BETHLEHEM TOWNSHIP BOARD OF EDUCATION
CONLEY ELEMENTARY SCHOOL
ENERGY ASSESSMENT

FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES

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CHA PROJECT NO. 24735

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REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the school was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing staff and spot measurements taken in the field.

1.0 EXECUTIVE SUMMARY

This energy audit is performed by CHA in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program for the Bethlehem Township School District. The purpose of this report is to convey the findings of the energy audit to identify energy savings potential associated with major energy consumers and inefficient practices. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Thomas Conley Elementary School	940 Iron Bridge Road Asbury, NJ 08802	59,584	1978

The Energy Conservation Measures (ECMs) and Operations and Maintenance Measures (OMMs) identified in this report are potential energy savings opportunities that, if implemented, will reduce the consumption of electricity, water, gas and/or fuel oil. These measures may qualify for incentive programs such as New Jersey SmartStart Buildings Program, Direct Install Program, Pay for Performance (P4P) or Energy Savings Improvement Plan (ESIP). A brief summary of the requirements of each program is provided in this report and more detailed information is available at the NJBPU website:

The potential annual energy savings and associated cost savings for each energy conservation measure (ECM) is shown in Table 1 below. Each measure's savings are dependent on implementing that measure alone. There are no interactive effects included in the calculations. The lighting ECM's are presented in three options. Only one option can be included. The potential incentive saving is calculated using the Smart Start program only. Additional incentives may be available for some ECM's and should be evaluated if the incentive is to implemented.

Table 1: Summary of Energy Conservation Measures

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Door Seals & Sweeps	$400	$900	0.4	$0	0.4	X
ECM-2	Replace Classroom Cabinet Heaters w/ Finned Radiation	$19,000	$1,900	10.0	$0	10.0	X
ECM-3	Replace Motors with Premium Efficiency Motors	$6,000	$700	8.6	$300	8.1	X
ECM-4	Night-time Setback HVAC Equipment	$1,000	$9,900	0.1	$0	0.1	X
ECM-5	Install Fan & Dampers on Louvers	$129,000	$1,100	>20	$0	>20	X
ECM-6	Install DDC & BMS	$307,000	$11,600	4.3	$0	>20	
ECM-7	Lighting Replacements & Upgrades	$140,000	$18,800	7.4	$5,300	7.2	
ECM-8	Lighting Controls	$9,000	$7,100	1.3	$1,200	1.1	
ECM-9	Lighting Replacements & Lighting Controls	$149,000	$23,700	6.3	$6,600	6.0	X

The measures recommended by CHA above have a simple payback less than 15 years based on the requirement of the New Jersey Energy Savings Improvement Plan (ESIP), that all cumulative payback periods must be less than 15 years to be incentivized. If the recommended measures are implemented a total potential annual savings of $38,200 may be realized with a payback period of 7.4 years.

2.0 INTRODUCTION AND BACKGROUND

The Thomas B. Conley Elementary School is a 59,584 square foot building consisting of one floor. The building was constructed in 1978 with an addition built in 2002. The original 1978 building includes fourteen classrooms, a resource room, library, large all-purpose room which is used as a cafeteria, kitchen, offices, toilet rooms, and a boiler room. The 2002 addition includes a gymnasium, eleven classrooms, offices, toilet rooms, storage, and a boiler room. The school hours of operation are from 6:00 AM – 11:00 PM Monday through Friday, with the school closed on Saturday and Sunday. The school has approximately 319 students and 45 faculty and staff members.

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

Figure 1: Thomas Conley Elementary School

3.0 UTILITIES

Utilities include electricity and fuel oil. Electricity is supplied and delivered by Jersey Central Power & Light. Fuel oil is supplied and delivered by Allied Oil.

For the 12-month period ending in August 2012, the utilities usage for the building was as follows:

Table 2: Actual Cost & Site Utility Usage

Electric		
Annual Usage	631,931	kWh/yr
Annual Cost	100,452	$
Blended Rate	0.159	$/kWh
Consumption Rate	0.139	$/kWh
Demand Rate	6.22	$/kW
Peak Demand	202.90	kW
Min. Demand	149.80	kW
Avg. Demand	169.92	kW
Fuel Oil		
Annual Usage	17,004	gallons/yr
Annual Cost	55,042	$
Rate	3.24	$/gallon

Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Fuel oil consumption was higher in winter months for heating. See Appendix A for a detailed utility analysis.

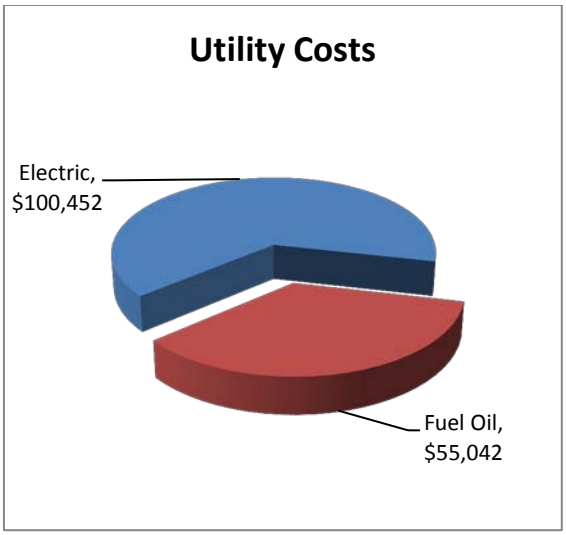


Figure 2: Annual Site Energy Usage

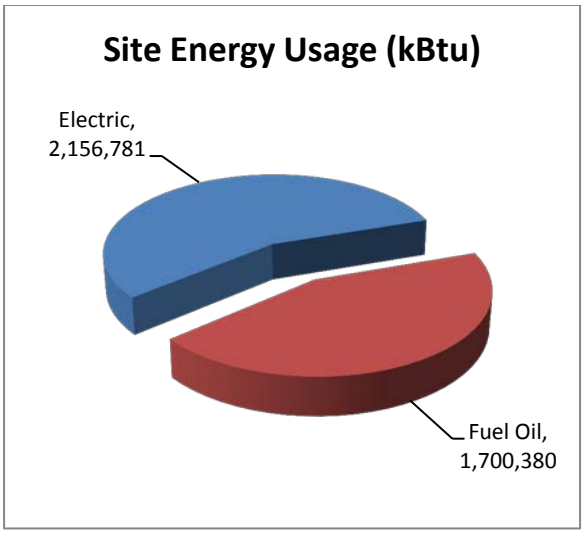


Figure 3: Annual Energy Cost

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. With the supply portion open to competition, customers can shop around for the best price on their energy supplies. Their electric and natural gas distribution utilities will still deliver those supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing your energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of your service. Additional information on selecting a third party energy supplier is available here: http://www.state.nj.us/bpu/commercial/shopping.html. See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

4.0 EXISTING CONDITIONS & AREAS OF ENERGY OPPORTUNITY

Energy conservation measures (ECM) are energy savings improvements that require a financial investment. Each ECM has an associated simple payback period that is cost to implement the ECM divided by the energy savings (in dollars). Large capital intensive ECM's typically have longer payback periods. Operational and maintenance measures (OMM) are low or no cost operational opportunities, which can be implemented to have positive impacts on overall building operation, comfort levels, or energy usage.

4.1 Building Envelope

The original 1978 building structure consists of steel framing and concrete masonry units, with an exterior veneer of plaster on 2" styrofoam insulation. The interior finish is gypsum board and paint. The pitched roof is made from 24 gauge aluminized standing seam panels, and is framed with steel beams.

The 2002 addition consists of steel framing and concrete masonry units with a brick veneer. Two inches of cavity wall insulation is sandwiched between the masonry and the exterior brick. The interior consists of painted concrete masonry units. The roof of this addition is flat with a black rubber membrane roofing system that contains 3" insulation.

Windows and doors throughout the school building have been updated through the years. The majority of the windows are operable aluminum framed double glazing units. The doors seem to be in fair condition as examined during the site visit, but seals on many in the original 1978 building are unsatisfactory.

The following energy conservation measures were identified for building envelope improvements:

4.1.1 ECM-1 Replace Door Seals and Sweeps

The seals around exterior doors over time fail. This leads to unwanted infiltration of unconditioned outside air and exfiltration of conditioned air resulting in increased heating and cooling energy usage. This measure calls for the replacement of all exterior door seals.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-1 Door Seals and Sweeps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
400	0	0	270	900	0	900	10.1	0	0.4	0.4

Expected Life: 5 years

Lifetime Savings: 0 kWh 1,350 gallons $4,500

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is not recommended.

4.2 HVAC Systems

Thomas Conley Elementary school has two completely separate and independent HVAC systems: one for the original 1978 building, and one for the 2002 addition.

HVAC for the Original 1978 Building

The original 1978 building has two light oil (#2 oil) fired H.B. Smith cast iron sectional boilers with a capacity of 1,139,100 BTUH each. These boilers were built in 1978. Both boilers are operational during the heating season, and provide hot water that is used to heat the school. The hot water is circulated through the building by two 5.0 HP pumps, which operate on a lead-lag basis. The electric motors for these pumps operate at an efficiency of 83.1%. The classrooms in the 1978 building are heated by wall mounted cabinet heaters, which consist of a 3/8" O.D. hot water finned tube heating element coupled with a small blower fan. A typical classroom has four cabinet heaters piped in series along the length of the exterior wall under the windows and covered with equal length enclosures. Each cabinet heater delivers 3.4 MBH at 250 cfm airflow, drawing 60 watts at 120/1/60 current. It was noted during the site visit that some of the blower fans have become loud when operating and school personnel have disconnected them. This has resulted in reduced heating capacity in these classrooms. Outside ventilation air is provided by three centralized air handling systems that deliver conditioned air to the classrooms and cafeteria via a ducted distribution system located above the ceiling. Exhaust air is ducted back through the air handling system and its energy is transferred to the incoming air stream via a motorized energy wheel, before exiting the building. It was noted during the site visit that these air handling systems run 24 hours a day, 7 days a week, for the duration of the school year. Although these air handling systems use energy recovery wheels, their constant operation during unoccupied hours wastes electricity.

The original 1978 building has a high roof with two levels of pitch, the steepest at the top. All of the classrooms, offices, cafeteria etc. occupy only a first floor (the Boiler Rm is stepped down at a slightly lower elevation). The space directly above the ceiling is attic space. The bulk of the attic space, except for three mechanical rooms, is open. At each gable end of this building are 6 louvers—3 above, and 3 below. The three lower louvers, at either end of the building, are connected with ductwork and tie into the existing air handling systems, functioning as either outside air, exhaust air, or relief. The three upper louvers on either end of the building, however, are not ducted and are simply open to the outside. It was noted during the site visit that on windy days, the airflow through the attic was causing a pressure differential that would literally 'lift up' or 'push down' the drop ceiling above the classrooms and corridors. This results in an unnecessary drafty condition and causes excessive heat loss or heat gain from the building, depending upon the season.

Ceiling mounted fan coil units with hot water heating coils and direct expansion (DX) cooling coils provide heat and air conditioning to offices. These are connected via refrigeration lines to condensing units remotely located outside.

Entranceways and toilet rooms are heated with wall mounted hydronic cabinet heaters. Storage rooms are heated with small hydronic unit heaters or wall mounted cabinet heaters.

The majority of the original 1978 building is not air conditioned.

HVAC for the 2002 Addition

The Thomas Conley 2002 addition has an HVAC system completely independent from the original 1978 building. Two light oil (#2 oil) fired H.B. Smith cast iron sectional boilers series 28A-5, built in 2001, with a capacity of 1,014,000 BTUH each, provide hot water to heat this addition. The hot water is circulated around the building by two 7.5 HP pumps which operate on a lead-lag basis. The electric motors for these pumps operate at an efficiency of 85.5%. Seven of the thirteen classrooms are heated and cooled by vertical self-contained Airedale unit ventilators, model #SCX. These units are equipped with hot water heating coils and DX cooling coils and are installed in a manufacturer's enclosure tight to a large louver in the exterior wall. Outside air is drawn in through the louver, mixed with return air, and supplied out the top of the unit via ductwork installed above the ceiling, and delivered into the classroom through ceiling-mounted diffusers. Air returns to the unit through two ceiling mounted return grilles per classroom.

The remainder of the classrooms, corridors, music room, art room, offices, and Gymnasium, are served by seven rooftop units. These are all 2001 Carrier Weathermaster packaged units (all model #50HJ), with air filters and DX cooling coils, delivering conditioned air to and from the space via ducted distribution systems. Heat is supplied downstream of each unit via hot water duct coils. Outside ventilation air and relief for the space is provided at the unit.

Storage rooms are heated by hydronic unit heaters or finned tube radiation. Entranceways are heated by hydronic ceiling mounted or floor mounted cabinet heaters.

The majority of the 2002 addition is air conditioned.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

The following ECMs were identified as HVAC system improvements:

4.2.1 ECM-2 Replace Classroom Cabinet Heaters with Finned Radiation

Classrooms in the original 1978 building are heated by wall-mounted Dunham-Bush cabinet heaters piped in series along the exterior wall. Both the cabinet heaters themselves and the piping that connects them are covered by a common enclosure. Each cabinet heater consists of 3/8" OD finned radiation coupled with small electric blower fans underneath. These cabinet heaters are original to the building and when operating properly deliver 3.4 MBH of heat in 250 cfm of air, drawing 60 watts of power at 120v/1/60. In many cases the blower fans are malfunctioning or have become noisy and school personnel have disconnected them. Replacement parts have become difficult or impossible to find, since this model is no longer manufactured.

An investigation of the original HVAC drawings indicates that typical HWS&R piping serving these cabinet heaters are 1-1/4" OD drops inside the walls at the classroom corners, with control valves that tie in with the classroom thermostat. It is proposed that new finned tube radiation (out-fitted with a control valve) be installed as replacement of the existing cabinet heaters and connect to the existing 1-1/4" HWS&R piping drops. New finned tube radiation could be sized to provide the exact heating requirement of each classroom and could do so without noise and without using electricity. This measure could be implemented with minimal impact on the existing hot water piping system, since finned tube elements typically have diameters larger than the existing 3/8" piping, no additional dynamic head would be added to the hot water pumps, and system re-balancing could easily be achieved.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Replace Classroom Cabinet Heaters with Finned Radiation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
19,000	11,800	0	0	1,900	0	1,900	1.5	0	10	10

Expected Life: 25 years

Lifetime Savings: 295,000 kWh 0 gallons $47,500

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is recommended.

OMM-1 HVAC Unit Maintenance

Regular maintenance of HVAC units is necessary not only because it saves energy by keeping them operating at optimal efficiency, but also insures that the equipment does not fail. Some areas that reduce efficiency are: dirty condenser/evaporator coils, dirty filters and fan blades, air leaks and dirty heat transfer surfaces. Implementing a routine maintenance strategy will allow for better indoor air quality, increased efficiency and improved equipment life.

4.2.2 ECM-3 Replace Motors with Premium Efficiency Motors

In the 1978 boiler room the two heating hot water primary circulating pump motors are 5 HP with efficiencies of approximately 83.1%. In the boiler room of the 2002 addition the two heating hot water primary circulating pump motors are 7.5 HP with efficiencies of approximately 85.5%. Replacing these four motors with premium efficiency motors which have rated efficiency of 95% will reduce demand and save electrical energy. This measure is recommended on an as needed basis such that as motors fail they should be replaced with premium efficiency motors.

ECM-3 Replace Motors with Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
6,000	3,800	0	0	700	0	700	0.7	300	8.6	8.1

Expected Life: 15 years

Lifetime Savings: 57,000 kWh 0 gallons $10,500

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is recommended.

4.2.3 ECM-4 Night-time Setback for Air Handling Units

During the site visit, it was noted that the three main air handling units, located in the upper mechanical rooms of the original 1978 building operate 24 hours a day 7 days a week throughout the school year. These existing air handling units are primarily tasked with providing ventilation throughout the building. Existing classroom / entranceway cabinet heaters and small HVAC units have the responsibility of providing heat for the facility. During night-time hours and during unoccupied weekends there are no occupants in the building, and ventilation air is not required. Operating the air handling units during unoccupied hours is 1) not required for ventilation reasons, 2) not required in order to maintain building temperature, and 3) wasteful of energy.

The existing Barber Coleman controls system in the original 1978 building could be re-configured to incorporate night-time setback.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-4 Night-time Setback for Air Handling Units

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
1,000	62,000	0	0	9,900	0	9,900	147	0	0.1	0.1

Expected Life: 15 years

Lifetime Savings: 930,000 kWh 0 gallons $148,500

* There is no incentive for this measure.

This measure is recommended.

4.2.4 ECM-5 Install Fan & Motorized Dampers at Attic Louvers

The original 1978 building has six louvers on the gable ends of the building. The three upper louvers on either end of the building are not ducted into the air handling system, and are open to the outside. Due to this condition the attic space has outside air blowing into and through it. At best the interior of the attic space is only a few degrees above the ambient outdoor temperature during the winter. Furthermore it was noted during the site visit that on windy days, the airflow through the attic causes a pressure differential that literally 'lifts up' or 'pushes down' the drop ceiling above the classrooms and corridors. This results in unnecessary air infiltration and causes an additional heating load on the building.

This ECM proposes that the upper three louvers on either end of the building be outfitted with dampers and actuators, one for each upper louver, for a total of six. These actuators can be controlled via the existing Barber Coleman controls system to open or close at the owner's discretion. The installation of these dampers will diminish the excessive flow of outdoor air throughout the attic space during the colder months. It is also proposed that the west end upper center louver be outfitted with a sidewall propeller exhaust fan in addition to the motorized damper. This will aid in exhausting some of the heat that accumulates in the attic on hot days.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-5 Install Fan & Motorized Dampers at Attic Louvers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
129,000	0	0	300	1,100	0	1,100	0.6	0	>20	>20

Expected Life: 15 years

Lifetime Savings: 0 kWh 4,500 gallons $16,500

* There is no incentive for this measure.

This measure is recommended.

4.3 Control Systems

The Thomas Conley Elementary school has two separate control systems: a Barber Coleman system that serves the original 1978 building, and a direct digital control (DDC) system that serves the 2002 addition. Typical set points for the original 1978 building range between 70 and 72 degrees Fahrenheit. There is no unoccupied set point and the school is heated continuously to 70-72°F during the heating season between November and April. The majority of the 1978 building is not cooled.

The 2002 addition has a DDC system that controls and monitors the HVAC equipment. Typical occupied set points for the 2002 addition range between 70 and 72 degrees Fahrenheit during the heating season; and approximately 75 degrees during the cooling season. Unoccupied set points are approximately 60 degrees for heating, and 85 degrees for cooling. The majority of the 2002 addition is cooled.

The following ECMs identified are improvements to the HVAC control system for the original 1978 building:

4.3.1 ECM-6 Install Direct Digital Controls and Building Management System

Pneumatic control systems use compressed air as a medium to control HVAC equipment. This is accomplished by bleeding or draining the compressed air in the air lines going to the control devices such as sensors or thermostats to maintain a set line pressure. This in turn provides feedback in the loop to close or open dampers and actuators to meet the control set point. In addition to the age and inadequacies of the system, compressed air is an inefficient and expensive means of controlling a building's HVAC system.

New direct digital control (DDC) systems use electrical signals to manage HVAC equipment. In combination with a building management system (BMS) which allows for trending, scheduling and remote control, the DDC and BMS system will save fuel oil and electrical energy. The new system will be able to set a schedule for occupied and unoccupied set-points as well as shutdown/startup of HVAC equipment. It will also eliminate the compressed air system including the air compressor and compressed air dryer.

Savings are seen from temperature scheduling for occupied and unoccupied hours and from the elimination of the air compressor.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-6 Install Direct Digital Controls & Building Management System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
307,000	1,900	4	3,400	11,600	0	11,600	(0.4)	0	>20	>20

Expected Life: 16 years

Lifetime Savings: 30,400 kWh 54,400 gallons $185,600

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is not recommended.

4.4 Domestic Hot Water System

The 1978 original building has one Bock water heater and one A.O. Smith storage tank. The Bock water heater (model # 361E ASME) is an oil fired unit with a recovery rate of 442 GPH at a 90°F temperature rise, and can store 113 gallons of water. The A.O. Smith DHW storage tank (model #T50 OA) has a capacity of 500 gallons. The domestic hot water tanks serve the kitchen, toilet rooms and sinks located throughout the building.

The 2002 addition has one electric 2001 A.O. Smith water heater (Cat. # DSE 80) with two 90 kw elements. This water heater can store 80 gallons of water and has a total heating capacity of 180 kW. This unit serves the kitchen, toilet rooms and sinks located throughout the 2002 addition.

4.5 Lighting/Electrical Systems

The majority of the lighting in the original 1978 building is T-12 fluorescent tube fixtures with magnetic ballasts and incandescent lamps. The multipurpose room is illuminated with T8 fluorescent high bay fixtures. The 2002 addition has a mixture of mostly T8 fluorescent fixtures with electronic ballasts and a few T-12 fluorescent fixtures with magnetic ballasts. The building exterior utilizes approximately (44) 150W metal halide lamps, (16) par38 120W spotlights, and (6) 75W incandescents. A comprehensive lighting survey can be found in Appendix B.

The following ECMs identified are improvements to Thomas Conley's Elementary School's lighting and electrical system:

4.5.1 ECM-7 Lighting Replacement / Upgrades

The original 1978 building mostly utilizes T-12 fluorescent fixtures. Compared to T-8 fixtures, these bulbs consume more energy and are less efficient. The ballasts are magnetic as well. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix B). There is an opportunity to reduce consumption by upgrading the lighting fixtures to a super T-8 fixture and all incandescent fixtures to compact fluorescent lamps. To upgrade the T12 fixtures to super T8's, the fixtures need to be re-lamped and re-ballasted and incandescent replacement only involves changing the bulbs to compact fluorescent bulbs.

The 2002 addition mostly utilizes T-8 fluorescent fixtures. The gymnasium however has approximately 40 high bay metal halide fixtures. It is proposed that these be replaced with lower wattage high bay LED fixtures which have higher efficiency and longer lifespan.

The exterior lighting is proposed to be changed from metal halide and incandescent to LED light fixtures which have a longer life and consume much less energy. The exterior lighting would require a full fixture replacement to change to LED fixtures.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 59,976 kWh with an electrical demand reduction of about 26 kW. These calculations are based upon 1 to 1 replacements with the fixtures. They do not take into account lumen output and square footage. A more comprehensive study may be performed to determine correct lighting levels.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-7 Lighting Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
140,000	100,700	26	0	18,800	0	18,800	0.8	17,900	7.4	6.5

Expected Life: 15 years

Lifetime Savings: 1,510,500 kWh 0 gallons $282,000

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is not recommended in lieu of ECM-9.

4.5.2 ECM-8 Install Lighting Controls (Occupancy Sensors)

Review of the comprehensive lighting survey determined that lighting in classrooms and various other spaces are typically operational, regardless of occupancy. Therefore, installing an occupancy sensor in these spaces to turn off lights when the areas are unoccupied was assessed.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in section 4.5.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture. The difference between the two values resulted in an annual savings of 39,749 kWh.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-8 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
9,000	44,900	0	0	7,100	0	7,100	11.3	1,400	1.3	1.1

Expected Life: 15 years

Lifetime Savings: 673,500 kWh 0 gallons $106,500

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is not recommended in lieu of ECM-9.

4.5.3 ECM-9 Lighting Replacements with Controls (Occupancy Sensors)

This measure is a combination of ECM 4 and ECM 5; recommending to replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on

the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to the sum of replacing the lighting fixtures alone and installing occupancy sensors without the lighting upgrade. The calculated annual savings is 70,316 kWh with a demand reduction of 21 kW at a total of $15,794.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-9 Lighting Replacement with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
149,000	131,300	26	0	23,700	0	23,700	1.1	19,300	6.3	5.5

Expected Life: 15 years

Lifetime Savings: 1,969,500 kWh 0 gallons $355,500

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

This measure is recommended.

4.6 Plumbing Systems

The original 1978 building has older style fixtures in the restrooms. The older style fixtures consume more water than modern plumbing fixtures. It was determined that there is a combination of (14) water closets with an average water use of 5.5 gpf, (10) urinals with an average of 3 gpf and (24) faucets with a flow of 3 gpm. Per the number of occupants, it was estimated that each water closet and faucet is utilized approximately 4 times per day.

In the 2002 addition the general restrooms viewed during the site visit contained water closets which use 1.6 gpf, and urinals which use 1.0 gpf. Faucets generally have aerators, but are not specifically designated to be low flow. Plumbing fixtures in this addition meet current water efficiency standards.

4.7 Kitchen Equipment

Cooking equipment for the kitchen within the school is all fueled by electricity. This includes the steam table, stove, oven, dishwasher, and dishwasher booster heater.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

The school will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: $0.10/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

<u>Electric</u>

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

<u>Gas</u>

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

<u>Electric</u>

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

<u>Gas</u>

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

The table below shows potential incentives available for the Thomas B. Conley Elementary School through Pay for Performance program:

	Incentives $		
	Elec	Therms	Total
Incentive #1	$0	$0	$5,958
Incentive #2	$23,186	$0	$23,186
Incentive #3	$23,186	$0	$23,186
Total All Incentives	**$46,371**	**$0**	**$52,330**

All ECM's that yield electrical savings were included in the incentive calculations for the P4P program. Oil savings ECM's cannot be included. The total annual savings exceeds the minimum program requirement of 15% annually. Refer to appendix D for detailed calculations.

5.1.2 New Jersey Smart Start Program

For this report, some energy conservation measures are applicable to the 2012 Smart Start Incentive Program and associated savings are included. This program provides incentives for pre-approved mechanical and electrical equipment replacements and pre-approved custom measures. The program includes a wide variety of incentives ranging from chillers and boilers, variable frequency drives, unitary HVAC equipment and lighting retrofits. Each incentive must be applied for and approved by the NJBPU (or corresponding utility program) prior to the installation of the equipment. Incentive payments are made to the owner after the equipment is fully installed and paid for.

5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays a maximum amount of $75,000 per building, and up to $250,000 per customer per year. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at

http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

Due to the demand exceeding the 150 kW threshold, this building is not eligible for Direct Install incentives.

5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The school was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. However, there is not sufficient room to size a system to meet the demand of the building. For this analysis we will consider a 90 KW system to help reduce usage.

The PVWATTS solar power generation model was utilized to calculate PV power generation. This model is provided in Appendix P.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The cost of the ACP penalty for 2011 is $600; this is the amount that must be paid per SREC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2012 is expected to be $95/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. Renewable Energy Consultants estimated an average of $487/ SREC per year and this number was utilized in the cash flow for this report.

The existing load justifies the use of 90 kW PV solar array; where incentives can be applied from a New Jersey SREC program. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system, for a 90 kW system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized as follows:

Photovoltaic (PV) Rooftop Solar Power Generation – 90 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Fuel Oil	Total					
$	kW	kWh	Gallons	$	$	$	$	Years	Years
360,000	90	115,188	0	18,310	18,310	0	7,487	19.7	14.0

** Estimated Solar Renewable Energy Certificate Program (SREC) at $77/1000 kWh

This measure is not recommended.

6.1.2 Geothermal Heat Pump System

Geothermal Heat pump systems use the relatively constant ground temperature to transfer heat from and to the building. In the winter months (heating mode) heat is absorbed from the ground and transferred to the building. In the summer months (cooling mode), heat is extracted from the building and transferred to the earth. There are several configuration of a Geothermal Systems, the most common is the closed-loop deep well system. This system involves boring multiple deep (400 feet plus) and installing closed loop piping inside each bore. The heat transfer fluid (typically food grade anti-freeze) is pumped from the bore fields into the building. Within the building individual heat pump units extract or reject compressor heat to the loop piping. Room air is heated or cooled by the refrigeration compressor. Another lees common variation of the geothermal system uses an open loop distribution system. This type of system circulates pond, river or ground spring water through a heat exchanger located within the building to similar room mounted heat pump units.

This system is popular for new construction as it is first cost intensive and can be more easily absorbed within the construction budget .It does not lend itself well to retrofits as it requires bore field drilling, underground piping , dedicated pumps individual heat pump units and specifically sized indoor and outdoor piping. Installation of this system within an existing building would require extensive exterior excavation and interior ceiling work. A large amount of available property is required for the bore field. A geothermal system requires year round operation (heating and cooling) to balance the heat transfer from/ to the ground.

Based on the high first cost and predominantly non-summer month usage, the payback period for implementing a geothermal heat pump system would exceed the equipment life and therefore this is not recommended.

Geothermal Heat Pump System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
1,200,000	-277,000	0	17,000	11,000	0	11,000	-6.8	83,250	>20	>20

Expected Life:	25	years			
Lifetime Savings:	-6,925,000	kWh	425,000	gallons	$275,000

* Incentive shown is per the New Jersey Direct Install Program. See section 5.0 for other incentive opportunities

7.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase.

The site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity, such as natural gas or oil; or as secondary energy, which is the product created from a raw fuel such as electricity or district steam. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the Portfolio Manager benchmarking tool are contained in the table below.

Building	Site EUI kBtu/ft^2/yr	Source EUI Btu/ft^2/yr	Energy Star Rating (1-100)
Thomas Conley Elementary School	64	137	32

The Thomas Conley Elementary School has an above average EUI and a below average Energy Star rating (50% is the medium). This is most likely due to the poor building envelope and relatively high electrical usage. By implementing the measures discussed in this report, it is expected that the EUI can be reduced and the score increase.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (https://www.energystar.gov/istar/pmpam/). The account has been shared with the NYSERDABENCHMARKING master account.

[redacted]

A full EPA Energy Star Portfolio Manager Report is located in Appendix H.

The user name and password for the building's EPA Portfolio Manager Account has been provided by CHA.

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Thomas Conley Elementary School identified potential annual savings of $38,200 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 Door Seals and Sweeps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
400	0	0	270	900	0	900	10.1	0	0.4	0.4

ECM-2 Replace Classroom Cabinet Heaters with Finned Radiation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
19,000	11,800	0	0	1,900	0	1,900	1.5	0	10	10

ECM-3 Replace Motors with Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
6,000	3,800	0	0	700	0	700	0.7	300	8.6	8.1

ECM-4 Night-time Setback for Air Handling Units

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
1,000	62,000	0	0	9,900	0	9,900	147	0	0.1	0.1

ECM-5 Install Fan & Motorized Dampers at Attic Louvers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gal	$	$	$		$	Years	Years
10,000	0	0	300	1,100	0	1,100	0.6	0	9.1	9.1

ECM-9 Lighting Replacement with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
149,000	131,300	26	0	23,700	0	23,700	1.1	19,300	6.3	5.5

APPENDIX A

Utility Usage Analysis and Alternate Supplier List

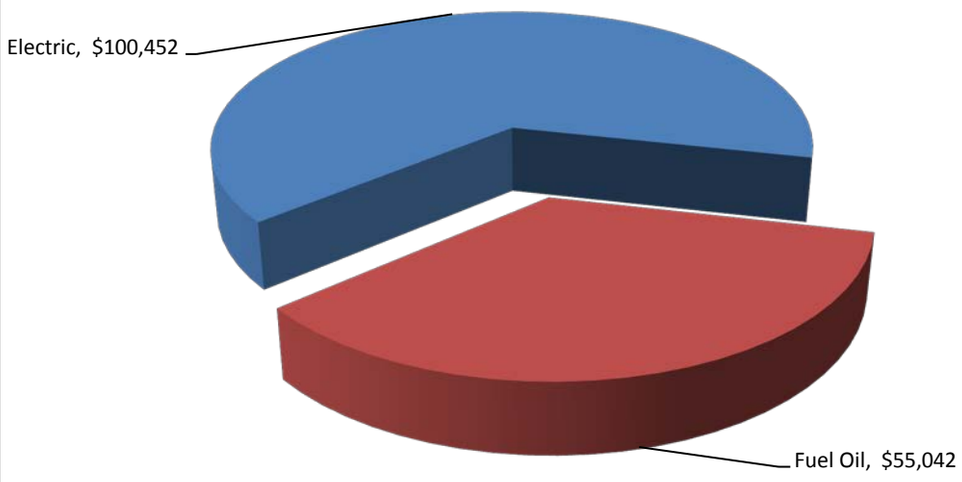
Thomas Conley Elementary School
940 Iron Bridge Road, Asbury, NJ 08802

Utility Bills: Account Numbers

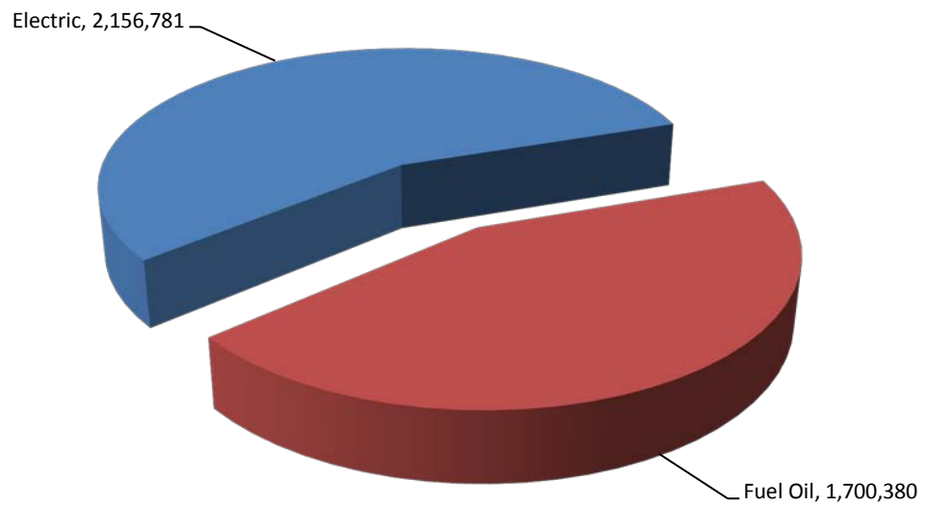
Account Number	School Building	Location	Type	Notes
	Elementary School	940 Iron Bridge Road, Asbury, NJ 08802	Fuel Oil	

Overall Utility Usage Summary			
	Electric	Fuel Oil	
Utility Costs*	$ 100,452	$ 55,042	
Utility Usage (kWh, Therm, Gal)	631,931	17,004	
$ Cost/Unit (kWh, Therm, Gal)	0.159	3.237	
Electric Demand (kW)	203		Total
Equivalent Site Usage (kBtu)	2,156,781	1,700,380	3,857,161
Equivalent Source Usage (kBtu)	7,203,647	1,780,298	8,983,945

Utility Costs



Site Energy Usage (kBtu)



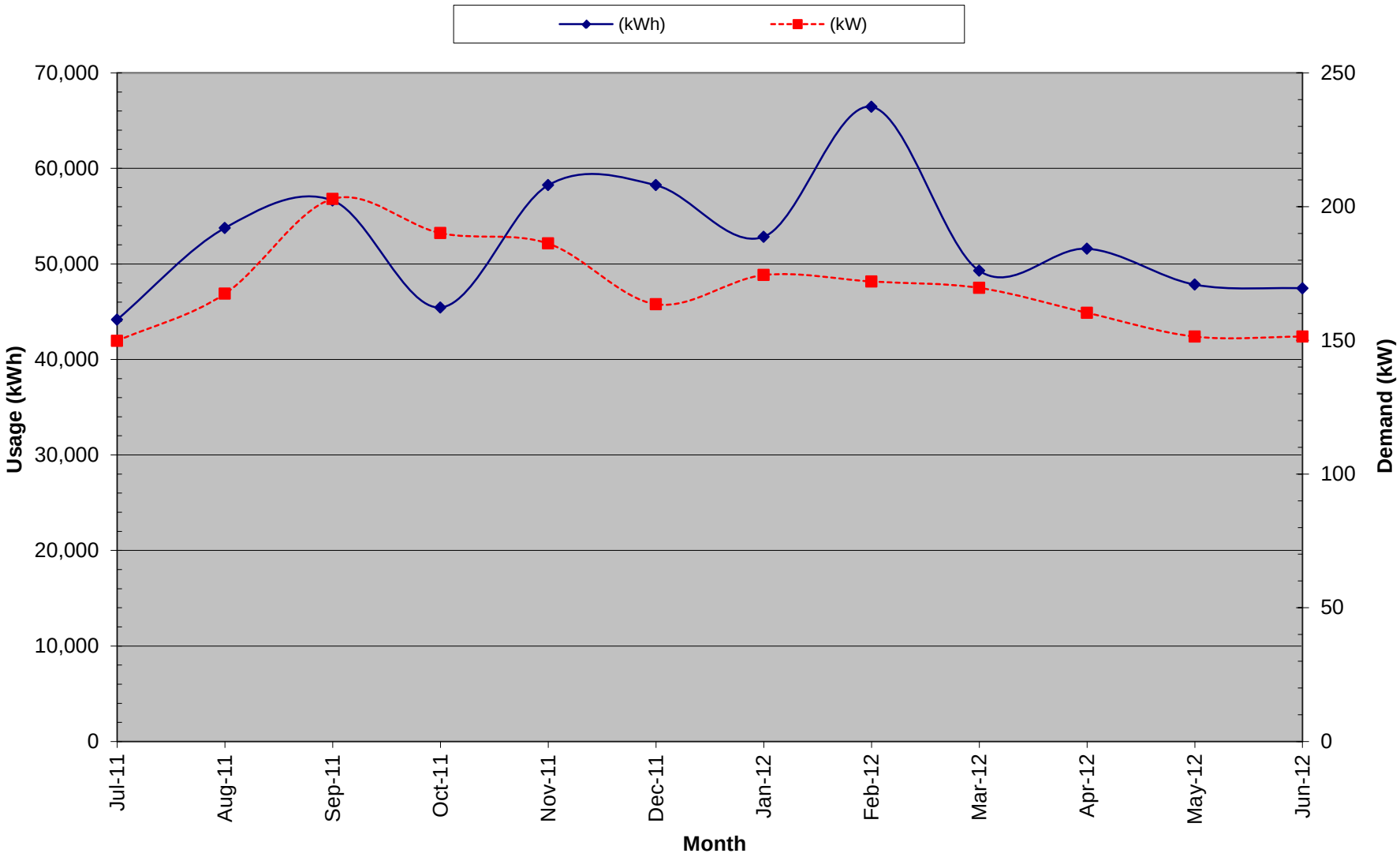
Thomas Conley Elementary School
940 Iron Bridge Road, Asbury, NJ 08802

Electric Service
Delivery - JCPL Electric
Supplier - JCPL Electric

For Service at: Thomas Conley Elementary School
Account No.: 10 00 05 0978 01
Meter No.: G21354793

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
July-11	44,160	149.80	$6,917.37	$1,383.41	$5,533.96	$ 0.157	$ 0.135	$ 6.48
August-11	53,760	167.40	$8,319.43	$1,582.98	$6,736.45	$ 0.155	$ 0.134	$ 6.53
September-11	56,640	202.90	$9,158.66	$1,852.57	$7,306.09	$ 0.162	$ 0.138	$ 6.60
October-11	45,440	190.10	$7,434.69	$1,584.13	$5,850.56	$ 0.164	$ 0.138	$ 6.13
November-11	58,240	186.20	$9,388.14	$1,723.52	$7,664.62	$ 0.161	$ 0.142	$ 6.12
December-11	58,240	163.50	$8,067.31	$1,512.62	$6,554.69	$ 0.139	$ 0.121	$ 6.07
January-12	52,842	174.40	$8,268.79	$1,567.56	$6,701.23	$ 0.156	$ 0.136	$ 6.10
February-12	66,452	172.00	$10,071.84	$1,624.74	$8,447.10	$ 0.152	$ 0.136	$ 6.09
March-12	49,280	169.60	$9,495.38	$2,091.07	$7,404.31	$ 0.193	$ 0.172	$ 6.09
April-12	51,593	160.30	$8,918.91	$2,557.40	$6,361.51	$ 0.173	$ 0.154	$ 6.07
May-12	47,835	151.40	$7,241.51	$1,342.93	$5,898.58	$ 0.151	$ 0.132	$ 6.04
June-12	47,449	151.40	$7,170.46	$1,326.30	$5,844.16	$ 0.151	$ 0.131	$ 6.23
Total (12-months)	**631,931**	**202.90**	**$100,452.49**	**$20,149.23**	**$80,303.26**	**$ 0.159**	**$ 0.139**	**$ 6.22**

Electric Usage - Thomas Conley Elementary School



Utility Data - Thomas Conley Elementary School
Electric Graph

Thomas Conley Elementary School
940 Iron Bridge Road, Asbury, NJ 08802

Fuel Oil Service
Delivery - Allied Oil
Supplier - Allied Oil

For Service at: Thomas Conley Elementary School
Account No.: 433247
Meter No.:

Month	Total ($)	Delivery ($)	Supply ($)	Total Gallons	$/Gal
Nov-11	$ 9,465	$ -	$ -	3005	$ 3.15
Jan-12	$ 15,482	$ -	$ -	4983	$ 3.11
Feb-12	$ 12,993	$ -	$ -	4004	$ 3.24
Apr-12	$ 17,103	$ -	$ -	5012	$ 3.41
Total (12-months)	**$ 55,042**	**$ -**	**$ -**	**17,004**	**$ 3.24**

Supplier Charges:
Electricity

Month	Consumption (kWh)	(Current Supplier) South Jersey Energy ($)	(Alternative Supplier) PSE&G ($)	Difference ($)
January-11	76,800	$ 8,131.85	$ 8,718.68	$ 586.83
February-11	79,500	$ 8,417.46	$ 9,595.59	$ 1,178.13
March-11	74,100	$ 7,845.71	$ 9,185.98	$ 1,340.27
April-11	66,300	$ 7,019.84	$ 8,023.02	$ 1,003.18
May-11	66,900	$ 6,257.16	$ 7,997.13	$ 1,739.97
June-11	73,800	$ 6,902.51	$ 8,897.56	$ 1,995.05
July-11	58,800	n/a	n/a	n/a
August-11	45,000	$ 4,208.85	$ 6,554.16	$ 2,345.31
September-11	61,200	$ 5,724.04	$ 7,999.16	$ 2,275.12
October-11	59,400	$ 5,555.68	$ 7,227.43	$ 1,671.75
November-11	68,400	$ 6,397.45	$ 7,783.03	$ 1,385.58
December-11	83,400	$ 7,800.40	$ 8,940.12	$ 1,139.72
January-12	79,800	$ 7,463.69	$ 9,081.93	$ 1,618.24
February-12	81,600	$ 7,871.95	$ 9,558.32	$ 1,686.37
March-12	77,400	$ 7,466.78	$ 8,800.64	$ 1,333.86
April-12	68,100	$ 6,569.61	$ 7,977.49	$ 1,407.88
Total (All)		**$ 103,632.98**	**$ 126,340.24**	**$ 22,707.26**

JCP&L SERVICE TERRITORY
Last Updated: 10/24/12

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL

Supplier	Telephone & Web Site	*Customer Class
AEP Energy, Inc. 309 Fellowship Road, Fl.2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877) 30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
AP Gas & Electric, LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	**R/C/I** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	**R/C/I** **ACTIVE**
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	**R/C** **ACTIVE**
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746-4702 www.clearviewenergy.com	**R/C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R** **ACTIVE**

ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	**R/C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	**C/I** **ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, NJ 08002	(800) 282-3331 www.discountenergygroup.com	**R/C** **ACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route 70 West, Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	**R/C** **ACTIVE**
DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	**C/I** **ACTIVE**
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	**R/C/I** **ACTIVE**

Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	**R/C** **ACTIVE**
FirstEnergy Solutions Corp. 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	**C/I** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08819	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I** **ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C** **ACTIVE**
HOP Energy, LLC d/b/a Metro Energy, HOP Fleet Fueling, HOP Energy Fleet Fueling 1011 Hudson Avenue Ridgefield, NJ 07657	(877) 390-7155 www.hopenergy.com	**R/C/I** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(973) 438-4380 www.idtenergy.com	**R/C** **ACTIVE**

Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Liberty Power Delaware, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Liberty Power Holdings, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	**R/C** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
NJ Gas & Electric 1 Bridge Plaza fl.2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	**R/C/I** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power and Gas, LLC 222 Ridgedale Ave. Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**

Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**R/C** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Public Power & Utility of New Jersey, LLC 39 Old Ridgebury Rd. Suite 14 Danbury, CT 06810	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza Route 54 Folsom, NJ 08037	(800) 800-266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	**R/C/I** **ACTIVE**
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**

Stream Energy 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	**R** **ACTIVE**
UGI Energy Services, Inc. **d/b/a GASMARK** 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46 Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	(888)997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

APPENDIX B

Equipment Inventory

Thomas B. Conley Elementary School
CHA Project#24735
940 Iron Bridge Rd.
Asbury, NJ 08802

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
Boiler B-1	1	H.B. Smith	series 28, 6 sections	N/A	HVAC/HW Heating	1,139,100 BTUH	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	0
Boiler B-2	1	H.B. Smith	series 28, 6 sections	N/A	HVAC/HW Heating	1,139,100 BTUH	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	0
Oil Burner 1	1	Carlin	800CRD	N/A	HVAC/HW Heating	11.40-19.80 GPH No. 2 Fuel Oil	Boiler Rm 1978 Orig. Bldg.	1978 Building	N/A	---
Oil Burner 2	1	Carlin	800CRD	N/A	HVAC/HW Heating	11.40-19.80 GPH No. 2 Fuel Oil	Boiler Rm 1978 Orig. Bldg.	1978 Building	N/A	---
EXP-1	1	Amtrol	Extrol AX-120V	N/A	HVAC/HW Heating	125 Psi	Boiler Rm 1978 Orig. Bldg.	1978 Building	1979	0
Oil Pump 1	1	ICA	J-40	N/A	HVAC/HW Heating	1/3 HP / 40 GPH / No. 2 Fuel Oil	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	-15
Oil Pump 2	1	ICA	J-40	N/A	HVAC/HW Heating	1/3 HP / 40 GPH / No. 2 Fuel Oil	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	-15
CP-1	1	Bell & Gossett	4" AB Base Mtd.	N/A	HVAC/HW Heating	5 HP / 250 GPM @ 40' TDH	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	-15
CP-2	1	Bell & Gossett	4" AB Base Mtd.	N/A	HVAC/HW Heating	5 HP / 250 GPM @ 40' TDH	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	-15
DHW-1	1	Bock	361E ASME	05093128P	DHW Heating	113 gal / 442 GPH @ 90°F rise	Boiler Rm 1978 Orig. Bldg.	1978 Building	1998	0
Storage tank 1	1	A.O. Smith	T500A	770-B79-79701	DHW Heating	500 gal	Boiler Rm 1978 Orig. Bldg.	1978 Building	1978	-15
AHU-1	1	Brundage fan / Flo-Con Energy Recovery Wheel	BI-18 / FC-60	N/A	HVAC/HW Heating	2200 CFM / 3/4 HP / 1/4 HP ERW	1978 Mechanical Rm West	1978 Classrooms	1978	-15
AHU-2	1	Brundage fan / Flo-Con Energy Recovery Wheel	BI-18 / FC-60	N/A	HVAC/HW Heating	11,700 CFM / 5 HP / 1/4 HP ERW	1978 Mechanical Rm West	1978 Cafeteria	1978	-15
AHU-3	1	Brundage fan / Flo-Con Energy Recovery Wheel	BI-18 / FC-60	N/A	HVAC/HW Heating	3,200 CFM / 1.5 HP / 1/4 HP ERW	1978 Mechanical Rm above Boiler Rm	1978 Classrooms	1978	-15
CH-1	72	Dunham Bush	BU-4	N/A	HVAC/HW Heating	250 CFM / 3.4 MBH / 60 W / 208-3-60	1978 Classrooms	1978 Classrooms	1978	-15
CH-2	4	Dunham Bush	BU-4	N/A	HVAC/HW Heating	250 CFM / 5.0 MBH / 60 W / 208-3-60	1978 Hallways	1978 Hallways	1978	-15
HVAC-1 Fan Coil	1	Trane	BH-70	N/A	HVAC/HW Heating & DX Cooling	2700 CFM / 1 HP / 208-1-60	1978 Office	1978 Offices	2002	4
HVAC-2 Fan Coil	1	Trane	BANB	N/A	HVAC/HW Heating & DX Cooling	1420 CFM / 1/2 HP / 120-1-60	1978 Office	1978 Office	2002	4
Air Compressor	1	N/A	N/A	N/A	HVAC Controls/Electric	3 phase 208v	N/A	1978 Building	N/A	---
Boiler B-1	1	H.B. Smith	series 28A-5	N2002-N28	HVAC/HW Heating	1,014,000 BTUH	Boiler Rm 2002 Addition	2002 Addition	2002	24
Boiler B-2	1	H.B. Smith	series 28A-5	N2002-N28	HVAC/HW Heating	1,014,000 BTUH	Boiler Rm 2002 Addition	2002 Addition	2002	24
FOP-1	1	Preferred Utilities	FPL-17	N/A	HVAC/HW Heating	3/4 HP / 10.4 GPH / No. 2 Fuel oil	Boiler Rm 2002 Addition	2002 Addition	2002	9
FOP-2	1	Preferred Utilities	FPL-17	N/A	HVAC/HW Heating	3/4 HP / 10.4 GPH / No. 2 Fuel oil	Boiler Rm 2002 Addition	2002 Addition	2002	9
ET-1 Expansion Tank	1	Bell & Gossett	B-200	N/A	HVAC/HW Heating	Accept. Vol. = 53 gal / 125 Psi	Boiler Rm 2002 Addition	2002 Addition	2002	24
P-1	1	Bell & Gossett	series 1510 2BC	N/A	HVAC/HW Heating	7.5 HP / 175 GPM @ 75 TDH	Boiler Rm 2002 Addition	2002 Addition	2002	9
P-2	1	Bell & Gossett	series 1510 2BC	N/A	HVAC/HW Heating	7.5 HP / 175 GPM @ 75 TDH	Boiler Rm 2002 Addition	2002 Addition	2002	9
DHW-1	1	A.O. Smith	Cat. # DSE 80	N/A	DHW Heating	18 kw / 100 gal / 74 GPH @ 100°F rise	Boiler Rm 2002 Addition	2002 Addition	2002	4
AC-1	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	2000 cfm / 75 MBH heat / 5 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-2	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	2000 cfm / 75 MBH heat / 5 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-3	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	2000 cfm / 75 MBH heat / 5 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-4	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	1200 cfm / 35 MBH heat / 3 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-5	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	1600 cfm / 60 MBH heat / 3.5 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-6	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	2000 cfm / 75 MBH heat / 5 tons cooling	2002 Classroom	2002 Classroom	2002	4
AC-7	1	Airedale	SCX5	N/A	HVAC/HW Heating & DX Cooling	2000 cfm / 75 MBH heat / 5 tons cooling	2002 Classroom	2002 Classroom	2002	4
RTU-1	1	Carrier	50HJ014	N/A	HVAC/ DX Cooling Rooftop unit	3840 cfm / 11 tons cooling	2002 Addition CST	2002 Addition	2002	4

Thomas B. Conley Elementary School
CHA Project#24735
940 Iron Bridge Rd.
Asbury, NJ 08802

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
RTU-2	1	Carrier	50HJ008	N/A	HVAC/ DX Cooling Rooftop unit	2850 cfm / 7 tons cooling	2002 Addition Computer Lab 132	2002 Addition	2002	4
RTU-3	1	Carrier	50HJ007	N/A	HVAC/ DX Cooling Rooftop unit	2410 cfm / 6 tons cooling	2002 Addition SGI 103	2002 Addition	2002	4
RTU-4	1	Carrier	50HJ014	N/A	HVAC/ DX Cooling Rooftop unit	2795 cfm / 6 tons cooling	2002 Addition SGI 102	2002 Addition	2002	4
RTU-5	1	Carrier	50HJ014	N/A	HVAC/ DX Cooling Rooftop unit	2645 cfm / 11 tons cooling	2002 Addition CR 107	2002 Addition	2002	4
RTU-6	1	Carrier	50HJ015	N/A	HVAC/ DX Cooling Rooftop unit	4000 cfm / 12 tons cooling	2002 Addition Gym 112	2002 Addition	2002	4
RTU-7	1	Carrier	50HJ017	N/A	HVAC/ DX Cooling Rooftop unit	4500 cfm / 14 tons cooling	2002 Addition Gym 112	2002 Addition	2002	4
CAC-1 Fan Coil unit CACCU-1 Condensing unit	1	Airedale	CAC-14 indoor unit SCC-12 outdoor unit	N/A	HVAC/ DX Cooling Split System units	510 cfm / 8 MBH heat / 1 ton cooling	2002 Addition Gym Office	2002 Addition	2002	4
BMS	1	Barber Coleman			HVAC Controls/Electric	3 phase 208v	Boiler Rm 2002 Addition	2002 Addition	2002	4

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

Existing Lighting

Cost of Electricity: **$0.159** **$/kWh**

$6.22 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
11	Doorway - 3	Hallways	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	2280	SW	164	
11	Old Hallway	Hallways	44	S 34 P F 2 (MAG)	F42EE	72	3.17	SW	2280	SW	7,223	
6	Room 106	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 106	Classrooms	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	2400	OCC	691	
6	Room 105	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 105	Classrooms	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	2400	OCC	691	
6	Room104	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 104	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 103	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 103	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 102	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 102	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
11	Doorway - 4	Hallways	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	2280	SW	164	
71	North Custodial Closet	Storage Areas	1	I 60	I60/1	60	0.06	SW	1000	SW	60	
11	Boy's Bathroom	Bath Room	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	500	SW	144	
11	Girl's Bathroom	Bath Room	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	500	SW	144	
6	Room 101	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 101	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Library	Classrooms	22	T 34 R F 4 (MAG)	F44EE	144	3.17	SW	2400	C-OCC	7,603	
11	Library Server Room	Storage Areas	2	S 34 P F 2 (MAG)	F42EE	72	0.14	SW	1000	SW	144	
6	Room 116	Classrooms	12	T 34 R F 4 (MAG)	F44EE	144	1.73	SW	2400	OCC	4,147	
11	Room 116	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 115	Classrooms	12	T 34 R F 4 (MAG)	F44EE	144	1.73	SW	2400	OCC	4,147	
11	Room 115	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
11	Boiler Room - 1	Storage Areas	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	1000	SW	432	
11	Nurse	Offices	3	S 34 P F 2 (MAG)	F42EE	72	0.22	SW	2400	OCC	518	
78	Nurse	Offices	1	EP I 100	I100/1	100	0.10	SW	2400	OCC	240	
11	Nurse	Offices	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	2400	OCC	173	
11	Nurse	Offices	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	2400	OCC	691	
71	Nurse	Offices	1	I 60	I60/1	60	0.06	SW	2400	OCC	144	
6	Room 122	Classrooms	2	T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	OCC	691	
11	Custodian Office	Offices	3	S 34 P F 2 (MAG)	F42EE	72	0.22	SW	2400	SW	518	
6	Room 114	Classrooms	2	T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	OCC	691	
6	Superintendent Office	Offices	4	T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2400	OCC	1,382	
6	Board of Education Room	Offices	4	T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2400	OCC	1,382	
11	Board of Education Room	Offices	3	S 34 P F 2 (MAG)	F42EE	72	0.22	SW	2400	OCC	518	
6	Business Administrator	Offices	4	T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2400	OCC	1,382	
11	Business Administrator	Offices	3	S 34 P F 2 (MAG)	F42EE	72	0.22	SW	2400	OCC	518	
6	Room 113	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 113	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 112	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 112	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
8	Cafeteria	Cafeteria	18	MH 175	MH175/1	215	3.87	SW	1600	C-OCC	6,192	
11	Kitchen	Cafeteria	15	S 34 P F 2 (MAG)	F42EE	72	1.08	SW	1600	SW	1,728	
71	Walk-in Freezer	Storage Areas	1	I 60	I60/1	60	0.06	SW	1000	SW	60	
71	Walk-in Freezer	Storage Areas	1	I 60	I60/1	60	0.06	SW	1000	SW	60	
6	Room 111	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 111	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 112	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 112	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 110	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 110	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

Existing Lighting

Cost of Electricity: **$0.159** **$/kWh**

$6.22 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
6	Room 109	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 109	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 108	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 108	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
6	Room 107	Classrooms	9	T 34 R F 4 (MAG)	F44EE	144	1.30	SW	2400	OCC	3,110	
11	Room 107	Classrooms	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2400	OCC	1,037	
78	Cafeteria	Cafeteria	18	EP I 100	I100/1	100	1.80	SW	1600	C-OCC	2,880	
6	Main Office	Offices	10	T 34 R F 4 (MAG)	F44EE	144	1.44	SW	2400	OCC	3,456	
257	Main Entrance	Hallways	10	CF11W	CF11/2	26	0.26	SW	2280	SW	593	
35	Room 117	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	OCC	1,296	
35	Room 118	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	OCC	1,296	
35	Computer Lab	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	C-OCC	1,944	
13	Storage Room	Storage Areas	3	S 32 P F 2 (ELE)	F42LL	60	0.18	SW	1000	SW	180	
13	Faculty Bathroom	Bathroom	1	S 32 P F 2 (ELE)	F42LL	60	0.06	SW	500	SW	30	
35	Physical Education Office	Offices	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	2400	OCC	1,080	
13	Boiler Room - 2	Storage Areas	10	S 32 P F 2 (ELE)	F42LL	60	0.60	SW	1000	SW	600	
13	Electrical Room	Storage Areas	2	S 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
18	Art Room	Classrooms	15	T 32 R F 4 (ELE)	F44ILL	112	1.68	SW	2400	OCC	4,032	
13	Art Room Storage	Storage Areas	2	S 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
13	Art Room Storage	Storage Areas	2	S 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
71	Art Room	Classrooms	6	I 60	I60/1	60	0.36	SW	2400	OCC	864	
9LED	Gymnasium	Gymnasium	40	High Bay MH 200 35 Feet High	MH200/1	232	9.28	SW	2000	C-OCC	18,560	
18	Music Room	Classrooms	15	T 32 R F 4 (ELE)	F44ILL	112	1.68	SW	2400	OCC	4,032	
13	Music Room Storage	Storage Areas	2	S 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
257	Hallway 6	Hallways	8	CF11W	CF11/2	26	0.21	SW	2280	SW	474	
18	Room 124	Classrooms	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	OCC	2,150	
18	Child Study Office	Offices	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	SW	2400	OCC	3,226	
13	Storage	Storage Areas	1	S 32 P F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
13	Boys Bathroom	Bath Room	4	S 32 P F 2 (ELE)	F42LL	60	0.24	SW	500	SW	120	
13	Girl's Bathroom	Bath Room	4	S 32 P F 2 (ELE)	F42LL	60	0.24	SW	500	SW	120	
18	Room 123	Classrooms	7	T 32 R F 4 (ELE)	F44ILL	112	0.78	SW	2400	OCC	1,882	
18	Room 122	Classrooms	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	OCC	2,419	
18	Room 118 K	Classrooms	13	T 32 R F 4 (ELE)	F44ILL	112	1.46	SW	2400	OCC	3,494	
18	Room 121	Classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	SW	2400	OCC	3,226	
18	Hallway 5	Hallways	15	T 32 R F 4 (ELE)	F44ILL	112	1.68	SW	2280	SW	3,830	
18	Hallway	Hallways	18	T 32 R F 4 (ELE)	F44ILL	112	2.02	SW	2280	SW	4,596	
18	Room 120	Classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	SW	2400	OCC	3,226	
18	Room 119	Classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	SW	2400	OCC	3,226	
257	Hallway	Hallways	11	CF11W	CF11/2	26	0.29	SW	2280	SW	652	
11	Faculty Room	Offices	5	S 34 P F 2 (MAG)	F42EE	72	0.36	SW	2400	OCC	864	
11	Men's Bathroom	Bath Room	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	500	SW	36	
11	Women's Bathroom	Bath Room	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	500	SW	36	
8	Exterior	Outside	44	MH 175	MH175/1	215	9.46	SW	4368	SW	41,321	
73	Exterior	Outside	16	I 120	I120/1	120	1.92	SW	4368	SW	8,387	
93	Exterior Shed	Outside	5	I 75	I75/1	75	0.38	SW	4368	SW	1,638	
11	Exterior Shed	Outside	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	4368	SW	314	
	Total		**778**				**91.42**				**227,328**	

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Door Seals and Sweeps	400	10	>20	0	N/A	X
ECM-2	Replace Exisiting Classroom Heaters w/ Finned Radiation	19,000	1,900	10	1,875	10	X
ECM-3	Replace Motors with Premium Efficiency Motors	6,000	700	9	300	N/A	X
ECM-4	Night-time Setback for Air Handling Units	1,000	9,900	0.1	0	N/A	X
ECM-5	Install Fan & Dampers on Louvers	129,000	1,100	>20	0	N/A	
ECM-6	Install Direct Digital Control and Building Management System	307,000	11,400	4	0	N/A	
ECM-7	Lighting Replacement / Upgrades	140,000	11,500	6	5,320	6	X
ECM-8	Lighting Controls	9,000	6,300	1	1,235	1	X
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	149,000	15,800	5	6,560	5	X

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM Summary Sheet

ECM-1 Replace Door Seals and Sweeps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
400	0	0	270	900	0	900	10.1	0	0.4	0.4

Expected Life: 5 years
Lifetime Savings: 0 kWh 1,350 gallons $ 4,500

ECM-2 Replace Exisiting Classroom Heaters w/ Finned Radiation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
19,000	11,800	0	0	1,900	0	1,900	1.5	0	10.0	10.0

Expected Life: 25 years
Lifetime Savings: 295,000 kWh 0 gallons $ 47,500

ECM-3 Replace Motors with Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
6,000	3,800	0	0	700	0	700	0.7	300	8.6	8.1

Expected Life: 15 years
Lifetime Savings: 57,000 kWh 0 gallons $ 10,500

ECM-4 Night-time Setback for Air Handling Units

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
1,000	62,000	0	0	9,900	0	9,900	146.9	0	0.1	0.1

Expected Life: 15 years
Lifetime Savings: 930,000 kWh 0 gallons $ 148,500

ECM-5 Install Fan & Dampers on Louvers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
129,000	0	0	300	1,100	0	1,100	(0.9)	0	>20	>20

Expected Life: 15 years
Lifetime Savings: 0 kWh 4,500 gallons $ 16,500

ECM-6 Install Direct Digital Control and Building Management System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
307,000	1,900	4	3,400	11,600	0	11,600	(0.4)	0	>20	>20

Expected Life: 16 years
Lifetime Savings: 30,400 kWh 54,400 gallons $ 185,600

ECM-7 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
140,000	100,700	26	0	18,800	0	18,800	0.8	17,900	7.4	6.5

Expected Life: 15 years
Lifetime Savings: 1,510,500 kWh 0 gallons $ 282,000

ECM-8 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
9,000	44,900	0	0	7,100	0	7,100	11.3	1,400	1.3	1.1

Expected Life: 15 years
Lifetime Savings: 673,500 kWh 0 gallons $ 106,500

ECM-9 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
149,000	131,300	26	0	23,700	0	23,700	1.1	19,300	6.3	5.5

Expected Life: 15 years
Lifetime Savings: 1,969,500 kWh 0 gallons $ 355,500

Bethlehem Township School District - NJBPU
CHA Project # 24735

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.159	$/kWh blended		0.00042021	59,584	Electric	Fuel Oil
$ 0.139	$/kWh supply	631,931	0.00042021		$100,452.49	$ 55,042.00
$ 6.22	$/kW	202.9	0			
$ 3.24	$/gals	17,004	0.00533471			
	$/kgal		0			

Thomas B. Conley Elementary School

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	gals	cooling	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	Replace Door Seals and Sweeps	0.0	0	274	0	0	$ 900	$ 400	0.4	1.5	5	$ -	N	$ -	$ -	0.4	0.0	0	1,368	0	0	$ 4,433	10.1
ECM-2	Replace Exisiting Classroom Heaters w/ Finned Radiation	0.0	11,794	0	0	0	$ 1,900	$ 18,732	9.9	5.0	25	$ -	N	$ -	$ -	9.9	0.0	294,850	0	0	0	$ 46,881	1.5
ECM-3	Replace Motors with Premium Efficiency Motors	1.1	3,841	0	0	0	$ 700	$ 5,596	8.0	1.6	15	$ 300	N	$ -	$ 300	7.6	16.5	57,618	0	0	0	$ 9,240	0.7
ECM-4	Night-time Setback for Air Handling Units	0.0	61,984	0	0	0	$ 9,900	$ 1,000	0.1	26.0	15.0	$ -	N	$ -	$ -	0.1	0.0	929,760	0	0	0	$ 147,832	146.9
ECM-5	Install Fan & Dampers on Louvers	0.0	0	338	0	0	$ 1,100	$ 129,360	117.6	1.8	15.0	$ -	N	$ -	$ -	117.6	0.0	0	5,070	0	0	$ 16,427	(0.9)
ECM-6	Install Direct Digital Control and Building Management System	3.7	1,865	3,401	0	0	$ 11,600	$ 306,900	26.5	18.9	16.0	$ -	N	$ -	$ -	26.5	59.7	29,840	54,413	0	0	$ 184,900	(0.4)
ECM-7	Lighting Replacement / Upgrades	37.5	100,690	0	0	0	$ 18,800	$ 140,358	7.5	42.3	15.0	$ 17,910	N	$ -	$ 17,910	6.5	562.5	1,510,350	0	0	0	$ 251,924	0.8
ECM-8	Install Lighting Controls (Occupancy Sensors)	0.0	44,855	0	0	0	$ 7,100	$ 8,708	1.2	18.8	15.0	$ 1,375	N	$ -	$ 1,375	1.0	0.0	672,825	0	0	0	$ 106,979	11.3
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	37.5	131,295	0	0	0	$ 23,700	$ 149,066	6.3	55.2	15.0	$ 19,285	N	$ -	$ 19,285	5.5	562.5	1,969,425	0	0	0	$ 315,735	1.1
	Total (Does Not Include ECM-7 & ECM-8)	**42.3**	**210,779.2**	**4,012.4**	**0.0**	**0.0**	**49,800.0**	**611,053.7**	12.3		15.1	$ 19,585		$ -	$ 19,585	11.9	638.7	3,281,493	60,851	0	0	$ 725,448	0.2
	Total Measures with Payback <15	**38.6**	**208,914.2**	**273.6**	**0.0**	**0.0**	**37,100.0**	**174,793.7**	4.7		15.0	$ 19,585		$ 5	$ 19,585	4.2	579.0	3,251,653	1,368	0	0	#REF!	#REF!
	% of Existing	**21%**	**33%**	**24%**	**0%**	**#DIV/0!**																	

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas Conley Elementary School

ECM-1: Replace Door Seals

Existing: Lack of door seals result in excessive heat loss and infiltration
Proposed: Install door seals and/or weather-stripping to reduce air infiltration

Heating System Efficiency	80%		Ex Occupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	72	*F
Cooling System Efficiency	1.20	kW/ton	Ex Unoccupied Clng Temp.	80	*F	Ex Unoccupied Htg Temp.	65	*F
Linear Feet of Door Edge	160		Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.16	$/kWh
Existing Infiltration Factor*	1.5	cfm/LF	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Fuel Oil	$ 3.24	$/gallon
Proposed Infiltration Factor*	0.45	cfm/LF						

*Infiltration Factor per Carrier Handbook of Air Conditioning System Design based on average door seal gap calculated below.

					EXISTING LOADS		PROPOSED LOADS		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied		
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Existing Heating Energy gallons	Proposed Heating Energy gallons
A		B	C	D	E	F	G	H	K	L
102.5	0.0	0	0	0	29,700	29,700	8,910	8,910	0	0
97.5	0.0	6	2	4	29,700	29,700	8,910	8,910	2	0
92.5	49.1	45	16	29	-23,328	-23,328	-6,998	-6,998	0	0
87.5	42.5	146	52	94	-16,200	-16,200	-4,860	-4,860	0	0
82.5	39.5	298	106	192	-12,960	-12,960	-3,888	-3,888	0	0
77.5	36.6	476	170	306	-9,828	0	-2,948	0	0	0
72.5	34.0	662	237	426	-7,020	0	-2,106	0	0	0
67.5	31.6	740	264	476	1,166	0	350	0	3	1
62.5	29.2	765	273	492	2,462	648	739	194	9	3
57.5	27.0	733	262	471	3,758	1,944	1,128	583	17	5
52.5	24.5	668	239	430	5,054	3,240	1,516	972	23	7
47.5	21.4	659	235	424	6,350	4,536	1,905	1,361	31	9
42.5	18.7	685	245	441	7,646	5,832	2,294	1,750	40	12
37.5	16.2	739	264	475	8,942	7,128	2,683	2,138	52	16
32.5	14.4	717	256	461	10,238	8,424	3,072	2,527	59	18
27.5	12.6	543	194	349	11,534	9,720	3,460	2,916	51	15
22.5	10.7	318	114	205	12,830	11,016	3,849	3,305	33	10
17.5	8.6	245	88	158	14,126	12,312	4,238	3,694	29	9
12.5	6.8	156	56	100	15,422	13,608	4,627	4,082	20	6
7.5	5.5	92	33	59	16,718	14,904	5,016	4,471	13	4
2.5	4.1	36	13	23	18,014	16,200	5,404	4,860	5	2
-2.5	2.6	19	7	12	19,310	17,496	5,793	5,249	3	1
-7.5	1.0	8	3	5	20,606	18,792	6,182	5,638	1	0
TOTALS		**8,760**	**3,129**	**5,631**					**390.921**	**117.276**

Existing Door Infiltration	**240**	**cfm**	**Fuel Oil Savings:**	**273.645**	**gallons**
Existing Unoccupied Door Infiltration	**240**	**cfm**	**Cost savings:**	**$ 886.61**	
Proposed Door Infiltration	**72**	**cfm**			
Proposed Unoccupied Door Infiltration	**72**	**cfm**			

Door	Width (ft)	Height (ft)	Linear Feet (LF)	gap (in)	gap location	LF of gap	% door w/ gap	Average gap for door (in)
1a	3	7	20	0.25	all sides	20	100%	0.25
1b	3	7	20	0.25	all sides	20	100%	0.25
2a	3	7	20	0.25	all sides	20	100%	0.25
2b	3	7	20	0.25	all sides	20	100%	0.25
3a	3	7	20	0.125	all sides	20	100%	0.125
3b	3	7	20	0.125	all sides	20	100%	0.125
4a	3	7	20	0.125	all sides	20	100%	0.125
4b	3	7	20	0.0625	all sides	20	100%	0.0625
Total	**24**	**56**	**160**	**0.191**		**160**	**100%**	**0.180**

Note: Doors labeled 'a', 'b', etc. are a part of the same door assembly.

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-1: Replace Door Seals

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Door Seals	1	EA	$ 276			$ 303	$ -	$ -	$ 303	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 303	Subtotal
$ 30.31	10% Contingency
$ 66.67	20% Contractor O&P
$ -	
$ 400	**Total**

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School
1978 Original Building

ECM-2 Replace Existing Classroom Cabinet Heaters with Finned Radiation

EXISTING CONDITIONS		
No. of existing CH-1 Classroom Cab	72	
Watts per CH-1 Cabinet Heater	60	watts
Hours used per year	2,730	hrs
Electricity consumed one year	11,794	
Annual Cost of Electricity	$ 0.16	$/kWh
Total Annual Cost	$ 1,875.18	
REPLACEMENT COSTS		
Remove Existing Cabinet Heaters	$ 3,400.00	
Install New Finned Tube Radiation	$ 15,300.00	
Total Estimated Project Cost	$ 18,700.00	
SAVINGS		
Annual Electricity Savings	11,794	kWh
Annual Electricity Cost Savings	$ 1,875.18	
Estimated Total Project Cost	$ 18,700	
Simple Payback	10.0	**years**

Assumptions

1	17	No. of existing classrooms with cabinet heaters
2	$200	Cost of demolition existing cabinet heaters per classroom
3	$900.00	New Finned Tube Radiation per classroom, including piping, control valve, finish work

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-2: Replace Existing Classroom Cabinet Heaters with Finned Radiation

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Demolition on Old Cabinet Heaters	17	EA	$ -	$ 105	$ -	$ -	$ 2,410	$ -	$ 2,410	
New Finned Tube Radiation - piping, control valve, finish work	17		$ 630.0	$ -	$ -	$ 11,781	$ -	$ -	$ 11,781	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 14,191	Subtotal
$ 1,419.08	10% Contingency
$ 3,121.97	20% Contractor O&P
$ -	
$ 18,732	**Total**

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-3: Install Premium Efficiency Motors

Runtime Schedule: 3,650 hrs/Annual
Days Open Per Week: 7 days
Supply Electric Rate $ 0.159 /kWh
Demand Rate $ 6.22 /kW

EXISTING CONDITIONS

Area Description	Description	HP	Load Factor	Efficiency	kW	Avg. Daily	Annual Hours	Annual kWh	Annual Energy Cost
1978 Boiler Rm	CP-1, 2	5.0	0.8	81.3%	3.7	10	3,650.0	13,391.4	$ 2,129.23
2002 Boiler Rm	P-1, 2	7.5	0.8	85.5%	5.2	10	3,650.0	19,100.4	$ 3,036.96
					0	10	3,650.0	0.0	$ -
					0	10	3,650.0	0.0	$ -
				0.0%	0	10	3,650.0	0.0	$ -
TOTALS:		12.5			8.9			32,491.8	$ 5,166.20

RETROFIT CONDITIONS

Area Description	Description	HP	Load Factor	Efficiency	kW	Avg. Daily	Annual Hours	Annual kWh	Annual Energy Cost
1978 Boiler Rm	CP-1, 2	5.0	0.8	89.7%	3.3	10	3,650.0	12,137.4	$ 1,929.84
2002 Boiler Rm	P-1, 2	7.5	0.8	90.8%	4.9	10	3,650.0	17,985.5	$ 2,859.69
TOTALS:		12.5			8.3			30,122.9	$ 4,789.54

COST ANALYSIS

Area Description	kW Saved	Annual kWh Saved	Annual $ Saved	Retrofit Cost ($ EA)	Simple Payback (yrs.)
1978 Boiler Rm	0.3	1,254.0	$ 225.04	$ 2,798.00	12.43
2002 Boiler Rm	0.3	1,114.9	$ 200.07	$ 2,798.00	13.99
TOTALS:	0.6	2,368.9	$ 425.10	$ 5,596.00	13.16

Notes:

Budgetary cost and energy saving estimates are based on rule of thumb type calculations, RS Means estimating guides, these are not investment grade level estimates, and provide order of magnitude type cost and saving estimates only.

Retrofit Cost equals the cost for four motor retrofits; although motors operate on a lead-lag basis and only one in each pair operates at a time.

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-3: Install Premium Efficiency Motors

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
5 HP Premium Efficiency Motor	1	EA	$ 595	$ 273	$ -	$ 655	$ 368	$ -	$ 2,045.02	
7.5 HP Premium Efficiency Motor	1	EA	$ 660.0	$ 275.00	$ -	$ 726	$ 371	$ -	$ 2,194.50	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 4,240	Subtotal
$ 423.95	10% Contingency
$ 932.69	20% Contractor O&P
$ -	
$ 5,596	**Total**

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School
1978 Original Building

ECM-4 Add Night-time Setback to Air Handling Units

Energy Cost $/kWh
$ 0.16

Demand Rate $/kW
$ 6.22

	EXISTING CONDITIONS							PROPOSED CONDITIONS			
AHU-1	HP	Load factor	Ex. Effic.	Ex. kW	Annual Hours	Total kWh	Ex. Cost	Annual Hours	Total kWh	Prop. Cost	Savings
Supply Fan-1	0.75	80%	83.10%	0.50	6935	3458	$ 549.79	2500	1247	$ 198	$ 352
Exhaust Fan-1	3	80%	83.10%	1.99	6935	13831	$ 2,199.16	2500	4986	$ 793	$ 1,406
ERW-1	0.25	80%	84%	0.17	6935	1165	$ 185.25	2500	420	$ 67	$ 118
AHU-2											
Supply Fan-2	5	80%	83.10%	3.32	6935	23052	$ 3,665.26	2500	8310	$ 1,321	$ 2,344
Exhaust Fan-2	5	80%	83.10%	3.32	6935	23052	$ 3,665.26	2500	8310	$ 1,321	$ 2,344
ERW-2	0.25	80%	84%	0.17	6935	1165	$ 185.25	2500	420	$ 67	$ 118
AHU-3											
Supply Fan-3	1.5	80%	83.10%	1.00	6935	6916	$ 1,099.58	2500	2493	$ 396	$ 703
Exhaust Fan-3	5	80%	83.10%	3.32	6935	23052	$ 3,665.26	2500	8310	$ 1,321	$ 2,344
ERW-3	0.25	80%	89%	0.18	6935	1234	$ 196.27	2500	445	$ 71	$ 126
Totals:				14.0		96,925	$15,411		34941	$ 5,556	$ 9,856
								kWh saved:	61,984		
								$$ saved:	$ 9,856		

Assumptions

	6935	Annual no. of hours for AHU units on for the entire school year
	2500	Annual no. of hours for AHU units on during occupied hours
$	1,000	Cost of implementing the change to the existing controls system

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-4: Add Night-time Setback to Air Handling Units

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Cost of Implementing Setback to DDC System	1	EA	$ -	$ 281	$ -	$ -	$ 379	$ -	$ 757.35	

$ 757	Subtotal
$ 75.74	10% Contingency
$ 166.62	20% Contractor O&P
$ -	
$ 1,000	**Total**

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley School

ECM-5 Add Dampers, Fan, and Ductwork in Attic Space

$ 3.24 Price of fuel oil $/gallon

Heat Loss Through the Ceiling -- Current									Heat Loss Through the Ceiling -- Proposed				
Heating Degree Range	Number of hours from Bin data	delta T	square foot area	Current effective U-value	Heat loss BTUHs	Boiler efficiency	Gallons of fuel oil used	Cost of fuel oil	Proposed effective U-value	Heat loss BTUHs	Boiler efficiency	Gallons of fuel oil used	Cost of fuel oil
50 - 55	695	2.5	58,084	0.05	5,046,048	78%	46.7	$ 151.34	0.04	4,205,040	78%	38.9	$ 126.12
45 - 50	656	7.5	58,084	0.05	14,288,664	78%	132.3	$ 428.54	0.04	11,907,220	78%	110.2	$ 357.12
40 - 45	629	17.5	58,084	0.05	31,967,982	78%	295.9	$ 958.77	0.04	26,639,985	78%	246.6	$ 798.98
35 - 40	909	17.5	58,084	0.05	46,198,562	78%	427.6	$ 1,385.57	0.04	38,498,801	78%	356.4	$ 1,154.64
30 - 35	788	22.5	58,084	0.05	51,491,466	78%	476.6	$ 1,544.32	0.04	42,909,555	78%	397.2	$ 1,286.93
25 - 30	322	27.5	58,084	0.05	25,716,691	78%	238.1	$ 771.29	0.04	21,430,576	78%	198.4	$ 642.74
20 - 25	223	32.5	58,084	0.05	21,048,190	78%	194.8	$ 631.27	0.04	17,540,158	78%	162.4	$ 526.06
15 - 20	122	37.5	58,084	0.05	13,286,715	78%	123.0	$ 398.49	0.04	11,072,263	78%	102.5	$ 332.08
10 - 15	50	42.5	58,084	0.05	6,171,425	78%	57.1	$ 185.09	0.04	5,142,854	78%	47.6	$ 154.24
5 - 10	18	47.5	58,084	0.05	2,483,091	78%	23.0	$ 74.47	0.04	2,069,243	78%	19.2	$ 62.06
0 - 5	7	52.5	58,084	0.05	1,067,294	78%	9.9	$ 32.01	0.04	889,411	78%	8.2	$ 26.67
					218,766,126 BTUs		2,025 gallons	$ 6,561.16 fuel cost		182,305,105 BTUs		1,688 gallons	$ 5,467.63 fuel cost

Existing fuel oil cost	$ 6,561.16	per year
Proposed fuel oil cost	$ 5,467.63	per year
Fuel Savings	338	gallons
Fuel Cost Savings	$ 1,093.53	per year
Installation Costs	$ 10,000.00	includes materials, and labor
Payback	9.1	years

Assumptions:

1	---	Asbury, NJ latitude very close to NYC latitude so use NYC Bin weather data
2	20	Effective current R value of ceiling + insulation. Original fiberglass insulation thickness was 12", however settling since 1978, and due to wind / pressure infiltration effects, effective insulation R value is diminished
3	58,084	Area of building, minus areas of 2nd flr mech. Rooms, = approximately 58,084 sq.ft.
4	138,500	The number of Btus in a gallon of #2 fuel oil
5	---	Building is in heating mode at 55 degrees and lower
6	24	Effective ceiling R value after installing dampers and assoc. HVAC ductwork
7	---	The above calculates total fuel consumed for heat loss through the ceiling only

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-5: Add Dampers, Fan, and Ductwork in Attic Space

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Dampers, Fan and Ductwork in Attic Space	1	EA	$ 20,000	$ 20,000		$ 22,000	$ 27,000	$ -	$ 98,000.00	

$ 98,000	Subtotal
$ 9,800.00	10% Contingency
$ 21,560.00	20% Contractor O&P
$ -	
$ 129,360	**Total**

Bethlehem Township School District - NJBPU
CHA Project #24735
Thomas Conley Elementary School

ECM 6 - Replace Pneumatic Controls with DDC Controls

EXISTING CONDITIONS			
Electricity Consumed by Air Compressor	1,865	kWh	3.73kW * 500 hours
Fuel Oil Consumed by HVAC System	17,004	gallons[1]	From Utility Analysis
SAVINGS			
Electric Savings	1,865	kWh[2]	
Electric Demand Savings	4	kW[2]	
Fuel Oil Savings	3,401	gallons[3]	
Total Cost Savings	$ 11,400		
Estimated Total Project Cost	$ 50,000	[4,5]	
Simple Payback	4.4	**years**	

Assumptions

1		Fuel Oil consumption based on utility data, boiler capacity & operating hours
2		Electric savings from removing the air compressor
3	20%	Approximate oil savings from night setback & temperature scheduling
4		Project cost is an estimate, includes cost of replacing non- programmable thermostats with programmable thermostats
5		control work cost

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

ECM-6: Replace Pneumatic Controls with DDC Controls

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Replace Pnuematic Controls with DDC Controls	1	LS	$150,000	$ 50,000		$ 165,000	$ 67,500	$ -	$232,500.00	

$ 232,500	Subtotal
$ 23,250.00	10% Contingency
$ 51,150.00	20% Contractor O&P
$ -	
$ 306,900	**Total**

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley School

Geothermal / Heat Pump Calc

Electricity Blended Rate:	0.159	$/kWh
Fuel oil price:	3.24	$ per gallon

Description: What would be the payback period to install a geothermal/heat pump heating and cooling system for the entire school? Currently only the 2002 addition is air conditioned. Heat pumps would take over both heating and cooling for almost all of the entire facility.

Assumptions / Givens:

1	37	Total number of heat pumps
2	22	Number of heat pumps required for 1978 portion
3	15	Number of heat pumps required for 2002 addition
4	36,000	BTUH cooling each heat pump [McQuay 2-stage geothermal heat pump]
5	26,600	BTUH heating each heat pump [McQuay 2-stage geothermal heat pump]
6	22.0	EER of each heat pump
7	4.3	COP of each heat pump
8	11.0	avg. EER of existing Carrier HJ model air conditioning RTUs for the 2002 addition
9	631,931	Total kWh electricity consumed in 2011-2012 school year
10	317,525	Total estimated kWh electricity consumed just for cooling in 2011-2012 school year
11	17,004	Total # gallons of fuel oil consumed in 2011-2012 school year
12	140,000	#BTUs per gallon of fuel oil
13	80%	Efficiency of boilers
14	2,975,700,000	#BTUs required to heat the school for 2011-2012 school year
15	2,975,700,000	#BTUs required for heating using heat pumps will not change from 2011-2012 school year
16	BTU/watts	= EER
17	BTU/(3413*kW)	= COP
18	$ 1,200,000.00	= total installed cost of geothermal/heat pump system including bore field, pumps, piping, heat pumps, DDC controls, etc.

Existing Case: Annual cost for COOLING and HEATING (2011-2012 school year):

Total annual cost for cooling:	$ 50,486.48	kWh x blended rate
Total annual cost for heating:	$ 55,092.96	gallons fuel oil x price per gallon
Total existing cost for cooling and heating:	$ 105,579.44	Sum

Proposed Case: COOLING using heat pumps:

Total amount of electricity required to cool the 2002 addition using heat pumps:	158,762.5 kWh		kWh x the EER ratio
Total amount of electricity required to cool the entire school using heat pumps:	391,614.2 kWh		kWh of 2002 addition x additional units for 1978 bldg.
Total cost of electricity required to cool the entire school using heat pumps:	$ 62,266.65		kWh x blended rate

Proposed Case: HEATING using heat pumps:

Total electricity needed to heat via heat pumps:	202,760.99 kWh	
Total cost of the electricity required for heating:	$ 32,239.00	kWh x blended rate

Proposed Case: TOTAL AMOUNT OF ELECTRICITY CONSUMED using heat pumps: 594,375 kWh

Proposed Case: TOTAL ANNUAL COST OF ELECTRICITY CONSUMED using heat pumps: $ 94,505.65 kWh x blended rate

ANNUAL SAVINGS: $ 11,073.79 Difference between two annual costs

PAYBACK PERIOD: 108 years

Geothermal Heat Pump System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Fuel Oil	Total						
$	kWh	kW	Gallons	$	$	$		$	Years	Years
1,200,000	-277,000	0	17,000	11,000	0	11,000	(6.8)	83,250	>20	>20

Expected Life: 25 years

Lifetime Savings: -6,925,000 kWh 425,000 gallons $ 275,000

ECM-7 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$140,358	**37.5**	**100,690**	**0**	**$18,808**	**0**	**$18,808**	**$17,910**	**7.5**	**6.5**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-8 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$8,708	**0.0**	**44,855**	**0**	**$7,132**	**0**	**$7,132**	**$1,375**	**1.2**	**1.0**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-9 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$149,066	**37.5**	**131,295**	**0**	**$23,674**	**0**	**$23,674**	**$19,285**	**6.3**	**5.5**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-7 Lighting Replacements

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11	Doorway - 3	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164	1	S 28 P F 2	F42SSILL	48	0.0	SW	2,280	109	55	0.0	$ 10.49	$ 114.75	$10	10.9	1.9
11	Old Hallway	44	S 34 P F 2 (MAG)	F42EE	72	3.2	SW	2280	7,223	44	S 28 P F 2	F42SSILL	48	2.1	SW	2,280	4,815	2,408	1.1	$ 461.64	$ 5,049.00	$440	10.9	1.9
6	Room 106	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 106	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	SW	2,400	461	230	0.1	$ 43.80	$ 459.00	$40	10.5	1.8
6	Room 105	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 105	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	SW	2,400	461	230	0.1	$ 43.80	$ 459.00	$40	10.5	1.8
6	Room104	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 104	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 103	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 103	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 102	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 102	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
11	Doorway - 4	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164	1	S 28 P F 2	F42SSILL	48	0.0	SW	2,280	109	55	0.0	$ 10.49	$ 114.75	$10	10.9	1.9
71	North Custodial Closet	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$0	0.9	0.2
11	Boy's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	48	0.1	$ 14.80	$ 459.00	$40	31.0	8.7
11	Girl's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	48	0.1	$ 14.80	$ 459.00	$40	31.0	8.7
6	Room 101	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 101	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Library	22	T 34 R F 4 (MAG)	F44EE	144	3.2	SW	2400	7,603	22	T 28 R F 4	F44SSILL	96	2.1	SW	2,400	5,069	2,534	1.1	$ 481.79	$ 3,118.50	$220	6.5	1.1
11	Library Server Room	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	48	0.0	$ 11.21	$ 229.50	$20	20.5	4.4
6	Room 116	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	1,382	0.6	$ 262.79	$ 1,701.00	$120	6.5	1.1
11	Room 116	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 115	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	1,382	0.6	$ 262.79	$ 1,701.00	$120	6.5	1.1
11	Room 115	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
11	Boiler Room - 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	1000	432	6	S 28 P F 2	F42SSILL	48	0.3	SW	1,000	288	144	0.1	$ 33.64	$ 688.50	$60	20.5	4.4
11	Nurse	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	SW	2,400	346	173	0.1	$ 32.85	$ 344.25	$30	10.5	1.8
78	Nurse	1	EP I 100	I100/1	100	0.1	SW	2400	240	1	CF 26	CFQ26/1-L	27	0.0	SW	2,400	65	175	0.1	$ 33.31	$ 20.25	$0	0.6	0.1
11	Nurse	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2400	173	1	S 28 P F 2	F42SSILL	48	0.0	SW	2,400	115	58	0.0	$ 10.95	$ 114.75	$10	10.5	1.8
11	Nurse	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	SW	2,400	461	230	0.1	$ 43.80	$ 459.00	$40	10.5	1.8
71	Nurse	1	I 60	I60/1	60	0.1	SW	2400	144	1	CF 26	CFQ26/1-L	27	0.0	SW	2,400	65	79	0.0	$ 15.06	$ 6.75	$0	0.4	0.1
6	Room 122	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	T 28 R F 4	F44SSILL	96	0.2	SW	2,400	461	230	0.1	$ 43.80	$ 283.50	$20	6.5	1.1
11	Custodian Office	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	SW	2,400	346	173	0.1	$ 32.85	$ 344.25	$30	10.5	1.8
6	Room 114	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	T 28 R F 4	F44SSILL	96	0.2	SW	2,400	461	230	0.1	$ 43.80	$ 283.50	$20	6.5	1.1
6	Superintendent Office	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	SW	2,400	922	461	0.2	$ 87.60	$ 567.00	$40	6.5	1.1
6	Board of Education Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	SW	2,400	922	461	0.2	$ 87.60	$ 567.00	$40	6.5	1.1
11	Board of Education Room	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	SW	2,400	346	173	0.1	$ 32.85	$ 344.25	$30	10.5	1.8
6	Business Administrator	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	SW	2,400	922	461	0.2	$ 87.60	$ 567.00	$40	6.5	1.1
11	Business Administrator	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	SW	2,400	346	173	0.1	$ 32.85	$ 344.25	$30	10.5	1.8
6	Room 113	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 113	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	42	0.3	SW	2,400	605	432	0.2	$ 82.12	$ 688.50	$60	8.4	1.5
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
8	Cafeteria	18	MH 175	MH175/1	215	3.9	SW	1600	6,192	18	FXLED39	FXLED39/1	39	0.7	SW	1,600	1,123	5,069	3.2	$ 1,042.40	$ 8,626.50	$1,800	8.3	1.3
11	Kitchen	15	S 34 P F 2 (MAG)	F42EE	72	1.1	SW	1600	1,728	15	S 28 P F 2	F42SSILL	48	0.7	SW	1,600	1,152	576	0.4	$ 118.45	$ 1,721.25	$150	14.5	2.7
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$0	0.9	0.2
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$0	0.9	0.2
6	Room 111	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 111	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	0	F42SSILL	42	0.3	SW	2,400	605	432	0.2	$ 82.12	$ 688.50	$60	8.4	1.5
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 110	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 110	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 109	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 109	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 108	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 108	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
6	Room 107	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	1,037	0.4	$ 197.10	$ 1,275.75	$90	6.5	1.1
11	Room 107	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	SW	2,400	691	346	0.1	$ 65.70	$ 688.50	$60	10.5	1.8
78	Cafeteria	18	EP I 100	I100/1	100	1.8	SW	1600	2,880	18	CF 26	CFQ26/1-L	27	0.5	SW	1,600	778	2,102	1.3	$ 432.36	$ 364.50	$0	0.8	0.2
6	Main Office	10	T 34 R F 4 (MAG)	F44EE	144	1.4	SW	2400	3,456	10	T 28 R F 4	F44SSILL	96	1.0	SW	2,400	2,304	1,152	0.5	$ 219.00	$ 1,417.50	$100	6.5	1.1
257	Main Entrance	10	CF11W	CF11/2	26	0.3	SW	2280	593	10	CF11W	CF11/2	26	0.3	SW	2,280	593	-	0.0	$ -	$ -	$0		
35	Room 117	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
35	Room 118	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
35	Computer Lab	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2,400	1,944	-	0.0	$ -	$ -	$0		
13	Storage Room	3	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	144	36	0.0	$ 8.41	$ 344.25	$30	40.9	8.7
13	Faculty Bathroom	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	500	30	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	6	0.0	$ 1.85	$ 114.75	$10	62.0	17.5
35	Physical Education Office	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,080	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,080	-	0.0	$ -	$ -	$0		
13	Boiler Room - 2	10	S 32 P F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	S 28 P F 2	F42SSILL	48	0.5	SW	1,000	480	120	0.1	$ 28.04	$ 1,147.50	$100	40.9	8.7
13	Electrical Room	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$20	40.9	8.7
18	Art Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032	15	T 28 R F 4	F44SSILL	96	1.4	SW	2,400	3,456	576	0.2	$ 109.50	$ 1,721.25	$150	15.7	2.7
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$20	40.9	8.7
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$20	40.9	8.7
71	Art Room	6	I 60	I60/1	60	0.4	SW	2400	864	6	CF 26	CFQ26/1-L	27	0.2	SW	2,400	389	475	0.2	$ 90.34	$ 40.50	$0	0.4	0.1
9LED	Gymnasium	40	High Bay MH 200 35 Feet High	MH200/1	232	9.3	SW	2000	18,560	40	FXLED78	FXLED78/1	78	3.1	SW	2,000	6,240	12,320	6.2	$ 2,418.66	$ 39,189.00	$6,000	16.2	2.7
18	Music Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032	15	T 28 R F 4	F44SSILL	96	1.4	SW	2,400	3,456	576	0.2	$ 109.50	$ 1,721.25	$150	15.7	2.7
13	Music Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$20	40.9	8.7
257	Hallway 6	8	CF11W	CF11/2	26	0.2	SW	2280	474	8	CF11W	CF11/2	26	0.2	SW	2,280	474	-	0.0	$ -	$ -	$0		
18	Room 124	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150	8	T 28 R F 4	F44SSILL	96	0.8	SW	2,400	1,843	307	0.1	$ 58.40	$ 918.00	$80	15.7	2.7
18	Child Study Office	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	461	0.2	$ 87.60	$ 1,377.00	$120	15.7	2.7
13	Storage	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 28 P F 2	F42SSILL	48	0.0	SW	1,000	48	12	0.0	$ 2.80	$ 114.75	$10	40.9	8.7
13	Boys Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	24	0.0	$ 7.40	$ 459.00	$40	62.0	17.5
13	Girl's Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	24	0.0	$ 7.40	$ 459.00	$40	62.0	17.5
18	Room 123	7	T 32 R F 4 (ELE)	F44ILL	112	0.8	SW	2400	1,882	7	T 28 R F 4	F44SSILL	96	0.7	SW	2,400	1,613	269	0.1	$ 51.10	$ 803.25	$70	15.7	2.7
18	Room 122	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2400	2,419	9	T 28 R F 4	F44SSILL	96	0.9	SW	2,400	2,074	346	0.1	$ 65.70	$ 1,032.75	$90	15.7	2.7
18	Room 118 K	13	T 32 R F 4 (ELE)	F44ILL	112	1.5	SW	2400	3,494	13	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,995	499	0.2	$ 94.90	$ 1,491.75	$130	15.7	2.7
18	Room 121	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	461	0.2	$ 87.60	$ 1,377.00	$120	15.7	2.7
18	Hallway 5	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2280	3,830	15	T 28 R F 4	F44SSILL	96	1.4	SW	2,280	3,283	547	0.2	$ 104.92	$ 1,721.25	$150	16.4	2.9
18	Hallway	18	T 32 R F 4 (ELE)	F44ILL	112	2.0	SW	2280	4,596	18	T 28 R F 4	F44SSILL	96	1.7	SW	2,280	3,940	657	0.3	$ 125.90	$ 2,065.50	$180	16.4	2.9
18	Room 120	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	461	0.2	$ 87.60	$ 1,377.00	$120	15.7	2.7
18	Room 119	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	SW	2,400	2,765	461	0.2	$ 87.60	$ 1,377.00	$120	15.7	2.7
257	Hallway	11	CF11W	CF11/2	26	0.3	SW	2280	652	11	CF11W	CF11/2	26	0.3	SW	2,280	652	-	0.0	$ -	$ -	$0		

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-7 Lighting Replacements

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11	Faculty Room	5	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	864	5	S 28 P F 2	F42SSILL	48	0.2	SW	2,400	576	288	0.1	$ 54.75	$ 573.75	$50	10.5	1.8
11	Men's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	12	0.0	$ 3.70	$ 114.75	$10	31.0	8.7
11	Women's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	12	0.0	$ 3.70	$ 114.75	$10	31.0	8.7
8	Exterior	44	MH 175	MH175/1	215	9.5	SW	4368	41,321	44	FXLED39	FXLED39/1	39	1.7	SW	4,368	7,495	33,826	7.7	$ 5,956.31	$ 21,087.00	$4,400	3.5	0.5
73	Exterior	16	I 120	I120/1	120	1.9	SW	4368	8,387	16	CF 26	CFQ26/1-L	27	0.4	SW	4,368	1,887	6,500	1.5	$ 1,144.50	$ 108.00	$0	0.1	0.0
93	Exterior Shed	5	I 75	I75/1	75	0.4	SW	4368	1,638	5	CF 26	CFQ26/1-L	27	0.1	SW	4,368	590	1,048	0.2	$ 184.60	$ 27.00	$0	0.1	0.0
11	Exterior Shed	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4368	314	1	S 28 P F 2	F42SSILL	48	0.0	SW	4,368	210	105	0.0	$ 18.46	$ 114.75	$10	6.2	1.0
	Total	**778**				**91.4**			**227,328**	**778**			**6,297**	**53.9**			**126,638**	**100,690**	**37.5**	**$18,808**	**$140,358**	**$17,910**		
																	Demand Savings			**37.5**	**$2,798**			
																	kWh Savings			**100,690**	**$16,010**			
																	Total savings				**$18,808**		**7.5**	**6.5**

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-8 Install Occupancy Sensors

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11	Doorway - 3	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164.2	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164.2	0.0	0.0	$0.00	$0.00	$0.00		
11	Old Hallway	44	S 34 P F 2 (MAG)	F42EE	72	3.2	SW	2280	7,223.0	44	S 34 P F 2 (MAG)	F42EE	72	3.2	SW	2280	7,223.0	0.0	0.0	$0.00	$0.00	$0.00		
6	Room 106	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 106	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691.2	4	S 34 P F 2 (MAG)	F42EE	72	0.3	OCC	1680	483.8	207.4	0.0	$32.97	$128.25	$20.00	3.9	3.3
6	Room 105	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 105	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691.2	4	S 34 P F 2 (MAG)	F42EE	72	0.3	OCC	1680	483.8	207.4	0.0	$32.97	$128.25	$20.00	3.9	3.3
6	Room104	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 104	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 103	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 103	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 102	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 102	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
11	Doorway - 4	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164.2	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164.2	0.0	0.0	$0.00	$0.00	$0.00		
71	North Custodial Closet	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	SW	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
11	Boy's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144.0	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144.0	0.0	0.0	$0.00	$0.00	$0.00		
11	Girl's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144.0	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144.0	0.0	0.0	$0.00	$0.00	$0.00		
6	Room 101	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 101	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Library	22	T 34 R F 4 (MAG)	F44EE	144	3.2	SW	2400	7,603.2	22	T 34 R F 4 (MAG)	F44EE	144	3.2	C-OCC	1680	5,322.2	2,281.0	0.0	$362.67	$202.50	$35.00	0.6	0.5
11	Library Server Room	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		
6	Room 116	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147.2	12	T 34 R F 4 (MAG)	F44EE	144	1.7	OCC	1680	2,903.0	1,244.2	0.0	$197.82	$128.25	$20.00	0.6	0.5
11	Room 116	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 115	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147.2	12	T 34 R F 4 (MAG)	F44EE	144	1.7	OCC	1680	2,903.0	1,244.2	0.0	$197.82	$128.25	$20.00	0.6	0.5
11	Room 115	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
11	Boiler Room - 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	1000	432.0	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	1000	432.0	0.0	0.0	$0.00	$0.00	$0.00		
11	Nurse	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518.4	3	S 34 P F 2 (MAG)	F42EE	72	0.2	OCC	1200	259.2	259.2	0.0	$41.21	$128.25	$20.00	3.1	2.6
78	Nurse	1	EP I 100	I100/1	100	0.1	SW	2400	240.0	1	EP I 100	I100/1	100	0.1	OCC	1200	120.0	120.0	0.0	$19.08	$128.25	$20.00	6.7	5.7
11	Nurse	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2400	172.8	1	S 34 P F 2 (MAG)	F42EE	72	0.1	OCC	1200	86.4	86.4	0.0	$13.74	$128.25	$20.00	9.3	7.9
11	Nurse	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691.2	4	S 34 P F 2 (MAG)	F42EE	72	0.3	OCC	1200	345.6	345.6	0.0	$54.95	$128.25	$20.00	2.3	2.0
71	Nurse	1	I 60	I60/1	60	0.1	SW	2400	144.0	1	I 60	I60/1	60	0.1	OCC	1200	72.0	72.0	0.0	$11.45	$128.25	$20.00	11.2	9.5
6	Room 122	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	T 34 R F 4 (MAG)	F44EE	144	0.3	OCC	1680	483.8	207.4	0.0	$32.97	$128.25	$20.00	3.9	3.3
11	Custodian Office	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518.4	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518.4	0.0	0.0	$0.00	$0.00	$0.00		
6	Room 114	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	T 34 R F 4 (MAG)	F44EE	144	0.3	OCC	1680	483.8	207.4	0.0	$32.97	$128.25	$20.00	3.9	3.3
6	Superintendent Office	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382.4	4	T 34 R F 4 (MAG)	F44EE	144	0.6	OCC	1200	691.2	691.2	0.0	$109.90	$128.25	$20.00	1.2	1.0
6	Board of Education Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382.4	4	T 34 R F 4 (MAG)	F44EE	144	0.6	OCC	1200	691.2	691.2	0.0	$109.90	$128.25	$20.00	1.2	1.0
11	Board of Education Room	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518.4	3	S 34 P F 2 (MAG)	F42EE	72	0.2	OCC	1200	259.2	259.2	0.0	$41.21	$128.25	$20.00	3.1	2.6
6	Business Administrator	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382.4	4	T 34 R F 4 (MAG)	F44EE	144	0.6	OCC	1200	691.2	691.2	0.0	$109.90	$128.25	$20.00	1.2	1.0
11	Business Administrator	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518.4	3	S 34 P F 2 (MAG)	F42EE	72	0.2	OCC	1200	259.2	259.2	0.0	$41.21	$128.25	$20.00	3.1	2.6
6	Room 113	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 113	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
8	Cafeteria	18	MH 175	MH175/1	215	3.9	SW	1600	6,192.0	18	MH 175	MH175/1	215	3.9	C-OCC	1200	4,644.0	1,548.0	0.0	$246.13	$202.50	$35.00	0.8	0.7
11	Kitchen	15	S 34 P F 2 (MAG)	F42EE	72	1.1	SW	1600	1,728.0	15	S 34 P F 2 (MAG)	F42EE	72	1.1	SW	1600	1,728.0	0.0	0.0	$0.00	$0.00	$0.00		
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	SW	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	SW	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
6	Room 111	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 111	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 110	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 110	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 109	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 109	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 108	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 108	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
6	Room 107	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110.4	9	T 34 R F 4 (MAG)	F44EE	144	1.3	OCC	1680	2,177.3	933.1	0.0	$148.37	$128.25	$20.00	0.9	0.7
11	Room 107	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,036.8	6	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1680	725.8	311.0	0.0	$49.46	$128.25	$20.00	2.6	2.2
78	Cafeteria	18	EP I 100	I100/1	100	1.8	SW	1600	2,880.0	18	EP I 100	I100/1	100	1.8	C-OCC	1200	2,160.0	720.0	0.0	$114.48	$202.50	$35.00	1.8	1.5
6	Main Office	10	T 34 R F 4 (MAG)	F44EE	144	1.4	SW	2400	3,456.0	10	T 34 R F 4 (MAG)	F44EE	144	1.4	OCC	1200	1,728.0	1,728.0	0.0	$274.75	$128.25	$20.00	0.5	0.4
257	Main Entrance	10	CF11W	CF11/2	26	0.3	SW	2280	592.8	10	CF11W	CF11/2	26	0.3	SW	2280	592.8	0.0	0.0	$0.00	$0.00	$0.00		
35	Room 117	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1680	907.2	388.8	0.0	$61.82	$128.25	$20.00	2.1	1.8
35	Room 118	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1680	907.2	388.8	0.0	$61.82	$128.25	$20.00	2.1	1.8
35	Computer Lab	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1680	1,360.8	583.2	0.0	$92.73	$202.50	$35.00	2.2	1.8
13	Storage Room	3	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	0.0	0.0	$0.00	$0.00	$0.00		
13	Faculty Bathroom	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	500	30.0	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
35	Physical Education Office	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,080.0	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1200	540.0	540.0	0.0	$85.86	$128.25	$20.00	1.5	1.3
13	Boiler Room - 2	10	S 32 P F 2 (ELE)	F42LL	60	0.6	SW	1000	600.0	10	S 32 P F 2 (ELE)	F42LL	60	0.6	SW	1000	600.0	0.0	0.0	$0.00	$0.00	$0.00		
13	Electrical Room	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		
18	Art Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032.0	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	OCC	1680	2,822.4	1,209.6	0.0	$192.33	$128.25	$20.00	0.7	0.6
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		
71	Art Room	6	I 60	I60/1	60	0.4	SW	2400	864.0	6	I 60	I60/1	60	0.4	OCC	1680	604.8	259.2	0.0	$41.21	$128.25	$20.00	3.1	2.6
9LED	Gymnasium	40	High Bay MH 200 35 Feet High	MH200/1	232	9.3	SW	2000	18,560.0	40	High Bay MH 200 35 Feet High	MH200/1	232	9.3	C-OCC	1800	16,704.0	1,856.0	0.0	$295.10	$202.50	$35.00	0.7	0.6
18	Music Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032.0	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	OCC	1680	2,822.4	1,209.6	0.0	$192.33	$128.25	$20.00	0.7	0.6
13	Music Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		
257	Hallway 6	8	CF11W	CF11/2	26	0.2	SW	2280	474.2	8	CF11W	CF11/2	26	0.2	SW	2280	474.2	0.0	0.0	$0.00	$0.00	$0.00		
18	Room 124	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150.4	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	OCC	1680	1,505.3	645.1	0.0	$102.57	$128.25	$20.00	1.3	1.1
18	Child Study Office	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	OCC	1200	1,612.8	1,612.8	0.0	$256.44	$128.25	$20.00	0.5	0.4
13	Storage	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
13	Boys Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120.0	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
13	Girl's Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120.0	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
18	Room 123	7	T 32 R F 4 (ELE)	F44ILL	112	0.8	SW	2400	1,881.6	7	T 32 R F 4 (ELE)	F44ILL	112	0.8	OCC	1680	1,317.1	564.5	0.0	$89.75	$128.25	$20.00	1.4	1.2
18	Room 122	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2400	2,419.2	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	OCC	1680	1,693.4	725.8	0.0	$115.40	$128.25	$20.00	1.1	0.9
18	Room 118 K	13	T 32 R F 4 (ELE)	F44ILL	112	1.5	SW	2400	3,494.4	13	T 32 R F 4 (ELE)	F44ILL	112	1.5	OCC	1680	2,446.1	1,048.3	0.0	$166.68	$128.25	$20.00	0.8	0.6
18	Room 121	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	OCC	1680	2,257.9	967.7	0.0	$153.86	$128.25	$20.00	0.8	0.7
18	Hallway 5	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2280	3,830.4	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2280	3,830.4	0.0	0.0	$0.00	$0.00	$0.00		
18	Hallway	18	T 32 R F 4 (ELE)	F44ILL	112	2.0	SW	2280	4,596.5	18	T 32 R F 4 (ELE)	F44ILL	112	2.0	SW	2280	4,596.5	0.0	0.0	$0.00	$0.00	$0.00		
18	Room 120	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	OCC	1680	2,257.9	967.7	0.0	$153.86	$128.25	$20.00	0.8	0.7

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-8 Install Occupancy Sensors

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
18	Room 119	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	OCC	1680	2,257.9	967.7	0.0	$153.86	$128.25	$20.00	0.8	0.7
257	Hallway	11	CF11W	CF11/2	26	0.3	SW	2280	652.1	11	CF11W	CF11/2	26	0.3	SW	2280	652.1	0.0	0.0	$0.00	$0.00	$0.00		
11	Faculty Room	5	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	864.0	5	S 34 P F 2 (MAG)	F42EE	72	0.4	OCC	1200	432.0	432.0	0.0	$68.69	$128.25	$20.00	1.9	1.6
11	Men's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36.0	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36.0	0.0	0.0	$0.00	$0.00	$0.00		
11	Women's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36.0	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36.0	0.0	0.0	$0.00	$0.00	$0.00		
8	Exterior	44	MH 175	MH175/1	215	9.5	SW	4368	41,321.3	44	MH 175	MH175/1	215	9.5	SW	4368	41,321.3	0.0	0.0	$0.00	$0.00	$0.00		
73	Exterior	16	I 120	I120/1	120	1.9	SW	4368	8,386.6	16	I 120	I120/1	120	1.9	SW	4368	8,386.6	0.0	0.0	$0.00	$0.00	$0.00		
93	Exterior Shed	5	I 75	I75/1	75	0.4	SW	4368	1,638.0	5	I 75	I75/1	75	0.4	SW	4368	1,638.0	0.0	0.0	$0.00	$0.00	$0.00		
11	Exterior Shed	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4368	314.5	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4368	314.5	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**778**				**91.4**			**227,328**	**778**				**91**			**182,473**	**44,855**	**0**	**7,132**	**$8,708**	**1,375**		
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**44,855**	**$7,132**			
																	Total Savings				**$7,132**		**1.2**	**1.0**

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-9 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number//Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11	Doorway - 3	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164	1	S 28 P F 2	F42SSILL	48	0.0	SW	2,280	109	55	0.0	$ 10.49	$ 114.75	$ 10	10.9	10.0
11	Old Hallway	44	S 34 P F 2 (MAG)	F42EE	72	3.2	SW	2280	7,223	44	S 28 P F 2	F42SSILL	48	2.1	SW	2,280	4,815	2,408	1.1	$ 461.64	$ 5,049.00	$ 440	10.9	10.0
6	Room 106	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 106	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	OCC	1,680	323	369	0.1	$ 65.78	$ 587.25	$ 60	8.9	8.0
6	Room 105	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 105	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	OCC	1,680	323	369	0.1	$ 65.78	$ 587.25	$ 60	8.9	8.0
6	Room104	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 104	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 103	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 103	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 102	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 102	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
11	Doorway - 4	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2280	164	1	S 28 P F 2	F42SSILL	48	0.0	SW	2,280	109	55	0.0	$ 10.49	$ 114.75	$ 10	10.9	10.0
71	North Custodial Closet	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$ -	0.9	0.9
11	Boy's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	48	0.1	$ 14.80	$ 459.00	$ 40	31.0	28.3
11	Girl's Bathroom	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	500	144	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	48	0.1	$ 14.80	$ 459.00	$ 40	31.0	28.3
6	Room 101	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 101	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Library	22	T 34 R F 4 (MAG)	F44EE	144	3.2	SW	2400	7,603	22	T 28 R F 4	F44SSILL	96	2.1	C-OCC	1,680	3,548	4,055	1.1	$ 723.57	$ 3,321.00	$ 255	4.6	4.2
11	Library Server Room	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	48	0.0	$ 11.21	$ 229.50	$ 20	20.5	18.7
6	Room 116	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	1,935	2,212	0.6	$ 394.68	$ 1,829.25	$ 140	4.6	4.3
11	Room 116	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 115	12	T 34 R F 4 (MAG)	F44EE	144	1.7	SW	2400	4,147	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	1,935	2,212	0.6	$ 394.68	$ 1,829.25	$ 140	4.6	4.3
11	Room 115	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
11	Boiler Room - 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	1000	432	6	S 28 P F 2	F42SSILL	48	0.3	SW	1,000	288	144	0.1	$ 33.64	$ 688.50	$ 60	20.5	18.7
11	Nurse	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	OCC	1,200	173	346	0.1	$ 60.32	$ 472.50	$ 50	7.8	7.0
78	Nurse	1	EP I 100	I100/1	100	0.1	SW	2400	240	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	208	0.1	$ 38.46	$ 148.50	$ 20	3.9	3.3
11	Nurse	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	2400	173	1	S 28 P F 2	F42SSILL	48	0.0	OCC	1,200	58	115	0.0	$ 20.11	$ 243.00	$ 30	12.1	10.6
11	Nurse	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2400	691	4	S 28 P F 2	F42SSILL	48	0.2	OCC	1,200	230	461	0.1	$ 80.43	$ 587.25	$ 60	7.3	6.6
71	Nurse	1	I 60	I60/1	60	0.1	SW	2400	144	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	112	0.0	$ 20.21	$ 135.00	$ 20	6.7	5.7
6	Room 122	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	T 28 R F 4	F44SSILL	96	0.2	OCC	1,680	323	369	0.1	$ 65.78	$ 411.75	$ 40	6.3	5.7
11	Custodian Office	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	SW	2,400	346	173	0.1	$ 32.85	$ 344.25	$ 30	10.5	9.6
6	Room 114	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	T 28 R F 4	F44SSILL	96	0.2	OCC	1,680	323	369	0.1	$ 65.78	$ 411.75	$ 40	6.3	5.7
6	Superintendent Office	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	OCC	1,200	461	922	0.2	$ 160.87	$ 695.25	$ 60	4.3	3.9
6	Board of Education Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	OCC	1,200	461	922	0.2	$ 160.87	$ 695.25	$ 60	4.3	3.9
11	Board of Education Room	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	OCC	1,200	173	346	0.1	$ 60.32	$ 472.50	$ 50	7.8	7.0
6	Business Administrator	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	T 28 R F 4	F44SSILL	96	0.4	OCC	1,200	461	922	0.2	$ 160.87	$ 695.25	$ 60	4.3	3.9
11	Business Administrator	3	S 34 P F 2 (MAG)	F42EE	72	0.2	SW	2400	518	3	S 28 P F 2	F42SSILL	48	0.1	OCC	1,200	173	346	0.1	$ 60.32	$ 472.50	$ 50	7.8	7.0
6	Room 113	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 113	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	42	0.3	OCC	1,680	423	613	0.2	$ 110.97	$ 816.75	$ 80	7.4	6.6
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
8	Cafeteria	18	MH 175	MH175/1	215	3.9	SW	1600	6,192	18	FXLED39	FXLED39/1	39	0.7	C-OCC	1,200	842	5,350	3.2	$ 1,087.05	$ 8,829.00	$ 1,835	8.1	6.4
11	Kitchen	15	S 34 P F 2 (MAG)	F42EE	72	1.1	SW	1600	1,728	15	S 28 P F 2	F42SSILL	48	0.7	SW	1,600	1,152	576	0.4	$ 118.45	$ 1,721.25	$ 150	14.5	13.3
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$ -	0.9	0.9
71	Walk-in Freezer	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 7.71	$ 6.75	$ -	0.9	0.9
6	Room 111	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 111	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	0	F42SSILL	42	0.3	OCC	1,680	423	613	0.2	$ 110.97	$ 816.75	$ 80	7.4	6.6
6	Room 112	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 112	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 110	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 110	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 109	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 109	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 108	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 108	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
6	Room 107	9	T 34 R F 4 (MAG)	F44EE	144	1.3	SW	2400	3,110	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	1,659	0.4	$ 296.01	$ 1,404.00	$ 110	4.7	4.4
11	Room 107	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	1,037	6	S 28 P F 2	F42SSILL	48	0.3	OCC	1,680	484	553	0.1	$ 98.67	$ 816.75	$ 80	8.3	7.5
78	Cafeteria	18	EP I 100	I100/1	100	1.8	SW	1600	2,880	18	CF 26	CFQ26/1-L	27	0.5	C-OCC	1,200	583	2,297	1.3	$ 463.27	$ 567.00	$ 35	1.2	1.1
6	Main Office	10	T 34 R F 4 (MAG)	F44EE	144	1.4	SW	2400	3,456	10	T 28 R F 4	F44SSILL	96	1.0	OCC	1,200	1,152	2,304	0.5	$ 402.16	$ 1,545.75	$ 120	3.8	3.5
257	Main Entrance	10	CF11W	CF11/2	26	0.3	SW	2280	593	10	CF11W	CF11/2	26	0.3	SW	2,280	593	-	0.0	$ -	$ -	$ -		
35	Room 117	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1,680	907	389	0.0	$ 61.82	$ 128.25	$ 20	2.1	1.8
35	Room 118	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1,680	907	389	0.0	$ 61.82	$ 128.25	$ 20	2.1	1.8
35	Computer Lab	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1,680	1,361	583	0.0	$ 92.73	$ 202.50	$ 35	2.2	1.8
13	Storage Room	3	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	144	36	0.0	$ 8.41	$ 344.25	$ 30	40.9	37.4
13	Faculty Bathroom	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	500	30	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	6	0.0	$ 1.85	$ 114.75	$ 10	62.0	56.6
35	Physical Education Office	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,080	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1,200	540	540	0.0	$ 85.86	$ 128.25	$ 20	1.5	1.3
13	Boiler Room - 2	10	S 32 P F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	S 28 P F 2	F42SSILL	48	0.5	SW	1,000	480	120	0.1	$ 28.04	$ 1,147.50	$ 100	40.9	37.4
13	Electrical Room	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$ 20	40.9	37.4
18	Art Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032	15	T 28 R F 4	F44SSILL	96	1.4	OCC	1,680	2,419	1,613	0.2	$ 274.35	$ 1,849.50	$ 170	6.7	6.1
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$ 20	40.9	37.4
13	Art Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$ 20	40.9	37.4
71	Art Room	6	I 60	I60/1	60	0.4	SW	2400	864	6	CF 26	CFQ26/1-L	27	0.2	OCC	1,680	272	592	0.2	$ 108.88	$ 168.75	$ 20	1.5	1.4
9LED	Gymnasium	40	High Bay MH 200 35 Feet High	MH200/1	232	9.3	SW	2000	18,560	40	FXLED78	FXLED78/1	78	3.1	C-OCC	1,800	5,616	12,944	6.2	$ 2,517.88	$ 39,391.50	$ 6,035	15.6	13.2
18	Music Room	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2400	4,032	15	T 28 R F 4	F44SSILL	96	1.4	OCC	1,680	2,419	1,613	0.2	$ 274.35	$ 1,849.50	$ 170	6.7	6.1
13	Music Room Storage	2	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 28 P F 2	F42SSILL	48	0.1	SW	1,000	96	24	0.0	$ 5.61	$ 229.50	$ 20	40.9	37.4
257	Hallway 6	8	CF11W	CF11/2	26	0.2	SW	2280	474	8	CF11W	CF11/2	26	0.2	SW	2,280	474	-	0.0	$ -	$ -	$ -		
18	Room 124	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150	8	T 28 R F 4	F44SSILL	96	0.8	OCC	1,680	1,290	860	0.1	$ 146.32	$ 1,046.25	$ 100	7.2	6.5
18	Child Study Office	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,200	1,382	1,843	0.2	$ 307.40	$ 1,505.25	$ 140	4.9	4.4
13	Storage	1	S 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 28 P F 2	F42SSILL	48	0.0	SW	1,000	48	12	0.0	$ 2.80	$ 114.75	$ 10	40.9	37.4
13	Boys Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	24	0.0	$ 7.40	$ 459.00	$ 40	62.0	56.6
13	Girl's Bathroom	4	S 32 P F 2 (ELE)	F42LL	60	0.2	SW	500	120	4	S 28 P F 2	F42SSILL	48	0.2	SW	500	96	24	0.0	$ 7.40	$ 459.00	$ 40	62.0	56.6
18	Room 123	7	T 32 R F 4 (ELE)	F44ILL	112	0.8	SW	2400	1,882	7	T 28 R F 4	F44SSILL	96	0.7	OCC	1,680	1,129	753	0.1	$ 128.03	$ 931.50	$ 90	7.3	6.6
18	Room 122	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2400	2,419	9	T 28 R F 4	F44SSILL	96	0.9	OCC	1,680	1,452	968	0.1	$ 164.61	$ 1,161.00	$ 110	7.1	6.4
18	Room 118 K	13	T 32 R F 4 (ELE)	F44ILL	112	1.5	SW	2400	3,494	13	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	2,097	1,398	0.2	$ 237.77	$ 1,620.00	$ 150	6.8	6.2
18	Room 121	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	1,935	1,290	0.2	$ 219.48	$ 1,505.25	$ 140	6.9	6.2
18	Hallway 5	15	T 32 R F 4 (ELE)	F44ILL	112	1.7	SW	2280	3,830	15	T 28 R F 4	F44SSILL	96	1.4	SW	2,280	3,283	547	0.2	$ 104.92	$ 1,721.25	$ 150	16.4	15.0
18	Hallway	18	T 32 R F 4 (ELE)	F44ILL	112	2.0	SW	2280	4,596	18	T 28 R F 4	F44SSILL	96	1.7	SW	2,280	3,940	657	0.3	$ 125.90	$ 2,065.50	$ 180	16.4	15.0
18	Room 120	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	1,935	1,290	0.2	$ 219.48	$ 1,505.25	$ 140	6.9	6.2
18	Room 119	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2400	3,226	12	T 28 R F 4	F44SSILL	96	1.2	OCC	1,680	1,935	1,290	0.2	$ 219.48	$ 1,505.25	$ 140	6.9	6.2
257	Hallway	11	CF11W	CF11/2	26	0.3	SW	2280	652	11	CF11W	CF11/2	26	0.3	SW	2,280	652	-	0.0	$ -	$ -	$ -		

Energy Audit of NJBPU - Bethlehem - Thomas Conley Elementary School

CHA Project No. 24735

ECM-9 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.159 $/kWh**

$6.22 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11	Faculty Room	5	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2400	864	5	S 28 P F 2	F42SSILL	48	0.2	OCC	1,200	288	576	0.1	$ 100.54	$ 702.00	$ 70	7.0	6.3
11	Men's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	12	0.0	$ 3.70	$ 114.75	$ 10	31.0	28.3
11	Women's Bathroom	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	S 28 P F 2	F42SSILL	48	0.0	SW	500	24	12	0.0	$ 3.70	$ 114.75	$ 10	31.0	28.3
8	Exterior	44	MH 175	MH175/1	215	9.5	SW	4368	41,321	44	FXLED39	FXLED39/1	39	1.7	SW	4,368	7,495	33,826	7.7	$ 5,956.31	$ 21,087.00	$ 4,400	3.5	2.8
73	Exterior	16	I 120	I120/1	120	1.9	SW	4368	8,387	16	CF 26	CFQ26/1-L	27	0.4	SW	4,368	1,887	6,500	1.5	$ 1,144.50	$ 108.00	$ -	0.1	0.1
93	Exterior Shed	5	I 75	I75/1	75	0.4	SW	4368	1,638	5	CF 26	CFQ26/1-L	27	0.1	SW	4,368	590	1,048	0.2	$ 184.60	$ 27.00	$ -	0.1	0.1
11	Exterior Shed	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4368	314	1	S 28 P F 2	F42SSILL	48	0.0	SW	4,368	210	105	0.0	$ 18.46	$ 114.75	$ 10	6.2	5.7
	Total	**778**				**91.4**			**227,328**	**778**				**53.9**			**96,033**		**37.5**	**23,674**	**149,066**	**$19,285**		
																	Demand Savings			**37.5**	**$2,798**			
																	kWh Savings			**131,295**	**$20,876**			
																	Total Savings				**$23,674**		**6.3**	**5.5**

APPENDIX D

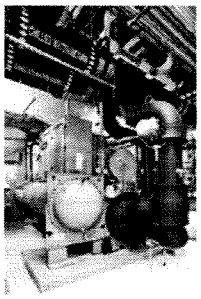
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

Incentives

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between $5,000 and $50,000 based on approximately $.10 per square foot, not to exceed 50% of the facility's annual energy expense.

Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.

CONTACT US

A detailed Incentive Structure document is available on the applications and forms page.

Energy Efficiency Revolving Loan Fund (EE RLF)

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed $2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

Steps to Participation

Click here for a step-by-step description of the program.

New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... $0.10 per sq ft
Minimum Incentive: $5,000
Maximum Incentive:: ..... $50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per projected kWh saved
For each % over 15% add: ..... $0.005 per projected kWh saved
Maximum Incentive: ..... $0.11 per projected kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per projected Therm saved
For each % over 15% add: ..... $0.05 per projected Therm saved
Maximum Incentive: ..... $1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per actual kWh saved
For each % over 15% add: ..... $0.005 per actual kWh saved
Maximum Incentive: ..... $0.11 per actual kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per actual Therm saved
For each % over 15% add: ..... $0.05 per actual Therm saved
Maximum Incentive: ..... $1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

Bethlehem Township School District - NJBPU
CHA Project # 24735
Thomas B. Conley Elementary School

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
Values used in this calculation are for measures with a positive return on investment (ROI) only.

Total Building Area (Square Feet)	59,584
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.10	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$100,452	
Existing Usage (from utility)	631,931	
Proposed Savings	210,779	
Existing Total MMBtus	2,157	
Proposed Savings MMBtus	719	
% Energy Reduction	**33.4%**	
Proposed Annual Savings	$49,800	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25

	Incentives $		
	Elec	Therms	Total
Incentive #1	$0	$0	$5,958
Incentive #2	$23,186	$0	$23,186
Incentive #3	$23,186	$0	$23,186
Total All Incentives	**$46,371**	**$0**	**$52,330**

Total Project Cost	$481,294

		Allowable Incentive
% Incentives #1 of Utility Cost*	5.9%	$5,958
% Incentives #2 of Project Cost**	4.8%	$23,186
% Incentives #3 of Project Cost**	4.8%	$23,186
Total Eligible Incentives***	**$52,330**	
Project Cost w/ Incentives	$428,964	

Project Payback (years)	
w/o Incentives	Incentives
9.7	8.6

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and 25% if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

APPENDIX E

Energy Savings Improvement Plan (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PLAN
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Plan

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

- Local Government
- School Districts (K-12)

The Board also adopted protocols to measure energy savings.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

ENERGY REDUCTION PLANS

If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

- Frankford Township School District
- Northern Hunterdon-Voorhees Regional High School
- Manalapan Township ***(180 MB** - Right Click, Save As)*

Program Updates

- Board Order - Standby Charges for Distributed Generation Customers
- T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached

Other updates posted.

APPENDIX F

Photovoltaic (PV) Rooftop Solar Power Generation

Bethlehem Township Board of Education
Thomas Conley Elementary School

Cost of Electricity	$0.159	/kWh
Electricity Usage	631,931	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$360,000	**90.0**	**115,188**	**0**	**$18,310**	**0**	**$18,310**	**$0**	**$7,487**	**19.7**	**14.0**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $65 /1000kwh

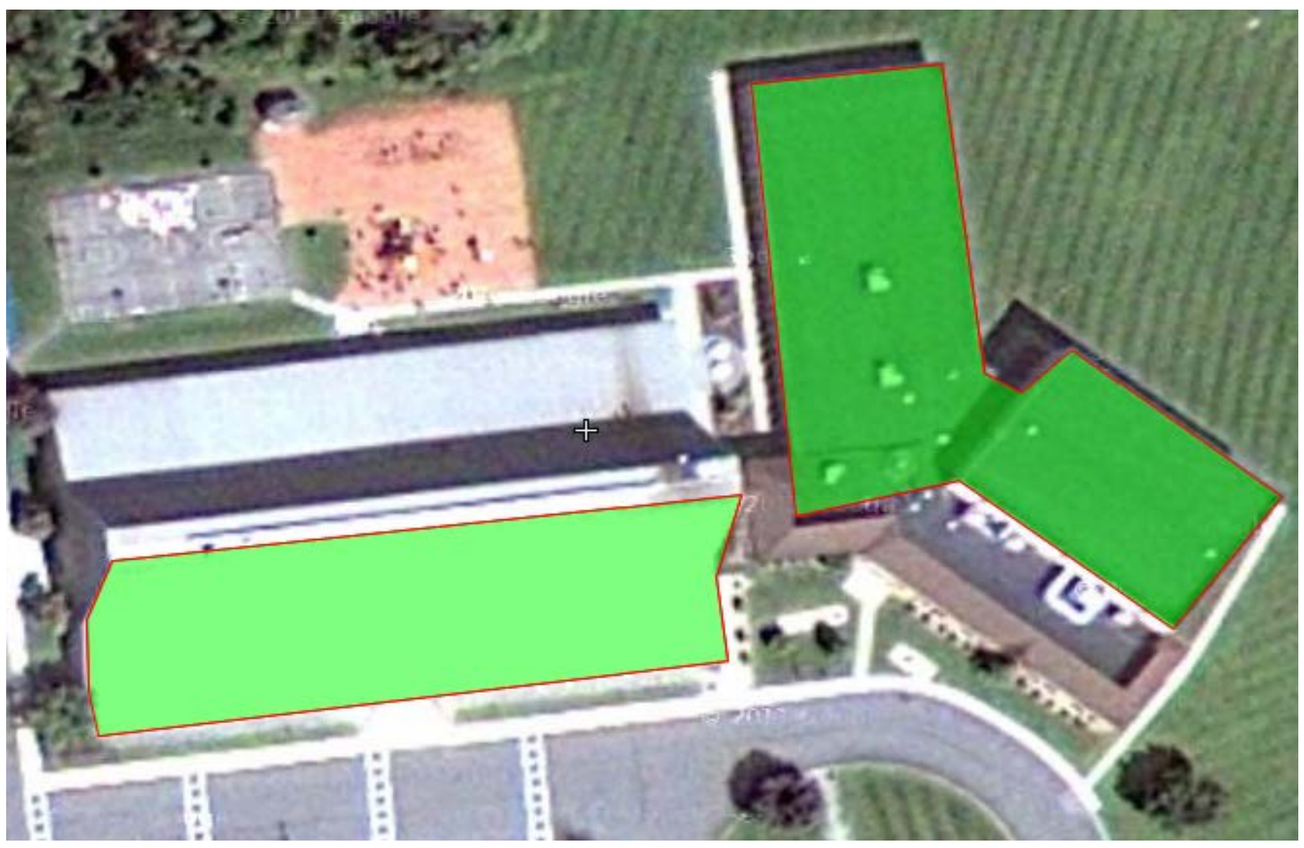
Area Output*
1,903 m2
20,489 ft2

Perimeter Output*
177 m
582 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
12,472 ft2

Approximate System Size: Is the roof flat? (Yes/No) Yes

8	watt/ft2	
99,776	DC watts	
90	kW	Enter into PV Watts



PV Watts Inputs*

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	08802	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
115,188 annual kWh calculated in PV Watts program

% Offset Calc

Usage	631,931	(from utilities)
PV Generation	115,188	(generated using PV Watts)
% offset	18%	

* http://www.freemaptools.com/area-calculator.htm
**http://www.flettexchange.com
http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Allentown
State:	Pennsylvania
Latitude:	40.65° N
Longitude:	75.43° W
Elevation:	117 m
PV System Specifications	
DC Rating:	90.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	74.7 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	15.9 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	3.22	7788	1238.29
2	3.84	8337	1325.58
3	4.71	10967	1743.75
4	5.25	11365	1807.03
5	5.24	11129	1769.51
6	5.25	10631	1690.33
7	5.57	11465	1822.93
8	5.23	10784	1714.66
9	4.85	9985	1587.61
10	4.37	9641	1532.92
11	2.92	6466	1028.09
12	2.81	6628	1053.85
Year	4.44	115188	18314.89

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

Return to RReDC home page (*http://www.nrel.gov/rredc*)

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Thomas Conley Elementary School

Building ID: 3310752
For 12-month Period Ending: June 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: October 31, 2012

Facility
Thomas Conley Elementary School
940 Iron Bridge Road
Asbury, NJ 08802

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1978
Gross Floor Area (ft²): 59,584

Energy Performance Rating[2] (1-100) 32

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,156,149
Fuel Oil (No. 2) (kBtu)	2,358,293
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	4,514,442

Energy Intensity[4]

Site (kBtu/ft²/yr)	76
Source (kBtu/ft²/yr)	161

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	479

Electric Distribution Utility
Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	64
National Median Source EUI	137
% Difference from National Median Source EUI	18%
Building Type	K-12 School

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional
N/A

Meets Industry Standards[5] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Thomas Conley Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	940 Iron Bridge Road, Asbury, NJ 08802	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Thomas Conley Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	59,584 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	50	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is “no“.		☐
Percent Cooled	50 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

h School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Jersey Central Power & Light Co [FirstEnergy Corp]

Fuel Type: Electricity

Meter: Electric Meter (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/01/2012	06/30/2012	47,449.00
05/01/2012	05/31/2012	47,835.00
04/01/2012	04/30/2012	51,593.00
03/01/2012	03/31/2012	49,280.00
02/01/2012	02/29/2012	66,452.00
01/01/2012	01/31/2012	52,842.00
12/01/2011	12/31/2011	58,240.00
11/01/2011	11/30/2011	58,240.00
10/01/2011	10/31/2011	45,440.00
09/01/2011	09/30/2011	56,640.00
08/01/2011	08/31/2011	53,760.00
07/01/2011	07/31/2011	44,160.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**631,931.00**
Electric Meter Consumption (kBtu (thousand Btu))		**2,156,148.57**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,156,148.57**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Fuel Oil (No. 2)

Meter: Fuel Oil (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
06/01/2012	06/30/2012	0.00
05/01/2012	05/31/2012	0.00
04/01/2012	04/30/2012	5,012.00
03/01/2012	03/31/2012	0.00
02/01/2012	02/29/2012	4,004.00
01/01/2012	01/31/2012	4,983.00
12/01/2011	12/31/2011	0.00
11/01/2011	11/30/2011	3,005.00
10/01/2011	10/31/2011	0.00
09/01/2011	09/30/2011	0.00

08/01/2011	08/31/2011	0.00
07/01/2011	07/31/2011	0.00
Oil Consumption (Gallons)		**17,004.00**
Fuel Oil Consumption (kBtu (thousand Btu))		**2,358,293.26**
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		**2,358,293.26**
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Thomas Conley Elementary School
940 Iron Bridge Road
Asbury, NJ 08802

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Thomas Conley Elementary School	
Gross Floor Area Excluding Parking: (ft²)	59,584
Year Built	1978
For 12-month Evaluation Period Ending Date:	June 30, 2012

Facility Space Use Summary

Thomas Conley Elementary School	
Space Type	K-12 School
Gross Floor Area (ft²)	59,584
Open Weekends?	No
Number of PCs	50
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	50
Percent Heated	100
Months ◦	10
High School?	No
School District ◦	Bethlehem

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 06/30/2012)	**Baseline** (Ending Date 06/30/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	32	32	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	76	76	50	N/A	64
Source (kBtu/ft²)	161	161	107	N/A	137
Energy Cost					
$/year	$ 155,495.49	$ 155,495.49	$ 103,492.64	N/A	$ 132,346.63
$/ft²/year	$ 2.61	$ 2.61	$ 1.74	N/A	$ 2.22
Greenhouse Gas Emissions					
$MtCO_2e$/year	479	479	319	N/A	408
$kgCO_2e/ft^2$/year	8	8	5	N/A	7

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Median column presents energy performance data your building would have if your building had a median rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.