclock	25	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking	4	LED - Fixtures: Wall Pack	Timeclock		13	4,380		None	No	4	LED - Fixtures: Wall Pack	Timeclock	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking	9	LED - Fixtures: Wall Pack	Timeclock		40	4,380		None	No	9	LED - Fixtures: Wall Pack	Timeclock	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking	6	LED - Fixtures: Wall Pack	Timeclock		75	4,380		None	No	6	LED - Fixtures: Wall Pack	Timeclock	75	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Roof	2	LED - Fixtures: Flood Fixture	Timeclock		150	4,380		None	No	2	LED - Fixtures: Flood Fixture	Timeclock	150	4,380	0.0	0	0	$0	$0	$0	0.0
Faculty Room	1	LED - Fixtures: Linear Strip	Wall Switch	S	46	4,508		None	No	1	LED - Fixtures: Linear Strip	Wall Switch	46	4,508	0.0	0	0	$0	$0	$0	0.0
Faculty Room	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	535	0	$52	$270	$35	4.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Room Men's Bath	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	36	4,508	0.0	0	0	$0	$0	$0	0.0
Faculty Room Women's Bath	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	36	4,508	0.0	0	0	$0	$0	$0	0.0
Fitness Room	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	935	0	$91	$540	$70	5.1
G Hallway	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
G Hallway	6	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	6	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	332	0	$32	$270	$35	7.2
Gym Storage	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,111		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	0	0	$0	$0	$0	0.0
Gymnasium	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium	24	LED - Fixtures: High-Bay	Wall Switch	S	60	4,508	2	None	Yes	24	LED - Fixtures: High-Bay	Occupancy Sensor	60	3,111	0.3	2,214	0	$217	$440	$70	1.7
H Hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
H Hallway	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	10	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	584	0	$57	$270	$35	4.1
H hallway Closet	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508		None	No	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	13	4,508	0.0	0	0	$0	$0	$0	0.0
H Hallway Faculty Men's Bath	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	4,508	0.0	0	0	$0	$0	$0	0.0
H Hallway Faculty Women's Bath	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	4,508	0.0	0	0	$0	$0	$0	0.0
H Hallway Janirotr's Closet	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508		None	No	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	13	4,508	0.0	0	0	$0	$0	$0	0.0
IT Department Office	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.1	446	0	$44	$270	$35	5.4
IT Storage	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508	2	None	Yes	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	13	3,111	0.0	40	0	$4	$116	$20	24.5
Kitchen	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$116	$20	8.9
Kitchen	20	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	20	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.2	1,168	0	$114	$540	$70	4.1
Kitchen - Faculty Dining Room	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	357	0	$35	$270	$35	6.7
Kitchen Bathroom	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	4,508	2	None	Yes	2	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	13	3,111	0.0	40	0	$4	$116	$20	24.5
Kitchen Office	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	36	4,508	0.0	0	0	$0	$0	$0	0.0
Kitchen Storage	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$270	$35	13.5
Library	124	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	124	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.4	2,764	-1	$270	$2,700	$350	8.7
Library Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library Lobby	9	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.1	498	0	$49	$270	$35	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Library Storage	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	4,508	2	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,111	0.0	201	0	$20	$270	$35	12.0
Library Storage 2	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	4,508	2	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,111	0.0	201	0	$20	$270	$35	12.0
M Hallway	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
M Hallway	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.1	701	0	$69	$270	$35	3.4
Main Lobby	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	3	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	36	3,111	0.1	664	0	$65	$450	$420	0.5
Main Lobby Case	7	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	7	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Main Office	4	LED - Fixtures: Linear Strip	Wall Switch	S	23	4,508	2	None	Yes	4	LED - Fixtures: Linear Strip	Occupancy Sensor	23	3,111	0.0	141	0	$14	$270	$35	17.0
Main Office - Assistant Principle Office	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	89	0	$9	$270	$35	26.9
Main Office - Conference Room	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$116	$20	22.0
Main Office - Guidance Office	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	221	0	$22	$270	$35	10.8
Main Office - Guidance Office	5	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	5	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	292	0	$29	$270	$35	8.2
Main Office - Guidance Office	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	134	0	$13	$270	$35	18.0
Main Office - Kitchen	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Main Office - Principle Conference Room	2	LED - Fixtures: Linear Strip	Wall Switch	S	23	4,508	2	None	Yes	2	LED - Fixtures: Linear Strip	Occupancy Sensor	23	3,111	0.0	71	0	$7	$116	$20	13.9
Main Office - Principle Office	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	111	0	$11	$270	$35	21.5
Main Office - Security Vestibule	2	LED - Fixtures: Linear Strip	Occupancy Sensor	S	23	3,111		None	No	2	LED - Fixtures: Linear Strip	Occupancy Sensor	23	3,111	0.0	0	0	$0	$0	$0	0.0
Main Office Copy Room	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	45	0	$4	$116	$20	22.0
Main Office Hallway	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	3	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,111	0.0	89	0	$9	$225	$140	9.7
Men's Gym Teacher's Office	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	S	13	3,111		None	No	1	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	13	3,111	0.0	0	0	$0	$0	$0	0.0
Men's Gym Teacher's Office	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	3,111		None	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.0	0	0	$0	$0	$0	0.0
Music Office	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	4,508	2	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	3,111	0.0	234	0	$23	$270	$35	10.3
Music Storage	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	3,111		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	0	0	$0	$0	$0	0.0
Nurse's Office	2	LED - Fixtures: Linear Strip	Wall Switch	S	46	4,508	2	None	Yes	2	LED - Fixtures: Linear Strip	Occupancy Sensor	46	3,111	0.0	141	0	$14	$116	$20	6.9
Nurse's Office	5	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	446	0	$44	$270	$35	5.4
Practice Rooms	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	267	0	$26	$270	$35	9.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Weight Room	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,111		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	0	0	$0	$0	$0	0.0
Weight Room Bath	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Weight Room Bath	1	LED - Fixtures: Linear Strip	Occupancy Sensor	S	23	3,111		None	No	1	LED - Fixtures: Linear Strip	Occupancy Sensor	23	3,111	0.0	0	0	$0	$0	$0	0.0
Women's Gym Teacher Office	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	3,111		None	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.0	0	0	$0	$0	$0	0.0
Women's Gym Teacher Office	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Women's Gym Teacher Vestibule	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	36	3,111		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	0	0	$0	$0	$0	0.0
Maintenance Office - Entrance Hallway	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	3	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,111	0.0	45	0	$4	$225	$70	35.5
Entrance Hallway	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	3	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,111	0.0	89	0	$9	$225	$70	17.8
Exterior Wall Pack	2	LED - Fixtures: Wall Pack	Photocell		13	4,380		None	No	2	LED - Fixtures: Wall Pack	Photocell	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	8	LED - Fixtures: Wall Pack	Photocell		40	4,380		None	No	8	LED - Fixtures: Wall Pack	Photocell	40	4,380	0.0	0	0	$0	$0	$0	0.0
Main Area	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Area	15	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508	2	None	Yes	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,111	0.0	334	0	$33	$270	$35	7.2
Main Area	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
Transportation Building - Break room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Break room	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	357	0	$35	$270	$35	6.7
Break room bath	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,508	0.0	0	0	$0	$0	$0	0.0
Break room closet	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	4,508		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,508	0.0	0	0	$0	$0	$0	0.0
Exterior Gas Station	6	LED - Fixtures: Fuel Pump Canopy	Wall Switch	S	50	4,508		None	No	6	LED - Fixtures: Fuel Pump Canopy	Wall Switch	50	4,508	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Packs	2	LED - Fixtures: Wall Pack	Photocell		35	4,380		None	No	2	LED - Fixtures: Wall Pack	Photocell	35	4,380	0.0	0	0	$0	$0	$0	0.0
Hallway	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	3	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,111	0.0	178	0	$17	$225	$140	4.9
Office - 2	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	357	0	$35	$270	$35	6.7
Office 1	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	36	4,508	2	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	36	3,111	0.0	111	0	$11	$116	$20	8.9
Office 1	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	4,508		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,508	0.0	0	0	$0	$0	$0	0.0
Shop Area	11	LED - Fixtures: Ambient - 8' - Indirect Fixture	Wall Switch	S	40	4,508	2	None	Yes	11	LED - Fixtures: Ambient - 8' - Indirect Fixture	Occupancy Sensor	40	3,111	0.1	676	0	$66	$270	$35	3.6
Shop Area	5	LED - Fixtures: High-Bay	Wall Switch	S	125	4,508	2	None	Yes	5	LED - Fixtures: High-Bay	Occupancy Sensor	125	3,111	0.1	961	0	$94	$270	$35	2.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Shop Area	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,508	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,111	0.0	178	0	$17	$0	$0	0.0
Shop Area	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	4,508	2	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,111	0.1	357	0	$35	$270	$35	6.7

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - Boys Locker Room Closet	Boys Locker Room - DHW Circulating Pump	1	DHW Circulation Pump	0.1	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Girl's Locker Room	Girls Locker Room - DHW Circulating Pump	1	DHW Circulation Pump	0.1	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Electrical Room	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Hallway	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Faculty Dinning Room	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Exhaust Fan	2	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Gym Lounge	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Custodian Bathroom	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Cafeteria	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Exhaust Fan	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Room 100 & 101	2	Exhaust Fan	0.5	70.0%	No			W	4,508		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Custodian Break Room	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Loading Dock	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Bathroom	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Science Room	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Special Ed Room	1	Exhaust Fan	0.5	70.0%	No			W	4,508		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Cooking Class	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Gymnasium	8	Exhaust Fan	3.0	89.5%	No			W	4,508	4	No	89.5%	Yes	8	7.1	33,818	0	$3,414	$36,438	$1,600	10.2
Upper Roof	Elevator Room	1	Exhaust Fan	0.2	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Upper Roof	1	Exhaust Fan	0.8	70.0%	No			W	4,508		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0

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Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Upper Roof	Girls and Boys Restroom	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Boiler Room	1	Exhaust Fan	1.0	85.5%	No			W	4,508	4	No	85.5%	Yes	1	0.3	1,475	0	$149	$3,508	$75	23.1
Upper Roof	Upper Roof	1	Exhaust Fan	1.0	85.5%	No			W	4,508	4	No	85.5%	Yes	1	0.3	1,475	0	$149	$3,508	$75	23.1
Upper Roof	Storage Room	2	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Loading Dock Boiler Room	Hot Water Pumps - P-HWS1 & 2	2	Heating Hot Water Pump	7.5	89.5%	Yes			W	3,100		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical South Boiler Room	Hot Water Pumps - P-HWS3 & 4	2	Heating Hot Water Pump	7.5	89.5%	Yes			W	3,100		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	Boiler Room	2	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Upper Roof	Science Room	4	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room - 58	Hot Water Pumps P1P2	2	Heating Hot Water Pump	3.0	80.0%	No	Baldor	VM3168	W	3,100	5	No	85.5%	Yes	2	0.8	7,257	0	$733	$9,482	$400	12.4
Loading Dock Boiler Room	Loading Dock Boiler Room	2	Heating Hot Water Pump	0.5	70.0%	Yes	Crane		W	3,100		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - Hydronic Heaters	2	Fan Coil Unit	0.1	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
2nd Floor Custodial Closet	Boys & Girls Locker Room - DHW Circulating Pump	1	DHW Circulation Pump	0.3	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Fan Room	AHU-13 - Auditorium	1	Supply Fan	7.5	86.0%	No			B	4,508	4	No	91.0%	Yes	1	2.3	12,086	0	$1,220	$5,945	$1,000	4.1
Fan Room	AHU-13 - Auditorium	1	Return Fan	5.0	86.0%	No			B	4,508	4	No	89.5%	Yes	1	1.6	7,848	0	$792	$5,028	$900	5.2
Kitchen Storage	AHU-6 - Cafetria Field Side	1	Supply Fan	7.5	86.0%	No			W	4,508	4	No	91.0%	Yes	1	2.3	12,086	0	$1,220	$5,945	$1,000	4.1
Kitchen Storage	AHU-8 - Teacher Lounge	1	Supply Fan	3.0	84.0%	No			B	4,508	4	No	89.5%	Yes	1	0.9	5,002	0	$505	$4,555	$200	8.6
North Mechanical Room	AHU-4 - Aux Gym	1	Supply Fan	1.0	82.5%	No			W	4,508	4	No	85.5%	Yes	1	0.3	1,625	0	$164	$3,508	$75	20.9
North Mechanical Room	AHU-3 - Main Gym	1	Supply Fan	10.0	89.5%	No			W	4,508	4	No	91.7%	Yes	1	3.0	14,699	0	$1,484	$6,697	$1,100	3.8
South Boiler Room	AHU-2 - Main Gym	1	Supply Fan	10.0	89.5%	No			W	4,508	4	No	91.7%	Yes	1	3.0	14,699	0	$1,484	$6,697	$1,100	3.8
South Boiler Room	AHU-1 - Aux Gym	1	Supply Fan	3.0	84.0%	No			B	4,508	4	No	89.5%	Yes	1	0.9	5,002	0	$505	$4,555	$200	8.6

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Kitchen Storage	AHU-7 - Cafetria Front Side	1	Supply Fan	7.5	86.0%	No			W	4,508	4	No	91.0%	Yes	1	2.3	12,086	0	$1,220	$5,945	$1,000	4.1
High School	AHU-12 - Auditorium	1	Supply Fan	7.5	86.0%	No			B	4,508	4	No	91.0%	Yes	1	2.3	12,086	0	$1,220	$5,945	$1,000	4.1
High School	AHU-12 - Auditorium	1	Return Fan	5.0	86.0%	No			B	4,508	4	No	89.5%	Yes	1	1.6	7,848	0	$792	$5,028	$900	5.2
Lower Roof	RTU - Custodian Break Room	1	Supply Fan	2.0	84.0%	No			B	4,508	4	No	86.5%	Yes	1	0.6	3,159	0	$319	$4,182	$100	12.8
Lower Roof	AC-1 & AC-2 - Band Rooms 100 & 101	2	Supply Fan	7.5	86.0%	No			B	4,508	4	No	91.0%	Yes	2	4.6	24,172	0	$2,440	$11,890	$2,000	4.1
Lower Roof	RTU-11 - Auditorium	1	Supply Fan	25.0	93.6%	Yes			W	4,508		No	93.6%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU-11 - Auditorium	1	Return Fan	10.0	91.7%	Yes			W	4,508		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU-11 - Auditorium	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	AC-22 - Woodshop	1	Supply Fan	5.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	1.4	7,045	0	$711	$5,028	$900	5.8
Lower Roof	AC-22 - Woodshop	1	Return Fan	1.0	84.0%	No			W	4,508	4	No	85.5%	Yes	1	0.3	1,549	0	$156	$3,508	$75	22.0
Lower Roof	AC-24 - Choir Room	1	Supply Fan	10.0	91.7%	No			W	4,508	4	No	91.7%	Yes	1	2.9	13,753	0	$1,388	$6,697	$1,100	4.0
Lower Roof	AC-24 - Choir Room	1	Return Fan	2.0	86.0%	No			W	4,508	4	No	86.5%	Yes	1	0.6	2,963	0	$299	$4,182	$100	13.6
Lower Roof	AC-23 - A Hallway & Classrooms	1	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	1	2.1	10,394	0	$1,049	$5,945	$1,000	4.7
Lower Roof	AC-23 - A Hallway & Classrooms	1	Return Fan	2.0	86.0%	No			W	4,508	4	No	86.5%	Yes	1	0.6	2,963	0	$299	$4,182	$100	13.6
Lower Roof	AC-17 - M & O Hallway & Classrooms	1	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	1	2.1	10,394	0	$1,049	$5,945	$1,000	4.7
Upper Roof	AC-17 - M & O Hallway & Classrooms	1	Return Fan	1.5	84.0%	No			W	4,508	4	No	86.5%	Yes	1	0.5	2,369	0	$239	$3,887	$75	15.9
Upper Roof	AC-12 - Q Hallway & Classrooms	1	Supply Fan	5.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	1.4	7,045	0	$711	$5,028	$900	5.8
Upper Roof	AC-12 - Q Hallway & Classrooms	1	Return Fan	1.0	84.0%	No			W	4,508	4	No	85.5%	Yes	1	0.3	1,549	0	$156	$3,508	$75	22.0
Upper Roof	AC-5 - P Hallway & Classrooms	1	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	1	2.1	10,394	0	$1,049	$5,945	$1,000	4.7
Upper Roof	AC-5 - P Hallway & Classrooms	1	Return Fan	3.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	0.9	4,227	0	$427	$4,555	$200	10.2

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Upper Roof	AC-14 - L Hallway & Classrooms	1	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	1	2.1	10,394	0	$1,049	$5,945	$1,000	4.7
Upper Roof	AC-14 - L Hallway & Classrooms	1	Return Fan	0.5	70.0%	No			W	4,508	4	No	78.2%	Yes	1	0.2	1,064	0	$107	$3,136	$50	28.7
Upper Roof	AC-10 - Classrooms 124 to 127 & 226 to 229	1	Supply Fan	5.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	1.4	7,045	0	$711	$5,028	$900	5.8
Upper Roof	AC-10 - Classrooms 124 to 127 & 226 to 230	1	Return Fan	1.5	84.0%	No			W	4,508	4	No	86.5%	Yes	1	0.5	2,369	0	$239	$3,887	$75	15.9
Upper Roof	AC-18 - N Hallway & Classrooms, AC-20 (Classrooms 105,163,208,209,260)	2	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	2	4.3	20,788	0	$2,099	$11,890	$2,000	4.7
Upper Roof	AC-18 - N Hallway & Classrooms, AC-20 (Classrooms 105,163,208,209,260)	2	Return Fan	1.5	84.0%	No			W	4,508	4	No	86.5%	Yes	2	0.9	4,738	0	$478	$7,774	$150	15.9
Upper Roof	AC-15 - N Hallway & Classrooms	1	Supply Fan	7.5	91.0%	No			W	4,508	4	No	91.0%	Yes	1	2.1	10,394	0	$1,049	$5,945	$1,000	4.7
Upper Roof	AC-15 - N Hallway & Classrooms	1	Return Fan	1.5	84.0%	No			W	4,508	4	No	86.5%	Yes	1	0.5	2,369	0	$239	$3,887	$75	15.9
Lower Roof	RTU-2 - Wood Shop	1	Supply Fan	3.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	0.9	4,227	0	$427	$4,555	$200	10.2
Lower Roof	RTU-3 - Training Room	1	Supply Fan	3.0	89.5%	No			B	4,508	4	No	89.5%	Yes	1	0.9	4,227	0	$427	$4,555	$200	10.2
Lower Roof	RTU-1- Robotic Classroom	1	Supply Fan	1.0	84.0%	No			W	4,508		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU-1- ERV	1	Other	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU - Weight Room	1	Supply Fan	7.5	86.0%	No			B	4,508	4	No	91.0%	Yes	1	2.3	12,086	0	$1,220	$5,945	$1,000	4.1
Upper Roof	RTU - Boys & Girls Locker Room	2	Supply Fan	1.5	84.0%	No			B	4,508	4	No	86.5%	Yes	2	0.9	4,738	0	$478	$7,774	$150	15.9
Upper Roof	RTU-5 - Building & Ground/It Office	1	Supply Fan	5.0	89.5%	No			W	4,508	4	No	89.5%	Yes	1	1.4	7,045	0	$711	$5,028	$900	5.8
Lower Roof	RTU - Band Wing	1	Supply Fan	3.0	84.0%	No			W	4,508	4	No	89.5%	Yes	1	0.9	5,002	0	$505	$4,555	$200	8.6
Loading Dock Boiler Room	HW Recirculation Pumps - P-HWB1, 2 & 3	3	Heating Hot Water Pump	1.0	85.5%	No			W	3,100		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical South Boiler Room	HW Recirculation Pumps - P-HWB4, 5 & 6	3	Heating Hot Water Pump	0.5	70.0%	No			W	3,100		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Loading Dock	Loading Dock	1	Exhaust Fan	0.3	65.0%	No			W	4,508		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Weight Room Boiler Room	HW Pumps - P1P2	2	Heating Hot Water Pump	3.0	80.0%	No			W	3,100	5	No	85.5%	Yes	2	0.8	7,257	0	$733	$9,482	$400	12.4

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Lower Roof	Kitchen Hood - HS	1	Kitchen Hood Exhaust Fan	0.5	70.0%	No			W	5,250		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen Mechanical Room	DHW Circulation Pump	1	DHW Circulation Pump	0.1	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Band Room	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Boys Locker Bath	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Boys Locker Room	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	C Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	C Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 11 through 14	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 7 through 10	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	D Hallway	1	Exhaust Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	D Hallway	1	Exhaust Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Faculty Bathroom	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Female Gym Teacher Office	2	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Girls and Boys Bath	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Gym	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Gym	3	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Gym	1	Exhaust Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Gym Hallway	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Gym Hallway	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
EMS - Roof	Hallway	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Bathroom	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Hood - MS	2	Kitchen Hood Exhaust Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Storage	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Storage	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	2	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 20 through 22	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 23 through 26	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 31	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Lab	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Labs 31 & 33	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Spanish Wing Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Weight Room	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Weight Room Bath	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Library	2	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Lab	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
EMS - Roof	Hallway	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Bathroom	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Hood - MS	2	Kitchen Hood Exhaust Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Storage	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Storage	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	2	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 20 through 22	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Classrooms 23 through 26	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 31	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Lab	1	Exhaust Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Labs 31 & 33	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Spanish Wing Hallway	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Weight Room	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Weight Room Bath	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Library	2	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Science Lab	1	Exhaust Fan	0.3	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
EMS - Boiler Room	Hot Water Pumps - Middle School	2	Heating Hot Water Pump	0.1	65.0%	No			W	3,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Boiler Room	Hot Water Pumps	3	Heating Hot Water Pump	0.8	70.0%	No			W	3,000		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Gym Storage	DHW Circulation Pump	1	DHW Circulation Pump	0.1	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Kitchen Hood - MS	1	Kitchen Hood Exhaust Fan	0.3	65.0%	No			W	5,250		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Boiler Room	Hot Water Pumps - Middle School	2	Heating Hot Water Pump	7.5	89.5%	No			W	3,000	5	No	89.5%	Yes	2	1.4	14,066	0	$1,420	$11,881	$2,000	7.0
EMS - Boiler Room	Hot Water Pumps - Middle School	2	Heating Hot Water Pump	5.0	88.5%	No			W	3,000	5	No	88.5%	Yes	2	1.0	9,483	0	$957	$10,418	$1,800	9.0
EMS - Roof	RTU-1 - Main Hallway	1	Supply Fan	3.0	89.5%	No			W	3,080	4	No	89.5%	Yes	1	0.9	2,888	0	$292	$4,555	$200	14.9
EMS - Roof	RTU-3 - Room 41	1	Supply Fan	1.5	84.0%	No			W	3,080	4	No	86.5%	Yes	1	0.4	1,619	0	$163	$3,887	$75	23.3
EMS - Roof	RTU-2 - Room 42	1	Return Fan	0.5	70.0%	No			W	3,080	4	No	78.2%	Yes	1	0.2	732	0	$74	$3,136	$50	41.8
EMS - Roof	RTU 4 - Music Room	1	Supply Fan	3.0	89.5%	No			W	3,080	4	No	89.5%	Yes	1	0.9	2,888	0	$292	$4,555	$200	14.9
EMS - Roof	RTU 7 - E Wing Hallway	1	Supply Fan	1.0	84.0%	No			W	3,080		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Cafteria	Unit Vent - Cafeteria	2	Supply Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Various Classrooms	Unit Vent - Various Classroms	37	Supply Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Faculty Dinning Room	Unit Vent - Faculty Dinning Room	1	Supply Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Fitness Room	Unit Vent - Fitness Room	1	Supply Fan	0.2	65.0%	No			W	3,080		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS - Roof	RTU-5 & RTU-6 - Library	2	Supply Fan	5.0	86.5%	No			B	3,080	4	No	89.5%	Yes	2	3.0	10,562	0	$1,066	$10,055	$1,800	7.7
EMS	HV-2 - Weigh room	1	Supply Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-10 - Kitchen	1	Supply Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-6 - Tech Lab	1	Supply Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-8,& 9 - Auditorium	2	Supply Fan	0.8	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
EMS	HV-1,& 7 - Auditorium	2	Supply Fan	0.8	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-3 - Boys Locker room	1	Supply Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-4 - Girls Locker room	1	Supply Fan	0.5	70.0%	No			W	3,080		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
EMS	HV-5 - Library	1	Supply Fan	0.5	70.0%	No			W	0		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - Lower Roof	Kitchen Office	1	Split-System	2.00		10.50				B	6	Yes	1	Split-System	2.00		16.00		0.4	471	0	$48	$4,040	$210	80.5
Boy's Locker Room	Boy's Locker Room	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Girl's Locker Room	Girl's Locker Room	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Girl's Locker Room	Girl's Locker Room	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Loading Dock	Loading Dock	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Main Electric Room	Main Electric Room	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Upper Roof	Server Room	2	Ductless Mini-Split AC	3.50		11.60		MITSUBICHI	PUY-A42NKA7	W		No							0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU - Custodian Break Room	1	Package Unit	5.00		10.30				B	6	Yes	1	Package Unit	5.00		16.00		1.0	1,245	0	$126	$7,880	$515	58.6
Lower Roof	AC-1 - Band Room 100	1	Package Unit	20.00	187.00	10.10	0.799145299145299 AFUE	Lennox	LGA240H3	B	6	Yes	1	Package Unit	20.00	187.00	12.50	0.82 Et	2.3	2,737	2	$307	$26,300	$1,700	80.1
Lower Roof	RTU-11 - Auditorium	1	Package Unit	42.00	420.00	10.70	0.8 AFUE	Trane	SFLHF504HP	W		No							0.0	0	0	$0	$0	$0	0.0
Lower Roof	AC-22 - Woodshop	1	Package Unit	16.00	160.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0162	B	6	Yes	1	Package Unit	16.00	160.00	14.00	0.82 Et	1.9	2,244	2	$252	$22,130	$1,424	82.2
Lower Roof	AC-24 - Choir Room	1	Package Unit	30.00	240.00	11.00	0.8 AFUE	Seasons 4	LA030/6MJF21-0342	B	6	Yes	1	Package Unit	30.00	240.00	12.50	0.82 Et	2.0	2,356	3	$276	$45,412	$2,550	155.4
Lower Roof	AC-23 - A Hallway & Classrooms	1	Package Unit	31.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0312	B	6	Yes	1	Package Unit	31.00	320.00	12.50	0.82 Et	2.0	2,435	3	$296	$47,156	$2,635	150.3
Upper Roof	AC-13 - M & O Hallway & Classrooms	1	Package Unit	32.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	320.00	12.50	0.82 Et	2.1	2,513	3	$304	$48,900	$2,720	151.8
Upper Roof	AC-12 - Q Hallway & Classrooms	1	Package Unit	22.00	240.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0222	B	6	Yes	1	Package Unit	22.00	240.00	12.50	0.82 Et	1.4	1,728	3	$212	$30,202	$1,870	133.5
Upper Roof	AC-5 - P Hallway & Classrooms	1	Package Unit	30.00	280.00	11.00	0.8 AFUE	Seasons 4	LA030/6MJF21-0322	B	6	Yes	1	Package Unit	30.00	280.00	12.50	0.82 Et	2.0	2,356	3	$282	$45,412	$2,550	152.0
Upper Roof	AC-3 - L Hallway & Classrooms	1	Package Unit	28.00	280.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0282	B	6	Yes	1	Package Unit	28.00	280.00	12.50	0.82 Et	1.8	2,199	3	$266	$41,669	$2,380	147.6
Upper Roof	AC-6 - Main Office	1	Package Unit	23.00	280.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0232	B	6	Yes	1	Package Unit	23.00	280.00	12.50	0.82 Et	1.5	1,807	3	$227	$32,153	$1,955	133.3
Upper Roof	AC-8 - D Hallway & Classrooms	1	Package Unit	33.00	400.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0332	B	6	Yes	1	Package Unit	33.00	400.00	12.50	0.82 Et	2.2	2,592	4	$325	$50,643	$2,805	147.3
Lower Roof	AC-25 - 1St Floor Hallway	1	Package Unit	25.00	280.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0252	B	6	Yes	1	Package Unit	25.00	280.00	12.50	0.82 Et	1.6	1,964	3	$242	$36,054	$2,125	140.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Effidiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Upper Roof	AC-7 - B Hallway & Classrooms	1	Package Unit	32.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	320.00	12.50	0.82 Et	2.1	2,513	3	$304	$48,900	$2,720	151.8
Upper Roof	AC-9 - Q Hallway & Classrooms	1	Package Unit	33.00	400.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0332	B	6	Yes	1	Package Unit	33.00	400.00	12.50	0.82 Et	2.2	2,592	4	$325	$50,643	$2,805	147.3
Upper Roof	AC-11 - B Hallway & Classrooms	1	Package Unit	32.00	160.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	160.00	12.50	0.82 Et	2.1	2,513	2	$279	$48,900	$2,720	165.5
Upper Roof	RTU - Girls Locker Room	1	Package Unit	4.00		9.50				B	6	Yes	1	Package Unit	4.00		16.00		1.0	1,232	0	$124	$7,469	$412	56.8
Upper Roof	AC-4 - P Hallway & Classrooms	1	Package Unit	33.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0332	B	6	Yes	1	Package Unit	33.00	320.00	12.50	0.82 Et	2.2	2,592	3	$312	$50,643	$2,805	153.3
Upper Roof	AC-16 - O Hallway & Classrooms	1	Package Unit	27.00	240.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0272	B	6	Yes	1	Package Unit	27.00	240.00	12.50	0.82 Et	1.8	2,121	3	$252	$39,797	$2,295	148.8
Upper Roof	AC-14 - L Hallway & Classrooms	1	Package Unit	32.00	280.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	280.00	12.50	0.82 Et	2.1	2,513	3	$298	$48,900	$2,720	155.0
Upper Roof	AC-10 - Classrooms 124 to 127 & 226 to 229	1	Package Unit	32.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	320.00	12.50	0.82 Et	2.1	2,513	3	$304	$48,900	$2,720	151.8
Upper Roof	AC-18 - N Hallway & Classrooms	1	Package Unit	32.00	280.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	280.00	12.50	0.82 Et	2.1	2,513	3	$298	$48,900	$2,720	155.0
Upper Roof	AC-15 - N Hallway & Classrooms	1	Package Unit	32.00	400.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	400.00	12.50	0.82 Et	2.1	2,513	4	$317	$48,900	$2,720	145.8
Upper Roof	RTU - Boys Locker Room	1	Package Unit	4.00		9.50				B	6	Yes	1	Package Unit	4.00	0.00	16.00		1.0	1,232	0	$124	$7,469	$412	56.8
Upper Roof	AC-17 - M & O Hallway & Classrooms	1	Package Unit	32.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	320.00	12.50	0.82 Et	2.1	2,513	3	$304	$48,900	$2,720	151.8
Lower Roof	AC-2 - Band Room 101	1	Package Unit	20.00	187.00	10.10	0.799145299145299 AFUE	Lennox	LGA240H3	B	6	Yes	1	Package Unit	20.00	187.00	12.50	0.82 Et	2.3	2,737	2	$307	$26,300	$1,700	80.1
Roof	AC-20 - Classrooms 105,163,260,208,209	1	Package Unit	32.00	320.00	11.00	0.8 AFUE	Seasons 4	6MJF21-0322	B	6	Yes	1	Package Unit	32.00	320.00	12.50	0.82 Et	2.1	2,513	3	$304	$48,900	$2,720	151.8
Lower Roof	RTU-2 - Wood Shop	1	Package Unit	10.00	162.00	12.00	0.81 AFUE	Trane	YHC120F4RMA	W		No							0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU-3 - Training Room	1	Package Unit	13.00	208.00	11.50	0.8 AFUE	Lennox	LGC156H	B	6	Yes	1	Package Unit	13.00	208.00	14.00	0.82 Et	1.2	1,453	2	$180	$19,630	$1,157	102.9
Lower Roof	RTU-1- Robotic Classroom	1	Package Unit	3.00		13.00		Trane	THC0364R01	W		No							0.0	0	0	$0	$0	$0	0.0
Lower Roof	RTU - Weight Room	1	Package Unit	20.00	187.00	10.10	0.799145299145299 AFUE	Lennox	LGA240H2	B	6	Yes	1	Package Unit	20.00	187.00	12.50	0.82 Et	2.3	2,737	2	$307	$26,300	$1,700	80.1
Upper Roof	RTU - Boys $ Girls Locker Room	2	Electric Resistance Heat		51.18		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Upper Roof	RTU-5 - Building & Ground/It Office	1	Package Unit	12.50	203.00	12.00	0.812 AFUE	Trane	YHD150G4RZ	W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Lower Roof	Faculty Dining Room	1	Split-System Air-Source HP	5.00	66.00	18.50	3.64 COP	Fijitsu	AOU60RL	W		No							0.0	0	0	$0	$0	$0	0.0
Lower Roof	Cafeteria	4	Split-System Air-Source HP	6.00	81.00	21.50	4.01 COP	Fijitsu	AOU72RL	W		No							0.0	0	0	$0	$0	$0	0.0
Gymnasium	AHU - Gymnasium	2	Built Up System		85.30		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Boys Locker Room Storage Closet	HV-3 - Boys Locker Room	1	Built Up System		85.30		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 15	1	Ductless Mini-Split AC	3.50		13.00		Trane	4TTA3042D4	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Room 16, 17,18 & 19	4	Split-System	3.00		11.00		Trane	4TTA3036B3	B	6	Yes	4	Split-System	3.00		16.00		2.0	2,455	0	$248	$22,067	$1,260	84.0
EMS - Roof	Security Vestibule	1	Ductless Mini-Split HP	1.00	16.00	12.50	4.97 COP	FUJITSU	AOU12RLFW1	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Classroom 36	AC-1 - Classroom 36	1	Fan Coil	4.00		14.00		Airedale		W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Classroom 37	AC-2 - Classroom 37	1	Fan Coil	4.00		14.00		Airedale		W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Gymnasium	HV-1 & HV-7 - Gymnasium	2	Built Up System		180.00		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	RTU-1 Main Hallway	1	Package Unit	10.00	188.00	12.00	0.8 AFUE	LENNOX	LGA120H2-PKG	B	6	Yes	1	Package Unit	10.00	188.00	14.00	0.82 Et	0.7	857	2	$116	$17,444	$790	143.3
EMS - Roof	RTU-7 - E Wing Hallway	1	Packaged Air-Source HP	5.00	47.00	9.10	7 HSPF	Carrier	50LJQ006- - -641	B	7	Yes	1	Packaged Air-Source HP	5.00	47.00	15.50	8.5 HSPF	1.4	2,629	0	$265	$8,747	$500	31.1
EMS - Roof	RTU-4 - Music Room	1	Package Unit	10.00	188.00	9.70	0.8 AFUE	LENNOX	LGA120H2-PKG	B	6	Yes	1	Package Unit	10.00	188.00	14.00	0.82 Et	1.9	2,280	2	$260	$17,444	$790	64.1
EMS - Roof	RTU-3 - Room 41	1	Package Unit	5.00	125.00	12.00	0.8 AFUE	LENNOX	LGA060H2BH2G	B	6	Yes	1	Package Unit	5.00	125.00	16.00	0.82 AFUE	0.6	750	1	$95	$11,874	$515	119.0
EMS - Roof	RTU-5 & RTU-6 - Library	2	Package Unit	12.50		10.10		TRANE	TCD151C40AAA	B	6	Yes	2	Package Unit	12.50		14.00		4.1	4,965	0	$501	$29,610	$2,225	54.6
EMS - Roof	Guidance Room	3	Ductless Mini-Split HP	3.75	45.00	17.70	9.5 HSPF	FUJITSU	AOU45RLXFZ	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Computer Lab	1	Split-System Air-Source HP	12.00	160.00	12.50	3.38 COP	MITSUBISHI	PUHY-P144TLMU-A	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Main Office	1	Ductless Mini-Split HP	3.00	36.00	9.20	4.2 COP	DAIKIN	4MXS36NMVJU	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	Main Office	1	Ductless Mini-Split AC	3.00		10.80		MITSUBISHI	PUY-A36NKA7	W		No							0.0	0	0	$0	$0	$0	0.0
EMS - Roof	RTU-5 & RTU-6 - Library	2	Electric Resistance Heat		122.83		1 COP	TRANE	TCD151C40AAA	B		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
EMS - Roof	RTU-2 - Room 42	1	Package Unit	5.00	125.00	12.00	0.8 AFUE	LENNOX	LGA060H2BH2G	B	6	Yes	1	Package Unit	5.00	125.00	16.00	0.82 AFUE	0.6	750	1	$95	$11,874	$515	119.0
EMS - Girls Locker Room Storage Closet	HV-4 - Girls Locker Room	1	Built Up System		85.30		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Transportation Building - Office 1	Transport Building - office	1	Forced Air Furnace	1.50	32.00	13.00	0.8 AFUE	GOODMAN	CAPF1824B6CA	W		No							0.0	0	0	$0	$0	$0	0.0
Transportation Shop	Transport Building Shop	1	Unit Heater		175.00		0.8 AFUE	REZNOR		W	8	Yes	1	Infrared Heater		140.00		0.93 Et	0.0	0	58	$857	$4,932	$300	5.4
Maintenance Bldg. Shop	Maintenance Building Shop	2	Unit Heater		175.00		0.8 AFUE	REZNOR		W	8	Yes	2	Infrared Heater		140.00		0.93 Et	0.0	0	109	$1,613	$9,863	$600	5.7

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - Band Wing Boiler - 58	Hydronic Heating - Band Wing	2	Non-Condensing Hot Water Boiler	314	BUDERUS	G334X-92	W		No						0.0	0	0	$0	$0	$0	0.0
Loading Dock Boiler Room	Faculty & Cafeteria	3	Non-Condensing Hot Water Boiler	1,487	RBI	MB1750	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical South Boiler Room	Hydronic Heating - High School Building	3	Non-Condensing Hot Water Boiler	638	RBI	MB750	W		No						0.0	0	0	$0	$0	$0	0.0
Weight Room Boiler Room	Weight Room and Bathroom	2	Non-Condensing Hot Water Boiler	218	BUDERUS	G234X-64	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - Boiler Room	Band Wing Boiler Room	2	Non-Condensing Hot Water Boiler	314	Burderus	G334X-92	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - Boiler Room	Eisenhower Middle School	3	Non-Condensing Hot Water Boiler	1,062	RBI	MB1250	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Lower Roof - High School	RTU-11 - Auditorium	9	4.00	42.00	0.00	420.00	0.0	738	22	$400	$5,438	$0	13.6
Lower Roof - High School	RTU-3 - Training Room	9	2.00	13.00	0.00	208.00	0.0	245	11	$186	$2,719	$0	14.6
Lower Roof - High School	RTU - Weight Room	9	2.00	20.00	0.00	187.00	0.0	332	10	$179	$2,719	$0	15.2

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - 2nd Floor Custodial Closet	Domestic Hot Water	10	6	1.00	0.0	636	0	$64	$72	$12	0.9
Girl's Locker Room	Domestic Hot Water	10	15	1.00	0.0	1,591	0	$161	$179	$30	0.9
Girl's Locker Room	Domestic Hot Water	10	20	1.50	0.0	3,104	0	$313	$266	$40	0.7
EMS - C Hallway Electrical Closet	Restrooms	10	2	1.00	0.0	212	0	$21	$24	$4	0.9
EMS - Classroom 21	Classrooms	10	10	0.75	0.0	828	0	$84	$119	$20	1.2
EMS - Gym Storage	Kitchen	10	5	0.75	0.0	414	0	$42	$60	$10	1.2
EMS - H Hallway Closet	Faculty Bathrooms	10	20	0.75	0.0	1,656	0	$167	$239	$40	1.2

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
High School - 2nd Floor Custodial Closet	Boys & Girls Locker Rooms	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	CEHD80A3633HCF	W		No						0.0	0	0	$0	$0	$0	0.0
Boys Locker Room Closet	Boys Locker Room	1	Storage Tank Water Heater (> 50 Gal)	Patterson Kelley	180V-1C	W		No						0.0	0	0	$0	$0	$0	0.0
Girl's Locker Room	Girls Locker Room	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	CEHD80A3633LCF	W		No						0.0	0	0	$0	$0	$0	0.0
Kitchen Mechanical Room	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	D80L4503NA	W		No						0.0	0	0	$0	$0	$0	0.0
Office F151	High School - Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	Rheem	ELD52-B	W		No						0.0	0	0	$0	$0	$0	0.0
Wood Shop Storage Closet	High School - Restrooms	1	Storage Tank Water Heater (> 50 Gal)	Patterson Kelley	48-7V	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - C Hallway Electrical Closet	Serve Bathrooms	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	MII50A63SF05	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - Classroom 21	Eisenhower Middle School	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	RE340T6-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - D Hallway Closet	Science Rooms	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	M240T6DS-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - Electrical Equipment Room	Spanish Wing	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	M130L6DS-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - Gym Storage	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	RHEEM RUUD	ES120-36-G	W		No						0.0	0	0	$0	$0	$0	0.0
EMS - H Hallway Closet	Faculty Bathrooms	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	RE120U6-1NAL	W		No						0.0	0	0	$0	$0	$0	0.0
Transportation Building -Shop Area	Transporation Building	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	RE34S6-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen - High School	11	7	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	12	$173	$50	$14	0.2
Restrooms & Science Classrooms - High School	11	114	Faucet Aerator (Lavatory)	2.20	0.50	0.0	31,696	0	$3,200	$817	$409	0.1
Kitchen - Middle School	11	2	Faucet Aerator (Kitchen)	2.50	1.50	0.0	981	0	$99	$14	$4	0.1
Restroom & Science Classrooms - Middle School	11	21	Faucet Aerator (Lavatory)	2.50	0.50	0.0	6,869	0	$693	$151	$75	0.1
Break Room Bath - Transportation Building	11	1	Faucet Aerator (Lavatory)	2.50	0.50	0.0	327	0	$33	$7	$4	0.1

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
HS - Kitchen	1	Cooler (35F to 55F)	HEATCRAFT		12, 13	Yes	No	Yes	0.1	1,251	0	$126	$2,281	$155	16.8
HS - Kitchen	1	Low Temp Freezer (-35F to -5F)	TRENTON		12, 13	Yes	Yes	Yes	0.2	5,027	0	$508	$3,709	$325	6.7
HS - Kitchen	1	Low Temp Freezer (-35F to -5F)	BALLY		12, 13	Yes	Yes	Yes	0.2	5,028	0	$508	$3,709	$325	6.7
EMS-Kitchen	1	Medium Temp Freezer (0F to 30F)	HEATCRAFT	LSF120BEWMC6K	12, 13	Yes	Yes	Yes	0.1	3,165	0	$319	$3,103	$245	8.9
EMS-Kitchen	1	Cooler (35F to 55F)	TRENTON	TPLP211MAS2DR	12, 13	Yes	No	Yes	0.1	1,309	0	$132	$2,281	$155	16.1

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
HS - Kitchen	2	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	4	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRUE		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
EMS-Kitchen	2	Refrigerator Chest	Oasis	CO47R	No		No	0.0	0	0	$0	$0	$0	0.0
EMS-Kitchen	1	Freezer Chest			No		No	0.0	0	0	$0	$0	$0	0.0
EMS-Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
EMS-Kitchen	2	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
HS - Athletic Training Room	1	Self-Contained Unit (≥175 lbs/day), Batch	HOSHIKAKI		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Self-Contained Unit (≥175 lbs/day), Batch	ICE-O-MATIC	B330P	No		No	0.0	0	0	$0	$0	$0	0.0
EMS - Kitchen	1	Self-Contained Unit (≥175 lbs/day), Batch	HOSHIZAKI		No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
HS - Kitchen	2	Insulated Food Holding Cabinet (Full Size)	Traulsen	G14311	Yes		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Electric Convection Oven (Full Size)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Electric Convection Oven (Half Size)	Rational	SCC WE 102	Yes		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Gas Fryer			No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Gas Fryer			No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Electric Convection Oven (Full Size)	Menumaster	MXP22	No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Electric Griddle (≥6 Feet Width)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Electric Convection Oven (Half Size)	Blodgett	B-50	No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	2	Electric Griddle (≤2 Feet Width)	Star Pro Max		No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	1	Insulated Food Holding Cabinet (Full Size)	CresCor	H137SUA12	No		No	0.0	0	0	$0	$0	$0	0.0
HS - Kitchen	2	Insulated Food Holding Cabinet (Full Size)	Vulcan	VHFA18	No		No	0.0	0	0	$0	$0	$0	0.0
EMS - Kitchen	1	Insulated Food Holding Cabinet (Full Size)	CresCor		Yes		No	0.0	0	0	$0	$0	$0	0.0
EMS - Kitchen	1	Electric Convection Oven (Half Size)	BLODGETT	ZEPHAIRE-100-E	Yes		No	0.0	0	0	$0	$0	$0	0.0
EMS - Kitchen	1	Electric Convection Oven (Half Size)	ACCUTEMP		Yes		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
HS Kitchen	1	Single Tank Conveyor (High Temp)	CMA	180-VL	Electric	N/A	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Roxbury High School	2	Clothes Dryer	5,000	No		
Roxbury High School	2	Clothes Washer	900	No		
Roxbury High School	20	Coffee Machine	900	No		
Roxbury High School	461	Desktop	270	No		
Roxbury High School	1	Diswasher	1,000	No		
Roxbury High School	4	Ceiling Fan	50	No		
Roxbury High School	28	Microwave	1,000	No		
Roxbury High School	6	Paper Shredder	150	No		
Roxbury High School	33	Printer (Medium/Small)	240	No		
Roxbury High School	2	Printer (Large)	600	No		
Roxbury High School	21	Projector	240	No		
Roxbury High School	16	Refrigerator (Mini)	180	No		
Roxbury High School	12	Refrigerator (Residential)	400	No		
Roxbury High School	77	Smart Board	316	No		
Roxbury High School	12	Television	220	No		
Roxbury High School	2	Toaster	850	No		
Roxbury High School	4	Toaster Oven	1,200	No		
Roxbury High School	3	Water Cooler	92	No		
Roxbury High School	18	Woodshop - Tools	1,100	No		
Roxbury High School	17	Electric Oven	3,000	No		
Roxbury High School	13	Hot & Cold Plate	950	No		
Roxbury High School	1	Electric Conveyor belt	5,600	No		
Roxbury High School	1	Electrick Panini	1,500	No		
EMS - Various Spaces	8	Coffee Machine	900	No		
EMS - Various Spaces	116	Desktop	270	No		
EMS - Various Spaces	7	Microwave	1,000	No		
ESM - Classroom 8 & 31	7	3D Printer	360	No		
EMS - Main Office	1	Paper Shredder	150	No		
EMS - Various Spaces	11	Printer (Medium/Small)	200	No		
EMS - Various Spaces	28	Projector	240	No		
EMS - Various Spaces	8	Refrigerator	400	No		
EMS - Various Spaces	20	Smart Board	316	Yes		
EMS - Various Spaces	9	Television	130	No		
EMS - Faculty Room	1	Water Cooler	92	No		
EMS - Various Spaces	3	Hot & Cold Plate	1,500	No		

	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
EMS - Kitchen	1	Electric Conveyor belt	5,600	No		
Transportation Building - Various Spaces	3	Coffee Machine	900	No		
Various Spaces	2	Desktop	270	No		
Various Spaces	2	Microwave	1,000	No		
Various Spaces	1	Paper Shredder	150	No		
Various Spaces	1	Printer (Medium/Small)	200	No		
Various Spaces	1	Refrigerator (Residential)	172	No		
Various Spaces	1	Television	71	No		
Various Spaces	1	Toaster	850	No		
Various Spaces	1	Misc. Plug Loads	1,500	No		
Various Spaces	4	Misc. Plug Loads	1,500	No		
Maintenance Office	1	Misc. Plug Loads	1,500	No		

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	**Quantity**	**Vending Machine Type**	**ECM #**	**Install Controls?**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Weight Room Hallway - HS	1	Glass Fronted Refrigerated	14	Yes	0.1	1,209	0	$122	$230	$50	1.5
Various Spaces	4	Non-Refrigerated	14	Yes	0.2	1,370	0	$138	$920	$0	6.7
Various Spaces	4	Refrigerated	14	Yes	0.7	6,447	0	$651	$920	$200	1.1
Various Spaces - EMS	2	Non-Refrigerated	14	Yes	0.1	685	0	$69	$460	$0	6.7
Various Spaces - EMS	1	Glass Fronted Refrigerated	14	Yes	0.1	1,209	0	$122	$230	$50	1.5
Various Spaces - EMS	1	Refrigerated	14	Yes	0.2	1,612	0	$163	$230	$50	1.1

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	304,697	**Fuel Utility Rate**	$14.782	MMBtu	
Percent of Conditioned Area Impacted	100%	**Blended Electric Utility Rate**	$0.101	kWh	

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis											
Description	**Area(s)/System(s) Served**	**Remaining Useful Life**	**Total HVAC Motor Usage kWh**	**Total HVAC Electric Usage kWh**	**Total HVAC Fuel Usage MMBtu**	**Description**	**% Savings HVAC Motor Usage kWh**	**% Savings HVAC Electric Usage kWh**	**% Savings HVAC Fuel Usage MMBtu**	**Estimated Cost per Sqft**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Base Incentives**	**Enhanced Incentives**	**Total Incentives**	**Total Net Cost**	**Payback w/o Incentives in Years**	**Simple Payback w/ Incentives in Years**
HVAC Controls Not Currently Optimized	HVAC Equipment & Systems	3	1,208,647	929,945	13,485	Retro-Commissioning Study	3%	3%	3%	$0.30	0.00	64,158	405	$12,457	$91,409	$0	$0	$0	$91,409	7.34	7.34

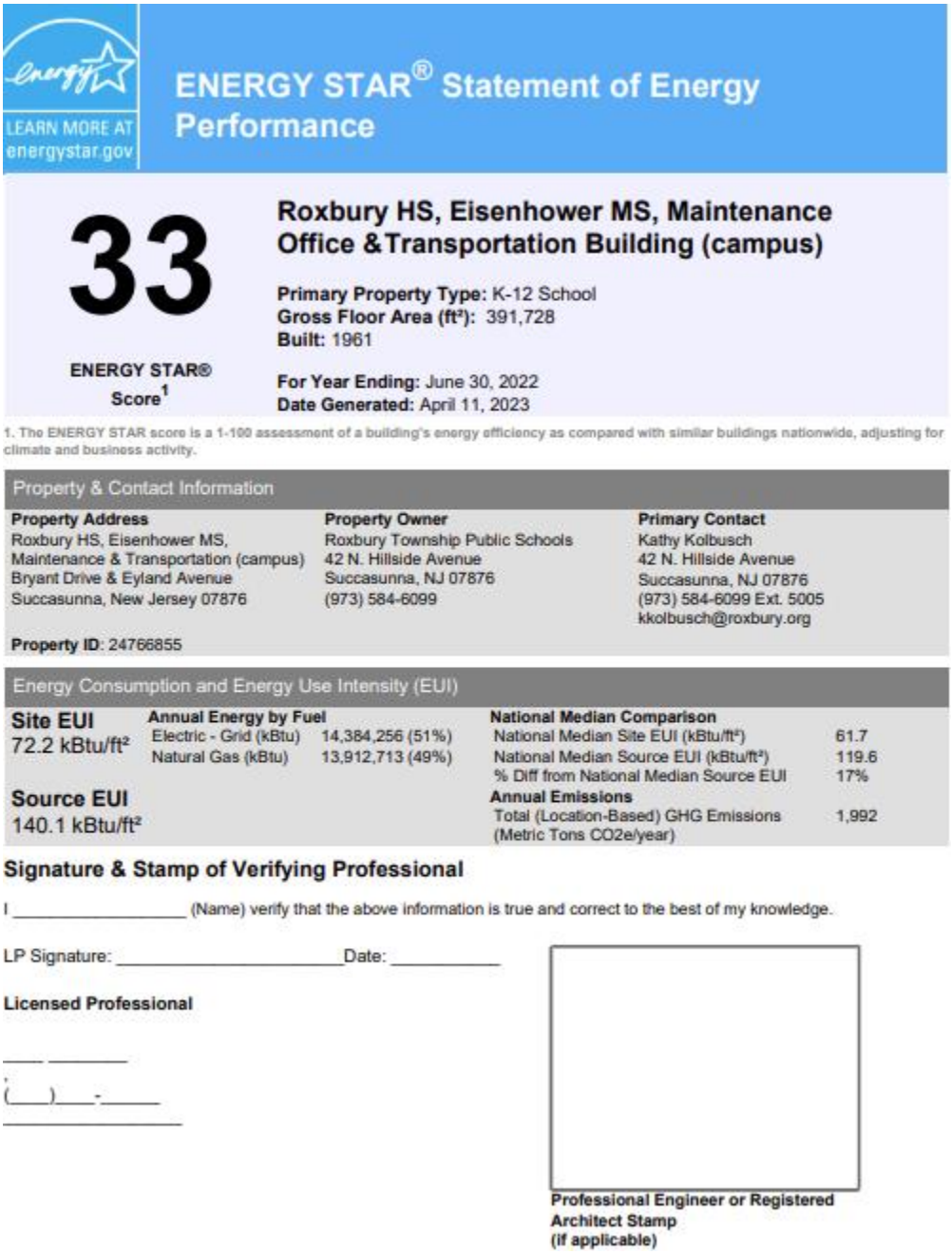
Electric Tank Water Heater to HPWH

NOTE: HPWH calculation should not be used for existing water heaters with a storage capacity greater than 120 gal.

Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis										
Description	**Area(s)/System(s) Served**	**SF of Area Served**	**Fuel Type**	**Input Capacity per Unit (kW)**	**Tank Capacity per Unit (Gal)**	**Description**	**COP**	**Tank Capacity per Unit (Gal)**	**Estimated Unit Cost**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Base Incentives**	**Enhanced Incentives**	**Total Incentives**	**Total Net Cost**	**Payback w/o Incentives in Years**	**Payback w/ Incentives in Years**
Storage Tank Water Heater (>50 Gal)	Boys & Girls Locker Rooms	20,000	Electric	30.0	80	Heat Pump Water Heater	2.5	80	$3,322.98	0.00	24,619	0	$2,485	$3,323	$0	$0	$0	$3,323	1.34	1.34
Storage Tank Water Heater (>50 Gal)	Boys Locker Room	60,000	Electric	180.0	100	Heat Pump Water Heater	2.5	100	$3,949.52	0.00	73,857	0	$7,456	$3,950	$0	$0	$0	$3,950	0.53	0.53
Storage Tank Water Heater (>50 Gal)	Girls Locker Room	20,000	Electric	30.0	80	Heat Pump Water Heater	2.5	80	$3,322.98	0.00	24,619	0	$2,485	$3,323	$0	$0	$0	$3,323	1.34	1.34

APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

Energy use intensity (EUI) is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.



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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Roxbury HS, Eisenhower MS, Maintenance Office &Transportation Building (campus)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 391,728
Built: 1961

For Year Ending: June 30, 2022
Date Generated: April 11, 2023

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
Roxbury HS, Eisenhower MS, Maintenance & Transportation (campus) Bryant Drive & Eyland Avenue Succasunna, New Jersey 07876	Roxbury Township Public Schools 42 N. Hillside Avenue Succasunna, NJ 07876 (973) 584-6099	Kathy Kolbusch 42 N. Hillside Avenue Succasunna, NJ 07876 (973) 584-6099 Ext. 5005 kkolbusch@roxbury.org

Property ID: 24766855

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
72.2 kBtu/ft²

Source EUI
140.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	14,384,256 (51%)
Natural Gas (kBtu)	13,912,713 (49%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	61.7
National Median Source EUI (kBtu/ft²)	119.6
% Diff from National Median Source EUI	17%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	1,992

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)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
Btu	*British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
CHP	*Combined heat and power*. Also referred to as cogeneration.
COP	*Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
DCV	*Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	*United States Department of Energy*
EC Motor	*Electronically commutated motor*
ECM	*Energy conservation measure*
EER	*Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	*Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR	ENERGY STAR is the government-backed symbol for energy efficiency. The ENERGY STAR program is managed by the EPA.
EPA	*United States Environmental Protection Agency*
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	*Greenhouse gas* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

gpm	*Gallon per minute*
HID	*High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	*Horsepower*
HPS	*High-pressure sodium*: a type of HID lamp.
HSPF	*Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	*Heating, ventilating, and air conditioning*
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	*Integrated part load value:* a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	*Kilowatt*: equal to 1,000 Watts.
kWh	*Kilowatt-hour*: 1,000 Watts of power expended over one hour.
LED	*Light emitting diode*: a high-efficiency source of light with a long lamp life.
LGEA	*Local Government Energy Audit*
Load	The total power a building or system is using at any given time.
Measure	A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption.
MH	*Metal halide*: a type of HID lamp.
MBh	*Thousand Btu per hour*
MBtu	*One thousand British thermal units*
MMBtu	*One million British thermal units*
MV	*Mercury Vapor:* a type of HID lamp.
NJBPU	*New Jersey Board of Public Utilities*
NJCEP	*New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money, and the environment.
psig	Pounds per square inch gauge
Plug Load	Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug.
PV	*Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current).

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR Portfolio Manager.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC (II)	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of $1/8^{th}$ of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use.
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.