NORTH BRUNSWICK TOWNSHIP
PUBLIC SCHOOL DISTRICT

PARSONS ELEMENTARY SCHOOL

899 HOLLYWOOD STREET
NORTH BRUNSWICK, NJ 08902

FACILITY ENERGY REPORT

TABLE OF CONTENTS

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 Owner.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	Large Power & Lighting Secondary (LPLS)
Third Party Supplier:	South Jersey Energy Company

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	None

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 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: 778019791
Account # E 42-123-503-00
Third Party Utility Provider: South Jersey Energy Company
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Aug-11	47,100	273.0	$9,277
Sep-11	49,200	252.0	$7,193
Oct-11	50,100	189.0	$7,100
Nov-11	57,000	198.0	$7,974
Dec-11	56,100	201.0	$7,899
Jan-12	58,500	204.0	$8,210
Feb-12	54,300	204.0	$7,699
Mar-12	45,000	231.0	$6,662
Apr-12	51,000	228.0	$7,381
May-12	45,000	246.0	$8,793
Jun-12	30,900	198.0	$6,523
Jul-12	32,400	201.0	$3,714
Totals	**576,600**	**273.0 Max**	**$88,425**

AVERAGE DEMAND **218.8 KW average**
AVERAGE RATE **$0.153** **$/kWh**

Figure 1
Electricity Usage Profile

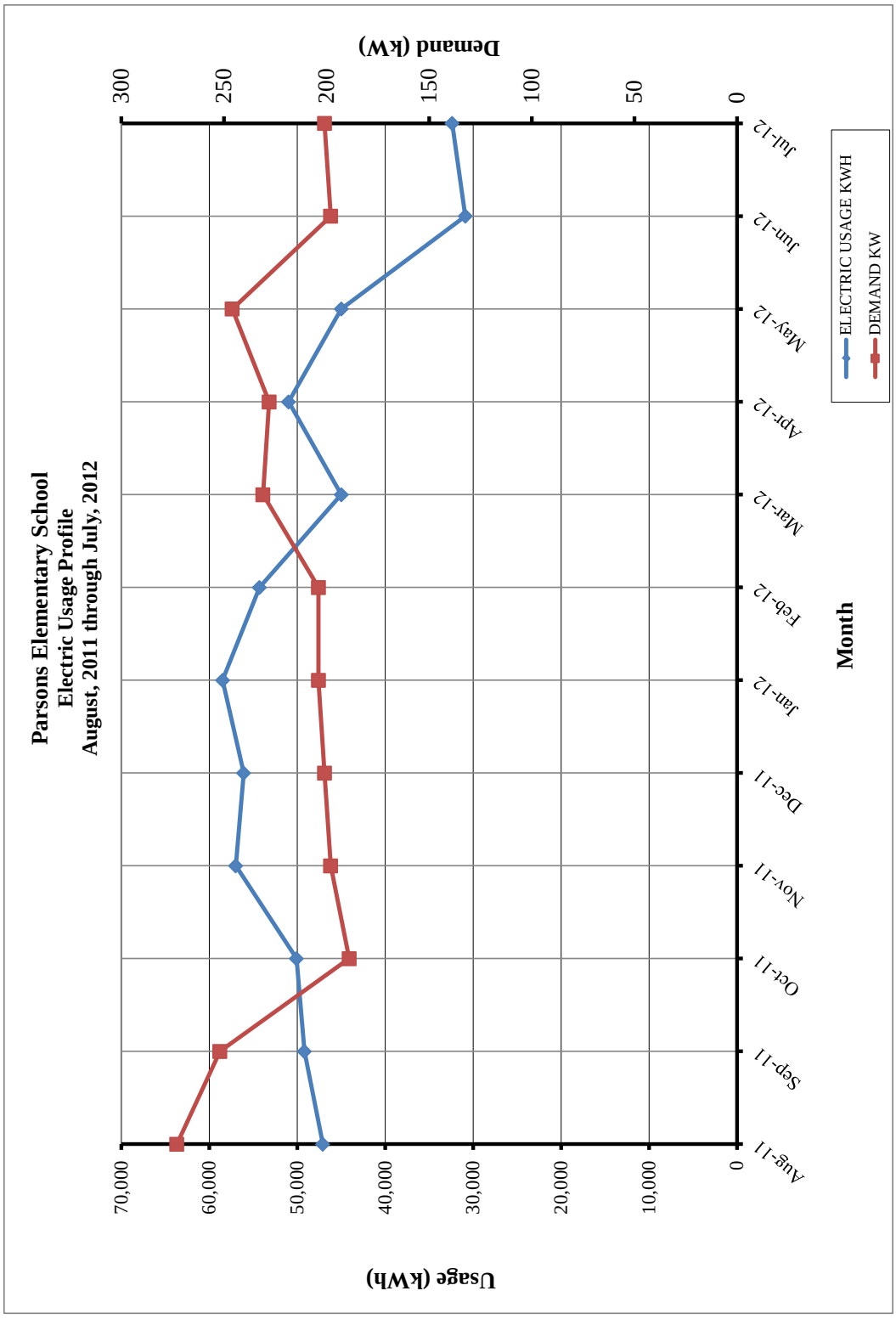
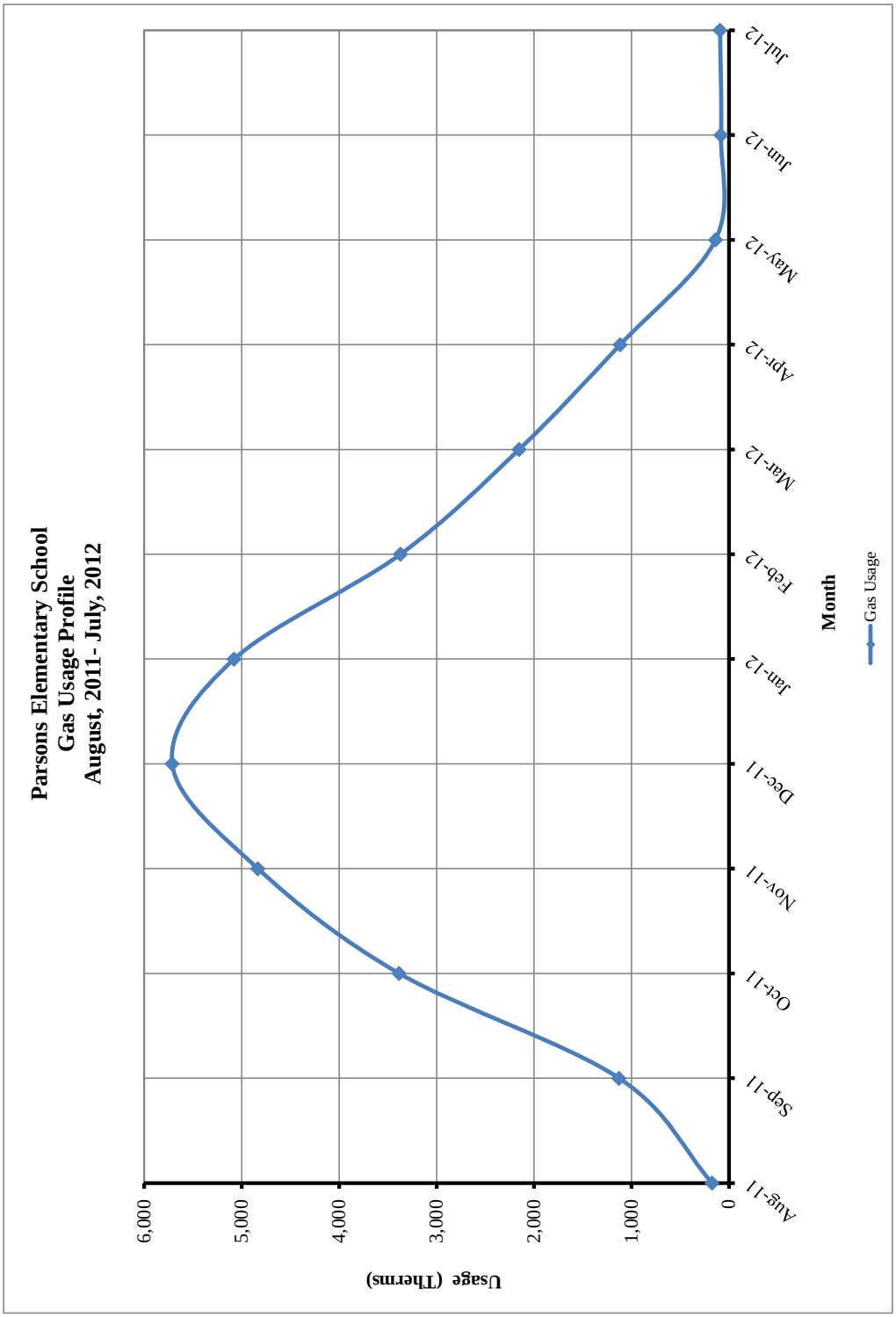


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 3567970		
Point of Delivery ID: G 42-123-503-0018		
Third Party Utility Provider: N/A		
TPS Meter No: N/A		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-11	172.00	$233.47
Sep-11	1,127.00	$964.66
Oct-11	3,384.00	$3,896.51
Nov-11	4,833.00	$5,346.90
Dec-11	5,713.00	$5,260.02
Jan-12	5,077.00	$4,513.05
Feb-12	3,370.00	$3,155.88
Mar-12	2,153.00	$1,377.58
Apr-12	1,116.00	$762.72
May-12	138.00	$186.25
Jun-12	81.00	$153.84
Jul-12	91.00	$163.02
TOTALS	**27,255.00**	**$26,013.90**
AVERAGE RATE:	**$0.95**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Parsons Elementary School is located at 899 Hollywood Street in North Brunswick, New Jersey. The 84,079 SF Parsons Elementary School was built in the early 1960s with an addition in 2008. The building is a single story building and is comprised of office space for administrative use, a gymnasium, classrooms, a cafeteria, kitchen and mechanical rooms. In addition, there is a 2,030 square foot modular building on the campus.

Occupancy Profile

The typical hours of operation for Parsons Elementary School are Monday through Friday between 8:00 am and 3:00 pm, with custodial services running until 8:00 pm. The elementary school has a 10 month occupancy with a student population of 669.

Building Envelope

Exterior walls for the Parsons Elementary School are brick faced with a concrete block construction. The amount of insulation within the walls is unknown. The windows throughout the elementary school are in good condition and appear to be maintained. Typical windows throughout the elementary school are double pane, ¼" clear glass with aluminum frames. Blinds are utilized throughout the school per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The roof is a flat, built up rubber roof where some of the HVAC equipment resides. Some of the roof has recently been refurbished and now has a layer of white gravel spread over the rubber. The amount of insulation below the roof is unknown.

HVAC Systems

The offices adjacent to the cafeteria are served by two International Comfort Products packaged rooftop air conditioning units. The cooling capacity of these units is two tons each.

The classroom wings and offices in the original building are conditioned by unit ventilators with hot water and direct expansion coils.

The new wing is served by a Trane Intellipak rooftop unit. This unit is an 80 ton unit that provides cooling via a DX coil, and heating via a hot water coil fed from the boiler system.

Heating Hot Water for the building is generated by a boiler plant fitted with two Cleaver Brooks packaged boilers. The boilers are natural gas fired with input rating of 5,230 MBH. The boilers are both equipped with Power Flame Burners. Heating water is circulated via two 10 horsepower Bell and Gossett pumps.

The modular building is conditioned by a total of two (2) packaged heating and cooling units, mounted on the exterior of the structure. These units rarely operate, as the modular building is only currently used for storage.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters.

HVAC System Controls

The Parsons Elementary School is controlled by a Novar DDC controls system. This is a non-web based control system that allows the facilities staff to set and monitor setpoints throughout the building. typical classrooms are set to 74°F for cooling and 72°F for heating. Offices typically are set to 74°F for heating and 70°F for cooling. Supplemental cooling systems are controlled by individual thermostats.

Domestic Hot Water

Domestic hot water for the Parsons Elementary School is provided by one A.O. Smith HW 300 892 natural gas domestic water heater with a separate storage tank that has a capacity of 940 gallons.

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.

III. 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.

IV. 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	Lighting Upgrade General	$3,560	$377	9.4	58.8%
ECM #2	Lighting Controls Upgrade	$16,480	$2,974	5.5	170.7%
ECM #3	NEMA Premium Motor Replacements	$6,898	$290	23.8	-24.3%
ECM #4	AC Unit Upgrades	$27,186	$1,913	14.2	5.6%
ECM #5	Boiler Upgrade	$184,878	$5,879	31.4	-20.5%
ECM #6	Computer Standby or Hibernate	$2,450	$3,471	0.7	2025.1%
ECM #7	Domestic Hot Water Heater Upgrade	$13,500	$1,043	12.9	-7.3%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	125.96 kW Solar Array	$794,424	$51,121	15.5	-3.5%
Notes:	A. Cost takes into consideration applicable NJ Smart StartTM incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

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	Lighting Upgrade General	1.2	3,042	0
ECM #2	Lighting Controls Upgrade	0	23,690	0
ECM #3	NEMA Premium Motor Replacements	0.2	687	0
ECM #4	AC Unit Upgrades	10.9	21,837	0
ECM #5	Boiler Upgrade	0.0	0	7,728
ECM #6	Computer Standby or Hibernate	0.0	26,085	0
ECM #7	Domestic Hot Water Heater Upgrade	0.0	0	1,098
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	125.96 kW Solar Array	126.0	148,571	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade General	$377	$3,560	$0	$3,560	9.4
Lighting Controls Upgrade	$2,974	$16,550	$70	$16,480	5.5
~~NEMA Premium Motor Replacements~~	~~$290~~	~~$7,218~~	~~$320~~	~~$6,898~~	~~23.8~~
AC Unit Upgrades	$1,913	$34,500	$7,314	$27,186	14.2
Boiler Upgrade	$5,879	$190,878	$6,000	$184,878	31.4
Computer Standby or Hibernate	$3,471	$2,450	$0	$2,450	0.7
Domestic Hot Water Heater Upgrade	$1,043	$14,000	$500	$13,500	12.9
Design / Construction Extras (15%)	*$0*	*$39,291*	*$0*	*$39,291*	
Total Project	**$15,657**	**$301,228**	**$13,884**	**$287,344**	**18**

Note: ECM's with the strike-through font are not included in the ESIP.

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

ECM #1: Lighting Upgrade – General

Description:

The majority of the interior lighting throughout Parsons Elementary School is provided with fluorescent fixtures with 32W T8 lamps and electronic ballasts. In addition, there are a number of older and outdated fixtures with T12 lamps and magnetic ballasts. It is recommended to replace all of the T12 fixtures in these areas with higher efficiency fluorescent T8 fixtures with electronic ballasts.

This ECM includes retrofit of all older fluorescent fixtures with T8 or T5 fluorescent fixtures with electronic ballasts in the building. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts.

The ECM also includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into existing fixtures, or hardwired into existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. The energy usage of an incandescent compared to a compact fluorescent is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,560
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$3,560
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$377
Total Yearly Savings ($/Yr):	$377
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.4
Simple Lifetime ROI	58.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$5,655
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$940.60

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Parsons Elementary School are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are 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.

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 commercial 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 (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and Media Centers. 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 implemented in this ECM and outlines the proposed 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:

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

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

Rebates and Incentives:

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Smart Start Incentive
= (# Wall mount sensors × $20 per sensor)
+ (# Ceiling mount sensors × $35 per sensor)

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$16,550
NJ Smart Start Equipment Incentive ($):	$70
Net Installation Cost ($):	$16,480
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,974
Total Yearly Savings ($/Yr):	$2,974
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.5
Simple Lifetime ROI	170.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$44,610
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	$19,023.42

ECM #3: Install NEMA Premium® Efficiency Motors

Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving the hot water pumps are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY					
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
P-1	Hot Water Pump	10	2,745	89.5%	92.4%
P-2	Hot Water Pump	10	2,745	89.5%	92.4%
P-1A	Hot Water Pump	3	2,745	86.5%	89.5%
P-2A	Hot Water Pump	3	2,745	85.5%	89.5%

Energy Savings Calculations:
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$$\text{Electric usage, kWh} = \frac{\text{HP} \times \text{LF} \times 0.746 \times \text{Hours of Operation}}{\text{Motor Efficiency}}$$

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left(\frac{\$}{\text{kWh}}\right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	MOTOR HP	LOAD FACTOR	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY	POWER SAVINGS kW	ENERGY SAVINGS kWH	COST SAVINGS
P-1	10	90%	89.5%	92.4%	0.24	650	$105
P-2	10	90%	89.5%	92.4%	0.24	650	$105
P-1A	3	90%	86.5%	89.5%	0.08	215	$35
P-2A	3	90%	85.5%	89.5%	0.11	291	$47
TOTAL					**0.7**	**1,805**	**$291**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	NJ SMART START INCENTIVE
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130
30	$150
40	$180

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	MOTOR POWER HP	INSTALLED COST	SMART START INCENTIVE	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
P-1	10	$2,560	$100	$2,460	$105	23.5
P-2	10	$2,560	$100	$2,460	$105	23.5
P-1A	3	$1,049	$60	$989	$35	28.5
P-2A	3	$1,049	$60	$989	$47	21.1
TOTAL		**$7,218**	**$320**	**$6,898**	**$291**	**23.7**

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,218
NJ Smart Start Equipment Incentive ($):	$320
Net Installation Cost ($):	$6,898
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$290
Total Yearly Savings ($/Yr):	$290
Estimated ECM Lifetime (Yr):	18
Simple Payback	23.8
Simple Lifetime ROI	-24.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$5,220
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($2,909.48)

ECM #4: AC Unit Upgrades

Description:

The Media Center and Computer Room are cooled by split systems at Parsons Elementary School. The unit capacities range from 2 tons to 3 tons. Please refer to the **Major Equipment List Appendix** for further information about these units.

These units are in average condition though the current units in operation are not high efficiency units. These units are approximately twenty-three years old and have surpassed their ASHRAE service life of fifteen years.

These units can be replaced with new higher efficiency units. New split system units provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and higher efficiency refrigerants such as R410A which would be used in place of R22 that is currently used in the units.

This ECM includes one-for-one replacement of the older split system units with new higher efficiency systems which include new evaporator coils and refrigerant lines. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
SS	Media Center	2	30,000	5.0	Carrier 24ANA1
SS	Computer Room	2	36,000	6.0	Carrier 24ANA1
Total		**4**	**66,000**	**11.0**	

The manufacturers used as the basis for the calculation is Carrier. The unit pricing and install cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and install costs if the ECM is implemented.

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity}\left(\frac{\$}{\text{kWh}}\right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS SEER**	**SPLIT UNITS SEER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
SS	30,000	2,000	10 SEER	19 SEER	2	5,684	2.8
SS	36,000	2,000	10 SEER	19 SEER	2	6,821	3.4
Total					4	12,505	6.3

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the rebate are $92 per ton for units below 5.4 tons & $73 per ton for units ranging from 5.4 tons to 11.25 tons..

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
SS	$20,700	2	$20,700	$6,348	$14,352	$870	16.5
SS	$13,800	2	$13,800	$368	$13,432	$1,044	12.9
Total	$34,500	4	$34,500	$7,314	$27,186	$1,913	14.2

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$34,500
NJ Smart Start Equipment Incentive ($):	$7,314
Net Installation Cost ($):	$27,186
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,913
Total Yearly Savings ($/Yr):	$1,913
Estimated ECM Lifetime (Yr):	15
Simple Payback	14.2
Simple Lifetime ROI	5.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$28,695
Internal Rate of Return (IRR)	1%
Net Present Value (NPV)	($4,348.73)

ECM #5: Condensing Boiler Installation

Description:

The existing boiler plant consists of two packaged boilers which are used as the primary source of heat for Parsons Elementary School. The existing boilers are well beyond the life expectancy of cast iron boilers and could be considered for replacement. With the increased efficiency of the condensing boilers, the savings can be substantial.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 92%. The existing boiler's efficiency is approximately 70%, which makes the condensing boilers a 22% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of two condensing gas fired boilers to replace the existing Cleaver Brooks CB.810 packaged boiler. As a result of this ECM, the one existing CB.800 Cleaver Brooks boiler will remain as a backup boiler. The basis for this ECM is Aerco condensing boiler; model number BMK – 3.0. The new Aerco boilers will be able to handle the main hot water load while the existing Cleaver Brooks will act as backup for any additional load the system requires fulfilling.

Energy Savings Calculations:

Existing Heating Natural Gas: 25,879 Therms

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Nat\ Gas\ (Therms) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

$$Energy\ Cost = Heating\ Gas\ Usage(Therms) \times Ave\ Fuel\ Cost\left(\frac{\$}{Therm}\right)$$

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	25,879	0	
Boiler Efficiency (%)	70%	92%	22%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	1,812	1,812	
Gas Cost ($/Therm)	0.95	0.95	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	25,879	19,691	6,188
Energy Cost ($)	$24,585	$18,706	$5,879
COMMENTS:			

From the **NJ Smart Start Appendix**, the installation of new condensing boilers warrants the following incentive: $1.00 per MBH.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$190,878
NJ Smart Start Equipment Incentive ($):	$6,000
Net Installation Cost ($):	$184,878
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,879
Total Yearly Savings ($/Yr):	$5,879
Estimated ECM Lifetime (Yr):	25
Simple Payback	31.4
Simple Lifetime ROI	-20.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$146,975
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($82,505.65)

ECM #6: Set Computers to Automatic Stand-by or Hibernate Modes

Description:

During the survey, it was noticed that the majority of the computers were left at ON position with the monitors at Screen Saver or OFF positions.

Many personal computers (PC) came equipped with automatic Sleep Mode or Hibernate (power down) mode features. Normally computers boot up from Sleep Mode or Hibernate mode much faster than powering up from Shut Down position.

Based on an independent study by the U.S. Department of Energy, Energy star® rated computers use approximately 70% less power during Sleep Mode. It is recommended to set up the PCs at this facility to switch into Sleep Mode after a short period of inactivity and Hibernate mode after a long period of inactivity.

This ECM includes configuring the computers in the classrooms and the offices such that they automatically switch into:

- Sleep Mode after 15 minutes of inactivity
- Hibernate after 60 minutes of inactivity

The inactivity times above can be adjusted based on experience or preference. Even though this ECM can be implemented easily in house, the calculations assume an independent computer technician performing the task at a typical market rate.

Energy Savings Calculations:

No. of Computers:	147
Operating Weeks per Yr:	42
Estimated percentage of computers left ON overnight:	75%

$$\text{Electric Usage} = \frac{\#\text{of Computers} \times \text{Computer Power (W)} \times \text{Operation (Hrs)}}{1000\left(\frac{\text{W}}{\text{KW}}\right)}$$

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

The cost of configuring the computers to automatically sleep or hibernate is based on 10 minutes per computer per technician at an hourly rate indicated below.

Implementation Costs: = # Computers X Configuration Time X Cost per Hour
= 147 Monitors X 10 Minutes/Computer X $100 per Hour
= $2450

AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manual Operation	Auto Power Save	-
# of Computers	147	147	-
% Computers left ON	75%	75%	-
Power when left ON (Watt)	50	50	-
Power at Stand-by (Watt)	5	5	-
Power at Hibernate (Watt)	4	4	-
Power when OFF (Watt)	0	0	-
Operating Weeks per Yr	42	42	-
Operating Hours per Week	168	168	-
Hours/Wk Computers ON	120	20	-
Hours/Wk at Sleep Mode	0	20	-
Hours/Wk at Hibernate Mode	0	80	-
Hours/Wk at Power Down	48	48	-
Elec Cost ($/kWh)	0.153	0.153	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	27,783	5,094	22,689
Energy Cost ($)	$4,251	$779	$3,471
COMMENTS:	Calculation assumes computers currently run throughout work week and are shut down over the weekend.		

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,450
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$2,450
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,471
Total Yearly Savings ($/Yr):	$3,471
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.7
Simple Lifetime ROI	2025.1%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$52,065
Internal Rate of Return (IRR)	142%
Net Present Value (NPV)	$38,986.57

ECM #7: High Efficiency Gas Hot Water Heater

Description:

The Parsons Elementary School is supplied domestic hot water by an A.O. Smith water heater which provides 234 MBH of heat. This heater feeds a 940 gallon storage tank. This heater has surpassed its ASHRAE service life of 12 years and should be replaced with a new high efficiency, gas fired model.

This ECM will replace the one gas domestic water heater with one 97% thermal efficient Bradford White eF Series Natural Gas fired 250 MBH and 100 gallons of storage domestic water heater to be used in conjunction with the existing storage.

Energy Savings Calculations:

DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Gas Hot Water Heater	High Efficiency Heater	
Building Type	Education		
Building Square-foot	84,079	84,079	
Domestic Water Usage, kBtu	437,210.80	437,210.80	
DHW Heating Fuel Type	Gas	Gas	
Heating Efficiency	78%	97%	19%
Total Usage (kBTU)	560,527	450,733	109,794
Nat Gas Cost ($/Therm)	$ 0.950	$ 0.950	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	5,605	4,507	1,098
Energy Cost ($)	$5,325	$4,282	$1,043
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

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

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

$$DHW\ Total\ Usage = \frac{Dom\ \ HW\ \ Heat\ Cons.(Btu)}{Heating\ \ Eff.(\%)\times Fuel\ \ Heat\ Value\left(\frac{BTU}{Fuel\ Unit}\right)}$$

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

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,000
NJ Smart Start Equipment Incentive ($):	$500
Net Installation Cost ($):	$13,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,043
Total Yearly Savings ($/Yr):	$1,043
Estimated ECM Lifetime (Yr):	12
Simple Payback	12.9
Simple Lifetime ROI	-7.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$12,516
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($3,117.97)

REM #1: 125.96 kW Solar System

Description:

Parsons Elementary School has available roof and parking lot space that could accommodate a significant amount of solar generation. Based on the available areas a 125.96 KW DC solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 148,571 kilowatt-hours annually that will reduce the overall electric usage of the facility by 25.77%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	125.96
Electric Generation (KWH/Yr):	148,571
Installation Cost ($):	$794,424
SREC Revenue ($/Yr):	$28,390
Energy Savings ($/Yr):	$22,731
Total Yearly Savings ($/Yr):	$51,121
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.5
Analysis Period Electric Savings ($):	$422,779
Analysis Period SREC Revenue ($):	$411,258
Net Present Value (NPV)	($284,952.58)

V. 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 which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

North Brunswick Township Public Schools - Parsons Elementary School

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 (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * 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	Lighting Upgrade General	$1,080	$2,480	$0	$3,560	$377	$0	$377	15	$5,655	$0	58.8%	9.4	6.43%	$940.60
ECM #2	Lighting Controls Upgrade	$13,950	$2,600	$70	$16,480	$2,974	$0	$2,974	15	$44,610	$0	170.7%	5.5	16.13%	$19,023.42
ECM #3	NEMA Premium Motor Replacements	$4,254	$2,964	$320	$6,898	$290	$0	$290	18	$5,220	$0	-24.3%	23.8	-2.78%	($2,909.48)
ECM #4	AC Unit Upgrades	$17,250	$17,250	$7,314	$27,186	$1,913	$0	$1,913	15	$28,695	$0	5.6%	14.2	0.68%	($4,348.73)
ECM #5	Boiler Upgrade	$114,861	$76,017	$6,000	$184,878	$5,879	$0	$5,879	25	$146,975	$0	-20.5%	31.4	-1.69%	($82,505.65)
ECM #6	Computer Standby or Hibernate	$0	$2,450	$0	$2,450	$3,471	$0	$3,471	15	$52,065	$0	2025.1%	0.7	141.67%	$38,986.57
ECM #7	Domestic Hot Water Heater Upgrade	$10,000	$4,000	$500	$13,500	$1,043	$0	$1,043	12	$12,516	$0	-7.3%	12.9	-1.15%	($3,117.97)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	125.96 kW Solar Array	$794,424	$0	$0	$794,424	$22,731	$28,390	$51,121	15	$766,815	$425,850	-3.5%	15.5	-1.88%	($284,953.82)

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.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

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 as of February 15, 2011:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per VFD rated hp
Compressors	$5,250 to $12,500 per drive
Cooling Towers ≥ 10 hp	$60 per VFD rated hp

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

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$25 per fixture (1-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start Including Parking Lot	$25 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $200 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture

Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	 $20 per fixture $10 per fixture
LED Display Case Lighting	$30 per display case
LED Shelf-Mtd. Display & Task Lights	$15 per linear foot
LED Portable Desk Lamp	$20 per fixture
LED Wall-wash Lights	$30 per fixture
LED Recessed Down Lights	$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	$100 per fixture
LED Parking Garage Luminaries	$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	$50 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 Bollard Fixtures	$50 per fixture
LED Linear Panels (2x2 Troffers only)	$100 per fixture
LED Fuel Pump Canopy	$100 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

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 a IRR of at least 10%.
Multi Measures Bonus	15%

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
North Brunswick BOE - Parsons Elementary School

Building ID: 3316315
For 12-month Period Ending: July 31, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 07, 2012

Facility
North Brunswick BOE - Parsons Elementary School
899 Hollywood Street
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

Year Built: 1965
Gross Floor Area (ft²): 84,079

Energy Performance Rating[2] (1-100) 68

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,004,216
Natural Gas (kBtu)[4]	2,885,030
Total Energy (kBtu)	4,889,246

Energy Intensity[4]

Site (kBtu/ft²/yr)	58
Source (kBtu/ft²/yr)	116

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	437

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	69
National Median Source EUI	138
% Difference from National Median Source EUI	-16%
Building Type	K-12 School

Stamp of Certifying Professional

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

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

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

Certifying Professional
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	North Brunswick BOE - Parsons Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	899 Hollywood Street, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Parsons Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	84,079 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	147	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

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

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Electric & Gas Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/23/2012	07/22/2012	30,900.00
05/23/2012	06/22/2012	45,000.00
04/23/2012	05/22/2012	51,000.00
03/23/2012	04/22/2012	45,000.00
02/23/2012	03/22/2012	54,300.00
01/23/2012	02/22/2012	58,500.00
12/23/2011	01/22/2012	56,100.00
11/23/2011	12/22/2011	57,000.00
10/23/2011	11/22/2011	50,100.00
09/23/2011	10/22/2011	49,200.00
08/23/2011	09/22/2011	47,100.00
electric Consumption (kWh (thousand Watt-hours))		**544,200.00**
electric Consumption (kBtu (thousand Btu))		**1,856,810.40**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,856,810.40**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
06/23/2012	07/22/2012	81.00
05/23/2012	06/22/2012	138.00
04/23/2012	05/22/2012	1,116.00
03/23/2012	04/22/2012	2,153.00
02/23/2012	03/22/2012	3,370.00
01/23/2012	02/22/2012	5,077.00
12/23/2011	01/22/2012	5,713.00
11/23/2011	12/22/2011	4,833.00
10/23/2011	11/22/2011	3,384.00
09/23/2011	10/22/2011	1,127.00
08/23/2011	09/22/2011	172.00

gas Consumption (therms)	**27,164.00**
gas Consumption (kBtu (thousand Btu))	**2,716,400.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**2,716,400.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
North Brunswick BOE - Parsons Elementary School
899 Hollywood Street
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

General Information

North Brunswick BOE - Parsons Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	84,079
Year Built	1965
For 12-month Evaluation Period Ending Date:	July 31, 2012

Facility Space Use Summary

Parsons Elementary School	
Space Type	K-12 School
Gross Floor Area (ft^2)	84,079
Open Weekends?	No
Number of PCs	147
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	90
Percent Heated	100
Months °	10
High School?	No
School District °	North Brunswick Twp

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2012)	**Baseline** (Ending Date 07/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	68	68	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	58	58	54	N/A	69
Source ($kBtu/ft^2$)	116	116	108	N/A	138
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	437	437	408	N/A	522
$kgCO_2e/ft^2$/year	5	5	5	N/A	6

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

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

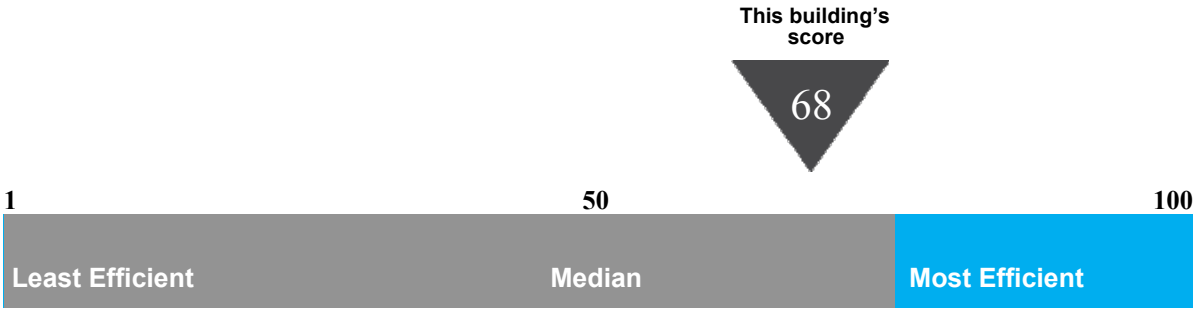
Statement of Energy Performance

2012

North Brunswick BOE - Parsons Elementary School
899 Hollywood Street
North Brunswick, NJ 08902

Portfolio Manager Building ID: 3316315

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 116 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2012

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 11/07/2012

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Parsons Elementary School

AC Units

Tag			
Unit Type	Condensing Unit	Condensing Unit for Heat Pump	Condensing Unit for Heat Pump
Qty	23	1	1
Location	Roof	Roof	Roof
Area Served	Classroom UVs	Office	Classroom
Manufacturer	Ducane	Sanyo	Sanyo
Model #	2AC13B36P-1A	CH1232	CH2432
Serial #	-	0069013	0017313
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	3 Tons	1 Ton	2 Tons
Cooling Efficiency (SEER/EER)	13 SEER	10 SEER	10 SEER
Heating Type	N/A	Electric	Electric
Heating Input (MBH)	N/A	13	25
Efficiency	N/A	-	-
Fuel	N/A	Electricity	Electricity
Approx Age	6	11	11
ASHRAE Service Life	15	15	15
Remaining Life	9	4	4
Comments	Typical Condensing Unit for Classroom Unit Ventilators		

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			
Unit Type	Condensing Unit	Condensing Unit	Condensing Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Classroom	Office	Office
Manufacturer	Rheem	Airedale	EMI
Model #	10AJB18A01	SCC09DMA0A0A0AA0A	S1CA9000D00
Serial #	6931T270504042	1-03-F-3567-26	1-08-C-7541-12
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	1.5 Tons	.75 Tons	.75 Tons
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	7	9	4
ASHRAE Service Life	15	15	15
Remaining Life	8	6	11
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			
Unit Type	Condensing Unit	Condensing Unit	Condensing Unit
Qty	2	2	1
Location	Roof	Roof	Roof
Area Served	Media Center	Computer Room	Library
Manufacturer	Trane	Trane	Rheem
Model #	TTD730B100A1	TTA036A300A0	RAKA-018JAZ
Serial #	D14228873	D17268320	5881F300312877
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	-	3 Tons	1.5 Tons
Cooling Efficiency (SEER/EER)	-	10 SEER	10 SEER
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	23	23	9
ASHRAE Service Life	15	15	15
Remaining Life	(8)	(8)	6
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag		
Unit Type	Packaged Unit	Packaged Unit
Qty	2	1
Location	Roof	New Wing Roof
Area Served	Offices	New Wing Classrooms and corridors
Manufacturer	ArcoAire	Trane
Model #	PAF024K000A	SLHFF75E4A77
Serial #	L9920 61826	CO7K10854
Cooling Type	DX, R-22	DX, R-22
Cooling Capacity (Tons)	2 Tons	80 Tons
Cooling Efficiency (SEER/EER)	-	9.5 EER
Heating Type	N/A	Hot Water
Heating Input (MBH)	N/A	-
Efficiency	N/A	-
Fuel	N/A	N/A
Approx Age	13	6
ASHRAE Service Life	15	15
Remaining Life	2	9
Comments		

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Parsons Elementary School

Boilers

Tag	B-1	B-2	
Unit Type	Packaged Boiler	Packaged Boiler	
Qty	1	1	
Location	Boiler Room	Boiler Room	
Area Served	Building Heat	Building Heat	
Manufacturer	Cleaver Brooks	Cleaver Brooks	
Model #	CB.800-125	CB.810-125	
Serial #	L-65844	L36812	
Input Capacity (Btu/Hr)	5,230,000	5,230,000	
Rated Output Capacity (Btu/Hr)	-	-	
Approx. Efficiency %	-	-	
Fuel	Natural Gas	Natural Gas	
Approx Age	34	47	
ASHRAE Service Life	25	25	
Remaining Life	(9)	(22)	
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Parsons Elementary School

Domestic Water Heaters

Tag			
Unit Type	Low Pressure Boiler		
Qty	1		
Location	Boiler Room		
Area Served	Building Domestic Hot Water		
Manufacturer	A.O. Smith		
Model #	HW 300 892		
Serial #	892 D 94 23933		
Size (Gallons)	-		
Input Capacity (MBH/KW)	300 MBH		
Recovery (Gal/Hr)	-		
Efficiency %	78%		
Fuel	Natural Gas		
Approx Age	18		
ASHRAE Service Life	12		
Remaining Life	(6)		
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Parsons Elementary School

Pumps

Tag	P1	P2	P1A
Unit Type	End Suction	End Suction	End Suction
Qty	1	1	1
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Building Heat	Building Heat	Building Heat
Manufacturer	Bell and Gossett	Bell and Gossett	Bell and Gossett
Model #	K70	K70	
Serial #	-	-	-
Horse Power	10	10	3
Flow	180 GPM	180 GPM	
Motor Info	Marathon	Marathon	-
Electrical Power	200V / 3 Ph	200V / 3 Ph	208V / 3 Ph
RPM	1750	1750	1750
Motor Efficiency %	89.5%	89.5%	-
Approx Age	7	7	-
ASHRAE Service Life	20	20	20
Remaining Life	13	13	-
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

Pumps

Tag	P2A		
Unit Type	End Suction		
Qty	1		
Location	Boiler Room		
Area Served	Building Heat		
Manufacturer	Bell and Gossett		
Model #	1510		
Serial #	-		
Horse Power	3		
Flow	-		
Motor Info	A.O. Smith Century		
Electrical Power	200V / 3 Ph		
RPM	1740		
Motor Efficiency %	85.5%		
Approx Age	11		
ASHRAE Service Life	20		
Remaining Life	9		
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12053
Facility Name: Parsons Elementary School
Address: 899 Hollywood Street
City, State, Zip North Brunswick, NJ 08902

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	Existing to Remain	2	62	0	0.19	484	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	97	$15
221.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	Existing to Remain	2	62	0	0.19	484	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	97	$15
651	Custodial Closet	2000	"Industrial" Relector, 26w CFL	1	26	1	0.03	52	Existing to Remain	Existing to Remain	1	26	0	0.03	52	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Room 141 Office	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	107	3	0.32	835	Existing to Remain	Existing to Remain	4	107	0	0.32	835	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	167	$26
242.11	Classroom 140	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	107	12	1.28	3,338	Existing to Remain	Existing to Remain	4	107	0	1.28	3,338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	668	$102
232.22	Faculty Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	10	0.86	2,236	Existing to Remain	Existing to Remain	3	86	0	0.86	2,236	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
247.21	Boy's Restroom	2600	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	68	2	0.14	354	Existing to Remain	Existing to Remain	4	68	0	0.14	354	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
247.21	Girl's Restroom	2600	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	68	2	0.14	354	Existing to Remain	Existing to Remain	4	68	0	0.14	354	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
651	Custodial Closet	2000	"Industrial" Relector, 26w CFL	1	26	1	0.03	52	Existing to Remain	Existing to Remain	1	26	0	0.03	52	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
651	Stage	2600	"Industrial" Relector, 26w CFL	1	26	8	0.21	541	Existing to Remain	Existing to Remain	1	26	0	0.21	541	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	PE Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	3	0.26	671	Existing to Remain	Existing to Remain	3	86	0	0.26	671	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Classroom 220	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	9	0.77	2,012	Existing to Remain	Existing to Remain	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Storage 204	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Faculty Restrooms	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	4	0.25	298	Existing to Remain	Existing to Remain	2	62	0	0.25	298	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 201	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	24	2.06	5,366	Existing to Remain	Existing to Remain	3	86	0	2.06	5,366	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 205	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	18	1.55	4,025	Existing to Remain	Existing to Remain	3	86	0	1.55	4,025	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 207	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	9	0.77	2,012	Existing to Remain	Existing to Remain	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 209	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Classroom 209	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 209 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 210	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
227.21	Classroom 210	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 210 Resteroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 211	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Classroom 211	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 211 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 212	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Clasroom 212	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 212 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 213	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	10	0.62	1,612	Existing to Remain	Existing to Remain	2	62	0	0.62	1,612	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 213 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 214	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Classroom 214	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 214 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 215	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Classroom 215	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	Existing to Remain	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 215 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 217	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.29	Classroom 217 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 219	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.33	Classroom 218	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.33	Classroom 216	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
232.22	Classroom 220	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 186	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 185	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 184	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 183	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
232.21	Classroom 182	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 181	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 180	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
222.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$20
222.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$20
121.34	Electrical Closet	1200	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	2	78	1	0.08	94	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	1	0.05	60	0.03	34	$5	$30.00	$70.00	$100.00	$0.00	19.45	0	No New Controls	0	0.0%	0	$0
121.34	Custodial Closet	2000	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	2	78	1	0.08	156	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	1	0.05	100	0.03	56	$9	$30.00	$70.00	$100.00	$0.00	11.67	0	No New Controls	0	0.0%	0	$0
200	Women's Restroom	1200	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	34	1	0.03	41	Existing to Remain	Existing to Remain	2	34	0	0.03	41	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 175	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	Existing to Remain	2	62	0	0.43	1,128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	226	$35
232.21	Classroom 174	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 172	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$27
232.22	Media Center	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	40	3.44	8,944	Existing to Remain	Existing to Remain	3	86	0	3.44	8,944	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	1,789	$274
232.22	Media Center Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$27
242.22	Medica Center classroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	4	104	16	1.66	4,326	Existing to Remain	Existing to Remain	4	104	0	1.66	4,326	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	865	$132
221.33	Classroom 116	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	14	0.87	2,257	Existing to Remain	Existing to Remain	2	62	0	0.87	2,257	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 117	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 119	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	23	1.43	3,708	Existing to Remain	Existing to Remain	2	62	0	1.43	3,708	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Calssroom 120A	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$27
221.11	Classroom 120	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	15	0.93	2,418	Existing to Remain	Existing to Remain	2	62	0	0.93	2,418	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	$74
221.11	Classroom 127	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classsroom 122	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 123	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 128	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 129	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 124	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 125	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59

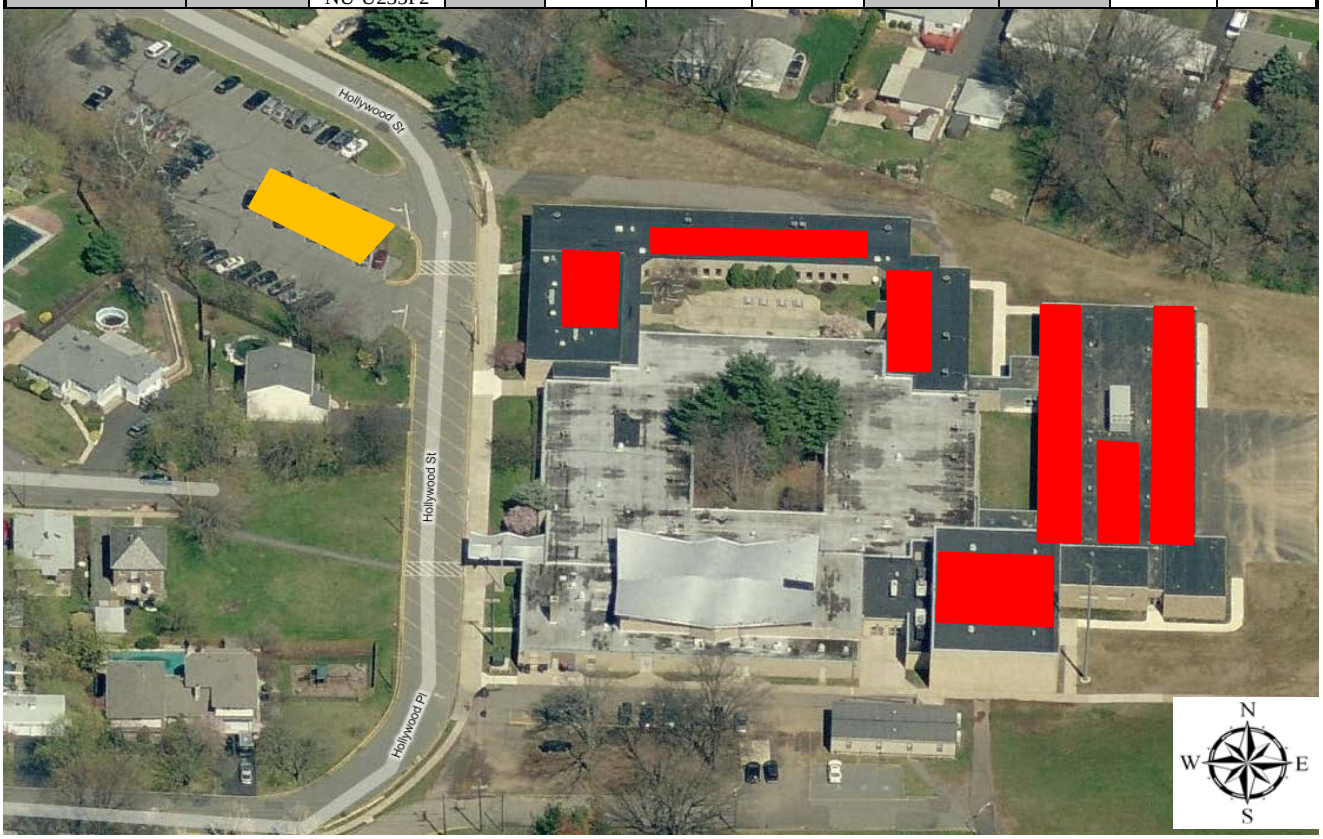
			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.11	Classroom 130	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
231.33	Classroom 126	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
242.21	Conference Room	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	104	3	0.31	811	Existing to Remain	Existing to Remain	4	104	0	0.31	811	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	162	$25
221.11	Classroom 112	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 113	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 114	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.33	Classroom 115	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 110	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 109	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 108	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Nurse	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	Existing to Remain	2	62	0	0.43	1,128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	226	$35
221.11	Copy	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Main Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	9	0.56	1,451	Existing to Remain	Existing to Remain	2	62	0	0.56	1,451	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	290	$44
221.11	Principak's Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Lobby	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	8	0.52	1,560	Existing to Remain	Existing to Remain	2	65	0	0.52	1,560	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Kitchen	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	16	0.99	2,579	Existing to Remain	Existing to Remain	2	62	0	0.99	2,579	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	516	$79
221.11	Boiler Room	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	9	0.56	1,674	Existing to Remain	Existing to Remain	2	62	0	0.56	1,674	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Office 164	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	104	4	0.42	1,082	Existing to Remain	Existing to Remain	4	104	0	0.42	1,082	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	216	$33
242.21	Classroom 149	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	104	4	0.42	1,082	Existing to Remain	Existing to Remain	4	104	0	0.42	1,082	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	216	$33
100	Restroom (2)	2600	2' Vanity Light, 2-Lamp, 20w T12, Mag. Ballast, Wall Mnt., Glass Lens	2	42	2	0.08	218	Reballast & Relamp	Reballast & Relamp; 17w T8 Elec. Ballast	2	33	2	0.07	172	0.02	47	$7	$60.00	$100.00	$160.00	$0.00	22.35	0	No New Controls	0	0.0%	0	$0
222.21	Corridors	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	91	5.64	16,926	Existing to Remain	Existing to Remain	2	62	0	5.64	16,926	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Corridors	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	14	0.87	2,604	Existing to Remain	Existing to Remain	2	62	0	0.87	2,604	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
			PODS																										
121.21	Classroom T3	2600	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	78	8	0.62	1,622	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	8	0.40	1,040	0.22	582	$89	$240.00	$560.00	$800.00	$0.00	8.98	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	208	$32
121.21	Classroom T4	2600	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	78	8	0.62	1,622	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	8	0.40	1,040	0.22	582	$89	$240.00	$560.00	$800.00	$0.00	8.98	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	208	$32
121.21	Classroom T5	2600	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	78	8	0.62	1,622	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	8	0.40	1,040	0.22	582	$89	$240.00	$560.00	$800.00	$0.00	8.98	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	208	$32
121.21	Classroom T6	2600	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	78	8	0.62	1,622	Reballast & Relamp	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	2	50	8	0.40	1,040	0.22	582	$89	$240.00	$560.00	$800.00	$0.00	8.98	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	208	$32
	TOTAL					**946**	**69**	**179,569**					**36**	**67.72**	**177,103**	**0.97**	**2,466**	**$377**	**$1,080.00**	**$2,480.00**	**$3,560.00**	**$0.00**	**9.44**			**52**		**19,438**	**$2,974**

CEG Project #: 9C12053
Facility Name: Parsons Elementary School
Address: 899 Hollywood Street
City, State, Zip North Brunswick, NJ 09902

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
745	Cafteria	2600	250w MH, Prismatic Lens	1	295	28	8.26	21,476	Remove and Return	1x4, 4 Lamp, 54w T5HO, Elect. Ballast, Lo Bay	6	230	28	6.44	16,744	1.82	4,732	$724	$5,600.00	$4,200.00	$9,800.00	$0.00	13.54	4	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	3,349	$512
745	Gym	2600	250w MH, Prismatic Lens	1	295	20	5.90	15,340	Remove and Return	1x4, 4 Lamp, 54w T5HO, Elect. Ballast, Lo Bay	6	230	20	4.60	11,960	1.30	3,380	$517	$4,000.00	$3,000.00	$7,000.00	$0.00	13.54	4	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	2,392	$366
	TOTAL					**48**	**14**	**36,816**					**48**	**11**	**28,704**	**3**	**8,112**	$1,241	$9,600	$7,200	$16,800	$0				**5**	**0**	**5,741**	$878.34

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Total KW_{AC}	Panel Weight (41.9 lbs)	W/SQFT
Parsons Elementary	12200	SHARP NU-U235F2	536	17.5	9,402	125.96	148,571	102.0	22,458	13.40



.= Proposed PV Layout = Proposed Parking PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

Project Name: **LGEA Solar PV Project - Parsons Elementary**
Location: **New Brunswick, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$794,424
Annual kWh Production	148,571
Annual Energy Cost Reduction	$22,731
Average Annual SREC Revenue	$28,390

Simple Payback: **15.54** Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.153**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	6.00%	Average SREC Value ($/kWh)	$0.191

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	148,571	$22,731	$0	$37,143	$46,749	$33,697	($20,572)	($20,572)
2	$0	147,828	$23,413	$0	$36,957	$44,670	$35,775	($20,075)	($40,647)
3	$0	147,089	$24,116	$0	$36,772	$42,464	$37,982	($19,558)	($60,204)
4	$0	146,354	$24,839	$0	$36,588	$40,121	$40,324	($19,018)	($79,223)
5	$0	145,622	$25,584	$1,500	$36,405	$37,634	$42,811	($19,956)	($99,178)
6	$0	144,894	$26,352	$1,492	$28,979	$34,994	$45,452	($26,607)	($125,786)
7	$0	144,169	$27,142	$1,485	$28,834	$32,190	$48,255	($25,954)	($151,740)
8	$0	143,448	$27,957	$1,478	$28,690	$29,214	$51,232	($25,277)	($177,017)
9	$0	142,731	$28,795	$1,470	$28,546	$26,054	$54,391	($24,574)	($201,591)
10	$0	142,017	$29,659	$1,463	$21,303	$22,699	$57,746	($30,947)	($232,537)
11	$0	141,307	$30,549	$1,455	$21,196	$19,138	$61,308	($30,156)	($262,693)
12	$0	140,601	$31,466	$1,448	$21,090	$15,356	$65,089	($29,338)	($292,031)
13	$0	139,898	$32,409	$1,441	$20,985	$11,342	$69,104	($28,492)	($320,524)
14	$0	139,198	$33,382	$1,434	$13,920	$7,080	$73,366	($34,578)	($355,102)
15	$0	138,502	$34,383	$1,427	$13,850	$2,555	$77,891	($33,639)	($388,740)
	Totals:	2,152,230	$422,779	$16,093	$411,258	$412,260	$794,424	($388,740)	($2,807,584)

Net Present Value (NPV) **($284,953)**