

WATCHUNG BOARD OF EDUCATION

BAYBERRY SCHOOL

**113 BAYBERRY LANE
WATCHUNG, NEW JERSEY 07069**

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the School District.

Electric Utility Provider:	PSE&G
Electric Utility Rate Structure:	Large Power & Lighting Service (LPLS)
Third Party Supplier:	Direct Energy
Power Purchase Provider:	SunLight General Somerset Solar
PPA Rate Structure:	0.04223 (variable)
PPA Energy Source:	Onsite Solar
Natural Gas Utility Provider:	PSE&G
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	Direct Energy/South Jersey Energy Company

The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

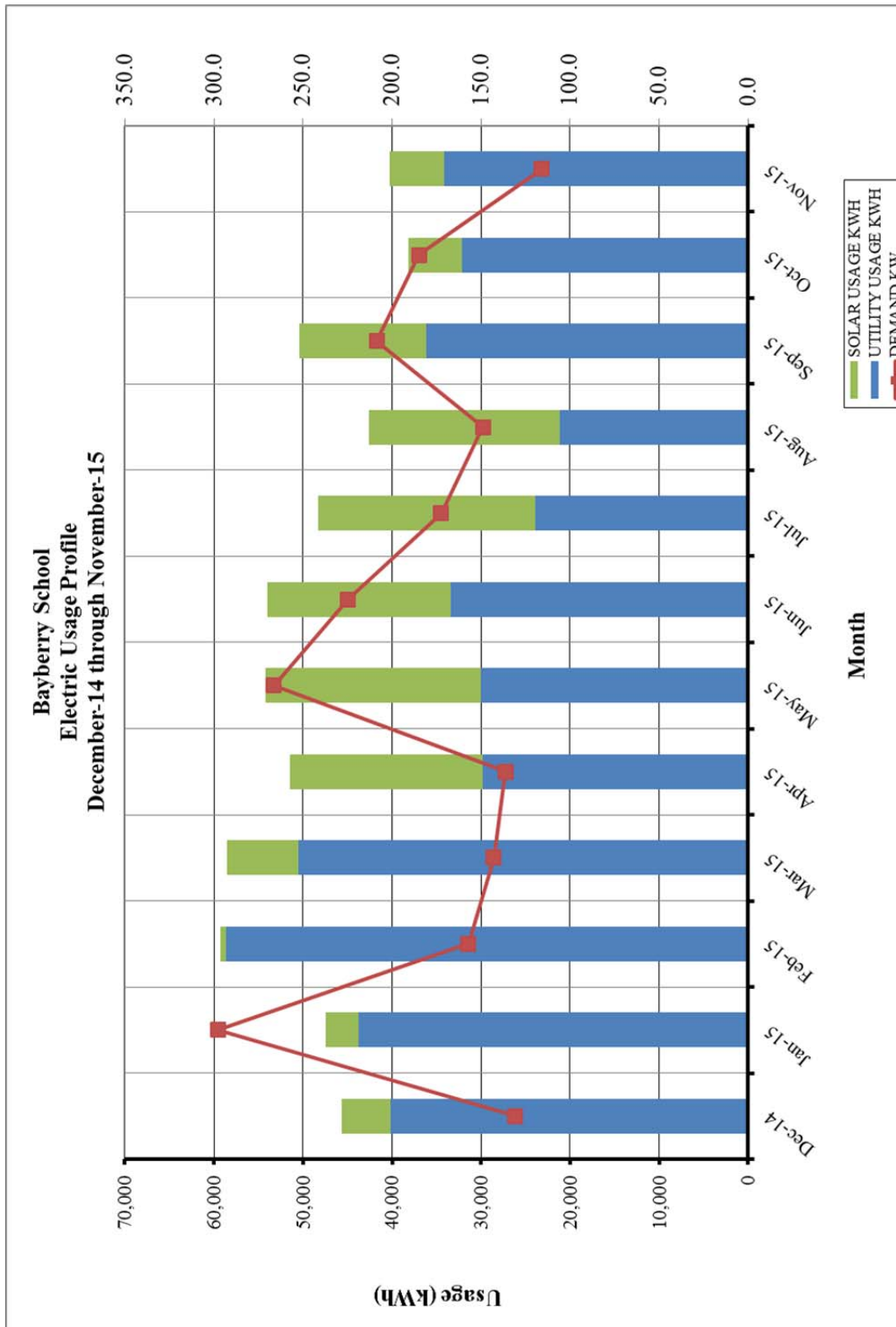
The Watchung Borough Board of Education has entered into a Power Purchase Agreement with SunLight General Capital to purchase electric supply generated by two (2) onsite solar arrays. The Watchung Borough Board of Education is responsible for purchasing all of the power generated by the system at a fixed price per kilowatt-hours (KWH). New Jersey's net metering guidelines allow them to get an on bill credit for exported KWH, to be utilized in the months to follow, up until the annual balance date when any remaining credit of KWH is paid to the owner based on average electric market pricing for the year. The Electric Billing Data summarized reflects the net electric used by the facility based on utility purchased electric and onsite solar.

The gas usage profile within each facility report shows the actual natural gas energy usage for the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

**Table 1
Electricity Billing Data**

ELECTRIC USAGE SUMMARY			
Utility Provider: PSE&G			
Rate: LPLS			
Meter No: 9200945			
Account No: 42 002 219 18			
Third Party Utility Provider: Direct Energy			
TPS Meter / Acct No:			
MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Dec-14	45,677	130.9	\$6,208
Jan-15	47,408	297.7	\$6,744
Feb-16	59,287	157.1	\$8,600
Mar-15	58,494	142.8	\$7,659
Apr-15	51,455	136.3	\$5,137
May-15	54,206	266.4	\$6,376
Jun-15	54,035	224.6	\$8,143
Jul-15	48,287	172.4	\$5,888
Aug-15	42,581	149.0	\$5,396
Sep-15	50,405	208.7	\$8,220
Oct-15	38,109	184.7	\$5,640
Nov-15	40,229	115.8	\$5,603
Totals	590,173	297.7 Max	\$79,615
AVERAGE DEMAND		182.2 KW average	
AVERAGE RATE		\$0.135 \$/kWh	

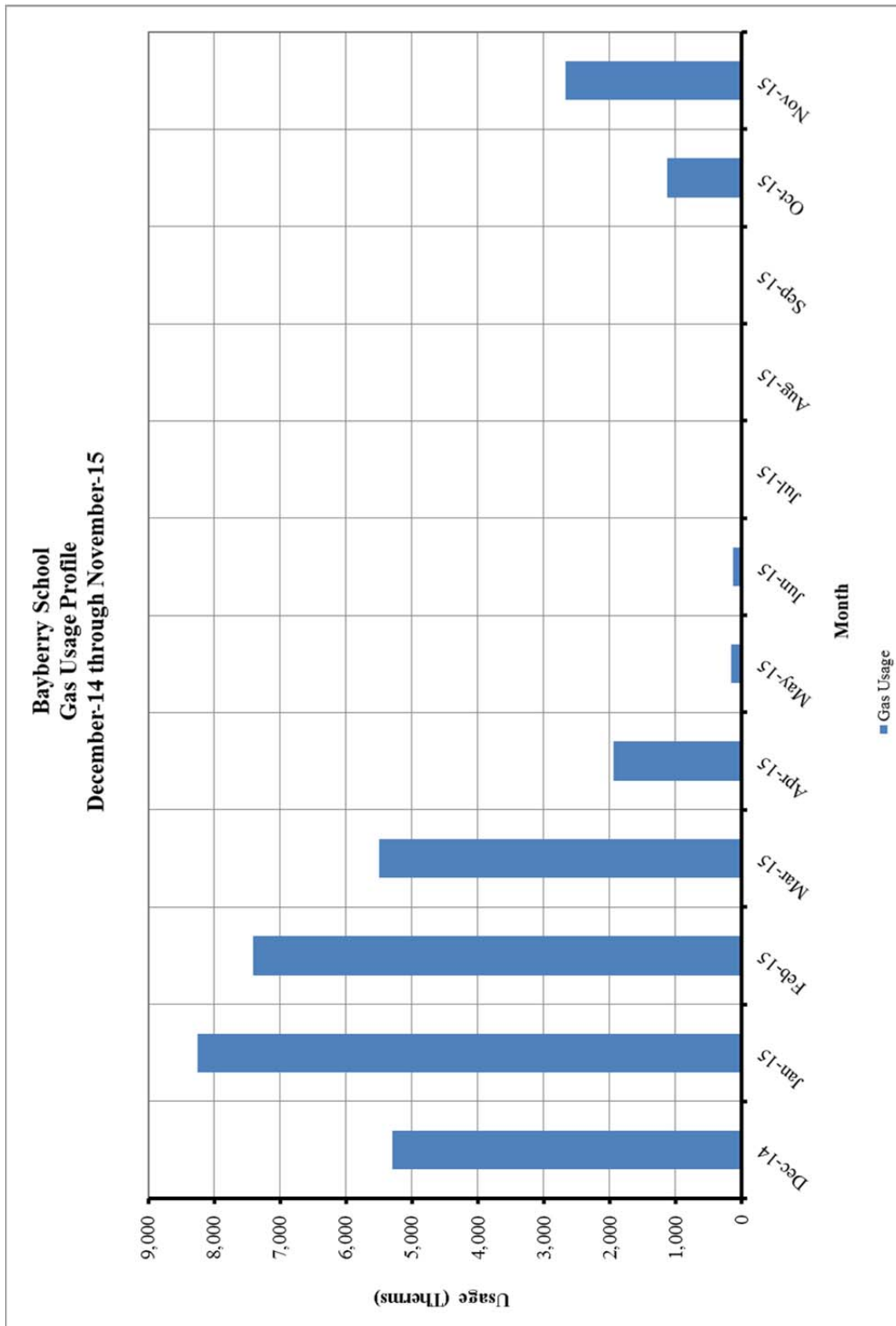
Figure 1
Electricity Usage Profile



**Table 2
Natural Gas Billing Data**

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 2523724		
Account No: 42 002 219 18		
Third Party Utility Provider: Direct Energy		
TPS Meter No: -		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Dec-14	5,293.97	\$4,705.30
Jan-15	8,244.39	\$6,988.84
Feb-15	7,411.72	\$6,067.08
Mar-15	5,490.57	\$4,368.24
Apr-15	1,930.41	\$1,149.01
May-15	154.65	\$187.41
Jun-15	126.88	\$174.35
Jul-15	0.00	\$103.31
Aug-15	3.23	\$105.11
Sep-15	17.25	\$116.18
Oct-15	1,127.96	\$710.73
Nov-15	2,662.33	\$2,620.77
TOTALS	32,463.36	\$27,296.33
AVERAGE RATE:	\$0.84	\$/THERM

**Figure 2
Natural Gas Usage Profile**



II. FACILITY ENERGY USE INDEX (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. Building Benchmarking data is collected and analyzed within the Commercial Building Energy Consumption Survey (CBECS), performed by the Energy and Information Administration (EIA). Building data is grouped by function types and tabulated, from which a median site and source energy intensity is determined. The national median or PEER Group Comparable in this instance is the middle value of the national population meaning half the buildings use more energy, and half use less. The PEER Group EUI allows us to compare the relative efficiency of the audited building to that of an average building with the same or similar primary function (i.e. group type).

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that **source energy** is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

$$\text{Building Site EUI} = \frac{(\text{Electric Usage in kBtu} + \text{Fuel Usage in kBtu})}{\text{Building Square Footage}}$$

$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu} \times \text{SS Ratio} + \text{Fuel Usage in kBtu} \times \text{SS Ratio})}{\text{Building Square Footage}}$$

**Table 3
Energy Use Index Summary**

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	590,173.0			2,014,851	3.140	6,326,631
NATURAL GAS		32,463.4		3,246,336	1.050	3,408,653
TOTAL				5,261,187		9,735,284
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document.						
AUDITED BUILDING				PEER COMPARISON		
BUILDING TYPE	Education			Education		
BUILDING AREA	90,704 SQUARE FEET					
BUILDING SITE EUI	58.00 kBtu/SF/YR		58.2 kBtu/SF/YR			
BUILDING SOURCE EUI	107.33 kBtu/SF/YR		141.5 kBtu/SF/YR			
		24%	More Efficient than PEER Comparison			

III. FACILITY DESCRIPTION

The Bayberry Elementary School is located at 113 Bayberry Lane in Watchung, New Jersey. This 90,704 SF facility was originally built in 1963 with additions in 1967 and 2003. A major HVAC upgrade was part of the 2003 addition with all equipment being replaced and interfaced to a Building Management System (BMS).

The building is a 1-story (common areas) and 2-story (classrooms) facility that is comprised of the principal's office, the main office, conference rooms, faculty room, technology office, MDF's, IDF's, small group study rooms, guidance offices, child study team offices, gym, locker rooms, computer rooms, teacher work room, all-purpose room/stage, music rooms, band room, media center, nurse's office, art room, serving kitchen, boiler room, various storage/utility rooms, etc.

In 2013, a PV system was installed by Somerset County on the center section of the roof (73 kW) and a canopy over one parking lot (112 kW).

Occupancy Profile

The typical hours of operation for the school are Monday through Friday between 6:30 AM – 5:00 PM. The building is staffed until 11:30 PM but the occupancy shuts down at 5:00 PM except where an activity is scheduled. Those individual areas are programmed to run as needed while the rest of the facility would be on a night time setback schedule. Summer hours are from 7:00 AM – 4:30 PM. Approximate enrollment is 352 students with a staff of 54 people.

Building Envelope

Exterior walls for the building are masonry brick faced with a concrete block construction. The windows throughout the facility are in good condition. Typical windows are double-pane with interior blinds and aluminum frames. Doors are double-pane with aluminum frames.

The roofing systems include a black EPOM membrane roofing system, 2" to 5" of rigid insulation, and a continuous vapor barrier; and modified bitumen roofing over rigid insulation (R-11) with a white rubberized cover.

HVAC Systems

In general, the school HVAC system consists of four (4) modular, condensing, hot water boilers; an air-cooled chiller; two (2) dual-temperature water pumps; one (1) glycol water pump; (5) packaged rooftop units; one large central air handling unit; vertical/horizontal unit ventilators; and numerous unit heaters, hot water convectors, roof exhaust fans and fan coil units.

The heating hot water system located in the boiler room includes four (4) Aerco Model BMK-2.0 GWB boilers each rated at 2,000 MBH input with a maximum thermal efficiency of 92%.

The heating hot water is pumped to the various hot water coils throughout the facility by two (2) Taco Model F150 dual-temperature, base-mounted, double-suction, centrifugal pumps. Each of these pumps has a flow of 650 GPM at 75 feet of TDH and a 20-HP Baldor motor with an efficiency of 93%. Each of these two pumps is controlled by a variable speed drive manufactured by Cutler-Hammer Model HV9000.

The chilled water system is comprised of a Trane Model RTAC 275A Air-Cooled Series R™ Rotary Liquid Chiller that serves the classroom unit ventilators and other chilled water coils throughout the facility. This air-cooled rooftop unit is rated at a nominal 275-Tons with an efficiency of 1.25 kW/Ton. The 30% glycol solution is pumped by a Taco Model F125 dual-temperature, base-mounted, double-suction, centrifugal pump. This pump has a flow of 200 GPM at 25 feet of TDH and a 2-HP Baldor motor with an efficiency of 86.5%.

The front offices are heated and cooled by two (2) Trane Model YCD180B packaged rooftop units with a heating capacity of 250 to 350 MBH each and a cooling capacity of 15 tons each. The gym is heated by a Des Champs Model PV-MZP-8707 energy recovery unit with a gas-fired heating capacity of 280 MBH. The gym and locker rooms are not cooled.

The all-purpose room/stage is heated and cooled by a Des Champs Model PV-MZP-8712 gas-fired heating and DX cooling air handling unit that is rated at approximately 50 tons of cooling capacity and 700 MBH of heating. The media center is heated and cooled by a Trane Model YCD150D packaged rooftop unit with a heating capacity of 150 to 250 MBH and a cooling capacity of 12.5 tons.

The coach's office is heated & cooled by a Trane Model PTHC09 thru-the-wall heat pump that is rated at 8.5 MBH of cooling and 10.1 MBH of heating capacity. The two (2) guidance offices are heated and cooled by Trane Model FCBB060 fan coil units rated at 10.7 MBH of cooling and 11.7 MBH of heating capacity each.

Most of the classrooms/faculty room are heated, cooled and ventilated by Trane Model VUV-100 and VUV-150 vertical unit ventilators that have hot water heating and chilled water cooling. These unit ventilators are rated from 1,000 CFM to 1,500 CFM; heating capacity from 51.8 to 74 MBH; and from 46.1 to 63.8 MBH of cooling capacity. Some of the vertical units in the various classrooms are interlocked with the Trane Model EUV wall exhausters. There are four (4) classrooms that have Trane Model HUV-100, HUV-150 and HUV-200 horizontal, ceiling-mounted unit ventilators that have hot water heating and chilled water cooling. These unit ventilators are rated from 1,000 CFM to 2,000 CFM; heating capacity from 51.8 to 128.3 MBH; and from 46.1 to 112.6 MBH of cooling capacity.

The stairwells, entrance vestibules, restrooms and hallways are heated by various electric unit heaters and hot water convectors. The main storage room is heated by four (4) TPI Corporation Model F3FUH07 electric unit heaters each with 7.5 kW of resistance heat. Various sized electric cabinet heaters heat the vestibules, stairwells, entrances, etc. The various restrooms have hot water convectors to heat the perimeter walls.

Fresh air is supplied to most of the spaces via the rooftop units, roof-mounted air intake housings, etc. Outside air intake louvers provide fresh air for the boiler room, mechanical rooms, and other spaces.

Exhaust System

Air is exhausted from the toilets via rooftop, down-blast fans that range in size from 300 CFM to 1,000 CFM. There are several ceiling cabinet exhaust fans that service several classrooms and toilets that range in size from 100 to 1,925 CFM. There are also numerous ceiling fans that range in size from 550 CFM to 1,500 CFM that serve some of the classrooms. Other classrooms have Trane Model EUV exterior wall exhausters ranging in size from 500 to 750 CFM. Kitchen make-up air and exhaust is provided by a Duo-Aire Model CAA-NH-40 make-up air rooftop unit with a Cook Model 150VH6B kitchen hood exhaust fan rated at 1,654 CFM with a 3/4 HP motor.

HVAC System Controls

All the HVAC units are controlled by an Automated Logic Building Management System (BMS) that monitors and controls the building HVAC equipment through graphics; schedule and modify the HVAC operation; collect, view and analyze trend information for space temperature; equipment operation and other points; and troubleshooting of the HVAC equipment. The boilers are controlled by an Aerco boiler management system that includes outside air temperature reset.

Domestic Hot Water

The domestic hot water heater located in the boiler room is a Bradford White Model MI76S6BN gas-fired domestic water heater rated at 76 MBH input with a 75-gallon capacity, a thermal efficiency of 80% and a recovery of 78 gallons per hour.

Plumbing System

In 2009, the restrooms were upgraded to low-flow sinks, toilets and urinals. The school utilizes sinks rated at 0.5 gallons per minute. Additionally, toilets and urinals located in the restroom areas have a rating of 1.6 and 1.0 gallons per flush, respectively.

Kitchen

The serving kitchen includes a convection oven, a Vollrath warmer, two (2) 4-door reach-in refrigerators, a Powers Equipment milk cooler, a pizza oven, and a Duo-Aire exhaust hood.

Lighting

Refer to the **Investment Grade Lighting Audit Appendix** for a detailed list of the lighting throughout the facility and estimated operating hours per space.

IV. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

V. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

**Table 1
ECM Financial Summary**

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST^A	ANNUAL SAVINGS^B	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
ECM #1	Interior Lighting Upgrades	\$117,805	\$12,314	9.6	56.8%
ECM #2	Interior Lighting Controls	\$38,080	\$2,108	18.1	-17.0%
ECM #3	Exterior Lighting Upgrades	\$13,445	\$1,925	7.0	114.8%
ECM #4	High-Efficiency Air-Cooled Chiller	\$318,869	\$5,313	60.0	-58.3%
ECM #5	High-Efficiency Gas-Fired Domestic Water Heater	\$24,800	\$825	30.1	-50.1%
ECM #6	De-Stratification Fans for APR	\$7,500	\$663	11.3	32.6%
ECM #7	EC Motors for Small Exhaust Fans	\$6,038	\$223	27.1	-44.6%
ECM #8	Vending Miser Controls	\$1,050	\$392	2.7	459.5%

Notes: A. Cost takes into consideration applicable NJ Smart Start™ incentives.

**Table 2
ECM Energy Summary**

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Interior Lighting Upgrades	35.1	91,212	0
ECM #2	Interior Lighting Controls	0.0	15,618	0
ECM #3	Exterior Lighting Upgrades	4.8	14,256	0
ECM #4	High-Efficiency Air-Cooled Chiller	39.8	39,359	0
ECM #5	High-Efficiency Gas-Fired Domestic Water Heater	0.0	0	983
ECM #6	De-Stratification Fans for APR	0.0	-224	825
ECM #7	EC Motors for Small Exhaust Fans	0.0	1,651	0
ECM #8	Vending Miser Controls	0.0	2,901	0

**Table 3
ECM Emissions Summary**

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	GREENHOUSE GAS EMISSIONS REDUCTION		
		CO₂ EMISSIONS (LBS)	NO_x EMISSIONS (LBS)	SO₂ EMISSIONS (LBS)
ECM #1	Interior Lighting Upgrades	138,642	255	593
ECM #2	Interior Lighting Controls	23,739	44	102
ECM #3	Exterior Lighting Upgrades	21,669	40	93
ECM #4	High-Efficiency Air-Cooled Chiller	59,826	110	256
ECM #5	High-Efficiency Gas-Fired Domestic Water Heater	11,501	9	0
ECM #6	De-Stratification Fans for APR	9,312	7	(1)
ECM #7	EC Motors for Small Exhaust Fans	2,510	5	11
ECM #8	Vending Miser Controls	4,410	8	19
	Total Emissions Savings	271,609	478	1,071

Notes: A. Emissions Reduction based on NJCEP published factors for electric & gas.

**Table 4
Facility Project Summary**

FACILITY PROJECT SUMMARY TABLE					
ENERGY CONSERVATION MEASURES	ANNUAL ENERGY SAVINGS (\$)	PROJECT COST (\$)	SMART START INCENTIVES	CUSTOMER COST	SIMPLE PAYBACK
Interior Lighting Upgrades	\$12,314	\$131,370	\$13,565	\$117,805	9.6
Interior Lighting Controls	\$2,108	\$38,800	\$720	\$38,080	18.1
Exterior Lighting Upgrades	\$1,925	\$14,905	\$1,460	\$13,445	7.0
High-Efficiency Air-Cooled Chiller	\$5,313	\$363,969	\$45,100	\$318,869	60.0
High-Efficiency Gas-Fired Domestic Water Heater	\$825	\$25,000	\$200	\$24,800	30.1
De-Stratification Fans for APR	\$663	\$7,500	\$0	\$7,500	11.3
EC Motors for Small Exhaust Fans	\$223	\$6,038	\$0	\$6,038	27.1
Vending Miser Controls	\$392	\$1,050	\$0	\$1,050	2.7
Total Project	\$23,763	\$588,632	\$61,045	\$527,587	22.2

Note the measure totals in this table do not take into account interactive effects of measures; see Method of Analysis Section III in Executive Report for further explanation.

The facility peak electrical demand and total project savings does not meet the qualifications for the Pay for Performance Program since the lighting upgrade savings is greater than 50% of the total energy savings for the facility.

ECM #1: Lighting Upgrade – Interior

Description:

The majority of the interior lighting throughout the Bayberry School is provided by 2x2, 1x4, 2x4 fluorescent fixtures with newer generation T8 lamps, in addition to various incandescent and CFL lamps and fixtures. It is recommended that all fixtures within the building be replaced with LED equivalent tube lamps, screw-in bulbs, and new LED fixtures where appropriate. No action is recommended for the gymnasium lighting.

This ECM includes replacing and retrofitting all of the interior lighting throughout the school with new LED type lamps and fixtures. It is recommended that the School District consult with a lighting engineer prior to retrofitting or replacing interior fixtures to ensure code required minimum light levels will be met.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed new fixtures/retrofits, costs, savings, and payback periods for each set of interior fixtures in the school.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	35.1
Electric Usage Savings (kWh)	91,212
Electric Cost Savings (\$)	\$14,594

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$131,370
NJ Smart Start Equipment Incentive (\$):	\$13,565
Net Installation Cost (\$):	\$117,805
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$12,314
Total Yearly Savings (\$/Yr):	\$12,314
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.6
Simple Lifetime ROI	56.8%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$184,710
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	\$29,198.73

ECM #2: Interior Lighting Controls Upgrade

Description:

Sometimes lights in a facility are left on unnecessarily. In many cases the lights may be left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. In some instances, lights might be left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas. In addition, daylight control systems can be implemented using daylighting control systems that dim the electric lighting in response to interior daylight levels. The light output of the fluorescent lamps (T8) is varied by using electronic dimming ballasts. Photosensors, typically mounted in the ceiling, are used to measure the quantity of daylight in the space then determine the amount of dimming required to maintain adequate lighting levels in the total space.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the “Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways,” document posted for public use April 2005. The study has found that buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors.

This ECM includes installation of ceiling or switch-mount sensors for the break rooms, conference rooms, offices, and restrooms. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent.

The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls which can be implemented in this ECM and outlines the proposed lighting/daylighting controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = (\% \text{ Savings} \times \text{Controlled Light Energy (kWh/Yr)})$$

$$\text{Savings} = \text{Energy Savings (kWh)} \times \text{Ave Elec Cost} \left(\frac{\$}{\text{kWh}} \right)$$

LIGHTING CONTROLS SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	0.0
Electric Usage Savings (kWh)	15,618
Electric Cost Savings (\$)	\$2,499

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$38,800
NJ Smart Start Equipment Incentive (\$):	\$720
Net Installation Cost (\$):	\$38,080
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$2,108
Total Yearly Savings (\$/Yr):	\$2,108
Estimated ECM Lifetime (Yr):	15
Simple Payback	18.1
Simple Lifetime ROI	-17.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$31,620
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	(\$12,914.83)

ECM #3: Exterior Lighting Upgrade**Description:**

The exterior lighting at the Bayberry School includes exterior building lighting only. The exterior of the building is currently lit by metal halide wall packs, high-pressure sodium wall packs, and CFL fixtures. Concord Engineering recommends upgrading all of the exterior lighting to an energy-efficient lighting system that includes LED bulbs and LED wall packs.

This ECM would replace the existing exterior lamps and fixtures with equivalent LED lamps and fixtures.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix** that outlines the proposed retrofits, costs, savings, and payback periods.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	4.8
Electric Usage Savings (kWh)	14,256
Electric Cost Savings (\$)	\$2,281

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$14,905
NJ Smart Start Equipment Incentive (\$):	\$1,460
Net Installation Cost (\$):	\$13,445
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,925
Total Yearly Savings (\$/Yr):	\$1,925
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.0
Simple Lifetime ROI	114.8%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$28,875
Internal Rate of Return (IRR)	12%
Net Present Value (NPV)	\$9,535.53

ECM #4: Air-Cooled Chiller Replacement**Description:**

The existing air-cooled chiller serving the Bayberry School is a 275 ton capacity Trane RTAC 275A air-cooled rotary chiller located on the ground near the boiler room. The chiller is approximately twelve (12) years old and has a full load efficiency of 9.8 EER and a part load efficiency of 13.3 EER.

This ECM would install one (1) new high efficiency air-cooled chiller with variable frequency drives on the compressors and a full load efficiency of 11.9 EER with a part load efficiency of 21.9 EER.

Energy Savings Calculations:

$$\text{Electric Usage} = \text{Capacity (tons)} \times \frac{12,000 \text{ Btu}}{1000 \text{ W}} \times \frac{1}{\text{EER}} \times \text{Operating Hours}$$

$$\text{Demand Savings} = \text{Capacity (tons)} \times \left(\frac{1}{\text{EER}_{\text{Old}}} - \frac{1}{\text{EER}_{\text{New}}} \right) \times 67\% \text{ Capacity Factor}$$

$$\text{Energy Cost} = \text{Electric Usage (kWh)} \times \text{Rate} \left(\frac{\$}{\text{kWh}} \right)$$

CHILLER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Air Cooled Chiller	High Efficiency Chiller	
Operating Capacity (Tons)	275.0	275.0	
Chiller Efficiency (EER)	9.8	11.9	
Full Load Cooling Hrs (Est.)	400	400	
Cooling Energy (kWh)	134,694	110,924	
Chiller Operating Hours (Year Round)	800	800	
Chiller Part Load Hours Est.	400	400	
Chiller IPLV (EER)	13.3	21.9	
Chiller Part Load %	40.0%	40.0%	
Part Load Cooling Energy (kWh)	39,699	24,110	
Elec Cost (\$/kWh)	0.160	0.160	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Demand (KW)	225.6	185.8	39.8
Electric Energy (kWh)	174,393	135,034	39,359
Electric Energy Cost (\$)	\$27,903	\$21,605	\$6,297

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$363,969
NJ Smart Start Equipment Incentive (\$):	\$45,100
Net Installation Cost (\$):	\$318,869
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$5,313
Total Yearly Savings (\$/Yr):	\$5,313
Estimated ECM Lifetime (Yr):	25
Simple Payback	60.0
Simple Lifetime ROI	-58.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$132,825
Internal Rate of Return (IRR)	-6%
Net Present Value (NPV)	(\$226,352.95)

ECM #5: High-Efficiency Gas-Fired Domestic Water Heater**Description:**

Domestic hot water for the Bayberry School is provided by a Bradford White Model M-I-75S gas-fired domestic water heater rated at 76 MBH. This unit has a rated thermal efficiency of only 80% and a recovery of 78 gallons per hour. This water heater is less efficient than newer water heaters. Therefore, it is recommended that this domestic water heater be replaced.

This ECM would replace the existing gas-fired domestic water heater with a condensing gas-fired water heater with a 96% thermal efficiency.

Energy Savings Calculations:

Energy Density for “Education” type building = 5.2 kBtu / SF / year

$$\text{DHW Heat Usage} = \text{Energy Density} \left(\frac{\text{kBtu} - \text{yr}}{\text{SF}} \right) \times \text{Building Square Footage (SF)}$$

$$\text{DHW Total Usage} = \frac{\text{DHW Heat Usage}}{\text{Heating Eff \%} \times \text{Fuel Heat Value} \left(\frac{\text{Btu}}{\text{Fuel Unit}} \right)}$$

$$\text{Energy Cost} = \text{Heating Fuel Usage (Fuel Units)} \times \text{Fuel Cost} \left(\frac{\$}{\text{Unit}} \right)$$

DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Gas-Fired Water Heater	High Efficiency Water Heater	
Building Type	Education		
Building Square-foot	90,704	90,704	
Domestic Water Usage, kBtu	471,660.80	471,660.80	
DHW Heating Fuel Type	Gas	Gas	
Heating Efficiency	80%	96%	16%
Total Usage (kBtu)	589,576	491,313	98,263
Electric Cost (\$/kWh)	\$ 0.160	\$ 0.160	
Nat Gas Cost (\$/Therm)	\$ 0.840	\$ 0.840	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Usage (kWh)	0	0	0
Natural Gas Usage (Therms)	5,896	4,913	983
Energy Cost (\$)	\$4,952	\$4,127	\$825
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off of RS Means Unit Cost data, vendor quotes, and local Mechanical Contractor estimates.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$25,000
NJ Smart Start Equipment Incentive (\$):	\$200
Net Installation Cost (\$):	\$24,800
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$825
Total Yearly Savings (\$/Yr):	\$825
Estimated ECM Lifetime (Yr):	15
Simple Payback	30.1
Simple Lifetime ROI	-50.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$12,375
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	(\$14,951.20)

ECM #6: De-Stratification Fans in the All Purpose Room**Description:**

The All Purpose Room (APR) has an 18-foot ceiling. In rooms with high ceilings typically stratification of heated air occurs, resulting in air at ceiling level being warmer than the floor. Since temperature at the floor level dictates the comfort of occupants and is typically the location of the thermostat controlling the system, this results in additional operating hours to satisfy space conditions. A de-stratification fan continuously mixes the air, balancing temperatures from ceiling to floor and wall to wall which helps the HVAC system maintain the desired temperature.

This ECM would install two (2) Airius Model A25 de-stratification fans with 92% efficient fan motors in the APR to be suspended from the ceiling, with all required electrical wiring and supports. These fans can be tied into the BMS or wall-mounted potentiometers. These fans should only operate during heating season to help maintain a higher floor temperature and reduce cycling time.

Energy Savings Calculations:

The calculations are based on the manufacturer's percent savings utilizing the height of the ceiling and associated temperature differential between floor and ceiling. The temperature differential in this case was estimated at 8.5 degrees Fahrenheit.

$$\text{Heating Energy (kBtu)} = 80\% \text{ Oversize Factor} \times \text{Space Heating Capacity} \times \text{HDD} \times \text{Adj. Factor} \times 24 \frac{\text{hr}}{\text{day}} \times \frac{1}{\text{Design } \Delta T} \times \frac{1}{\text{Efficiency}}$$

$$\text{Savings (kBtu)} = \text{Heating Energy} \times \text{Percent Savings}$$

$$\text{Fan Power Penalty (kWh)} = \text{Fan Power (W)} \times \text{Winter Operating Hours} \times \frac{1 \text{ kWh}}{1,000 \text{ W}}$$

Each A25 unit has an 85-watt fan motor.

DESTRATIFICATION FAN ANALYSIS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
Description	Existing All Purpose Room	Proposed Room w/ De-Stratification Fans	
Space Heating Type	Gas-Fired Rooftop Unit	Gas-Fired Rooftop Unit	
Space Heating Capacity (MBH)	700	700	
Heating Efficiency (%)	80%	80%	
Heating Degree Days (65 F)	5062	5062	
Degree Day Adjustment Factor	0.45	0.45	
Space Ceiling Height (ft)	18	18	
Ceiling-Floor ΔT ($^{\circ}F$)	8.5	8.5	
Percent Energy Savings	-	22%	
Destrat Fan Power (kWh)	-	224	
Heating Energy (kBtu)	375,184	292,643	
Electric Rate (\$/kWh)	\$0.160	\$0.160	
Natural Gas (\$/Therm)	\$0.84	\$0.84	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	0	224	(224)
Natural Gas (Therms)	3,752	2,926	825
Energy Cost (\$)	\$3,152	\$2,494	\$657

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$7,500
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$7,500
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$663
Total Yearly Savings (\$/Yr):	\$663
Estimated ECM Lifetime (Yr):	15
Simple Payback	11.3
Simple Lifetime ROI	32.6%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	\$9,945
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	\$414.85

ECM #7: EC Motors on Small Rooftop Exhaust Fans**Description:**

Electronically Commutated (EC) Motors are proven to generate substantial savings on small motor applications. These motors currently are available in sizes up to 1 horsepower, and provide efficiencies similar to how NEMA premium efficiency motor would at a large horsepower. The motor works much like a direct current (DC) motor and is without mechanical brushes and the commutator reduces friction losses in the motor. The motors are programmable and can be used for a wide range of applications.

This measure would replace the existing fan motors in the rooftop exhaust fans with fractional horsepower. In total, there is one (1) 3/4 HP motors and four (4) 1/6 HP motors.

Energy Savings Calculations:

Measured savings for ECM motors has proven that up to 65% reduction in power can be realized through the installation these motors.

$$\text{Electric Energy (kWh)} = \frac{(\text{Amps} \times \text{Volts} \times \text{Phase}^{1/2})}{1000} \times \text{Power Factor} \times \text{Operating Hours}$$

$$\text{Energy Savings} = \text{Electric Energy} \times \text{Power Reduction (40\%)}$$

Energy Savings Calculations for Each Size Exhaust Fan Motor:

ELECTRONICALLY COMMUTATED MOTOR CALCULATION			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	PSC	EC Motor	
Quantity of Motors	1	1	
Motor Nameplate HP	3/4	3/4	
Full Load Amps	3.7		
Voltage	208	208	
Phase	3	3	
Power Factor	55%	55%	
Operating Hrs	2400	2400	
Load Reduction	-	40.0%	
Elec Cost (\$/kWh)	0.160	0.160	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Energy (kWh)	1,760	1,056	704
Electric Energy Cost (\$)	\$282	\$169	\$113
COMMENTS:	Rooftop Exhaust Fans		

ELECTRONICALLY COMMUTATED MOTOR CALCULATION			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	PSC	EC Motor	
Quantity of Motors	4	4	
Motor Nameplate HP	1/6	1/6	
Full Load Amps	3.9		
Voltage	115	115	
Phase	1	1	
Power Factor	55%	55%	
Operating Hrs	2400	2400	
Load Reduction	-	40.0%	
Elec Cost (\$/kWh)	0.160	0.160	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Energy (kWh)	2,368	1,421	947
Electric Energy Cost (\$)	\$379	\$227	\$152
COMMENTS:	Rooftop Exhaust Fan		

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based on RS Means Unit Cost Data and local contractor pricing.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$6,038
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$6,038
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$223
Total Yearly Savings (\$/Yr):	\$223
Estimated ECM Lifetime (Yr):	15
Simple Payback	27.1
Simple Lifetime ROI	-44.6%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$3,345
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	(\$3,375.84)

ECM #8: Vending Miser Controls

Description:

The Bayberry School currently utilizes vending machines in select areas within the building. Vending machines are located in the faculty lounge and in the snack area of the kitchen which can be in use for a limited time during the day. The installation of the Vending Miser system will help reduce the operating hours of vending machines.

Cold beverage machines regularly operate inefficiently trying to maintain a constant cool temperature within the machine and snack machines with no cooling usually have lights that operate 24/7. The VendingMiser® system incorporates innovative energy-saving technology into a small plug-and-play device that in conjunction with a passive infrared sensor regulate the operation of the cold beverage and snack machines based on occupancy and room temperature. This ECM approximates the installation of one (1) system for the cold beverage machine and one (1) system for the snack machine.

Energy Savings Calculations:

Cold Drink and Snack Vending Machine Energy Conservation			
		Input Variables	
Energy Analysis Prepared For:	Energy Costs (\$0.000 per kwh)		\$0.135
	Facility Occupied Hours per Week		40
Bayberry School	Number of Cold Drink Vending Machines		1
	Number of Uncooled Snack Machines		1
www.VendingMiserStore.com	Power Requirements of Cold Drink Machine (avg watts)		427
	Power Requirements of Snack Machine (avg watts)		80
	VendingMiser Sale Price (for cold drink machines)		\$600.00
	OfficeMiser Sale Price (for snack machines)		\$450.00
Savings Analysis			
	Before	After	
Cold Drink Machines	\$505.32	\$185.58	Cost of Operation
	3,743	1,375	kWh
		63%	% Energy Savings
Snack Machines	\$94.35	\$22.46	Cost of Operation
	699	166	kWh
		76%	% Energy Savings
Project Summary			
Present kWh	Projected kWh	kWh Savings per Year	
4,442	1,541	2,901	
Present Cost	Projected Costs	Annual Savings	Per Cent Savings
\$599.66	\$208.04	\$391.62	65%
			Total Project Cost
			\$1,050.00
			Break Even (Months)
			32.2

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,050
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$1,050
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$392
Total Yearly Savings (\$/Yr):	\$392
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.7
Simple Lifetime ROI	459.5%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$5,874
Internal Rate of Return (IRR)	37%
Net Present Value (NPV)	\$3,625.13

VI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

- A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
- B. Maintain all weather stripping on windows and doors.
- C. Clean all light fixtures to maximize light output.
- D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
- E. Turn off computers when not in use. Ensure computers are not running in screen saver mode.
- F. Replace any old CRT Monitors with LED/LCD Type Monitors, which can draw as much as a quarter the power of an equivalent CRT monitor.
- G. Ensure outside air dampers are functioning properly and only open during occupied mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING

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ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Saving * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1+DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/yr)	(\$/yr)	(\$/yr)		(Yr)	(\$)	(\$)	(%)	(Yr)	(\$)
ECM #1	Interior Lighting Upgrades	\$81,440	\$49,930	\$13,565	\$117,805	\$12,314	\$0	\$12,314	15	\$184,710	\$0	56.8%	9.6	6.23%	\$29,198.73
ECM #2	Interior Lighting Controls	\$31,000	\$7,800	\$720	\$38,080	\$2,108	\$0	\$2,108	15	\$31,620	\$0	-17.0%	18.1	-2.24%	(\$12,914.83)
ECM #3	Exterior Lighting Upgrades	\$8,305	\$6,600	\$1,460	\$13,445	\$1,925	\$0	\$1,925	15	\$28,875	\$0	114.8%	7.0	11.53%	\$9,535.53
ECM #4	High-Efficiency Air-Cooled Chiller	\$229,500	\$134,469	\$45,100	\$318,869	\$5,313	\$0	\$5,313	25	\$132,825	\$0	-58.3%	60.0	-5.85%	(\$226,352.95)
ECM #5	High-Efficiency Gas-Fired Domestic Water Heater	\$15,000	\$10,000	\$200	\$24,800	\$825	\$0	\$825	15	\$12,375	\$0	-50.1%	30.1	-7.65%	(\$14,951.20)
ECM #6	De-Stratification Fans for APR	\$4,500	\$3,000	\$0	\$7,500	\$663	\$0	\$663	15	\$9,945	\$0	32.6%	11.3	3.75%	\$414.85
ECM #7	EC Motors for Small Exhaust Fans	\$3,000	\$3,038	\$0	\$6,038	\$223	\$0	\$223	15	\$3,345	\$0	-44.6%	27.1	-6.61%	(\$3,375.84)
ECM #8	Vending Miser Controls	\$500	\$550	\$0	\$1,050	\$392	\$0	\$392	15	\$5,874	\$0	459.5%	2.7	36.96%	\$3,625.13

- Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
 2) The variable DR in the NPV equation stands for Discount Rate
 3) For NPV and IRR calculations: From n=0 to N periods where N is the lifetime of ECM and Cn is the cash flow during each period.

APPENDIX B

Concord Engineering Group, Inc.

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SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives from July 1, 2015 to June 30, 2016, further details including how to apply, forms, and calculated incentive values can be found the Clean Energy Website. (www.njcleanenergy.com)

Electric Chillers

Water-Cooled Chillers	Constant Speed: Base: \$8 - \$30 per ton Performance Add: \$2 - \$2.25 per ton Variable Speed: Base: \$12 - \$44 per ton Performance Add: \$2 - \$4.00 per ton
Air-Cooled Chillers	Constant Speed: Base: \$20 per ton Performance Add: \$3.50 per ton Variable Speed: Base: \$90 - \$92 per ton Performance Add: \$4.00 per ton

Energy Efficiency must comply with ASHRAE 90.1-2013

Gas Cooling

Gas Absorption Chillers (Indirect & Direct-Fired)	\$185 - \$450 per ton
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Desiccant Systems

\$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	\$73 - \$92 per ton
Air-to-Air Heat Pumps	\$73 - \$92 per ton
Water-Source Heat Pumps	\$81 per ton
Packaged Terminal AC & HP	\$65 per ton
Central DX AC Systems	\$40- \$72 per ton
Dual Enthalpy Economizer Controls	\$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	\$75 per thermostat
A/C Economizing Controls	≤ 5 tons \$85/unit; >5 tons \$170/unit

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Hot Water Gas Fired Boilers < 300 MBH	Non-Condensing: \$0.95 per MBH, Minimum \$400 per unit Condensing: \$2.00 per MBH, Minimum \$1000 per unit
Hot Water Gas Fired Boilers ≥ 300 - 1500 MBH	Non-Condensing: \$1.75 per MBH Condensing: \$2.20 per MBH Minimum \$1000 per unit
Hot Water Gas Fired Boilers >1500 - ≤ 2500 MBH	Non-Condensing: \$1.50 per MBH Condensing: \$2.20 per MBH
Hot Water Gas Fired Boilers >2500 - ≤ 4000 MBH	Non-Condensing: \$1.30 per MBH Condensing: \$2.00 per MBH
Steam, Except Natural Draft, Gas fired Boilers < 300 MBH	\$1.40 per MBH, Minimum \$400 per unit
Steam, Except Natural Draft, Gas fired Boilers ≥ 300 – 1500 MBH	\$1.20 per MBH
Steam, Except Natural Draft, Gas fired Boilers > 1500 – 2500 MBH	\$1.20 per MBH
Steam, Except Natural Draft, Gas fired Boilers > 2500 – 4000 MBH	\$1.00 per MBH
Steam, Natural Draft < 300 MBH	\$1.40 per MBH, Minimum \$300 per unit
Steam, Natural Draft ≥ 300 - 1500 MBH	\$1.00 per MBH
Steam, Natural Draft >1500 - ≤ 2500 MBH	\$0.90 per MBH
Steam, Natural Draft >2500 - ≤ 4000 MBH	\$0.70 per MBH
All Types Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	\$400 per unit, AFUE ≥ 95%
Boiler Economizing Controls	\$1,200 - \$2,700
Low Intensity Infrared Heating	\$300 - \$500 per unit

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons, 0.67 energy factor or better	\$50 per unit
Gas-Fired Water Heaters > 50 gallons	\$1.00 - \$2.00 per MBH
Gas-Fired Booster Water Heaters	\$17 - \$35 per MBH
Gas Fired Tankless Water Heaters	\$300 per unit

Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER \geq 16
	\$600 per ton, EER \geq 18
	\$750 per ton, EER \geq 20

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps \geq 20 hp	\$60 per VFD rated hp
Rotary Screw Air Compressors \geq 25 hp	\$5,250 to \$12,500 per drive
Centrifugal Fan Applications on Constant Volume HVAC Systems	\$80 per VFD rated hp, maximum \$6,000 per drive
Cooling Towers \geq 10 hp	\$60 per VFD rated hp
Boiler Fans \geq 5 HP	\$65 to \$155 per hp
Boiler Feed Water Pumps \geq 5 HP	\$60 to \$155 per hp
Commercial Kitchen Hood up to 50 HP	Retrofit \$55 – \$300 per hp New Hood \$55 - \$250 per hp

Prescriptive Lighting

T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
For retrofit of T-8 fixtures by permanent de-lamping & new reflectors (Electronic ballast replacement required)	\$5 per fixture
T-5 and T-8 High Bay Fixtures	\$25 - \$150 per fixture
HID \geq 100w Replace with new induction fixture. (must be 30% less watts/fixture than HID system)	\$70 per fixture
HID \geq 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture

Prescriptive Lighting - LED

LED Architectural Floor and Spot Luminaires	\$50 per fixture
LED Bollard Fixtures	\$50 per fixture
LED Display Case Lighting	\$30 per display case
LED Fuel Pump Canopy	\$100 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	\$150 per fixture
LED High-Bay-Aisle Lighting	\$150 per fixture
LED Linear Ambient Luminaires (Indirect, Indirect/Direct, Direct/Indirect, Direct)	2' Fixtures - \$20/fixture 3' Fixtures - \$30/fixture 4' Fixtures - \$45/fixture 6' Fixtures - \$60/fixture 8' Fixtures - \$75/fixture
LED Linear Replacement Lamps (2' & 4' only)	\$5 per lamp
Luminaires for Ambient Lighting of Interior Commercial Spaces (1x4, 2x2, 2x4 New Fixtures and Retrofit Kits)	1x4 LED - \$15 per fixture 2x2 LED - \$15 per fixture 2x4 LED - \$25 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	\$100 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	\$50 per fixture
LED Outdoor Wall-Mounted Area Luminaries	\$100 per fixture
LED Parking Garage Luminaries	\$100 per fixture
LED Retrofit Kits for Large Outdoor Pole / Arm-Mounted Area and Roadway Luminaires	\$150 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$30 per 4 foot \$42 per 5 foot \$65 per 6 foot
LED Shelf-Mtd. Display & Task Lights	\$15 per linear foot

LED Stairwell and Passageway Luminaires	\$40 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	\$30 per fixture
LED Wall-Wash Lights	\$30 per fixture
EnergyStar Commercial Lighting Fixtures	\$5 to \$10 per fixture
EnergyStar Screw and Pine-Based Bulbs	\$5 to \$10 per lamp

Lighting Controls – Occupancy Sensors

Wall Mounted (Existing Facilities Only)	\$20 per control
Remote Mounted (Existing Facilities Only)	\$35 per control
Daylight Dimming Controls	\$45 per fixture controlled
Occupancy Based hi-low Dimming Control	\$35 per fixture controlled
Occupancy Sensor Remote Mounted High-Bay (Existing Facilities Only)	\$35 per control

Refrigeration Doors/Covers

Energy-Efficient Doors/Covers for Installation on Open Refrigerated Cases	\$100 per door
Aluminum Night Curtains for Installation on Open Refrigerated Cases	\$3.50 per linear foot

Refrigeration Controls

Door Heater Controls	\$50 per control
Electric Defrost Controls	\$50 per control
Evaporator Fan Controls	\$75 per control
Novelty Cooler Shutoff	\$50 per control

Refrigerator / Freezer Case Premium Efficiency Motors

Fraction ECM Motor < 1 HP	\$40 per ECM for replacement of existing shaded-pole motor
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Food Service Equipment

Combination Oven/Steamer (Electric)	\$1,000/oven
Combination Oven/Steamer (Natural Gas)	\$750/oven
Convection Oven (Electric)	\$350/oven
Convection Oven (Natural Gas)	\$500/oven
Rack Oven (Natural Gas)	\$1,000/single oven, \$2,000/double oven
Conveyor Oven (Natural Gas)	\$500/small deck \$750/large deck
Fryer (Electric)	\$200/vat
Fryer (Natural Gas)	\$749/vat
Large Vat Fryer (Electric)	\$200/vat
Large Vat Fryer (Natural Gas)	\$500/vat
Griddle (Electric)	\$300/griddle
Griddle (Natural Gas)	\$125/griddle
Steam Cooker (Electric)	\$1,250/steamer
Steam Cooker (Natural Gas)	\$2,000/steamer
Insulated Holding Cabinets	\$200 to \$300/unit
Glass Door Refrigerators	\$75 to \$150/unit
Solid Door Refrigerators	\$50 to \$200/unit
Glass Door Freezers	\$200 to \$1,000/unit
Solid Door Freezers	\$100 to \$600/unit
Ice Machines	\$50 to \$500/unit
Dishwashers	\$400 to \$1,500/unit

Other Equipment Incentives

Performance Lighting	\$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2007 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	\$0.16 KWh and \$1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and an IRR of at least 10%.

APPENDIX C



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ENERGY STAR[®] Statement of Energy Performance

87

ENERGY STAR[®]
Score¹

Bayberry Elementary School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 90,704
Built: 1963

For Year Ending: October 31, 2015
Date Generated: February 04, 2016

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

Property & Contact Information

Property Address

Bayberry Elementary School
113 Bayberry Lane
Watchung, New Jersey 07069

Property Owner

Watchung Board of Education
One Dr. Parenty Way
Watchung, NJ 07069
(____)____-____

Primary Contact

Irfan Evcil
One Dr. Parenty Way
Watchung, NJ 07069
(908) 755-8536
ievcil@watchungschools.us

Property ID: 4778052

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

55.7 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	1,459,463 (29%)
Electric - Solar (kBtu)	539,578 (11%)
Natural Gas (kBtu)	3,053,941 (60%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	86.1
National Median Source EUI (kBtu/ft ²)	141.9
% Diff from National Median Source EUI	-35%

Source EUI

91.8 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	358
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Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

,
(____)____-____



**Professional Engineer Stamp
(if applicable)**



LEARN MORE AT
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ENERGY STAR® Data Verification Checklist

87

ENERGY STAR®
Score¹

Bayberry Elementary School

Registry Name: Bayberry Elementary School

Primary Function: K-12 School

Gross Floor Area (ft²): 90,704

Built: 1963

For Year Ending: 10/31/2015

Date Generated: 02/04/2016

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

Property & Contact Information

Property Address

Bayberry Elementary School
113 Bayberry Lane
Watchung, New Jersey 07069

Property ID: 4778052

Property Owner

Watchung Board of Education
One Dr. Parenty Way
Watchung, NJ 07069
(____)____-____

Primary Contact

Irfan Evcil
One Dr. Parenty Way
Watchung, NJ 07069
(908) 755-8536
ievcil@watchungschools.us

1. Review of Whole Property Characteristics

Basic Property Information

1) Property Name: Bayberry Elementary School

Is this the official name of the property?

Yes No

If "No", please specify: _____

2) Primary Function: K-12 School

Is this an accurate description of the primary use of this property?

Yes No

3) Location:

113 Bayberry Lane
Watchung, New Jersey 07069

Is this correct and complete?

Yes No

4) Gross Floor Area: 90,704 ft²

Yes No

Does this represent the entire property? (i.e., no part of the building/property was excluded/subtracted from the total) If “no” please specify what space has been excluded.

5) Average Occupancy: 100

Is this occupancy accurate for the entire 12 month period being assessed?

Yes No

6) Number of Buildings: 1

Does this number accurately represent all structures?

Yes No

Notes:

Indoor Environmental Standards

1) Ventilation for Acceptable Indoor Air Quality

Does this property meet the ASHRAE Standard 62 for ventilation for acceptable indoor air quality?

Yes No

2) Acceptable Thermal Environmental Conditions

Does this property meet the ASHRAE Standard 55 for thermal comfort?

Yes No

3) Adequate Illumination

Does this property adhere to the IESNA Lighting Handbook for lighting quality?

Yes No

Notes:

2. Review of Property Use Details

K-12 School: Building Use

★ This Use Detail is used to calculate the 1-100 ENERGY STAR Score.

★ **1) Gross Floor Area: 90,704 ft²**

Is this the total size, as measured between the principal exterior surfaces of the enclosing fixed walls of the building(s)? This includes all areas inside the building(s) such as: occupied tenant areas, common areas, meeting areas, break rooms,

Yes No

restrooms, elevator shafts, mechanical equipment areas, and storage rooms. Gross Floor Area should not include interstitial plenum space between floors, which may house pipes and ventilation. Gross Floor Area is not the same as rentable, but rather includes all area inside the building(s). Leasable space would be a sub-set of Gross Floor Area. In the case where there is an atrium, you should count the Gross Floor Area at the base level only. Do not increase the size to accommodate open atrium space at higher levels. The Gross Floor Area should not include any exterior spaces such as balconies or exterior loading docks and driveways.

2) Gymnasium Floor Area: 5,000 ft²

Does the gymnasium floor area include all areas devoted to a gymnasium, including gymnasium/athletic areas, spectator areas, locker rooms, and other associated spaces?

Yes No

★ 3) High School: No

Is the property a high school (teaching grades 10, 11, and/or 12)? If the property 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'.

Yes No

4) Number of Workers on Main Shift: 57

Is this the number of workers present during the main shift? Note that this is not a total count of workers, but rather a count of workers who are present at the same time. For example, if there are two daily eight hour shifts of 100 workers each, the Number of Workers on Main Shift value is 100. Number of Workers on Main Shift may include employees of the property, sub-contractors who are onsite regularly, and volunteers who perform regular onsite tasks. Number of Workers should not include visitors to the buildings such as clients, customers, or patients.

Yes No

5) Student Seating Capacity: 340

Is this the maximum number of students for which the school was designed? This should include the seating capacity of the entire school. If portable classrooms have been added to the school, include the capacity of these classrooms, as they expand the overall capacity of the school.

Yes No

6) Months in Use: 12

Is this the total number of months that the property is open for standard activities?

Yes No

★ 7) Weekend Operation: 100% Yes

Does the property include regular activities on the weekend beyond the scope of maintenance, cleaning, and security personnel? Weekend activity could include any time when the property is used for classes, performances, or other school or community activities. The Yes selection is appropriate for any property that is open on one or both days of the weekend during one or more seasons of the year.

Yes No

★ 8) Number of Computers: 89

Is this the total number of desktop computers, laptops, and data servers at the property? This number should not include tablet computers, such as iPads, or any other types of office equipment. The count should only reflect computers that are owned by the school. It should not include any computers that are brought onsite by students or staff.

Yes No

★ 9) Cooking Facilities: 100% Yes

Does the property have a commercial cooking area designed to provide and serve food to occupants and/or visitors? This may include restaurants and cafeterias. If the property contains only employee break room kitchens, this field should be marked No.

Yes No

★ 10) **Number of Walk-in Refrigeration/Freezer Units: 0**

Is this the total count of walk-in units at the property? Walk-in Refrigeration/Freezers are typically very large units located in storage areas or commercial kitchens that would not be accessible to all building occupants. This count should only include large storage units that a person actually walks into in order to store or retrieve perishable goods.

Yes No

★ 11) **Percent That Can Be Heated: 100**

Is this the total percentage of the property that can be heated by mechanical equipment?

Yes No

★ 12) **Percent That Can Be Cooled: 90**

Is this the total percentage of the property that can be cooled by mechanical equipment? This includes all types of cooling from central air to individual window units.

Yes No

13) **School District: Watchung**

Is this the administrative school district in which the property is located?

Yes No

Notes:

3. Review of Energy Consumption

Data Overview

Site Energy Use Summary

Electric - Grid (kBtu)	1,459,462.9 (29%)
Electric - Solar (kBtu)	539,578.4 (11%)
Natural Gas (kBtu)	3,053,940.7 (60%)
Total Energy (kBtu)	5,052,981.9

National Median Comparison

National Median Site EUI (kBtu/ft ²)	86.1
National Median Source EUI (kBtu/ft ²)	141.9
% Diff from National Median Source EUI	-35.3%

Energy Intensity

Site (kBtu/ft ²)	55.7
Source (kBtu/ft ²)	91.8

Emissions (based on site energy use)

Greenhouse Gas Emissions (Metric Tons CO ₂ e)	357.6
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Power Generation Plant or Distribution Utility:

Public Service Electric & Gas Co

Note: All values are annualized to a 12-month period. Source Energy includes energy used in generation and transmission to enable an equitable assessment.

Summary of All Associated Meters

The following meters are associated with the property, meaning that they are added together to get the total energy use for the property. Please see additional tables in this checklist for the exact meter consumption values.

Meter Name	Fuel Type	Start Date	End Date	Associated With
Electric Solar Meter	Electric on Site Solar	10/31/2014	In Use	Bayberry Elementary School
Electric Grid Meter	Electric	10/29/2014	In Use	Bayberry Elementary School
Natural Gas	Natural Gas	10/28/2014	In Use	Bayberry Elementary School

Total Energy Use

Yes No

Do the meters shown above account for the total energy use of this property during the reporting period of this application?

Additional Fuels

Yes No

Do the meters above include all fuel *types* at the property? That is, no additional fuels such as district steam, generator fuel oil have been excluded.

On-Site Solar and Wind Energy

Yes No

Are all on-site solar and wind installations reported in this list (if present)? All on-site systems must be reported.

Notes:

Electric on Site Solar Meter: Electric Solar Meter (kWh (thousand Watt-hours))

Associated With: Bayberry Elementary School

Start Date	End Date	Energy Used Onsite	Energy Exported Offsite	REC Ownership
10/31/2014	11/30/2014	7,902	0	Owned
11/30/2014	12/31/2014	5,528	0	Owned
12/31/2014	01/31/2015	3,691	0	Owned
01/31/2015	02/28/2015	610	0	Owned
02/28/2015	03/31/2015	8,004	0	Owned
03/31/2015	04/30/2015	21,655	0	Owned
04/30/2015	05/31/2015	24,160	0	Owned

Start Date	End Date	Energy Used Onsite	Energy Exported Offsite	REC Ownership
05/31/2015	06/30/2015	20,657	0	Owned
06/30/2015	07/31/2015	24,385	0	Owned
07/31/2015	08/31/2015	21,389	0	Owned
08/31/2015	09/18/2015	9,382	0	Owned
09/18/2015	09/30/2015	4,858	0	Owned
09/30/2015	10/31/2015	5,980	0	Owned
10/31/2015	11/30/2015	6,114	0	Owned
Total Consumption (kWh (thousand Watt-hours)):				164,315
Total Consumption (kBtu (thousand Btu)):				560,642.8
Total Energy Consumption for this Meter				<input type="checkbox"/> Yes <input type="checkbox"/> No
Do the fuel consumption totals shown above include consumption of all energy tracked through this meter that affect energy calculations for the reporting period of this application (i.e., do the entries match the utility bills received by the property)?				
Notes:				

Electric Meter: Electric Grid Meter (kWh (thousand Watt-hours))

Associated With: Bayberry Elementary School

Start Date	End Date	Usage	Green Power?
10/29/2014	11/26/2014	31,471	No
11/26/2014	12/30/2014	40,149	No
12/30/2014	01/29/2015	43,717	No
01/29/2015	03/02/2015	58,677	No
03/02/2015	03/31/2015	50,490	No
03/31/2015	04/30/2015	29,800	No
04/30/2015	06/01/2015	30,046	No
06/01/2015	06/30/2015	33,378	No
06/30/2015	07/30/2015	23,902	No
07/30/2015	08/28/2015	21,192	No
08/28/2015	09/29/2015	36,165	No
09/29/2015	11/01/2015	32,129	No

Total Consumption (kWh (thousand Watt-hours)):	431,116
Total Consumption (kBtu (thousand Btu)):	1,470,967.8

Total Energy Consumption for this Meter

Yes No

Do the fuel consumption totals shown above include consumption of all energy tracked through this meter that affect energy calculations for the reporting period of this application (i.e., do the entries match the utility bills received by the property)?

Notes:

Natural Gas Meter: Natural Gas (therms)

Associated With: Bayberry Elementary School

Start Date	End Date	Usage
10/28/2014	11/26/2014	3,095.7
11/26/2014	12/30/2014	5,294
12/30/2014	01/29/2015	8,244.4
01/29/2015	03/02/2015	7,411.7
03/02/2015	04/30/2015	5,490.6
04/30/2015	06/01/2015	154.6
06/01/2015	06/30/2015	126.9
06/30/2015	07/30/2015	0
07/30/2015	08/28/2015	3.2
08/28/2015	09/29/2015	17.3
09/29/2015	11/01/2015	1,128
Total Consumption (therms):		30,966.4
Total Consumption (kBtu (thousand Btu)):		3,096,640

Total Energy Consumption for this Meter

Yes No

Do the fuel consumption totals shown above include consumption of all energy tracked through this meter that affect energy calculations for the reporting period of this application (i.e., do the entries match the utility bills received by the property)?

Notes:

4. Signature & Stamp of Verifying Licensed Professional

_____ (Name) visited this site on _____ (Date). Based on the conditions observed at the time of the visit to this property, I verify that the information contained within this application is accurate and in accordance with the Licensed Professional Guide.

Signature: _____ Date: _____

Licensed Professional

,
(____)____-____



NOTE: When applying for the ENERGY STAR, the signature of the Verifying Professional must match the stamp.

Professional Engineer Stamp
(if applicable)

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering

Rooftops

Rooftop Units

Tag	RTU-1	RTU-2	RTU-4
Unit Type	Packaged Rooftop	Packaged Rooftop	Packaged Rooftop
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Gym	Media Center	Front Offices
Manufacturer	Des Champs Technologies	Trane	Trane
Model No.	PV-MZP-8707	YCD150D3HABA	YCD180B3LAHA
Serial No.	46681	331100863D	331100878D
Cooling Type	No Cooling	Packaged DX	Packaged DX
Cooling Capacity (Tons)	N/A	12.5	15
Cooling Efficiency (SEER/EER)	N/A	9.6 EER	9.7 EER
Heating Type	Gas Furnace	Gas Furnace	Gas Furnace
Heating Input (MBH)	350	250/150	350/250
Efficiency	81%	81.2%	81.2%
Supply Fan (HP)	7.5	3	3
Supply Fan VFD	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Return/Exhaust Fan (HP)	7.5	N/A	N/A
Return/Exhaust Fan VFD	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Approx Age	12	12	12
ASHRAE Service Life	15	15	15
Remaining Life	3	3	3
Comments	Single Sterling Heater @ 350 MBH		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Rooftops

Rooftop Units

Tag	RTU-5	RTU-3
Unit Type	Packaged Rooftop	Rooftop Make-Up-Air Unit
Qty	1	1
Location	Roof	Roof
Area Served	Front Offices	Kitchen Hood
Manufacturer	Trane	Duo-Aire
Model No.	YCD180B3LAHA	CAA-NH-40
Serial No.	3311'00910D	-
Cooling Type	Packaged DX	No Cooling
Cooling Capacity (Tons)	15	N/A
Cooling Efficiency (SEER/EER)	9.7 EER	N/A
Heating Type	Gas Furnace	N/A
Heating Input (MBH)	350/250	N/A
Efficiency	81.2%	N/A
Supply Fan (HP)	3	3/4
Supply Fan VFD	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Return/Exhaust Fan (HP)	N/A	N/A
Return/Exhaust Fan VFD	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Approx Age	12	12
ASHRAE Service Life	15	15
Remaining Life	3	3
Comments		Only Used Occassionally for the Pizza Oven

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Air Handler Units

Tag	AHU-3
Unit Type	Packaged Air Handling Unit
Qty	1
Location	Outdoor on Pad Near Boiler Room
Area Served	All Purpose Room
Manufacturer	Des Champs
Model No.	PV-MZP-8712
Serial No.	46678
Cooling Type	Packaged DX
Cooling Capacity	594 MBH
Heating Type	Gas Furnace
Heating Input	700 MBH
Supply Fan (HP)	15
Supply Fan VFD	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Exhaust Fan (HP)	10
Return Fan VFD	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Approx Age	12
ASHRAE Service Life	20
Remaining Life	8
Comments	Sterling Double Furnace (2 heaters @ 350 MBH)

Note:

"N/A" = Not Applicable.

"- " = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Terminal Units

Terminal Units

Tag	FCU-1,2	UV
Unit Type	Fan Coil	Vertical Unit Ventilator
Qty	2	34
Location	Guidance Offices	Classrooms/Faculty Rm
Area Served	Guidance Offices	Classrooms/Faculty Rm
Manufacturer	Trane	Trane
Model No.	FCBB060	VUV-100 & 150
Serial No.	-	W03D12325
Cooling Type	Chilled Water	Chilled Water
Cooling Capacity (MBH)	10.7	46.1 to 63.8
Cooling Efficiency	1.22 kW/Ton (Chiller)	1.22 kW/Ton (Chiller)
Heating Type	Hot Water	Hot Water
Heating Input (MBH)	11.7	51.8 to 74.0
Heating Efficiency	92% (Boilers)	92% (Boilers)
Approx Age	12	12
ASHRAE Service Life	20	20
Remaining Life	8	8
Comments	600 CFM	1,000 to 1,500 CFM

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Terminal Units

Concord Engineering

Terminal Units

Tag	UV	EUV	EUH
Unit Type	Horizontal Unit Ventilator	Wall Exhauster	Unit Heater
Qty	4	2	4
Location	Classrooms	Classrooms	Main Storage
Area Served	Classrooms	Classrooms	Main Storage
Manufacturer	Trane	Trane	T. P. I. Corporation
Model No.	HUV-100, 150 & 200	EUV	F3FUH07
Serial No.	-	-	-
Cooling Type	Chilled Water	N/A	N/A
Cooling Capacity (MBH)	46.1 to 112.6	N/A	N/A
Cooling Efficiency	1.22 kW/Ton (Chiller)	N/A	N/A
Heating Type	Hot Water	N/A	Electric
Heating Input (MBH)	51.8 to 128.3	N/A	7.5 kW
Heating Efficiency	92% (Boilers)	N/A	97%
Approx Age	12	12	12
ASHRAE Service Life	20	20	20
Remaining Life	8	8	8
Comments	1,000 to 2,000 CFM	500 and 750 CFM	

Note:

"N/A" = Not Applicable.

"- " = Info Not Available

MAJOR EQUIPMENT LIST

Terminal Units

Concord Engineering

Terminal Units

Tag	CUH	PTAC	HWC
Unit Type	Cabinet Unit Heater	Heat Pump	Hot Water Convactor
Qty	4	1	6
Location	Vestibules, Stairwells, etc.	Coach's Office	Restroom Perimeter Walls
Area Served	Vestibules, Stairwells, etc.	Coach's Office	Restrooms
Manufacturer	-	Trane	"-"
Model No.	-	PTHC09	"-"
Serial No.	-	-	"-"
Cooling Type	N/A	AC Heatpump	N/A
Cooling Capacity (MBH)	N/A	8.5	N/A
Cooling Efficiency	N/A	15.4 SEER	N/A
Heating Type	Electric	Electric	Hot Water
Heating Input (MBH)	2.0 kW	10.1	8.5 BTUH
Heating Efficiency	97%	97%	92% (Boilers)
Approx Age	12	12	12
ASHRAE Service Life	20	20	20
Remaining Life	8	8	8
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Boilers

Boilers

Tag	B-1	B-2
Unit Type	Condensing (Water)	Condensing (Water)
Qty	1	1
Location	Boiler Room	Boiler Room
Manufacturer	AERCO	AERCO
Model No.	BMK-2.0 GWB	BMK-2.0 GWB
Serial No.	G-01-0626	G-01-0627
Input Capacity (MBH)	2,000	2,000
Output Capacity (MBH)	1,840	1,840
Approx. Efficiency %	92.0%	92.0%
Fuel Type	Natural Gas	Natural Gas
Approx Age	14	14
ASHRAE Service Life	24	24
Remaining Life	10	10
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Boilers

Boilers

Tag	B-3	B-4
Unit Type	Condensing (Water)	Condensing (Water)
Qty	1	1
Location	Boiler Room	Boiler Room
Manufacturer	AERCO	AERCO
Model No.	BMK-2.0 GWB	BMK-2.0 GWB
Serial No.	G-03-0259	G-03-0260
Input Capacity (MBH)	2,000	2,000
Output Capacity (MBH)	1,840	1,840
Approx. Efficiency %	92.0%	92.0%
Fuel Type	Natural Gas	Natural Gas
Approx Age	12	12
ASHRAE Service Life	24	24
Remaining Life	12	12
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Chiller

Chiller

Tag	CHL-1
Unit Type	Air-Cooled
Qty	1
Location	On Ground Next to Boiler Room
Area Served	All Chilled Water Coils
Manufacturer	Trane
Model No.	RTAC 275A UFON UAFN...
Serial No.	U03H01530
Refrigerant	R-134a
Cooling Capacity (Tons)	275
Cooling Efficiency (KW/Ton)	1.25 kW/Ton
Volts / Phase / Hz	208/3/60
Chilled Water GPM / ΔT	687.5/10°F
Condenser Water GPM / ΔT	N/A (Air Cooled)
Approx Age	12
ASHRAE Service Life	20
Remaining Life	8
Comments	25 - 30 % Glycol Solution

Note:

"N/A" = Not Applicable.

"-

" = Info Not Available

MAJOR EQUIPMENT LIST

Dom HWH

Concord Engineering

Domestic Water Heaters

Tag	DHW-1
Unit Type	Gas-Fired Water Heater
Qty	1
Location	Boiler Room
Area Served	Entire Facility
Manufacturer	Bradford White
Model #	M-I-75S6BN
Serial #	LH34903896
Storage Size (Gal)	75
Input Capacity (MBH/KW)	76 MBH
Recovery (Gal/Hr)	78
Efficiency %	80%
Fuel	Natural Gas
Approx Age	1
ASHRAE Service Life	15
Remaining Life	14
Comments	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Pumps

Pumps

Tag	HWP-1	HWP-2
Unit Type	Base-mounted	Base-mounted
Qty	1	1
Location	Boiler Room	Boiler Room
System Served	Heating Hot Water	Heating Hot Water
Manufacturer	Taco	Taco
Model #	F150-11	F150-11
Serial #	CP2040-02 A30	CP2040-02 A30
Horse Power	20	20
Flow Rate (GPM)	650	650
Head Pressure (FTHD)	75	75
Motor Manufacturer	Baldor	Baldor
Motor Frame	256T	256T
Electrical Power (V/P/HZ)	208/3/60	208/3/60
Motor RPM	1765	1765
Motor Efficiency %	93.0%	93.0%
Pump VFD	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Approx Age	12	12
ASHRAE Service Life	18	18
Remaining Life	6	6
Comments	Variable Speed Drive	Variable Speed Drive

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Pumps

Pumps

Tag	CHWP-1
Unit Type	Base-mounted
Qty	1
Location	Boiler Room
System Served	Primary Chilled Water
Manufacturer	Taco
Model #	F125-07
Serial #	-
Horse Power	2
Flow Rate (GPM)	200
Head Pressure (FTHD)	25
Motor Manufacturer	Baldor
Motor Frame	256T
Electrical Power (V/P/HZ)	208/3/60
Motor RPM	1760
Motor Efficiency %	86.5%
Pump VFD	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Approx Age	12
ASHRAE Service Life	18
Remaining Life	6
Comments	Tag underneath motor

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Exhaust Fans

Exhaust Fans

Tag	EF-1	EF-5	EF-6
Unit Type	Down Blast	Down Blast	Down Blast
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Toilets, Art Room	Boys & Girls Toilets	Mens & Womens Toilets
Manufacturer	Cook	Cook	Cook
Model #	80C2B	100C2B	120C2B
Motor (HP)	1/6	1/6	1/6
Electrical (V/H/P)	115/60/1	115/60/1	115/60/1
Approx Age	12	12	12
ASHRAE Service Life	20	20	20
Remaining Life	8	8	8
Comments	300 CFM	700 CFM	1,000 CFM

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Exhaust Fans

Exhaust Fans

Tag	EF-17	KEF-1
Unit Type	In-line	Down Blast
Qty	1	1
Location	Ceiling	Roof
Area Served	Main Storage	Kitchen Hood
Manufacturer	Cook	Cook
Model #	GN-940	150VH6B
Motor (HP)	1/6	3/4
Electrical (V/H/P)	115/60/1	208/3/60
Approx Age	12	12
ASHRAE Service Life	20	20
Remaining Life	8	8
Comments	1,000 CFM	1,654 CFM

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Kitchen / Misc.

Tag			
Unit Type	Reach-in Refrigerator	Milk Cooler	Warmer
Qty	2	1	1
Location	Kitchen	Kitchen	Kitchen
Manufacturer	Continental	Powers Equipment	Vollrath
Model No.	-	780	cayenne
Fuel	Electric	Electric	Electric
Comments	4-door		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Kitchen-Misc

Kitchen / Misc.

Tag			
Unit Type	Pizza Oven	Convection Oven	Exhaust Hood
Qty	1	1	Exhaust Hood
Location	Kitchen	Kitchen	Kitchen
Manufacturer	-	-	Duo-Aire
Model No.	-	-	CW III 48048
Fuel	Gas-Fired	Electric	N/A
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Kitchen / Misc.

Tag			
Unit Type	Residential Refrigerator	Residential Refrigerator	Residential Refrigerator
Qty	1	1	1
Location	Faculty Room	-	Nurse's Office
Manufacturer	Amana	Electrolux	-
Model No.	TX21VW	FFTR1817LW2	-
Fuel	Electric	Electric	Electric
Comments	21 Cu. Ft.	18 Cu. Ft.	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: IC15683
 Facility Name: Bayberry School
 Address: 113 Bayberry Lane
 City, State, Zip: Watchung, NJ 07069

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS				PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COST						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
1	B112 - APR Kitchen	600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	4	0.34	207	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	104	0.17	102	\$14	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	21	\$3	\$360.00	\$190.00	\$550.00	\$40.00	36.86	\$200.00	\$50.00	\$250.00	YES	-
2	B113 - APR	3000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	39	3.36	10,085	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	39	1.70	5,090	1.67	4,996	\$674	0	No New Controls	0	0.0%	0	\$0	\$3,510.00	\$1,852.50	\$5,362.50	\$390.00	7.37	\$0.00	\$0.00	\$0.00	FALSE	-
3	APR Small RR	1200	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	2	0.13	153	New Fixture	New Philips 2x2 LED Fixture 2-Lamps	2	29	2	0.06	70	0.07	83	\$11	0	No New Controls	0	0.0%	0	\$0	\$290.00	\$180.00	\$470.00	\$100.00	33.01	\$0.00	\$0.00	\$0.00	FALSE	-
4	B109 - APR Storage/Roof Access	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	3	0.19	74	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	3	0.09	35	0.10	40	\$5	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$180.00	\$142.50	\$322.50	\$30.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	106.43
5	APR Stage	3000	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	12	0.74	2,232	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	12	0.35	1,044	0.40	1,188	\$160	0	No New Controls	0	0.0%	0	\$0	\$720.00	\$570.00	\$1,290.00	\$120.00	7.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	SE Stage Exit	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	2	0.17	517	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	261	0.09	256	\$35	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	52	\$7	\$180.00	\$95.00	\$275.00	\$20.00	7.37	\$50.00	\$50.00	\$100.00	FALSE	14.19
1	NW Stage Exit	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	2	0.17	517	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	261	0.09	256	\$35	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	52	\$7	\$180.00	\$95.00	\$275.00	\$20.00	7.37	\$50.00	\$50.00	\$100.00	FALSE	14.19
1	Corridor outside APR	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	19	1.64	4,913	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	19	0.83	2,480	0.81	2,434	\$329	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	4	20.0%	496	\$67	\$1,710.00	\$902.50	\$2,612.50	\$190.00	7.37	\$1,200.00	\$200.00	\$1,400.00	FALSE	20.91
1	RR	1200	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	1	0.09	103	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	52	0.04	51	\$7	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$47.50	\$137.50	\$10.00	18.43	\$0.00	\$0.00	\$0.00	FALSE	-
1	Corridor from Boiler Room	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	9	0.78	2,327	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	9	0.39	1,175	0.38	1,153	\$156	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	235	\$32	\$810.00	\$427.50	\$1,237.50	\$90.00	7.37	\$600.00	\$100.00	\$700.00	FALSE	22.07
6	Corridor from Boiler Room	3000	2-Lamp 1x4 T8 32W Ceiling-mounted Wrap Prismatic Lens	2	62	1	0.06	186	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	87	0.03	99	\$13	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	17	\$2	\$60.00	\$47.50	\$107.50	\$10.00	7.30	\$200.00	\$50.00	\$250.00	FALSE	106.43
7	Corridor from Boiler Room	3000	3-Lamp 2x2 T8 F17 Recessed Prismatic Lens	3	48.1	1	0.05	144	New Fixture	New Philips 2x2 LED Fixture 2-Lamps	2	29	1	0.03	87	0.02	57	\$8	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	17	\$2	\$145.00	\$90.00	\$235.00	\$50.00	23.92	\$200.00	\$50.00	\$250.00	FALSE	106.43
8	B119 - Boiler Room	400	1-Lamp 6"x4" T8 32W Ceiling-mounted Wrap Prismatic Lens	1	33.2	1	0.03	13	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	1	14.5	1	0.01	6	0.02	7	\$1	0	No New Controls	0	0.0%	0	\$0	\$30.00	\$47.50	\$77.50	\$5.00	71.80	\$0.00	\$0.00	\$0.00	FALSE	-
4	B119 - Boiler Room	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	8	0.50	198	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	8	0.23	93	0.26	106	\$14	0	No New Controls	0	0.0%	0	\$0	\$480.00	\$380.00	\$860.00	\$80.00	54.71	\$0.00	\$0.00	\$0.00	FALSE	-
9	B119 - Boiler Room	400	1-Lamp 4"x4" T8 32W Ceiling-mounted Open Lamp	1	33.2	1	0.03	13	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	1	14.5	1	0.01	6	0.02	7	\$1	0	No New Controls	0	0.0%	0	\$0	\$30.00	\$47.50	\$77.50	\$5.00	71.80	\$0.00	\$0.00	\$0.00	FALSE	-
6	Custodian's Office	400	2-Lamp 1x4 T8 32W Ceiling-mounted Wrap Prismatic Lens	2	62	2	0.12	50	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	23	0.07	26	\$4	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	5	\$1	\$120.00	\$95.00	\$215.00	\$20.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	159.64
10	Custodian's Office - RR	2600	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	68	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	36	0.01	31	\$4	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$90.00	\$90.00	\$180.00	\$20.00	37.99	\$50.00	\$50.00	\$100.00	FALSE	101.75
4	B118 - Fire Alarm Control Panel Room	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
2	C118 - Teacher's Workroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	4	0.34	896	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	452	0.17	444	\$60	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	90	\$12	\$360.00	\$190.00	\$550.00	\$40.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	17.60
2	C120 - Faculty Lounge	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	8	0.69	1,793	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	8	0.35	905	0.34	888	\$120	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	181	\$24	\$720.00	\$380.00	\$1,100.00	\$80.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	10.23
2	C122 - Phone Room	400	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	1	0.09	34	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	17	0.04	17	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	3	\$0	\$90.00	\$47.50	\$137.50	\$10.00	55.30	\$50.00	\$50.00	\$100.00	FALSE	212.86
1	A148 - Girl's Room	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	2	0.17	448	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	226	0.09	222	\$30	0	No New Controls	0	0.0%	0	\$0	\$180.00	\$95.00	\$275.00	\$20.00	8.51	\$0.00	\$0.00	\$0.00	FALSE	-
11	A148 - Girl's Room	2600	A-Lamp 40W, Recessed Hi-Hat	1	40	1	0.04	104	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	1	0.01	16	0.03	88	\$12	0	No New Controls	0	0.0%	0	\$0	\$25.00	\$47.50	\$72.50	\$5.00	5.66	\$0.00	\$0.00	\$0.00	FALSE	-
10	A155 - Janitor's Closet	400	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	10	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	6	0.01	5	\$1	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	1	\$0	\$90.00	\$90.00	\$180.00	\$20.00	246.91	\$50.00	\$50.00	\$100.00	FALSE	661.38
1	A147 - Boy's RR	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	2	0.17	448	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	226	0.09	222	\$30	0	No New Controls	0	0.0%	0	\$0	\$180.00	\$95.00	\$275.00	\$20.00	8.51	\$0.00	\$0.00	\$0.00	FALSE	-

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES					PROPOSED FIXTURE RETROFIT					RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COST									
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
11	A147 - Boy's RR	2600	A-Lamp 40W, Recessed Hi-Hat	1	40	1	0.04	104	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	1	0.01	16	0.03	88	\$12	0	No New Controls	0	0.0%	0	\$0	\$25.00	\$47.50	\$72.50	\$5.00	5.66	\$0.00	\$0.00	\$0.00	FALSE	-
1	C112 - Storage	400	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	1	0.09	34	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	17	0.04	17	\$2	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	3	\$0	\$90.00	\$47.50	\$137.50	\$10.00	55.30	\$200.00	\$50.00	\$250.00	FALSE	532.14
10	A151 - Personal RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	3	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$50.00	\$50.00	\$100.00	FALSE	220.46
12	C114 - MDF Closet	400	2-Lamp 2x4 T8 32W Recessed Prismatic Lens	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
1	C124 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C124 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C126 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C126 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C128 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C128 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C130 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C130 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C132 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	10.06
10	C132 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C121 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C121 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C119 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	10.06
10	C119 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C117 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C117 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	C115 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	C115 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	1	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$50.00	\$50.00	FALSE	-
2	C113 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	17	1.47	3,810	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	17	0.74	1,923	0.73	1,887	\$255	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	385	\$52	\$1,530.00	\$807.50	\$2,337.50	\$170.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	4.14
1	Corridor - Block C Upper Level	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	15	1.29	3,879	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	15	0.65	1,958	0.64	1,922	\$259	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	3	20.0%	392	\$53	\$1,350.00	\$712.50	\$2,062.50	\$150.00	7.37	\$900.00	\$150.00	\$1,050.00	FALSE	19.87
9	Corridor Trophy Case	3000	1-Lamp 4"x4" T8 32W Ceiling-mounted Open Lamp	1	33.2	4	0.13	398	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	1	14.5	4	0.06	174	0.07	224	\$30	0	No New Controls	0	0.0%	0	\$0	\$120.00	\$190.00	\$310.00	\$20.00	9.57	\$0.00	\$0.00	\$0.00	FALSE	-
6	C111 - Classroom	2600	2-Lamp 1x4 T8 32W Ceiling-mounted Wrap Prismatic Lens	2	62	24	1.49	3,869	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	24	0.70	1,810	0.79	2,059	\$278	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	362	\$49	\$1,440.00	\$1,140.00	\$2,580.00	\$240.00	8.42	\$200.00	\$50.00	\$250.00	FALSE	5.12
10	C111 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS				LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COST								
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
1	Corridor - Block A, Classrooms	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	17	1.47	4,396	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	17	0.74	2,219	0.73	2,178	\$294	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	3	20.0%	444	\$60	\$1,530.00	\$807.50	\$2,337.50	\$170.00	7.37	\$900.00	\$150.00	\$1,050.00	FALSE	17.53
2	C109 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	5.87
2	C107 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C105 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C103 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	5.87
2	C102 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C104 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C106 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C108 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
2	C110 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	5.87
2	B107 - Storage	400	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	69	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	35	0.09	34	\$5	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$180.00	\$95.00	\$275.00	\$20.00	55.30	\$50.00	\$50.00	\$100.00	FALSE	106.43
1	B102 - CST Office	4000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	4	0.34	1,379	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	696	0.17	683	\$92	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	139	\$19	\$360.00	\$190.00	\$550.00	\$40.00	5.53	\$200.00	\$50.00	\$250.00	\$35.00	11.44
3	B106 - Director's Office	4000	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	4	0.25	1,018	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	4	0.12	464	0.14	554	\$75	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	93	\$13	\$580.00	\$360.00	\$940.00	\$200.00	9.90	\$200.00	\$50.00	\$250.00	FALSE	19.96
2	B105 - Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	690	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	348	0.09	342	\$46	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	70	\$9	\$180.00	\$95.00	\$275.00	\$20.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	26.61
2	B104 - Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	690	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	348	0.09	342	\$46	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	70	\$9	\$180.00	\$95.00	\$275.00	\$20.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	26.61
2	B103 - Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	690	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	348	0.09	342	\$46	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	70	\$9	\$180.00	\$95.00	\$275.00	\$20.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	26.61
2	B101 - Conf. Room	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	3	0.26	1,034	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	522	0.13	512	\$69	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	104	\$14	\$270.00	\$142.50	\$412.50	\$30.00	5.53	\$200.00	\$50.00	\$250.00	\$35.00	15.25
1	A173 - Women's RR	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	4	0.34	896	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	452	0.17	444	\$60	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	90	\$12	\$360.00	\$190.00	\$550.00	\$40.00	8.51	\$50.00	\$50.00	\$100.00	FALSE	8.19
1	A172 - Men's RR	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	4	0.34	896	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	452	0.17	444	\$60	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	90	\$12	\$360.00	\$190.00	\$550.00	\$40.00	8.51	\$50.00	\$50.00	\$100.00	\$20.00	6.55
1	Corridor - Block A, outside Offices	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	35	3.02	9,051	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	35	1.52	4,568	1.49	4,484	\$605	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	5	20.0%	914	\$123	\$3,150.00	\$1,662.50	\$4,812.50	\$350.00	7.37	\$1,500.00	\$250.00	\$1,750.00	FALSE	14.19
13	Corridor - Block A, outside Offices	3000	1-Lamp 13W CFL, Recessed Hi-Hat	1	13	18	0.23	702	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	18	0.11	324	0.13	378	\$51	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	3	20.0%	65	\$9	\$450.00	\$855.00	\$1,305.00	\$90.00	23.81	\$900.00	\$150.00	\$1,050.00	FALSE	120.03
1	Lobby - Block A, Main	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	4	0.34	896	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	452	0.17	444	\$60	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	90	\$12	\$360.00	\$190.00	\$550.00	\$40.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	20.47
13	A103 - Main Office	4000	1-Lamp 13W CFL, Recessed Hi-Hat	1	13	4	0.05	208	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	4	0.02	96	0.03	112	\$15	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	19	\$3	\$100.00	\$190.00	\$290.00	\$20.00	17.86	\$400.00	\$100.00	\$500.00	FALSE	192.90
3	A103 - Main Office	4000	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	19	1.21	4,834	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	19	0.55	2,204	0.66	2,630	\$355	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	441	\$60	\$2,755.00	\$1,710.00	\$4,465.00	\$950.00	9.90	\$400.00	\$100.00	\$500.00	FALSE	8.40
2	A104 - Workroom	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	690	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	348	0.09	342	\$46	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	70	\$9	\$180.00	\$95.00	\$275.00	\$20.00	5.53	\$50.00	\$50.00	\$100.00	FALSE	10.64
4	A104 - Closet	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS				LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COST								
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
2	A105 - Asst. Principal's Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	3	0.26	1,034	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	522	0.13	512	\$69	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	104	\$14	\$270.00	\$142.50	\$412.50	\$30.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	17.74
13	A103 - Hall Closet	400	1-Lamp 13W CFL, Recessed Hi-Hat	1	13	1	0.01	5	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	1	0.01	2	0.01	3	\$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	0	\$0	\$25.00	\$47.50	\$72.50	\$5.00	178.57	\$50.00	\$50.00	\$100.00	FALSE	1543.21
2	A106 - Office RR	1200	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	1	0.09	103	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	52	0.04	51	\$7	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	10	\$1	\$90.00	\$47.50	\$137.50	\$10.00	18.43	\$200.00	\$50.00	\$250.00	FALSE	177.38
2	A107 - Principal's Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	4	0.34	1,379	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	4	0.17	696	0.17	683	\$92	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	139	\$19	\$360.00	\$190.00	\$550.00	\$40.00	5.53	\$200.00	\$50.00	\$250.00	\$35.00	11.44
2	A108 - Nurse's Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	1	0.09	345	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	174	0.04	171	\$23	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	35	\$5	\$90.00	\$47.50	\$137.50	\$10.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	53.21
14	A108 - Nurse's Office	4000	3-Lamp 2x2 T8 31W U-Tube, Recessed Parabolic Lens	3	90.1	7	0.63	2,523	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	7	0.20	812	0.43	1,711	\$231	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	162	\$22	\$1,015.00	\$630.00	\$1,645.00	\$350.00	5.61	\$200.00	\$50.00	\$250.00	\$35.00	9.81
14	A109 - Nurse's RR	1200	3-Lamp 2x2 T8 31W U-Tube, Recessed Parabolic Lens	3	90.1	1	0.09	108	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	1	0.03	35	0.06	73	\$10	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$145.00	\$90.00	\$235.00	\$50.00	18.69	\$50.00	\$50.00	\$100.00	FALSE	106.43
14	A110 - Nurse's Storage	400	3-Lamp 2x2 T8 31W U-Tube, Recessed Parabolic Lens	3	90.1	1	0.09	36	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	1	0.03	12	0.06	24	\$3	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$145.00	\$90.00	\$235.00	\$50.00	56.07	\$50.00	\$50.00	\$100.00	FALSE	319.28
2	A112 - Exam Room	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	1	0.09	345	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	174	0.04	171	\$23	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	35	\$5	\$90.00	\$47.50	\$137.50	\$10.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	53.21
2	A122 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	6	0.52	1,345	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	6	0.26	679	0.26	666	\$90	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	136	\$18	\$540.00	\$285.00	\$825.00	\$60.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	11.73
2	A124 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	6	0.52	1,345	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	6	0.26	679	0.26	666	\$90	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	136	\$18	\$540.00	\$285.00	\$825.00	\$60.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	11.73
2	A126 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	5	0.43	1,121	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	5	0.22	566	0.21	555	\$75	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	113	\$15	\$450.00	\$237.50	\$687.50	\$50.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	14.08
14	A126 - Classroom	2600	3-Lamp 2x2 T8 31W U-Tube, Recessed Parabolic Lens	3	90.1	1	0.09	234	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	1	0.03	75	0.06	159	\$21	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	15	\$2	\$145.00	\$90.00	\$235.00	\$50.00	8.63	\$200.00	\$50.00	\$250.00	FALSE	122.80
12	A132 - Office	4000	2-Lamp 2x4 T8 32W Recessed Prismatic Lens	2	62	2	0.12	496	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	232	0.07	264	\$36	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	46	\$6	\$120.00	\$95.00	\$215.00	\$20.00	5.47	\$200.00	\$50.00	\$250.00	FALSE	39.91
12	A133 - Office	4000	2-Lamp 2x4 T8 32W Recessed Prismatic Lens	2	62	4	0.25	992	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	4	0.12	464	0.13	528	\$71	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	93	\$13	\$240.00	\$190.00	\$430.00	\$40.00	5.47	\$200.00	\$50.00	\$250.00	\$35.00	17.16
15	Corridor - Block A, outside Library	2600	4-Lamp 2x2 T8 F17, Recessed Prismatic Lens	4	59.8	23	1.38	3,576	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	23	0.67	1,734	0.71	1,842	\$249	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	4	20.0%	347	\$47	\$3,335.00	\$2,070.00	\$5,405.00	\$1,150.00	17.11	\$1,200.00	\$200.00	\$1,400.00	FALSE	29.90
7	A129 - Storage	400	3-Lamp 2x2 T8 F17 Recessed Prismatic Lens	3	48.1	3	0.14	58	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	3	0.09	35	0.06	23	\$3	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$435.00	\$270.00	\$705.00	\$150.00	179.37	\$50.00	\$50.00	\$100.00	FALSE	106.43
2	A128 - G&T	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	10.06
16	A128 - RR	1200	1-Lamp 1x1 CFL 13W, Recessed Prismatic Lens	1	13	1	0.01	16	New Fixture	Philips 1x1 Fixture with a A19 LED Lamp (6W)	1	6	1	0.01	7	0.01	8	\$1	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$20.00	158.73	\$0.00	\$0.00	\$0.00	FALSE	-
2	A126 - Art Room	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	10	0.86	2,241	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	10	0.44	1,131	0.43	1,110	\$150	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	226	\$31	\$900.00	\$475.00	\$1,375.00	\$100.00	8.51	\$400.00	\$100.00	\$500.00	FALSE	16.37
16	A126 - RR	1200	1-Lamp 1x1 CFL 13W, Recessed Prismatic Lens	1	13	1	0.01	16	New Fixture	Philips 1x1 Fixture with a A19 LED Lamp (6W)	1	6	1	0.01	7	0.01	8	\$1	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$20.00	158.73	\$0.00	\$0.00	\$0.00	FALSE	-
14	A114 - Library	2600	3-Lamp 2x2 T8 31W U-Tube, Recessed Parabolic Lens	3	90.1	16	1.44	3,748	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	16	0.46	1,206	0.98	2,542	\$343	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	241	\$33	\$2,320.00	\$1,440.00	\$3,760.00	\$800.00	8.63	\$400.00	\$100.00	\$500.00	\$35.00	14.28
2	A114 - Library	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	11	0.95	2,465	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	11	0.48	1,244	0.47	1,221	\$165	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	249	\$34	\$990.00	\$522.50	\$1,512.50	\$110.00	8.51	\$400.00	\$100.00	\$500.00	\$35.00	13.84
17	A114 - Library	2600	3-Lamp 1x4 T8 32W, Recessed Parabolic Lens	3	86.2	36	3.10	8,068	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	36	1.57	4,072	1.54	3,997	\$540	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	814	\$110	\$3,240.00	\$1,710.00	\$4,950.00	\$360.00	8.51	\$200.00	\$50.00	\$250.00	\$35.00	1.96
18	A114 - Library	2600	1-Lamp 17W CFL, Recessed Hi-Hat	1	17	21	0.36	928	Re-Lamp	Philips LED A19 Lamp (6W)	1	6	21	0.13	328	0.23	601	\$81	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	66	\$9	\$525.00	\$997.50	\$1,522.50	\$105.00	17.48	\$200.00	\$50.00	\$250.00	\$35.00	24.31
2	A115 - Library Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	3	0.26	1,034	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	522	0.13	512	\$69	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	104	\$14	\$270.00	\$142.50	\$412.50	\$30.00	5.53	\$50.00	\$50.00	\$100.00	FALSE	7.10
2	A115 - Office Breakroom	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	2	0.17	690	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	348	0.09	342	\$46	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	70	\$9	\$180.00	\$95.00	\$275.00	\$20.00	5.53	\$50.00	\$50.00	\$100.00	FALSE	10.64

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS			LIGHTING CONTROLS COST								
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
19	A113 - Computer Lab	2600	2-Lamp 1x4 T8 32W, Pendant-mounted Parabolic Lens	2	62	18	1.12	2,902	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	18	0.52	1,357	0.59	1,544	\$208	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	271	\$37	\$1,080.00	\$855.00	\$1,935.00	\$180.00	8.42	\$400.00	\$100.00	\$500.00	FALSE	13.64
1	A113 - Computer Lab	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	1	0.09	224	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	113	0.04	111	\$15	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	23	\$3	\$90.00	\$47.50	\$137.50	\$10.00	8.51	\$50.00	\$50.00	\$100.00	FALSE	32.75
1	Comp. Lab Electrical Room	400	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	1	0.09	34	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	1	0.04	17	0.04	17	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	3	\$0	\$90.00	\$47.50	\$137.50	\$10.00	55.30	\$50.00	\$50.00	\$100.00	FALSE	212.86
20	Library - Boy's RR	2600	A-Lamp 90W, Recessed	1	90	1	0.09	234	Re-Lamp	Philips LED A21 Lamp (18W)	1	18	1	0.02	47	0.07	187	\$25	0	No New Controls	0	0.0%	0	\$0	\$25.00	\$47.50	\$72.50	\$5.00	2.67	\$0.00	\$0.00	\$0.00	FALSE	-
7	Library - Boy's RR	2600	3-Lamp 2x2 T8 F17 Recessed Prismatic Lens	3	48.1	2	0.10	250	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	2	0.06	151	0.04	99	\$13	0	No New Controls	0	0.0%	0	\$0	\$290.00	\$180.00	\$470.00	\$100.00	27.60	\$0.00	\$0.00	\$0.00	FALSE	-
20	Library - Girl's RR	2600	A-Lamp 90W, Recessed	1	90	1	0.09	234	Re-Lamp	Philips LED A21 Lamp (18W)	1	18	1	0.02	47	0.07	187	\$25	0	No New Controls	0	0.0%	0	\$0	\$25.00	\$47.50	\$72.50	\$5.00	2.67	\$0.00	\$0.00	\$0.00	FALSE	-
7	Library - Girl's RR	2600	3-Lamp 2x2 T8 F17 Recessed Prismatic Lens	3	48.1	2	0.10	250	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	2	0.06	151	0.04	99	\$13	0	No New Controls	0	0.0%	0	\$0	\$290.00	\$180.00	\$470.00	\$100.00	27.60	\$0.00	\$0.00	\$0.00	FALSE	-
15	Stairwell - Block A, by Library	3000	4-Lamp 2x2 T8 F17, Recessed Prismatic Lens	4	59.8	8	0.48	1,435	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	8	0.23	696	0.25	739	\$100	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	139	\$19	\$1,160.00	\$720.00	\$1,880.00	\$400.00	14.83	\$600.00	\$100.00	\$700.00	FALSE	37.25
10	Stairwell - Block A, by Library	3000	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	78	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	42	0.01	36	\$5	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	8	\$1	\$90.00	\$90.00	\$180.00	\$20.00	32.92	\$600.00	\$100.00	\$700.00	FALSE	617.28
21	Stairwell - Block A, by Library	3000	A-Lamp 61W, Wall-mounted	1	61	1	0.06	183	Re-Lamp	Philips LED A21 Lamp (18W)	1	18	1	0.02	54	0.04	129	\$17	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	11	\$1	\$25.00	\$47.50	\$72.50	\$5.00	3.88	\$600.00	\$100.00	\$700.00	FALSE	480.11
2	A204 - Choral Music	800	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	12	1.03	828	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	418	0.51	410	\$55	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	84	\$11	\$1,080.00	\$570.00	\$1,650.00	\$120.00	27.65	\$400.00	\$100.00	\$500.00	FALSE	44.35
16	A204 - RR	1200	1-Lamp 1x1 CFL 13W, Recessed Prismatic Lens	1	13	1	0.01	16	New Fixture	Philips 1x1 Fixture with a A19 LED Lamp (6W)	1	6	1	0.01	7	0.01	8	\$1	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$20.00	158.73	\$0.00	\$0.00	\$0.00	FALSE	-
16	Small corridor connecting A204 & A205	3000	1-Lamp 1x1 CFL 13W, Recessed Prismatic Lens	1	13	3	0.04	117	New Fixture	Philips 1x1 Fixture with a A19 LED Lamp (6W)	1	6	3	0.02	54	0.02	63	\$9	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	11	\$1	\$330.00	\$270.00	\$600.00	\$60.00	63.49	\$300.00	\$50.00	\$350.00	FALSE	240.05
2	A205 - Instrumental Music	2600	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	13	1.12	2,914	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	13	0.57	1,470	0.56	1,443	\$195	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	294	\$40	\$1,170.00	\$617.50	\$1,787.50	\$130.00	8.51	\$400.00	\$100.00	\$500.00	FALSE	12.60
16	A205 - RR	1200	1-Lamp 1x1 CFL 13W, Recessed Prismatic Lens	1	13	1	0.01	16	New Fixture	Philips 1x1 Fixture with a A19 LED Lamp (6W)	1	6	1	0.01	7	0.01	8	\$1	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$20.00	158.73	\$0.00	\$0.00	\$0.00	FALSE	-
1	Music Storage	400	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	2	0.17	69	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	2	0.09	35	0.09	34	\$5	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	7	\$1	\$180.00	\$95.00	\$275.00	\$20.00	55.30	\$50.00	\$50.00	\$100.00	FALSE	106.43
1	Hall behind music rooms	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	6	0.52	1,552	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	6	0.26	783	0.26	769	\$104	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	157	\$21	\$540.00	\$285.00	\$825.00	\$60.00	7.37	\$300.00	\$50.00	\$350.00	FALSE	16.56
5	Elevator Machine Room	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
22	Electrical Closet	400	2-Lamp 1x4 T8 32W, Wall-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
4	A209 - Large Storage under Gym	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	29	1.80	719	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	29	0.84	336	0.96	383	\$52	0	No New Controls	0	0.0%	0	\$0	\$1,740.00	\$1,377.50	\$3,117.50	\$290.00	54.71	\$0.00	\$0.00	\$0.00	FALSE	-
3	Hall outside Music room entrances	3000	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	6	0.38	1,145	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	6	0.17	522	0.21	623	\$84	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	104	\$14	\$870.00	\$540.00	\$1,410.00	\$300.00	13.20	\$300.00	\$50.00	\$350.00	FALSE	24.83
9	Janitor's Storage	400	1-Lamp 4"x4" T8 32W Ceiling-mounted Open Lamp	1	33.2	3	0.10	40	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	1	14.5	3	0.04	17	0.06	22	\$3	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	3	\$0	\$90.00	\$142.50	\$232.50	\$15.00	71.80	\$50.00	\$50.00	\$100.00	FALSE	212.86
5	Records storage	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	2	0.12	50	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	23	0.07	26	\$4	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	5	\$1	\$120.00	\$95.00	\$215.00	\$20.00	54.71	\$200.00	\$50.00	\$250.00	FALSE	399.11
5	Space behind Records Storage	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	2	0.12	50	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	23	0.07	26	\$4	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	5	\$1	\$120.00	\$95.00	\$215.00	\$20.00	54.71	\$200.00	\$50.00	\$250.00	FALSE	399.11
22	Space behind Records Storage	400	2-Lamp 1x4 T8 32W, Wall-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	0	No New Controls	0	0.0%	0	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$0.00	\$0.00	\$0.00	FALSE	-

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS				PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST					
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
10	A134 - Boy's RR	2600	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	2	0.05	135	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	2	0.03	73	0.02	62	\$8	0	No New Controls	0	0.0%	0	\$0	\$180.00	\$180.00	\$360.00	\$40.00	37.99	\$0.00	\$0.00	\$0.00	FALSE	-
23	A134 - Boy's RR	2600	2-Lamp 6"x2" Valence, Wall-mounted Prismatic Lens	2	18.3	1	0.02	48	New Fixture	Philips 6"x2" Valence Fixture with 7W LED Linear Lamp	2	14	1	0.01	36	0.00	11	\$2	0	No New Controls	0	0.0%	0	\$0	\$85.00	\$90.00	\$175.00	\$10.00	109.32	\$0.00	\$0.00	\$0.00	FALSE	-
24	Custodian's Closet in A134	400	A-Lamp 100W, Ceiling-mounted Industrial Shade Round	1	100	1	0.10	40	Re-Lamp	Philips LED A21 Lamp (18W)	1	18	1	0.02	7	0.08	33	\$4	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	1	\$0	\$25.00	\$47.50	\$72.50	\$5.00	15.24	\$50.00	\$50.00	\$100.00	FALSE	514.40
10	A136 - Girl's RR	2600	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	2	0.05	135	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	2	0.03	73	0.02	62	\$8	0	No New Controls	0	0.0%	0	\$0	\$180.00	\$180.00	\$360.00	\$40.00	37.99	\$0.00	\$0.00	\$0.00	FALSE	-
23	A136 - Girl's RR	2600	2-Lamp 6"x2" Valence, Wall-mounted Prismatic Lens	2	18.3	1	0.02	48	New Fixture	Philips 6"x2" Valence Fixture with 7W LED Linear Lamp	2	14	1	0.01	36	0.00	11	\$2	0	No New Controls	0	0.0%	0	\$0	\$85.00	\$90.00	\$175.00	\$10.00	109.32	\$0.00	\$0.00	\$0.00	FALSE	-
15	Corridor - Block A	3000	4-Lamp 2x2 T8 F17, Recessed Prismatic Lens	4	59.8	4	0.24	718	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	4	0.12	348	0.12	370	\$50	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	70	\$9	\$580.00	\$360.00	\$940.00	\$200.00	14.83	\$300.00	\$50.00	\$350.00	FALSE	37.25
3	Corridor - Block A	3000	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	2	0.13	382	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	2	0.06	174	0.07	208	\$28	0	No New Controls	0	0.0%	0	\$0	\$290.00	\$180.00	\$470.00	\$100.00	13.20	\$0.00	\$0.00	\$0.00	FALSE	-
25	Corridor - Block A	3000	A-Lamp 100W, Recessed Hi-Hat	1	100	2	0.20	600	Re-Lamp	Philips LED A21 Lamp (18W)	1	18	2	0.04	108	0.16	492	\$66	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	22	\$3	\$50.00	\$95.00	\$145.00	\$10.00	2.03	\$300.00	\$50.00	\$350.00	FALSE	120.03
2	Corridor - Outside Gym	3000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	9	0.78	2,327	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	9	0.39	1,175	0.38	1,153	\$156	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	235	\$32	\$810.00	\$427.50	\$1,237.50	\$90.00	7.37	\$600.00	\$100.00	\$700.00	FALSE	22.07
26	A137 - Gym	3000	6-Lamp 2x4 T5 54W, Ceiling-mounted Prismatic HO w/ cage	6	360.9	20	7.22	21,654	Existing to Remain		6	360.9	0	7.22	21,654	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
2	A142 - Gym Office	4000	3-Lamp 2x4 T8 32W Recessed Parabolic Lens	3	86.2	3	0.26	1,034	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	522	0.13	512	\$69	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	104	\$14	\$270.00	\$142.50	\$412.50	\$30.00	5.53	\$200.00	\$50.00	\$250.00	FALSE	17.74
1	A141 - Boy's RR	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	3	0.26	672	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	339	0.13	333	\$45	0	No New Controls	0	0.0%	0	\$0	\$270.00	\$142.50	\$412.50	\$30.00	8.51	\$0.00	\$0.00	\$0.00	FALSE	-
1	A139 - Girl's RR	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	3	0.26	672	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	3	0.13	339	0.13	333	\$45	0	No New Controls	0	0.0%	0	\$0	\$270.00	\$142.50	\$412.50	\$30.00	8.51	\$0.00	\$0.00	\$0.00	FALSE	-
4	A138 - Gym Storage	400	2-Lamp 1x4 T8 32W Pendant-mounted Industrial Shade Open	2	62	6	0.37	149	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	6	0.17	70	0.20	79	\$11	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	14	\$2	\$360.00	\$285.00	\$645.00	\$60.00	54.71	\$200.00	\$50.00	\$250.00	FALSE	133.04
5	Gym Stairwell #7	3000	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	2	0.12	372	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	174	0.07	198	\$27	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	35	\$5	\$120.00	\$95.00	\$215.00	\$20.00	7.30	\$600.00	\$100.00	\$700.00	FALSE	149.00
5	Gym Stairwell #6	3000	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	2	0.12	372	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	2	0.06	174	0.07	198	\$27	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	35	\$5	\$120.00	\$95.00	\$215.00	\$20.00	7.30	\$600.00	\$100.00	\$700.00	FALSE	149.00
5	A143 - Janitor's Closet	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
5	A140 - IDF Room (Storage)	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
5	A144 - Recreation Closet	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$200.00	\$50.00	\$250.00	FALSE	798.21
27	Stairwell	3000	4-Lamp 2x2 T8 F17, Ceiling-mounted Prismatic Lens	4	59.8	3	0.18	538	New Fixture	New Phillips 2x2 LED Fixture 2-Lamps	2	29	3	0.09	261	0.09	277	\$37	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	52	\$7	\$435.00	\$270.00	\$705.00	\$150.00	14.83	\$600.00	\$100.00	\$700.00	FALSE	99.33
6	D202 - Storage	400	2-Lamp 1x4 T8 32W Ceiling-mounted Wrap Prismatic Lens	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
5	S203 - Storage	400	2-Lamp 1x4 T8 32W Ceiling-mounted Industrial Shade Open	2	62	1	0.06	25	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	2	29	1	0.03	12	0.03	13	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0	\$60.00	\$47.50	\$107.50	\$10.00	54.71	\$50.00	\$50.00	\$100.00	FALSE	319.28
1	D204 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	D204 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	D206 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COST						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
10	D206 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	D208 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	D208 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	D210 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	D210 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	D212 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	7	0.60	1,569	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	7	0.30	792	0.30	777	\$105	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	158	\$21	\$630.00	\$332.50	\$962.50	\$70.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	11.70
10	D212 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
1	D214 - Classroom	2600	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	12	1.03	2,689	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	12	0.52	1,357	0.51	1,332	\$180	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	271	\$37	\$1,080.00	\$570.00	\$1,650.00	\$120.00	8.51	\$200.00	\$50.00	\$250.00	FALSE	6.82
10	D214 - RR	1200	2-Lamp 13W CFL Ceiling-mounted Prismatic Globe Light	2	26	1	0.03	31	New Fixture	Philips Globe Fixture with (2) 7W LED Lamps	2	14	1	0.01	17	0.01	14	\$2	0	No New Controls	0	0.0%	0	\$0	\$90.00	\$90.00	\$180.00	\$20.00	82.30	\$0.00	\$0.00	\$0.00	FALSE	-
3	Stairwell - Block C to Block D	3000	2-Lamp 2x2 T8 31W U-Tube Recessed Prismatic Lens	2	63.6	3	0.19	572	New Fixture	New Philips 2x2 LED Fixture 2-Lamps	2	29	3	0.09	261	0.10	311	\$42	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	2	20.0%	52	\$7	\$435.00	\$270.00	\$705.00	\$150.00	13.20	\$600.00	\$100.00	\$700.00	FALSE	99.33
1	Corridor - Block D	3000	3-Lamp 2x4 T8 32W Recessed Prismatic Lens	3	86.2	19	1.64	4,913	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	3	43.5	19	0.83	2,480	0.81	2,434	\$329	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	3	20.0%	496	\$67	\$1,710.00	\$902.50	\$2,612.50	\$190.00	7.37	\$900.00	\$150.00	\$1,050.00	FALSE	15.68
9	Corridor Trophy Cases	3000	1-Lamp 4"x4" T8 32W Ceiling-mounted Open Lamp	1	33.2	2	0.07	199	Re-Lamp	Philips LED T8 InstaFit Lamp (14.5W)	1	14.5	2	0.03	87	0.04	112	\$15	0	No New Controls	0	0.0%	0	\$0	\$60.00	\$95.00	\$155.00	\$10.00	9.57	\$0.00	\$0.00	\$0.00	FALSE	-
39	Entire Building	8760	Emergency Exit Signs - LED	1	3	45	0.14	1,183	Existing to Remain		1	3	0	0.14	1,183	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C120 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C124 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C126 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
30	Above C126/C128 Exits	3000	1-Lamp 150W HPS Wall-mounted, Prismatic	1	188	2	0.38	1,128	New Fixture	RAB Wall Mount Fixture with with LED 44 Watt Lamp	1	44	2	0.09	264	0.29	864	\$117	0	No New Controls	0	0.0%	0	\$0	\$220.00	\$180.00	\$400.00	\$20.00	3.26	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C128 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C130 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
28	Above C132 Exit	3000	2-Lamp 26W Ceiling-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	Philips Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
31	Block C East Corner	3000	1-Lamp 150W HPS Wall-mounted, Open	1	188	2	0.38	1,128	New Fixture	RAB Wall Mount Fixture with with LED 44 Watt Lamp	1	44	2	0.09	264	0.29	864	\$117	0	No New Controls	0	0.0%	0	\$0	\$220.00	\$180.00	\$400.00	\$20.00	3.26	\$0.00	\$0.00	\$0.00	FALSE	-
32	Exit #11	3000	0	0	0	1	0.00	0	0	0	0	0	0.00	0	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-	
30	Block D North Corner	3000	1-Lamp 150W HPS Wall-mounted, Prismatic	1	188	2	0.38	1,128	New Fixture	RAB Wall Mount Fixture with with LED 44 Watt Lamp	1	44	2	0.09	264	0.29	864	\$117	0	No New Controls	0	0.0%	0	\$0	\$220.00	\$180.00	\$400.00	\$20.00	3.26	\$0.00	\$0.00	\$0.00	FALSE	-
30	Wall outside C117/C115	3000	1-Lamp 150W HPS Wall-mounted, Prismatic	1	188	1	0.19	564	New Fixture	RAB Wall Mount Fixture with with LED 44 Watt Lamp	1	44	1	0.04	132	0.14	432	\$58	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$10.00	3.26	\$0.00	\$0.00	\$0.00	FALSE	-
29	Exit #10 and ramp	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	3	0.16	468	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	3	0.05	162	0.10	306	\$41	0	No New Controls	0	0.0%	0	\$0	\$285.00	\$270.00	\$555.00	\$60.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
29	Exit #9	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS			LIGHTING CONTROLS COST								
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
29	Gymnasium Walls	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
33	Gym Stair Exit #7	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
29	Gym Stair Exit #7	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
33	Abv. Storage Room Loading Door	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
29	Gym Stair Exit #6	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
33	Exit #5 Ramp	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
33	Exit #5	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
29	A126 Wall	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
31	A126 Wall	3000	1-Lamp 150W HPS Wall-mounted, Open	1	188	1	0.19	564	New Fixture	RAB Wall Mount Fixture with LED 44 Watt Lamp	1	44	1	0.04	132	0.14	432	\$58	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$10.00	3.26	\$0.00	\$0.00	\$0.00	FALSE	-
33	Exit #4	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
29	A116 Wall	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
34	A114 Wall	3000	1-Lamp 400W MH Wall-mounted Prismatic Lens	1	460	1	0.46	1,380	New Fixture		1	104	1	0.10	312	0.36	1,068	\$144	0	No New Controls	0	0.0%	0	\$0	\$350.00	\$90.00	\$440.00	\$50.00	2.70	\$0.00	\$0.00	\$0.00	FALSE	-
29	A114 Wall	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
33	Exit #3	3000	7W LED, Wall-mounted	1	7	1	0.01	21	Existing to Remain		1	7	0	0.01	21	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
29	Exit #2	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
29	A113 Wall	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
35	A111 Wall	3000	1-Lamp 100W MH Wall-mounted, Prismatic Lens	1	129	1	0.13	387	New Fixture	RAB Wall Mount Fixture with LED 44 Watt Lamp	1	44	1	0.04	132	0.09	255	\$34	0	No New Controls	0	0.0%	0	\$0	\$150.00	\$90.00	\$240.00	\$10.00	6.68	\$0.00	\$0.00	\$0.00	FALSE	-
35	Main Entrance Walls	3000	1-Lamp 100W MH Wall-mounted, Prismatic Lens	1	129	2	0.26	774	New Fixture	RAB Wall Mount Fixture with LED 44 Watt Lamp	1	44	2	0.09	264	0.17	510	\$69	0	No New Controls	0	0.0%	0	\$0	\$300.00	\$180.00	\$480.00	\$20.00	6.68	\$0.00	\$0.00	\$0.00	FALSE	-
35	Front Wall - South	3000	1-Lamp 100W MH Wall-mounted, Prismatic Lens	1	129	1	0.13	387	New Fixture	RAB Wall Mount Fixture with LED 44 Watt Lamp	1	44	1	0.04	132	0.09	255	\$34	0	No New Controls	0	0.0%	0	\$0	\$150.00	\$90.00	\$240.00	\$10.00	6.68	\$0.00	\$0.00	\$0.00	FALSE	-
29	B107 Wall	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
29	B113 (APR) SW Exit	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
34	B112 (APR Kitchen) Corner	3000	1-Lamp 400W MH Wall-mounted Prismatic Lens	1	460	1	0.46	1,380	New Fixture	RAB LED 104 W Wallpack	1	104	1	0.10	312	0.36	1,068	\$144	0	No New Controls	0	0.0%	0	\$0	\$350.00	\$90.00	\$440.00	\$50.00	2.70	\$0.00	\$0.00	\$0.00	FALSE	-
36	B112 (APR Kitchen) Corner	3000	1-Lamp 250W MH Wallpack, Prismatic Lens	1	295	1	0.30	885	New Fixture	RAB 78 W LED Wallpack	1	78	1	0.08	234	0.22	651	\$88	0	No New Controls	0	0.0%	0	\$0	\$250.00	\$90.00	\$340.00	\$50.00	3.30	\$0.00	\$0.00	\$0.00	FALSE	-
29	B112 (APR Kitchen) Corner	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	1	0.05	156	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	1	0.02	54	0.03	102	\$14	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
29	B113 (APR) SE Exit	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	7	0.36	1,092	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	7	0.13	378	0.24	714	\$96	0	No New Controls	0	0.0%	0	\$0	\$665.00	\$630.00	\$1,295.00	\$140.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
37	B113 (APR) SE Exit	3000	1-Lamp 70W MH Wall-mounted Open Lens	1	93	1	0.09	279	New Fixture	RAB 30 W LED WP1 Wallpack	1	30	1	0.03	90	0.06	189	\$26	0	No New Controls	0	0.0%	0	\$0	\$110.00	\$90.00	\$200.00	\$0.00	7.84	\$0.00	\$0.00	\$0.00	FALSE	-
29	B119 Exits	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	2	0.10	312	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	2	0.04	108	0.07	204	\$28	0	No New Controls	0	0.0%	0	\$0	\$190.00	\$180.00	\$370.00	\$40.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS			LIGHTING CONTROLS COST								
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
34	B119 Corner	3000	1-Lamp 400W MH Wall-mounted Prismatic Lens	1	460	1	0.46	1,380	New Fixture	RAB LED 104 W Wallpack	1	104	1	0.10	312	0.36	1,068	\$144	0	No New Controls	0	0.0%	0	\$0	\$350.00	\$90.00	\$440.00	\$50.00	2.70	\$0.00	\$0.00	\$0.00	FALSE	-
38	B119 Corner	3000	1-Lamp 26W CFL, Wall-mounted Prismatic Lens	1	26	1	0.03	78	New Fixture	Philips Wall Mount Fixture with LED A21 Lamp (18W)	1	18	1	0.02	54	0.01	24	\$3	0	No New Controls	0	0.0%	0	\$0	\$95.00	\$90.00	\$185.00	\$20.00	50.93	\$0.00	\$0.00	\$0.00	FALSE	-
29	Triangular Courtyard	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	9	0.47	1,404	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	9	0.16	486	0.31	918	\$124	0	No New Controls	0	0.0%	0	\$0	\$855.00	\$810.00	\$1,665.00	\$180.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
29	Rectangular Courtyard	3000	2-Lamp 26W Wall-mounted CFL, Exterior light	2	52	10	0.52	1,560	New Fixture	RAB Wall Mount Fixture with LED 18W Lamp (18W)	1	18	10	0.18	540	0.34	1,020	\$138	0	No New Controls	0	0.0%	0	\$0	\$950.00	\$900.00	\$1,850.00	\$200.00	11.98	\$0.00	\$0.00	\$0.00	FALSE	-
TOTAL						1,071	82.9	221,658					1,000	43.0	116,190	39.9	105,468	\$14,238			156	24	15,618	\$2,108	\$89,745	\$56,590	\$146,335	\$15,025	9.22	\$31,000	\$7,800	\$38,800	\$720.00	18.06