

**CHERRY HILL TOWNSHIP SCHOOLS
CHERRY HILL HIGH SCHOOL EAST**

**1750 KRESSON ROAD
CHERRY HILL, NJ 08003**

FACILITY ENERGY REPORT

TABLE OF CONTENTS

I.	HISTORIC ENERGY CONSUMPTION/COST.....	2
II.	FACILITY DESCRIPTION	7
III.	MAJOR EQUIPMENT LIST	10
IV.	ENERGY CONSERVATION MEASURES.....	11
V.	ADDITIONAL RECOMMENDATIONS	61

Appendix A – ECM Cost & Savings Breakdown

Appendix B – New Jersey Smart Start[®] Program Incentives

Appendix C – Portfolio Manager “Statement of Energy Performance”

Appendix D – Major Equipment List

Appendix E – Investment Grade Lighting Audit

Appendix F – Renewable / Distributed Energy Measures Calculations

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 (PSEG)
Electric Utility Rate Structure:	Large Power and Lighting Secondary (LPLS)
Third Party Supplier:	South Jersey Energy Company

Natural Gas Utility Provider:	Public Service Electric & Gas (PSEG)
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	HESS

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: 778010144, 725013283 Account # 4201201104 Third Party Utility South Jersey Energy Company TPS Meter / Acct No:			
MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
May-10	200,580	672.2	\$28,761
Jun-10	247,540	520.7	\$40,332
Jul-10	208,604	576.7	\$34,647
Aug-10	185,732	426.6	\$29,923
Sep-10	218,678	588.6	\$36,189
Oct-10	183,276	564.7	\$26,617
Nov-10	222,071	524.6	\$31,650
Dec-10	238,244	518.6	\$33,778
Jan-11	204,980	494.6	\$28,887
Feb-11	223,580	476.6	\$31,214
Mar-11	199,343	482.6	\$28,088
Apr-11	184,328	468.3	\$26,418
Totals	2,516,956	672.2 Max	\$376,503
AVERAGE DEMAND 526.2 KW average AVERAGE RATE \$0.150 \$/kWh			

Figure 1
Electricity Usage Profile

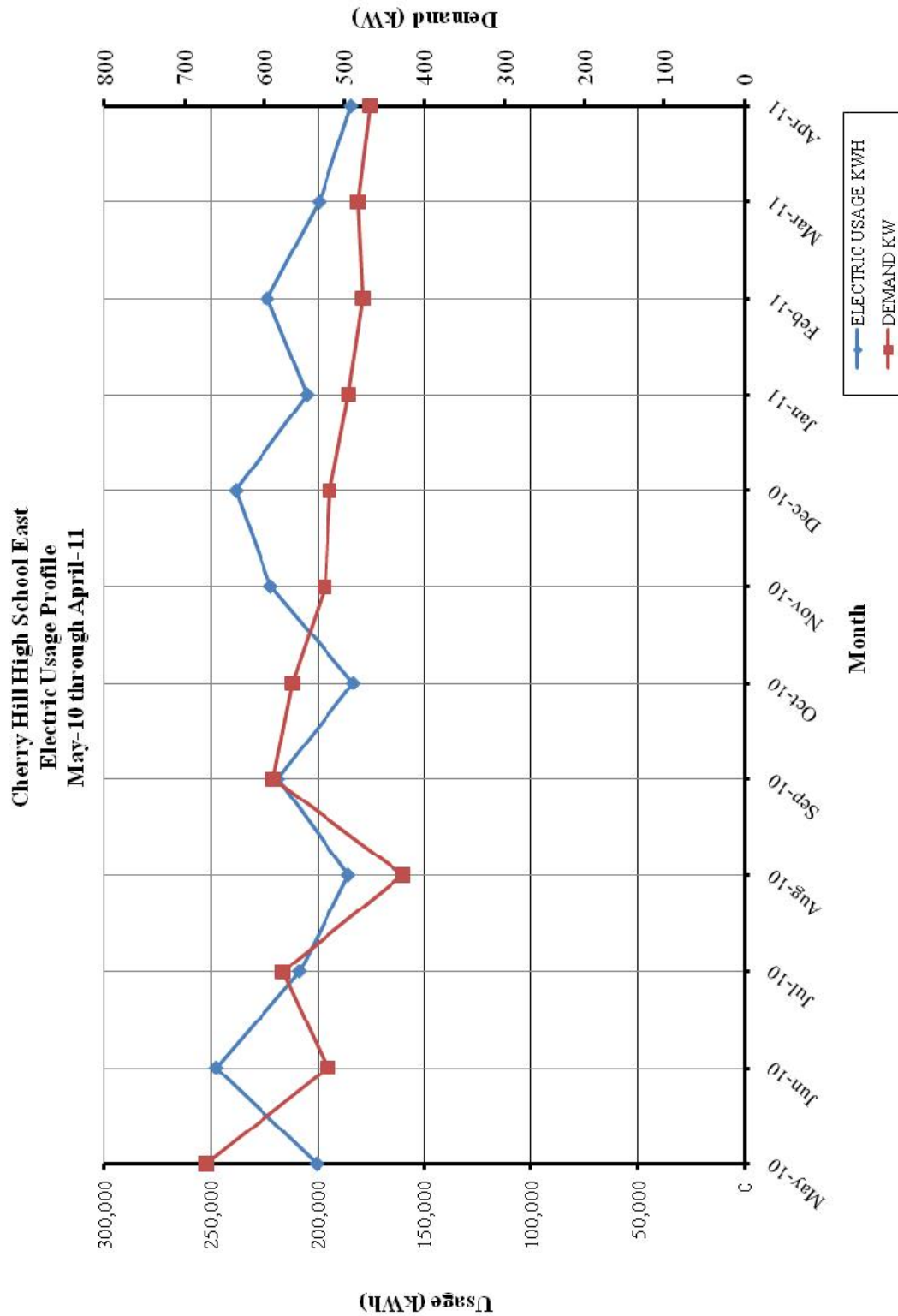
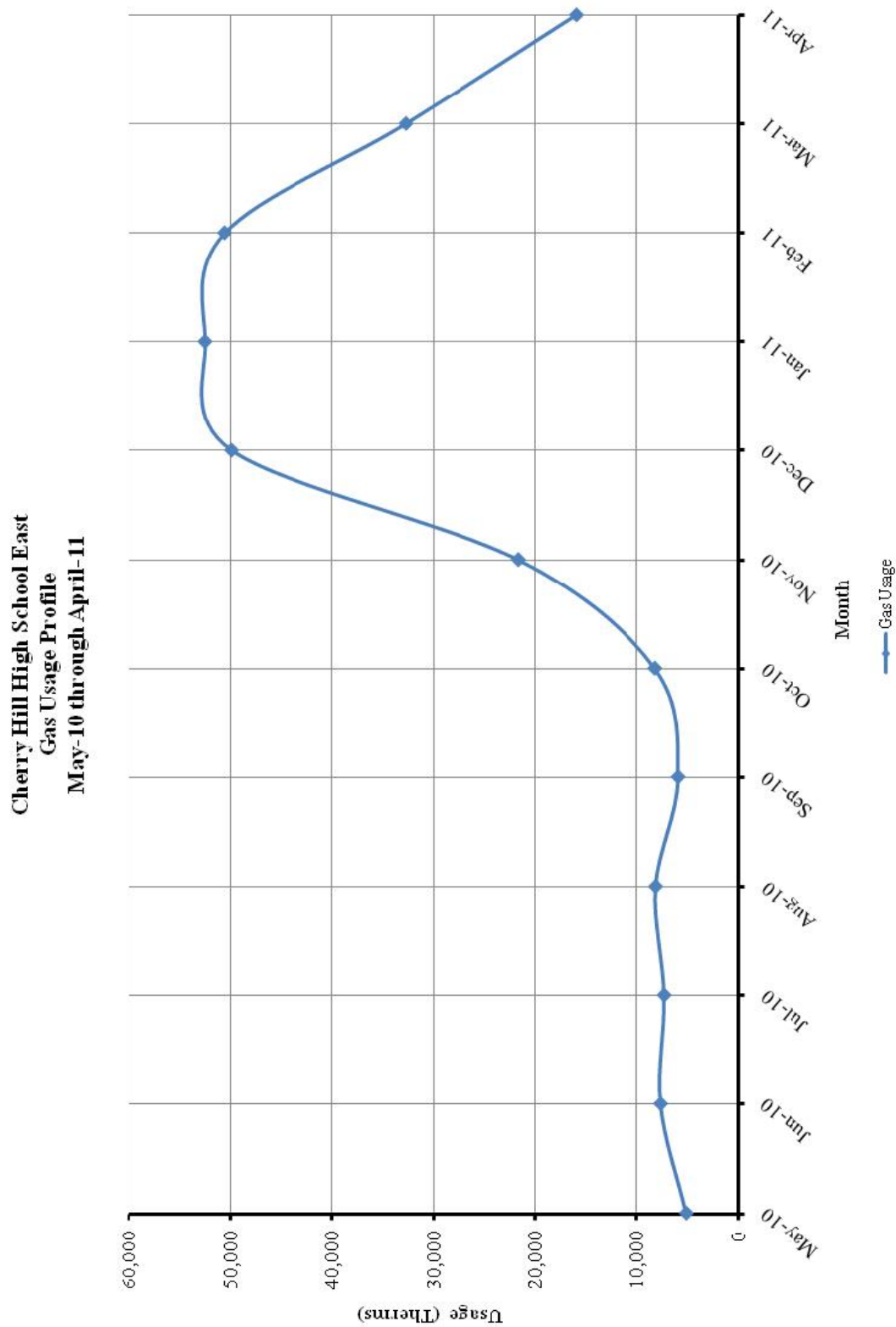


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G Rate: LVG Meter No: 2532856, 25987275 Point of Delivery ID: PG000010775560598376 Third Party Utility Provider: HESS TPS Meter No: 367896, 492204		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
May-10	5,136.22	\$5,179.60
Jun-10	7,656.72	\$5,420.94
Jul-10	7,312.45	\$5,349.70
Aug-10	8,152.61	\$6,070.28
Sep-10	5,952.14	\$3,869.40
Oct-10	8,235.33	\$5,887.40
Nov-10	21,673.06	\$19,864.37
Dec-10	49,900.26	\$42,253.51
Jan-11	52,509.66	\$45,374.15
Feb-11	50,585.02	\$43,683.48
Mar-11	32,743.07	\$30,075.12
Apr-11	15,981.60	\$11,319.50
TOTALS	265,838.14	\$224,347.45
AVERAGE RATE:	\$0.84	\$/THERM

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Cherry Hill Township BOE Cherry Hill High School East is located on 1750 Kresson Road, Cherry Hill, NJ 08003. The original building constructed in 1967 was 204,185 SF. A 164,292 SF addition was added in 1969. The 369,000 SF facility is a multi story structure.

Occupancy Profile

The typical hours of operation for the school students and teachers are between 7:30 AM and 2:30 PM on the weekdays. The facility remains occupied till 8:00 PM for afterschool activities as well as the custodial services. The facility is open on Saturdays and Sundays for sports activities. The student enrollment at the Cherry Hill High School East is approximately 2,200. Estimated total number of staff is 200.

Building Envelope

The facility is constructed of multiple levels of integrated structures. It is divided into six (7) sections (wings) based on function. ‘B’ and ‘C’ wings are 2 and 3 story structures housing most of the classrooms. ‘A’ wing is a single story structure housing the administrative offices. ‘F’ wing houses the science laboratories, kitchen, cafeterias and the facility services. ‘D’ and ‘E’ wings houses music rooms and main gymnasium. The facility has a large auditorium, two (2) gymnasiums and two (2) cafeterias. A third gymnasium is located in the basement and referred to as ‘G’ wing.

There are three major roof levels in this facility. The roofs of the structures are built-up with tar and stone roof covering. Some of the HVAC and exhaust systems are located on the roof of the facility. The facility exterior consists of cinder block construction with brick façade. It is reported that there is minimal amount of insulation within the exterior walls, which is typical for the year of construction.

There are limited amount of windows throughout this facility. Original windows were recently replaced with double pane, tinted, operable windows with aluminum frames. The facility has over 10 entrance and exit doors. Majority of the exit doors are recently replaced as well. The windows and exterior doors throughout the School are in good condition and appear to be maintained.

HVAC Systems

A two-pipe heating and cooling system serves the entire facility. Heating is provided by a central hot water boiler room located in the ‘E’ wing. The boiler room consists of four (4) 12,554 MBH, gas fired Cleaver Brooks HW boilers. Built in 1965, the boilers are original to the building and appear to be in fair condition. There are four (4) heating zones in this building. Hot water is delivered to each zone via two (2) 7.5 HP pumps, one operating and one standby configuration. The pumps are driven with standard efficiency motor. Each two-pipe water loop is constant speed with 2-way control valves on air handling equipments.

Cooling for the A, B, C and D wings during the school year are provided with a York direct gas-fired absorption chiller installed in 1993 with a cooling capacity of 400 Tons at 800 GPM. Chiller operation information could not be gathered since the school was not occupied during the time of survey. This chiller is designed for 45°F supply water temperature. Therefore, it is recommended to operate the chiller at this range for maximum efficiency. A 50 HP chilled water pump delivers chilled water to the air handling units with cooling coils. The York absorber is turned off during July and part of August when the school is closed for the summer.

During the off season, cooling for the administrative offices in the A wing and music room in D wing are provided with a smaller 45 ton Carrier (Model # 50HHO45400) reciprocating chiller, which is original to the building. Chilled water for these zones is provided with the corresponding zone circulation pumps on the two-pipe system. The Carrier chiller is maintained well but it is old and inefficient as compared to the currently available models.

There are two (2) cooling towers providing condenser water cooling for each chiller. The larger cooling tower is an Evapco 2-cell, cross flow cooling tower serving the 400 Ton York absorption chiller. The unit was installed approximately 3 years ago. Each cell has two speed fans driven by 7.5 HP and 20 HP standard efficiency motors. The second tower serves the 45 ton Carrier chiller. It is a counter flow cooling tower made by BAC. The tower is reported to be original to the building and appears to be in fair condition. The towers run on constant condenser water temperature.

Heating and cooling in the administrative offices in the A wing and classrooms in the B and C wings are provided with Nesbitt unit ventilators. These units appear to be original to the building. Each unit is equipped with a heat exchanger coil, 2-way valve and outside air dampers. Proper operation of the dampers could not be verified. Each unit ventilator is controlled with a pneumatic thermostat located within each office. It is recommended to check each unit ventilator and make sure outside dampers are operating properly.

The Auditorium is heated and cooled with two air handling units in the mezzanine mechanical room. The cooling for these air handling units are provided with two (2) 60-Ton TRANE split condensing units. The units are approximately 3 years old and appear to be in excellent condition.

The Cafeteria is split into two sections by the kitchen and they are heated by four air-handling units each, which are mounted in the ceiling in the adjacent space. Each of the eight units is hard to service due to the location and tight access.

E and F wing classrooms are heated by the original 1969 Nesbitt two-pipe, fan-coil unit ventilators with outside air. These units are not capable of cooling. As with most of these units throughout the facility, they must be checked for proper operation, adequate fresh air to meet the current ventilation code, and updated to meet the existing energy/indoor quality standards. Some of the rooms in the F wing are cooled with two rooftop Air conditioning units. The units are old and appear to be in fair condition. F wing laboratories are conditioned with six (6) Lennox split air conditioning units with 4 ton cooling capacity each.

The gymnasium located in the basement is heated with hot water cabinet heaters and ventilated with roof exhausters. The main gymnasium and the east gym are heated and ventilated by large heating and ventilating units in the ceiling. The gymnasiums do have air conditioning.

Exhaust System

Air is exhausted from the hallways, classrooms, toilet rooms, gymnasiums and workshops through the roof exhausters. There are four (4) larger exhaust fans serving the kitchen exhaust hood. The kitchen hood exhaust fans are on manual switches.

HVAC System Controls

The facility is originally designed with pneumatic controls and substantial amount of the pneumatic system still exists and functional. The pneumatic actuators are interfaced with DDC P/E switches, which are controlled by a Honeywell web based DDC system. The “B” and “C” wing HVAC systems are controlled directly the Honeywell DDC system. However, remainder of the original 1967 and 1969 equipment has all pneumatic controls and room/zone thermostats.

The DDC system controls/monitors outside air temperature, status of hot water pumps, the Quincy air compressor, boiler status, hot water supply zone temperature, etc. The system also used to implement time of day schedules for the equipment and spaces in the B and C building as well as the central plant based on occupancy.

Domestic Hot Water

Domestic hot water for the restrooms is provided by two (2) new 600 gallon gas fired condensing hot water heaters made by PVI. The units are new, therefore in excellent condition.

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	\$54,148	\$14,846	3.6	311.3%
ECM #2	Lighting Controls	\$47,270	\$10,244	4.6	225.1%
ECM #3	LED Exit Signs	\$1,155	\$134	8.6	74.0%
ECM #4	CRT Monitors	\$18,900	\$3,215	5.9	155.2%
ECM #5	Boiler Replacement	\$976,000	\$32,214	30.3	-17.5%
ECM #6	Replace Electric Chiller	\$57,984	\$2,710	21.4	-6.5%
ECM #7	Replace Absorption Chiller with Electric Chiller	\$558,000	\$11,551	48.3	-58.6%
ECM #8	Install VFD on Cooling Tower Fan	\$20,000	\$1,164	17.2	-12.7%
ECM #9	Replace Rooftop AC Units	\$44,982	\$1,180	38.1	-60.6%
ECM #10	NEMA Premium Efficiency Motors	\$25,724	\$840	30.6	-51.0%
ECM #11	Kitchen Exhaust Hood Controls	\$39,105	\$4,584	8.5	75.8%
ECM #12	Replace Window AC Units with Ductless Split Units	\$96,780	\$2,835	34.1	-56.1%
ECM #13	Expand DDC Energy Management System	\$800,000	\$59,981	13.3	12.5%
ECM #14	Convert 3-way valves to 2-way and install VFDs	\$94,000	\$9,397	10.0	49.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	Solar Photovoltaic System	\$2,161,781	\$239,876	9.0	66.4%
Notes:					
A. Cost takes into consideration applicable NJ Smart Start™ 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	36.8	98,970	0
ECM #2	Lighting Controls	25.2	68,290	0
ECM #3	LED Exit Signs	0.3	893	0
ECM #4	CRT Monitors	0.0	21,433	0
ECM #5	Boiler Replacement	0.0	0	35,969
ECM #6	Replace Electric Chiller	9.1	11,400	0
ECM #7	Replace Absorption Chiller with Electric Chiller	-110.7	-88,593	22,913
ECM #8	Install VFD on Cooling Tower Fan	0.0	7,867	0
ECM #9	Replace Rooftop AC Units	8.8	7,869	0
ECM #10	NEMA Premium Efficiency Motors	2.5	5,182	0
ECM #11	Kitchen Exhaust Hood Controls	0.0	7,706	4,082
ECM #12	Replace Window AC Units with Ductless Split Units	23.6	18,900	0
ECM #13	Expand DDC Energy Management System	0.0	251,696	26,584
ECM #14	Convert 3-way valves to 2-way and install VFDs	0.0	62,644	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Solar Photovoltaic System	296.9	447,859	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	\$14,846	\$56,288	\$2,140	\$54,148	3.6
Lighting Controls	\$10,244	\$51,600	\$4,330	\$47,270	4.6
LED Exit Signs	\$134	\$1,365	\$210	\$1,155	8.6
CRT Monitors	\$3,215	\$18,900	\$0	\$18,900	5.9
Boiler Replacement	\$32,214	\$1,000,000	\$24,000	\$976,000	30.3
Replace Electric Chiller	\$2,710	\$60,000	\$2,016	\$57,984	21.4
Replace Absorption Chiller with Electric Chiller	\$11,551	\$570,000	\$12,000	\$558,000	48.3
Install VFD on Cooling Tower Fan	\$1,164	\$20,000	\$0	\$20,000	17.2
Replace Rooftop AC Units	\$1,180	\$47,000	\$2,018	\$44,982	38.1
NEMA Premium Efficiency Motors	\$840	\$26,719	\$995	\$25,724	30.6
Kitchen Exhaust Hood Controls	\$4,584	\$40,500	\$1,395	\$39,105	8.5
Replace Window AC Units with Ductless Split Units	\$2,835	\$100,000	\$3,220	\$96,780	34.1
Expand DDC Energy Management System	\$59,981	\$800,000	\$0	\$800,000	13.3
Convert 3-way valves to 2-way and install VFDs	\$9,397	\$94,000	\$0	\$94,000	10.0
<i>Design / Construction Extras (15%)</i>		<i>\$190,406</i>		<i>\$190,406</i>	
Total Project	\$109,950	\$1,459,778	\$14,306	\$1,445,472	13.1

Highlighted ECMs are not included in total

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

Description:

Re-lamping Opportunities

Majority of the interior lighting throughout Cherry Hill High School - East building is provided with fluorescent fixtures with older generation, 700 series 32W T8 lamps and electronic ballasts. Although 700 series T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output.

This ECM includes re-lamping of the existing fluorescent fixtures with 800 series, 28W T8 lamps. 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.

Retrofit Opportunities

A portion of the interior lighting throughout the School building is provided with fluorescent fixtures with T12 lamps and magnetic ballasts. In addition, some of the areas are lit with incandescent lamps. It is recommended to retrofit or replace all of the older fluorescent fixtures and the incandescent lights with high efficiency fluorescent T8 or T5 fixtures with electronic ballasts or compact fluorescent lamps.

The 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. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need approximately 33% less lamps replaced per year for each one for one fixture replaced.

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 your existing fixtures, or hardwired into your 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 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.

Metal Halides

The Dance Hall (Room #250) is currently lit via twenty (15) 175W Metal Halide fixtures with prismatic lenses. The space would be better served with a more efficient, fluorescent lighting system. Studies have shown that metal halide lighting systems have a steep lumen depreciation rate (rate at which light is produced from fixture) which equates to approximately a 26% to 35% reduction in lighting output at 40% of the rated lamp life. In addition, the new fluorescent system will provide a better quality of light and save the Owner many dollars on replacement of the highly expensive metal halide lamps.

CEG recommends upgrading the lighting within this space to an energy-efficient T-5 lighting system that includes new lighting fixtures with high efficiency, electronic ballasts and T-5 high output (HO) lamps. The T-5 HO lamps are rated for 20,000 hours versus the 10,000 hours for the Metal Halide lamps so there would be a savings in replacement cost and labor.

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 each building.

Rebates and Incentives:

From the **NJ Smart Start Incentive Appendix**, the retrofit of a T-12 fixture to a T-5 or T-8 fixture or the retrofit of existing 32 watt T-8 system to reduced wattage (28w/25w 4') warrants the following incentive: \$10 per fixture.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$56,288
NJ Smart Start Equipment Incentive (\$):	\$2,140
Net Installation Cost (\$):	\$54,148
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$14,846
Total Yearly Savings (\$/Yr):	\$14,846
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.6
Simple Lifetime ROI	311.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$222,690
Internal Rate of Return (IRR)	27%
Net Present Value (NPV)	\$123,082.58

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Cherry Hill High School East 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 and daylight 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 libraries. 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:

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

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

Cost and Incentives:

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) are as follows:

Dual Technology Occupancy Sensor - Switch Mnt.	\$150 per installation
Dual Technology Occupancy Sensor - Remote Mnt.	\$300 per installation

Cost includes material and labor.

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

Occupancy Sensor Fixture Mounted (existing facility only) = \$20 per sensor
 Occupancy Sensor Remote Mounted (existing facility only) = \$35 per sensor

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$51,600
NJ Smart Start Equipment Incentive (\$):	\$4,330
Net Installation Cost (\$):	\$47,270
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$10,244
Total Yearly Savings (\$/Yr):	\$10,244
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.6
Simple Lifetime ROI	225.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$153,660
Internal Rate of Return (IRR)	20%
Net Present Value (NPV)	\$75,022.21

ECM #3: Install LED Exit Signs

Description:

LED is an acronym for light-emitting-diode. LED's are small light sources that are readily associated with electronic equipment. LED exit signs have been manufactured in a variety of shapes and sizes. There are also retrofit kits that allow for simply modification of existing exit signs to accommodate LED technology. The benefits of LED technology are substantial. LED exit signs will last for 20-30 years without maintenance. This results in tremendous maintenance savings considering that incandescent or fluorescent lamps need to be replaced at a rate of 1-5 times per year. Lamp costs (\$2-\$7 each) and labor costs (\$4-\$10 per lamp) add up rapidly. Additionally, LED exit lights only uses 4 Watts. In comparison, conventional exit signs use 10-40 Watts. It is recommended that samples of the products be installed to confirm that they are compatible with the existing electrical system.

This ECM replaces all exit signs with incandescent or fluorescent lamps with new exit signs containing LED technology.

Energy Savings Calculations:

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

From the **Smart Start Incentive Appendix**, \$20/LED Exit sign ($\leq 75\text{kW}$ facility connected load) and \$10/LED Exit sign ($\geq 75\text{kW}$ facility connected load).

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,365
NJ Smart Start Equipment Incentive (\$):	\$210
Net Installation Cost (\$):	\$1,155
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$134
Total Yearly Savings (\$/Yr):	\$134
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.6
Simple Lifetime ROI	74.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$2,010
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	\$444.44

ECM #4: Computer Monitor Replacement

Description:

The computers throughout the high school utilize CRT computer monitors. These computer monitors are used at many of the offices, computer labs, lounges, classrooms, etc. These computer monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, uses large amount of desk space, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of the drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits as well.

Based on the site survey it was noted that some of the computers may be left on and allowed to run 24 / 7, while the others may be left left in screen saver mode, which is deceiving since this mode only saves the computer screen from image burn in, however it does not save on energy consumption. The average operating hours for all computers and monitors is estimated based on the site survey observations. Energy consumption of computer monitors are based on manufacture's specifications.

This ECM includes replacement of all existing CRT monitors with LCD flat panel monitors throughout the school. Installation costs were neglected for this ECM with the intention that this ECM would be replaced by the school employees. The calculations are based on the following operating assumptions:

Energy Savings Calculations:

# of Computers:	189
Run Time %:	90%
Weeks per Yr:	42
Hrs per Week:	70

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

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

COMPUTER MONITOR CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	CRT Monitors	LCD Monitor	
# of Computers	189	189	
Monitor Power Cons. (W)	75	25	
Run Time %	90%	90%	
Operating Hrs per Week	60	60	
Operating Weeks per Yr	42	42	
Elec Cost (\$/kWh)	0.150	0.150	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Usage (kWh)	32,149	10,716	21,433
Energy Cost (\$)	\$4,822	\$1,607	\$3,215
COMMENTS:			

Installation cost of new monitors is estimated based on current pricing for a 17" LCD monitor on the market today. No labor costs were included for replacing the existing monitors with the new monitors. No incentives are available for installation of computer monitors. Net cost per monitor was estimated to be \$100.

Installation Costs: # Monitors X Cost per Monitor
 189 Monitors X \$100 per Monitor
 \$18,900

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$18,900
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$18,900
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$3,215
Total Yearly Savings (\$/Yr):	\$3,215
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.9
Simple Lifetime ROI	155.2%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$48,223
Internal Rate of Return (IRR)	15%
Net Present Value (NPV)	\$19,479.15

ECM #5: Install Condensing Hot Water Boilers

Description:

The existing Cleaver Brooks hot boilers are used as the primary source of heat for the building. The boilers are over 40 years old, which is beyond the life expectancy of a typical firetube boiler. The equipment appears to be maintained well and they are in fair operating condition. Even after the end of the expected useful life, it is difficult to predict the point at which the boiler becomes inoperable. It is recommended to replace these boilers with condensing hot water boilers. 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 90%. The existing boiler's efficiency is approximately 75%, which makes the condensing boilers an 15% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of four condensing gas fired boilers to replace the existing hot water boilers. The basis for this ECM is Aerco Benchmark Series condensing boilers; model number BMK 3.0. The owner is recommended to retain a professional engineer to confirm equipment sizing and finalize design.

Energy Savings Calculations:

Currently the boiler gas usage is not separately metered. Therefore, annual energy consumption of the boilers has to be estimated. First, domestic hot water usage and the absorption chiller gas usage is estimated and subtracted from the total usage in order to estimate the net natural gas usage for space heating.

Current total hot water usage can be estimated using the Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information. Based on the surveys, annual hot water consumption of educational facility is as follows:

AVERAGE HOT WATER CONSUMPTION	
Building Type	Energy Density (kBtu/SF/Yr)
Educational Facility	5.2

Total energy consumption of the facility is calculated using the total square footage of the facility as follows.

DOMESTIC HOT WATER HEATING ENERGY	
ECM INPUTS	EXISTING
Building Type	Education
Building Square-foot	365,000
Domestic Water Usage, kBtu	1,898,000
DHW Heating Fuel Type	Gas
Estimated Domestic Water Heating Efficiency	70%
Total Usage (kBtu/Yr)	2,711,429
Total Usage (Therms/Yr)	27,114
Monthly Usage (Therms/Mo)	2,260
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information

Using monthly total gas consumption of the facility and estimated gas usage for domestic hot water heating, following table is developed in order to estimate space heating energy:

ANNUAL GAS USAGE (THERMS), METER #2532856, 25987275					
MONTH	TOTAL USAGE	DOMESTIC HW USAGE	ABSORBER USAGE	HEATING ONLY	COST
May-10	5,136	2,260	2,877	0	\$0
Jun-10	7,657	2,260	5,397	0	\$0
Jul-10	7,312	2,260	5,053	0	\$0
Aug-10	8,153	2,260	5,893	0	\$0
Sep-10	5,952	2,260	3,693	0	\$0
Oct-10	8,235	2,260	0	5,976	\$4,272
Nov-10	21,673	2,260	0	19,414	\$17,793
Dec-10	49,900	2,260	0	47,641	\$40,340
Jan-11	52,510	2,260	0	50,250	\$43,422
Feb-11	50,585	2,260	0	48,325	\$41,732
Mar-11	32,743	2,260	0	30,484	\$28,000
Apr-11	15,982	2,260	0	13,722	\$9,719
TOTAL	265,838			215,811	\$185,278

Estimated Natural Gas Use for Heating = 215,811 Therms

Energy savings due to conversion is calculated using the equations below:

$$\text{Bldg Heat Required} = \text{Heating Nat. Gas (Therm)} \times \text{Heating Eff (\%)} \times \text{Fuel Heat Value} \left(\frac{\text{BTU}}{\text{Therm}} \right)$$

$$\text{Proposed Heating Gas Usage} = \frac{\text{Bldg. Heat Required (BTU)}}{\text{New Heating Eff (\%)} \times \text{Fuel Heat Value } \left(\frac{\text{BTU}}{\text{Therm}}\right)}$$

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

Energy savings calculations are summarized in the table below.

According to interviews with the facility personnel, two (2) of the four (4) boilers are able to satisfy the facility's peak heating requirement.

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	(4) Cleaver Brooks Hot Water Boilers	New Condensing Boilers	-
Number of Boilers	4	8	
Input Capacity (MBH / Boiler)	12,554	3000	
Total Output Capacity (MBH)	37,662	21,600	-
Existing Nat Gas Usage (Therms)	215,811	-	-
Estimated Total Output Capacity Req'd (MBH) based on HDD	15,695	15,695	
Boiler Efficiency (%)	75%	90%	15%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	-
Equivalent Building Heat Usage (MMBTUs)	16,186	16,186	-
Gas Cost (\$/Therm)	0.84	0.84	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	215,811	179,843	35,969
Energy Cost (\$)	\$181,282	\$151,068	\$30,214
COMMENTS:			

Project Cost, Incentives and Maintenance Savings

Estimated cost for removing the existing boilers and installing eight (8) new 3,000 MBH condensing hot water boilers, piping and controls is \$1,000,000.

From the **New Jersey Smart Start[®] Program Incentives Appendix**, installation of a high efficiency hot water boiler falls under the category “Gas Heating” and warrants an incentive based on efficiency at or above 84% for this type of equipment. The program incentives are calculated as follows:

GAS FIRED BOILER REBATE SUMMARY					
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE \$/MBH	PROPOSED CAPACITY, MBH	NUMBER OF UNITS	TOTAL REBATE, \$
>1500 - ≤ 4000 MBH	84% AFUE for Hot Water boilers	\$1	3,000	8	\$24,000
TOTAL					\$24,000

Estimated maintenance savings associated with this ECM: \$2000

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,000,000
NJ Smart Start Equipment Incentive (\$):	\$24,000
Net Installation Cost (\$):	\$976,000
Maintenance Savings (\$/Yr):	\$2,000
Energy Savings (\$/Yr):	\$30,214
Total Yearly Savings (\$/Yr):	\$32,214
Estimated ECM Lifetime (Yr):	25
Simple Payback	30.3
Simple Lifetime ROI	-17.5%
Simple Lifetime Maintenance Savings	\$50,000
Simple Lifetime Savings	\$805,340
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	(\$415,060.06)

ECM #6: Replace 45-Ton Carrier Water Cooled Chiller

Description:

Cooling for the administration offices, music room and several other spaces in the A-Wing is provided with a 45-Ton Carrier water cooled reciprocating electric chiller. This unit is original to the building. Therefore, the unit is very old, requiring extra maintenance and care throughout the cooling season. The part load and full load efficiency of this chiller is below the new models currently available in the market. Moreover, this chiller uses R22 refrigerant, which is currently being phased out due to environmental standards and protocols. It is recommended to replace this chiller with a new high efficiency water cooled chiller.

The full load efficiency of the existing air cooled unitary equipments is approximately 0.94kW/Ton (12.7 EER). Estimated part load efficiency of the chiller is 15 IPLV. The efficiency of a new modern water cooled chiller is approximately 0.38 KW/Ton (IPLV). The ancillary pumping energy and cooling tower fan energy is approximately 0.14 KW/Ton for existing and proposed cases. Cooling tower make-up water requirements is estimated to be 2.5 Gal/Ton-Hr.

This ECM includes replacement of the existing reciprocating water cooled chiller with a new high efficiency scroll type chiller while the ancillary pumping systems, cooling tower and other equipments remain the same. The ECM is based on one (1) 56 Ton York model number YCWL0056SE Water-Cooled Scroll Liquid Chiller or equivalent. Sizing indicated within the calculation of this ECM is based on replacement of the total existing equipment capacity. The owner should have a Professional Engineer verify heating and cooling loads to verify actual building cooling requirements.

Parameters:

Estimated total hours of operation for this chiller is based on 26 Weeks cooling, 4 days per week, 12 hours per day.

WATER COOLED CHILLER PARAMETERS	
INPUT	
Total Annual Cooling Hrs.	1248
Average Cost of Electricity	0.165
Total Cooling Load (Tons)	45
Existing Unit Eff. (Ave)	15 IPLV (Est)
New Unit Eff.*	20.1 IPLV

Unit efficiency does not include ancillary equipment energy

Energy Savings Calculations:Cooling Energy:

$$\text{Cooling Energy} = \text{Cooling (Tons)} \times \text{Eff.} \left(\frac{\text{kW}}{\text{Ton}} \right) \times \text{Full Load Hrs.}$$

$$\text{Demand Savings} = \frac{\text{Energy Savings (kWh)}}{\text{Full Load Hrs}}$$

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

Energy savings calculations are summarized in the table below.

WATER COOLED CHILLER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Air Cooled Chillers	Water Cooled Chiller & Cooling Tower	-
Cooling Load (Tons)	45	45	-
Average System Efficiency, IPLV (KW/Ton)	0.80	0.60	-
Full Load Cooling Hrs (Est.)	1,248	1,248	-
Make-Up Water Use (Gal/Ton Hr)	2.5	2.5	-
Cooling Energy (kWh)	44,928	33,528	-
Water Cost (\$/Gallon)	0.0025	0.0025	-
Elec Cost (\$/kWh)	0.150	0.150	-
ANNUAL ENERGY AND COST SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Water Usage (Gallons)	140,400	140,400	0
Electric Energy (kWh)	44,928	33,528	11,400
Electric Demand (KW)	36.0	27	9
Water Cost (\$)	351	351	0
Electric Energy Cost (\$)	\$6,739	\$5,029	\$1,710
Total Energy Cost (\$)	\$7,090	\$5,380	\$1,710
COMMENTS:	New chiller efficiency based on water cooled, scroll water chiller.		

Installation cost and Equipment Incentives

Estimated total replacement cost for the water cooled chiller is \$60,000

From the NJ Smart Start[®] Program appendix, the unit falls under the category “Electric Chiller” and warrants an incentive based on full load efficiency at 0.65 KW/Ton. The program incentives are calculated as follows:

$$\begin{aligned} \text{Smart Start}^{\text{®}} \text{ Incentive} &= (\text{Cooling Tons} \times \$/\text{Ton Incentive}) \\ &= 1 \times (56 \text{ Tons} \times 36\$/\text{Ton}) = \$2,016 \end{aligned}$$

Estimated maintenance savings with this ECM is \$1,000 per year.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$60,000
NJ Smart Start Equipment Incentive (\$):	\$2,016
Net Installation Cost (\$):	\$57,984
Maintenance Savings (\$/Yr):	\$1,000
Energy Savings (\$/Yr):	\$1,710
Total Yearly Savings (\$/Yr):	\$2,710
Estimated ECM Lifetime (Yr):	20
Simple Payback	21.4
Simple Lifetime ROI	-6.5%
Simple Lifetime Maintenance Savings	20000
Simple Lifetime Savings	\$54,199
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	(\$17,666.84)

ECM #7: Replace Absorption Chiller with Electric Centrifugal Chiller

Cooling for the A, B, C and D wings during the school year are provided with a York direct gas-fired absorption chiller installed in 1993 with a cooling and flow capacities of 400 Tons and 800 GPM. The absorption chiller operates at an estimated average efficiency of 1.0 COP. The efficiency of a modern, high efficiency centrifugal water cooled chiller is approximately 0.4 KW/Ton (IPLV).

It is recommended to replace the direct gas fired absorption chiller with a new centrifugal chiller. The efficiency increase due to the equipment upgrade and fuel switching will result in energy and cost savings. The added electric load from the electric chiller will increase the peak electric demand and therefore have a negative effect on the electric utility costs.

This ECM includes installation of an electric chiller to provide cooling for the building for all operating hours during the cooling season when the school is occupied with students. The basis for this ECM is York YK Series centrifugal chiller with 400 ton cooling capacity.

Energy Savings Calculations

Energy consumption of the York Absorption chiller is based on utility bills. Gas consumption for domestic hot water heating is subtracted from the total gas consumption during cooling season in order to calculate the natural gas consumption of the absorption chiller. This ECM represents a fuel switching option. Electrical energy is the proposed replacement for natural gas for chilled water production. With this fuel switching ECM, the electrical energy cost will increase and the natural gas costs will decrease. The savings from the gas energy utility subtracted by the electrical increase is the overall savings utilized for all energy savings calculations.

Currently the absorption chiller gas usage is not separately metered. Therefore, annual energy consumption of the chiller is estimated. First, domestic hot water usage is estimated and subtracted from the total usage in the cooling season in order to estimate the net natural gas usage for cooling.

Current total hot water usage can be estimated using the Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information. Based on the surveys, annual hot water consumption of educational facility is as follows:

AVERAGE HOT WATER CONSUMPTION	
Building Type	Energy Density (kBtu/SF/yr)
Educational Facility	5.2

Total energy consumption of the facility is calculated using the total square footage of the facility as follows.

DOMESTIC HOT WATER HEATING ENERGY	
ECM INPUTS	EXISTING
Building Type	Education
Building Square-foot	365,000
Domestic Water Usage, kBtu	1,898,000
DHW Heating Fuel Type	Gas
Estimated Domestic Water Heating Efficiency	70%
Total Usage (kBtu/Yr)	2,711,429
Total Usage (Therms/Yr)	27,114
Monthly Usage (Therms/Mo)	2,260
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information

Using monthly total gas consumption of the facility and estimated gas usage for domestic hot water heating, following table is developed in order to estimate space heating energy:

ANNUAL GAS USAGE METER #2532856, 25987275				
MONTH	TOTAL USAGE	DOMESTIC HW USAGE	ABSORBER USAGE	COST
May-10	5,136	2,260	2,877	\$2,531
Jun-10	7,657	2,260	5,397	\$4,750
Jul-10	7,312	2,260	5,053	\$4,447
Aug-10	8,153	2,260	5,893	\$5,186
Sep-10	5,952	2,260	3,693	\$3,250
Oct-10	8,235	2,260	0	\$0
Nov-10	21,673	2,260	0	\$0
Dec-10	49,900	2,260	0	\$0
Jan-11	52,510	2,260	0	\$0
Feb-11	50,585	2,260	0	\$0
Mar-11	32,743	2,260	0	\$0
Apr-11	15,982	2,260	0	\$0
TOTAL	265,838		22,913	\$20,163

Estimated Natural Gas Use for Cooling = 22,913 Therms

Following equations are used for calculating decreased cooling tower make-up use, reduced condenser water pumping energy due to reduced condenser water flow and reduced cooling tower fan energy due to reduced heat rejection.

$$\text{Total Heat Rejection (per Ton of Cooling), } \frac{\text{BTU}}{\text{Hr}} = 12,000 \frac{\text{BTU}}{\text{Hr}} \times \left(1 + \frac{1}{\text{COP}}\right)$$

$$\text{Makeup Water } \left(\frac{\text{Gallon}}{\text{TonHr}}\right) = \frac{\text{Total Heat Rejection (per Ton of Cooling)}}{\text{Latent Heat of Water, } \frac{\text{Btu}}{\text{lb}} \times \frac{8.4 \text{ Lb}}{1 \text{ Gallon Water}}}$$

$$\text{Latent Heat of Water} = 1,000 \frac{\text{Btu}}{\text{lb}}$$

$$\text{Absorber Total Cooling Energy } \left(\frac{\text{TonHr}}{\text{Season}}\right) = \frac{\text{Natural Gas Consumption (Therms)}}{\text{COP} \times \frac{1 \text{ Therm}}{8.33 \text{ TonHr}}}$$

$$\text{Proposed Chiller Total Cooling Energy} = \text{Absorber Total Cooling Energy } \left(\frac{\text{TonHr}}{\text{Season}}\right)$$

The condenser water flow and cooling tower fan load will reduce due to reduction in condenser heat rejection. Estimated rate of reduction is equal to the reduction in cooling tower make up water usage.

Condenser Pump Energy Consumption (kWh)

$$= \text{Motor HP} \times \text{Load Factor} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)}$$

Estimated load factor = 0.7

Condenser Pump Motor Power = 30 HP

Cooling Tower Fan Energy Consumption (kWh)

$$= \text{Motor HP} \times \text{Load Factor} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)}$$

Estimated load factor = 0.5

Fan Motor Power = 2 x (20+7.5) = 55 HP (2 Cell Tower)

WATER COOLED CHILLER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Absorption Chiller	New Water Cooled Chiller	-
Operating Capacity (Tons)	400	400	-
Chiller Efficiency (KW/Ton)	-	0.53	-
Chiller Efficiency (COP)	1.00	6.6	-
Total Cooling Hrs (Est.)	800	800	-
Natural Gas Consumption for Cooling (Therms)	22,913	-	-
Total Cooling Energy (Ton-Hrs)	190,938	190,938	
Make-Up Water Use (Gal/Ton Hr)	2.86	1.64	-
Condenser Pump Energy	12,533	7,211	5,322
Cooling Tower Fan Energy	16,412	9,443	6,969
Water Cost (\$/Gallon)	0.0025	0.0025	-
Elec Cost (\$/kWh)	0.150	0.150	-
Natural Gas Cost (\$/Therm)	0.880	0.880	-
ANNUAL ENERGY AND COST SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Water Usage (Gallons)	545,536	313,885	231,651
Electric Energy (kWh)	28,945	117,851	(117,851)
Electric Demand (KW)	-	147	(147)
Water Cost (\$)	\$1,091	\$785	\$306
Natural Gas Cost (\$)	\$20,163	\$0	\$20,163
Electric Energy Cost (\$)	\$4,342	\$17,678	-\$17,678
Total Cost (\$)	\$25,596	\$18,462	\$7,133
COMMENTS:	New chiller efficiency based on water cooled, centrifugal chillers. Assumptions: Condenser pump load factor = 0.7, cooling tower fan load factor = 0.5.		

Installation cost and Equipment Incentives

Estimated installation cost for a centrifugal water cooled chiller system with a new condenser water pump is \$570,000.

From the NJ Smart Start® Program appendix, the unit falls under the category “Electric Chiller” and warrants an incentive based on part load efficiency at 0.4 KW/Ton. The program incentives are calculated as follows:

$$\begin{aligned}\text{Smart Start}^{\circledR} \text{ Incentive} &= (\text{Cooling Tons} \times \$/\text{Ton Incentive}) \\ &= 400 \text{ Tons} \times \$30/\text{Ton} = \$12,000\end{aligned}$$

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$570,000
NJ Smart Start Equipment Incentive (\$):	\$12,000
Net Installation Cost (\$):	\$558,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$11,551
Total Yearly Savings (\$/Yr):	\$11,551
Estimated ECM Lifetime (Yr):	20
Simple Payback	48.3
Simple Lifetime ROI	-58.6%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$231,025
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	(\$386,146.43)

ECM #8: Install VFD on Cooling Tower Fans

Description:

The main cooling tower serving the York Absorption Chiller is a 2-cell cooling tower with 2-speed fans. In a 2-speed fan configuration, the fan is driven with two motors to operate at two different speeds. The smaller motor operates the fan at lower speed when the cooling load is low. The larger motor is energized to run the cooling tower fan at high speed.

Two speed cooling towers are typically more energy efficient than single speed cooling towers with on/off controls. However, there is still potential energy savings by converting the two speed system to variable speed systems. In a typical variable speed system, cooling tower air volume is varied based on a relationship between the condenser water supply temperature and the ambient air wet bulb temperature. This allows system to modulate fan speed to the optimum speed required for the load conditions and minimizes full speed operation.

This ECM includes installation of new variable frequency drives (VFDs) and controls for the cooling tower in this facility. The drive will be connected to the larger of the two motors. The drive belt for the smaller motor needs to be removed. The VFDs shall be programmed to modulate fan speed based on condenser water supply temperature. In addition, a sub-routine should be added to the control algorithm to reset condenser water supply temperature based on the wet-bulb temperature of the ambient air.

Energy and cost savings calculations are based on basic engineering principles along with a VFD savings calculation software “FanSave Version 4.0.B,” provided by ABB.

Hours of operation for the cooling tower operation: 1,200 Hours/year

Energy Savings Calculations:

FanSave software calculates fan energy consumption savings based on the principles below.

$$\text{Fan Electric HP} = \frac{Q_{\text{CFM}} \times \text{Total Pressure}_{\text{in WG}}}{6356 \times \eta_{\text{Fan}} \times \eta_{\text{motor}} \times \eta_{\text{transmission}}}$$

$$\text{Fan Energy Consumption (kWh)} = \text{Motor HP} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)}$$

$$\text{Total Fan Energy Consumption (kWh)} = \sum \text{Energy Consumption of Each Motor}$$

$$\text{Fan Energy Cost (\$)} = \text{Total Consumption(kWh)} \times \text{Average Cost of Electric} \left(\frac{\$}{\text{kWh}} \right)$$

FanSave uses Affinity Laws in order to calculate energy savings by reducing fan speed. Affinity laws, also known as Fan Laws are as following:

Q = Flow, n = Fan Speed, p = total pressure

$$\frac{Q_2}{Q_1} = \frac{n_2}{n_1} \quad \frac{p_2}{p_1} = \left(\frac{n_2}{n_1}\right)^2 \quad \frac{HP_2}{HP_1} = \left(\frac{n_2}{n_1}\right)^3$$

Fan Save Input:

$\eta_{\text{Fan}} = 70\%$ $\eta_{\text{motor}} = 93\%$ $\eta_{\text{transmission}} = 95\%$

Existing Flow Control Method is selected as Two-speed Flow Control. Other input values for each cooling tower can be seen in the screenshot below from the software.

Cooling Tower:

Fan #1 Motor #1 = 20 HP (Install VFD)

Fan #2 Motor #1 = 20 HP (Install VFD)

Fan #1 Motor #2 = 7.5 HP (Remove drive belt)

Fan #2 Motor #2 = 7.5 HP (Remove drive belt)

FanSave Energy saving calculator for fans
4.0.B Traditional flow control methods compared to variable speed AC drive control

EQUIPMENT DATA - EXISTING

Fan data
Fan type: Centrifugal Impeller type: Backward curved (B)
Nominal volume flow: ##### cfm
Total pressure increase: 1 in-H2O = 0.04 psi Efficiency: 75%

Transmission
Nominal efficiency: 95.0%

Existing flow control method
Two-speed motor

Motor data
Supply voltage: 460 V 440/460/480 V
Motor power: 20 Hp Required motor power: 17 Hp including 10% safety margin
Motor efficiency: 93.0 %

Operating profile
Annual running time: 1,200 h

GENERAL DATA

Measurement units: Metric US
Calculated by: C.E.G.
Calculated for: Cherry Hill HS East
Fan ID: #1 and 2

EQUIPMENT DATA - NEW

Improved flow control by:
ABB standard drive (ACS550)
ACS550-U1-031A-4 Copy to clipboard

RESULTS

Energy & environmental

Electric power consumption of fan

Graph showing kW vs Air flow rate (cfm). The graph compares Two-speed motor (grey line) and AC drive control (green line). The AC drive control shows a significant reduction in power consumption across the entire flow range.

Saving percentage: 45.0 %

Annual energy consumption:
with existing control method: 8,749 kWh
with improved control method: 4,816 kWh
Annual energy saving: 3,933 kWh
Annual CO₂ reduction: 1,967 lb
CO₂ emission per unit: 0.5 lb/kWh

Economic results
Annual money saving: \$
Payback period: years
Net present value: \$

ABB

FanSave 4.0.B calculates approximately 45% fan energy savings for each cooling tower by modulating the fan speed throughout the day. The results for the fan are as follows:

CALCULATION SUMMARY						
EQMT ID	FUNCTION	MOTOR HP	HOURS OF OPERATION	ENERGY SAVINGS %	ENERGY SAVINGS kWh	COST SAVINGS \$
Cooling Tower	Fan Motor #1	20	1,200	45%	3,933	\$582
Cooling Tower	Fan Motor #2	20	1,200	45%	3,933	\$582
TOTAL					7,867	\$1,164

Cost and Incentives

Estimated installed cost of two sets of variable frequency drives with controllers is \$20,000. The basis for this ECM is packaged cooling tower drives and controllers made by BAC or equivalent.

This ECM does not qualify for an incentive from the NJ Smart Start program.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$20,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$20,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,164
Total Yearly Savings (\$/Yr):	\$1,164
Estimated ECM Lifetime (Yr):	15
Simple Payback	17.2
Simple Lifetime ROI	-12.7%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$17,464
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	(\$6,100.74)

ECM #9: Air Conditioning Unit Upgrades

Description:

Air conditioning for some of the spaces at the Cherry Hill High School – East is provided a combination of packaged rooftop units and split AC units. Some of these units are old and inefficient as compared to the currently available models.

This ECM includes one-for-one replacement of the older air conditioning units with new higher efficiency systems. 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
RTU - E Wing Roof	E100	1	120,000	10.0	Trane YHC-120
RTU - F Wing Roof	Photo Room	1	60,000	5.0	Carrier 50XL-A
Split AC Unit	Teacher's Lounge	1	60,000	5.0	Rheem 060JEC Cond. Unit R410 coil
Split AC Unit	DiBart Gym Offices	1	48,000	4.0	Rheem 048JEC Cond. Unit R410 coil
Total		4	288,000	24.0	

The units are one for one style replacements with matching capacity of the new units to the old units.

Energy Savings Calculations:

Cooling Energy Savings:

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

Energy Savings, kWh

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

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

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

ENERGY SAVINGS CALCULATIONS						
ECM INPUTS	COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNITS (S)EER	SPLIT UNITS (S)EER	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
RTU - E Wing Roof	120,000	800	9 EER	12.5 EER	2,987	3.7
RTU - F Wing Roof	60,000	960	10 SEER	15 SEER	1,920	2.0
Split AC Unit	60,000	960	10 SEER	14 SEER	1,646	1.7
Split AC Unit	48,000	960	10 SEER	14 SEER	1,317	1.4
Total	288,000				7,869	8.8

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start[®] Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category “Unitary HVAC Split System” and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{SmartStart}^{\text{®}} \text{ Incentive} = (\text{CoolingTons} \times \$/\text{Ton Incentive})$$

UNITARY / SPLIT SYSTEM AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE \$/TON	PROPOSED CAPACITY TONS	TOTAL REBATE \$
≥20 to 30 tons	10.5 EER	79	0	\$0
≥ 11.25 to < 20 tons	11.5 EER	79	0	\$0
≥ 5.4 to < 11.25 tons	11.5 EER	73	10	\$730
5.4 tons or less Unitary AC and Split System	≥14 SEER	\$92	14	\$1,288
TOTAL			24	\$2,018

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
RTU - E Wing Roof	\$17,500	1	\$17,500	\$730	\$16,770	\$448	37.4
RTU - F Wing Roof	\$12,500	1	\$12,500	\$460	\$12,040	\$288	41.8
Split AC Unit	\$9,000	1	\$9,000	\$460	\$8,540	\$247	34.6
Split AC Unit	\$8,000	1	\$8,000	\$368	\$7,632	\$197	38.6
Total		4	\$47,000	\$2,018	\$44,982	\$1,180	38.1

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$47,000
NJ Smart Start Equipment Incentive (\$):	\$2,018
Net Installation Cost (\$):	\$44,982
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,180
Total Yearly Savings (\$/Yr):	\$1,180
Estimated ECM Lifetime (Yr):	15
Simple Payback	38.1
Simple Lifetime ROI	-60.6%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$17,705
Internal Rate of Return (IRR)	-10%
Net Present Value (NPV)	(\$30,891.14)

ECM #10: 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 and supply fans in some of the HVAC equipment 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
Pump	HW Pump	15	2,160	88.5%	92.4%
Pump	HW Pump	7.5	2,160	88.5%	91.7%
Pump	HW Pump	7.5	2,160	88.5%	91.7%
Pump	HW Pump	7.5	2,160	88.5%	91.7%
Fan	Cooling Tower Fan	7.5	1,440	88.5%	91.7%
Fan	Cooling Tower Fan	7.5	720	88.5%	91.7%
Fan	Cooling Tower Fan	20	1,440	91.0%	93.0%
Fan	Cooling Tower Fan	20	720	91.0%	93.0%
Comp	Air Compressor	7.5	4,320	88.5%	91.7%
Comp	Air Compressor	7.5	4,320	88.5%	91.7%
* Motor efficiency N/A. Estimated based on EPCAct of 1997					

Energy Savings Calculations:

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

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor

Motor Efficiency = Motor Nameplate Efficiency

Electric Usage Savings, kWh = Electric Usage_{Existing} – Electric Usage_{Proposed}

Electric Usage Savings, kWh = Electric Usage_{Existing} – Electric Usage_{Proposed}

Electric cost savings = Electric Usage Savings × 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
Pump	15	90%	88.5%	92.4%	0.48	1,043	\$169
Pump	7.5	90%	88.5%	91.7%	0.20	431	\$70
Pump	7.5	90%	88.5%	91.7%	0.20	431	\$70
Pump	7.5	90%	88.5%	91.7%	0.20	431	\$70
Fan	7.5	90%	88.5%	91.7%	0.20	287	\$47
Fan	7.5	90%	88.5%	91.7%	0.20	144	\$23
Fan	20	90%	91.0%	93.0%	0.32	459	\$75
Fan	20	90%	91.0%	93.0%	0.32	230	\$37
Comp	7.5	90%	88.5%	91.7%	0.20	862	\$140
Comp	7.5	90%	88.5%	91.7%	0.20	862	\$140
TOTAL					2.5	5,182	\$840

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

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
Pump	15	\$3,652	\$115	\$3,537	\$169	20.9
Pump	7.5	\$1,971	\$90	\$1,881	\$70	26.9
Pump	7.5	\$1,971	\$90	\$1,881	\$70	26.9
Pump	7.5	\$1,971	\$90	\$1,881	\$70	26.9
Fan	7.5	\$1,971	\$90	\$1,881	\$47	40.3
Fan	7.5	\$1,971	\$90	\$1,881	\$23	80.7
Fan	20	\$4,635	\$125	\$4,510	\$75	60.5
Fan	20	\$4,635	\$125	\$4,510	\$37	121.1
Comp	7.5	\$1,971	\$90	\$1,881	\$140	13.4
Comp	7.5	\$1,971	\$90	\$1,881	\$140	13.4
TOTAL	107.5	\$26,719	\$995	\$25,724	\$840	30.6

Energy Savings Summary:

ECM #10 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$26,719
NJ Smart Start Equipment Incentive (\$):	\$995
Net Installation Cost (\$):	\$25,724
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$840
Total Yearly Savings (\$/Yr):	\$840
Estimated ECM Lifetime (Yr):	15
Simple Payback	30.6
Simple Lifetime ROI	-51.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$12,606
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	(\$15,691.41)

ECM #11: Commercial Kitchen Exhaust Hood Controls

Description:

The kitchen in this facility is equipped with two commercial kitchen exhaust hoods providing exhaust for the cooking equipment. The estimated total kitchen exhaust from the hoods is 21,000 CFM powered by an estimated total 9 HP of exhaust fans. Currently the facility operates from 6am – 2pm each day, with the kitchen exhaust hood's running continuously. The installation of kitchen exhaust controls would significantly reduce the total kitchen exhaust and its overall energy use. The conditioned make up air and exhausted air savings are achieved by monitoring the exhaust hoods and exhaust based on the actual use of the kitchen equipment. Temperature sensors and optical lasers monitor the heat and smoke production at each exhaust hood to reduce the exhaust and make-up airflow based on the need of the kitchen equipment.

This ECM includes installation of kitchen exhaust controls for the main kitchen exhaust hood and VFD's for the constant volume exhaust fans. The hoods would be retrofitted with temperature and laser sensors to monitor the activity of each of all equipment installed below the hoods. The work involves installing a Melink Kitchen Hood Variable Air Volume Controller; variable frequency drive on the kitchen hood exhaust fan; and turn off all the kitchen hood exhaust systems when the kitchen is closed. When the cooking appliances are turned on, the hood exhaust fan speed will increase based on the hood exhaust temperature. During heavy cooking, the kitchen hood exhaust fan increases to 100% speed until the smoke/vapor is removed. Energy savings are also realized when the kitchen equipment is operating at less than full load due to minimal cooking operations. During these times the fan speed decreases, removing only the necessary amount of air, saving exhaust fan energy and make up air conditioning energy.

Energy Calculations Summary:

Detailed calculations for the proposed kitchen hood control system can be found in the **Kitchen Exhaust Calculations Appendix**. It is pertinent to note that the calculation assumes the exhaust fans remain off for approximately 8 hours per day.

The tables below summarize and compare the energy savings with the installed cost of the equipment. The Smart Start program currently offers incentives for premium efficient motors, which is based on installed horsepower. This savings is also included in the savings summary table.

From the NJ Smart Start[®] Program appendix, installation of Variable Frequency Drives falls under the category "Centrifugal Fan Applications on Variable Air Volume HVAC Systems" and warrants an incentive based on Cumulative Motor HP Controlled by Each VFD. The program incentives are calculated as follows:

$$\text{SmartStart}^{\text{®}} \text{ Incentive} = (\text{Cumulative Motor HP} \times \$/\text{HP}) = 9 \text{ HP} \times \$155/\text{HP} = \$1,395$$

KITCHEN EXHAUST CONTROLS CALCULATION			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Manually Controlled Kitchen Exhaust	MELINK Kitchen Exhaust Controls	-
Fan Energy Usage (kWh)	10,504	2,798	7,706
Heating Energy Usage (Therms)	8,873	4,791	4,082
Average Gas Cost (\$/Therm)	0.84	0.84	-
Electric Cost (\$/KWH)	0.150	0.150	-
SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Total Energy Usage (kWh)	10,504	2,798	7,706
Total Energy Usage (Therms)	8,873	4,791	4,082
Natural Gas Energy Cost (\$)	\$7,453	\$4,025	\$3,429
Electric Energy Cost (\$)	\$1,576	\$420	\$1,156
Total Energy Cost (\$)	\$9,029	\$4,444	\$4,584
COMMENTS:	*ECM is based on calculations using spreadsheets provided by MELINK Intelli-hood controls manufacturer.		

Energy Savings Summary:

ECM #11 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$40,500
NJ Smart Start Equipment Incentive (\$):	\$1,395
Net Installation Cost (\$):	\$39,105
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$4,584
Total Yearly Savings (\$/Yr):	\$4,584
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.5
Simple Lifetime ROI	75.8%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$68,760
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	\$15,618.49

ECM #12: Replace Window AC Units with Ductless Split Units

Description:

Some of the classrooms and offices in the high school require supplemental air conditioning due to students with special attention. There are approximately 35 large window units installed on the windows of the perimeter of the building. Despite low initial cost, window air conditioners are inefficient and loud compared to the traditional ducted or ductless central or split air conditioning systems.

One of the ideal methods of providing supplemental air conditioning for this type of spaces is the ductless mini split air conditioning systems. Typical system of this type is comprised of single or multiple indoor fan coil unit(s) and an outdoor condensing unit. Efficiencies of typical systems vary between SEER 13 - 25.

This ECM includes installing wall mounted ductless mini split air conditioning systems to provide cooling for the classrooms, which require supplemental air conditioning. The basis for this ECM is Fujitsu Halycon Series split systems with single and multiple wall mounted indoor units and ground or roof mounted outdoor units. The owner should retain a professional engineer verify configuration, heating and cooling loads prior to moving forward with this ECM.

A summary of the existing system for this space 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
Window AC Units	Classrooms, offices	35	18,000 (Ave)	1.5	Ductless split units
Total		35	18,000 (Ave)	1.5	

Average unit size is estimated.

Energy Savings Calculations:

Cooling Energy Savings:

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

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

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

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

Estimated annual cooling hours for the window units is 800 hours.

SUPPLEMENTAL CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Window Units	Ductless Split Units	
Number of Units	35	35	
Ave. Cooling Capacity, BTU/H	18,000	18,000	
Efficiency, SEER	10	16	
Annual Cooling Hours	800	800	
Elec Cost (\$/kWh)	\$0.150	\$0.150	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Cooling Demand, kW	63.0	39.4	23.6
Cooling Energy Consumption, kWh	50,400	31,500	18,900
Electric Energy Cost (\$)	\$7,560	\$4,725	\$2,835
COMMENTS:			

Project Cost, Incentives and Maintenance Savings

Installed cost for a combination of ductless split system with multiple indoor and outdoor units is \$100,000.

From the NJ Smart Start® Program appendix, the replacement of window AC units with ductless mini split AC units falls under the category “Unitary HVAC Split System” and warrants an incentive based on efficiency (SEER) at or above 14 for this type of systems. The program incentives are calculated as follows:

$$\text{SmartStart® Incentive} = (\text{Cooling Tons} \times \$/\text{Ton Incentive})$$

DUCTLESS MINI SPLIT AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE \$/TON	TOTAL CAPACITY TONS	TOTAL REBATE \$
5.4 tons or less Unitary AC and Split System	≥14 SEER	\$92	35	\$3,220
TOTAL			35	\$3,220

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #12 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$100,000
NJ Smart Start Equipment Incentive (\$):	\$3,220
Net Installation Cost (\$):	\$96,780
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$2,835
Total Yearly Savings (\$/Yr):	\$2,835
Estimated ECM Lifetime (Yr):	15
Simple Payback	34.1
Simple Lifetime ROI	-56.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$42,525
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	(\$62,935.95)

ECM #13: Expand DDC Energy Management System

Description:

The facility is originally designed with pneumatic controls and substantial amount of the pneumatic system still exists and functional. The pneumatic actuators are interfaced with DDC P/E switches, which are controlled by a Honeywell web based DDC system. The “B” and “C” wing HVAC systems are controlled directly the Honeywell DDC system. However, remainder of the original 1967 and 1969 equipment has all pneumatic controls and room/zone thermostats.

This ECM includes expansion of the Honeywell Building Automation system to include remainder of the facility. The system will include new temperature sensors and new local thermostats with limited over-ride capability tied into the existing front end computer and main controller. The system will also include central controls for lighting. With the communication between the control devices and the front end computer interface, the facility manager will be able to take advantage of scheduling for occupied and unoccupied periods based on the actual occupancy of each space in the facility. Due to the fact that the building may have diverse hours of occupancy, including evening and weekend activities, having supervisory control over all of the equipment makes sense. The DDC system will also aid in the response time to service / maintenance issues when the facility is not under normal maintenance supervision, i.e. after-hours.

The new DDC system has the potential to provide significant savings by controlling the HVAC systems as a whole and provide operating schedules and features such as space averaging, night set-back, temperature override control, etc. 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 referenced report:

- Energy Management and Control System Savings: 5%-15%.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of each utility type utilized in this building.

The basis for this ECM is the Honeywell Commercial Energy Management System.

Energy Savings Calculations:

Energy savings for each utility is calculated with the equation below.

Energy Savings (Utility) = Current Energy Consumption × Estimated Savings, %

Following table summarizes energy savings for this facility via implementation of an Energy Management System:

DDC ENERGY MANAGEMENT SYSEYEM CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Controls w/ Local Thermostats	DDC Controls	
Existing Nat Gas Usage (Therms)	265,838	-	
Existing Electricity Usage (kWh)	2,516,956	-	
Energy Savings, Nat. Gas	-	10%	
Energy Savings, Electricity	-	10%	
Gas Cost (\$/Therm)	\$0.84	\$0.84	
Electricity Cost (\$/kWh)	\$0.15	\$0.15	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	265,838	239,254	26,584
Electricity Usage (kWh)	2,516,956	2,265,260	251,696
Natural Gas Cost (\$)	\$223,304	\$200,974	\$22,330
Electricity Cost (\$)	\$376,503	\$338,853	\$37,650
Energy Cost (\$)	\$599,807	\$539,827	\$59,981
COMMENTS:			

Demand savings due to implementation of this ECM is minimal.

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately \$4.00 per SF in accordance with recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system. Estimated area not covered by the DDC system is 200,000 SF.

Cost of complete DDC System = (\$4.00/SF x 200,000 SF) = \$800,000

Currently, there are no prequalified NJ SmartSmart Incentives for installation of the DDC system.

Energy Savings Summary:

ECM #13 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$800,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$800,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$59,981
Total Yearly Savings (\$/Yr):	\$59,981
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.3
Simple Lifetime ROI	12.5%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$899,711
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	(\$83,953.99)

ECM #14: Install VFD's on Zone Pumps

Description:

The air handling units and heating and ventilation units are utilizing a constant volume pumping design. Majority of the air handlers utilize 3-way control valves which allow continuous flow through the piping loop throughout the building. As a result the water loop pumps must provide nearly full power output to circulate the water through all rooftop units and unit ventilators continuously.

2-way control valves provide flow through the heat exchanger equipment only when there is a call for heating or cooling, unlike 3-way control valves that allow constant flow of the water loop. 3-way control valves require full pumping energy continuously, while 2-way control valves allow the system to reduce flow when it is not needed. This measure includes capping off the bypass port on the 3-way control valves which effectively turns the valves into “2-way” control valves. When the unit is not calling for heating, the control valve closes reducing overall flow of the system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM includes the installation of Variable Frequency Drives on the eight (8) existing 2-pipe zone pumps (4 lead / 4 lag) within the boiler room. To control flow through the system, this ECM includes piping modifications at the air handling units and H&V units to cap off the bypass port on the 3-way control valves. The VFD's would be controlled by a differential pressure sensor in the water loop to measure demand for water (typical for each of the four pump sets). The furthest unit from the loop pumps would remain as 3-way control valves (constant flow) to eliminate dead heading potential. This ECM also includes replacement of the existing pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard, which also helps to reduce energy consumption.

Energy and cost savings calculations are based on calculation software “PumpSave v4.2,” provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. Each 2-pipe water loop pump set (lead/lag pumps) operate approximately 2,180 Hrs per year (per pump) since this system is used for about 6 month's total. The pump flow, HD, and resultant energy are calculated based on the existing pump horse power installed. The calculation is based on all existing equipment to be modified to operate as 2-way control valves. Where control valves are already 2-way style, these control valves shall remain. The exact quantity of equipment with 3-way valves is not known. The operation of all equipment control valves should be verified before implementing this ECM.

Energy Savings Calculations:

$$\text{Cons. Volume Power (HP)} = \frac{\text{Specific Gravity} \times \text{Flow Rate} \left(\frac{\text{Gal}}{\text{min}} \right) \times \text{Head (Ft)}}{3960 \times \text{Pump Efficiency (\%)} \times \text{Motor Efficiency (\%)}}$$

$$\text{Energy Cons. (kWh)} = \text{Power (HP)} \times 0.746 \left(\frac{\text{KW}}{\text{HP}} \right) \times \text{Operation (Hrs.)}$$

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

Boiler Room – 2-pipe Loop VFD Pumping Energy:

PumpSave 4.2 Energy saving calculator for pumps

System Data
 Liquid density: 62 lb/ft³ Static head: 1 ft

Pump Data
 Nominal volume flow: 1500 gpm Efficiency: 80%
 Nominal head: 65 ft Max head: 100 ft

Existing Flow Control

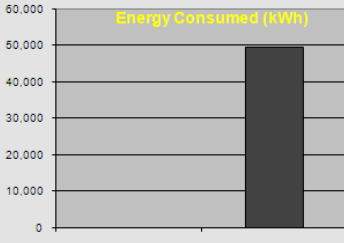
Motor and Supply Data
 Supply voltage: 460 V 440/460/480 V
 Motor power: 33.5 Hp Required motor power: 33.9 Hp including 10% safety margin
 Motor efficiency: 92.0 % ?

Operating Profile
 Annual running time: 4,320 h

Measurement Units
☒ Metric ☐ US

Calculated by: E. G.
 Calculated for: Cherry Hill HS East
 Pump ID: Zone pumps

Improved Control by ABB Drive :
 ACS550

Energy Consumption


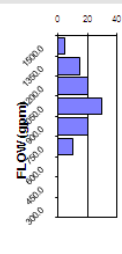
Results
 Saving percentage:
 Annual energy consumption:
 with existing control method: 49 MWh
 with improved control method: -49 MWh
 Annual energy saving: -49 MWh
 Annual CO₂ reduction: -25 t
 CO₂ emission/unit: 0.5 lb/kWh

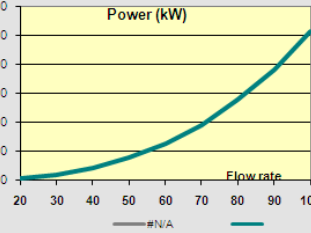
Economic Data
 Currency unit: \$
 Energy price: 0 \$/kWh
 Investment cost: 0 \$
 Interest rate: 4%
 Service life: 10 years

Economic Results
 Annual saving: \$
 Payback period: years
 Net present value: \$

Operating Profile Table

Flow (%)	Hours	Flow (gpm)
5%	216 h	at nom. flow
15%	648 h	at 90% flow
20%	864 h	at 80% flow
30%	1296 h	at 70% flow
20%	864 h	at 60% flow
10%	432 h	at half flow
0%	0 h	at 40% flow
0%	0 h	at 30% flow
0%	0 h	at 20% flow

Flow (gpm) vs. Flow (%) Bar Chart


Power (kW) vs. Flow (%) Line Graph


Auto-adjust screen size Save calculation Send to default printer Close program

ABB

BOILER ROOM 2-PIPE WATER LOOP PUMP VFD CALCULATION			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	-
Total Flow* (GPM)	1500	1500	-
Head* (Ft)	65	65	-
Pump Efficiency (%)	80%	80%	-
Ave. Motor Efficiency (%)	88.5%	92.0%	3.5%
Operating Hrs	4320	4320	-
Estimated Total Horse Power	34.8	33.5	1.32
Elec Cost (\$/kWh)	0.150	0.150	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Energy (kWh)	112,072	49,428	62,644
Electric Energy Cost (\$)	\$16,811	\$7,414	\$9,397
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head estimated based on existing pump horse power.		

Installation cost for six (8) VFDs, (8) premium efficiency motors, piping work, re-balancing, capping of 3-way valves and controls is estimated to be \$94,000.

Currently there are no **NJ Smart Start® Program Incentives** for installation of hot water pump Variable Frequency Drives.

Energy Savings Summary:

ECM #14 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$94,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$94,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$9,397
Total Yearly Savings (\$/Yr):	\$9,397
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.0
Simple Lifetime ROI	49.9%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$140,949
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	\$18,176.12

REM #1: 366.6 kW Solar System

Description:

The Cherry Hill High School East has available roof space that could accommodate a significant amount of solar generation. Based on the available area a 366.6 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 447,859 kilowatt-hours annually that will reduce the overall electric usage of the facility by 17.79%.

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}):	366.60
Electric Generation (KWH/Yr):	447,859
Installation Cost (\$):	\$2,161,781
SREC Revenue (\$/Yr):	\$172,697
Energy Savings (\$/Yr):	\$67,179
Total Yearly Savings (\$/Yr):	\$239,876
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	9.0
Analysis Period Electric Savings (\$):	\$1,249,454
Analysis Period SREC Revenue (\$):	\$2,501,721
Net Present Value (NPV)	\$371,577.79

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.
- G. Educate staff and students on awareness of wasteful energy practices such as leaving lights on unnecessarily, leaving on of non-essential computer and/or equipment at the end of the day, leaving of outside doors/windows open as a means to control room temperature, etc.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Cherry Hill – High School - EAST

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Saving * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1 + IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1 + DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
ECM #1	Lighting Upgrade	\$45,030	\$11,258	\$2,140	\$54,148	\$14,846	\$0	\$14,846	15	\$222,690	\$0	311.3%	3.6	26.62%	\$123,082.58
ECM #2	Lighting Controls	\$41,280	\$10,320	\$4,330	\$47,270	\$10,244	\$0	\$10,244	15	\$153,660	\$0	225.1%	4.6	20.32%	\$75,022.21
ECM #3	LED Exit Signs	\$1,365	\$0	\$210	\$1,155	\$134	\$0	\$134	15	\$2,010	\$0	74.0%	8.6	7.88%	\$444.44
ECM #4	CRT Monitors	\$18,900	\$0	\$0	\$18,900	\$3,215	\$0	\$3,215	15	\$48,225	\$0	155.2%	5.9	14.89%	\$19,480.46
ECM #5	Boiler Replacement	\$400,000	\$600,000	\$24,000	\$976,000	\$30,214	\$2,000	\$32,214	25	\$805,340	\$50,000	-17.5%	30.3	-1.43%	(\$415,060.06)
ECM #6	Replace Electric Chiller	\$30,000	\$30,000	\$2,016	\$57,984	\$1,710	\$1,000	\$2,710	20	\$54,199	\$20,000	-6.5%	21.4	-0.63%	(\$17,666.84)
ECM #7	Replace Absorption Chiller with Electric Chiller	\$200,000	\$370,000	\$12,000	\$558,000	\$11,551	\$0	\$11,551	20	\$231,025	\$0	-58.6%	48.3	-7.24%	(\$386,146.43)
ECM #8	Install VFD on Cooling Tower Fan	\$10,000	\$10,000	\$0	\$20,000	\$1,164	\$0	\$1,164	15	\$17,464	\$0	-12.7%	17.2	-1.65%	(\$6,100.74)
ECM #9	Replace Rooftop AC Units	\$29,000	\$18,000	\$2,018	\$44,982	\$1,180	\$0	\$1,180	15	\$17,705	\$0	-60.6%	38.1	-9.89%	(\$30,891.14)
ECM #10	NEMA Premium Efficiency Motors	\$14,464	\$12,255	\$995	\$25,724	\$840	\$0	\$840	15	\$12,606	\$0	-51.0%	30.6	-7.83%	(\$15,691.41)
ECM #11	Kitchen Exhaust Hood Controls	\$14,500	\$26,000	\$1,395	\$39,105	\$4,584	\$0	\$4,584	15	\$68,760	\$0	75.8%	8.5	8.06%	\$15,618.49
ECM #12	Replace Window AC Units with Ductless Split Units	\$50,000	\$50,000	\$3,220	\$96,780	\$2,835	\$0	\$2,835	15	\$42,525	\$0	-56.1%	34.1	-8.87%	(\$62,935.95)
ECM #13	Expand DDC Energy Management System	\$800,000	\$0	\$0	\$800,000	\$59,981	\$0	\$59,981	15	\$899,711	\$0	12.5%	13.3	1.51%	(\$83,953.99)
ECM #14	Convert 3-way valves to 2-way and install VFDs	\$40,000	\$54,000	\$0	\$94,000	\$9,397	\$0	\$9,397	15	\$140,949	\$0	49.9%	10.0	5.55%	\$18,176.12
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Solar Photovoltaic System	\$2,161,781	\$0	\$0	\$2,161,781	\$67,179	\$172,697	\$239,876	15	\$3,598,134	\$2,590,451	66.4%	9.0	7.17%	\$701,838.66

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*.

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, 2010:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

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 - \$93 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 90.1-2004

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

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

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps	\$60 per hp
Compressors	\$5,250 to \$12,500 per drive

Natural Gas Water Heating

Gas Water Heaters \leq 50 gallons	\$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 (1-2 lamps) \$30 per fixture (3-4 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	\$25 per fixture
LED Exit Signs	\$10 - \$20 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$284 per fixture
HID \geq 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID \geq 100w Replacement with new HID \geq 100w	\$70 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- 2004 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%



STATEMENT OF ENERGY PERFORMANCE

Cherry Hill BOE - High School East

Building ID: 2787788
For 12-month Period Ending: April 30, 2011¹
Date SEP becomes ineligible: N/A

Date SEP Generated: August 02, 2011

Facility

Cherry Hill BOE - High School East
1750 Kresson Road
Cherry Hill, NJ 08003

Facility Owner

Cherry Hill Public Schools
45 Ranoldo Terrace
Cherry Hill, NJ 08034

Primary Contact for this Facility

James Devereaux
45 Ranoldo Terrace
Cherry Hill, NJ 08034

Year Built: 1967

Gross Floor Area (ft²): 369,107

Energy Performance Rating² (1-100) 52

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	8,587,854
Natural Gas (kBtu) ⁴	26,583,814
Total Energy (kBtu)	35,171,668

Energy Intensity⁵

Site (kBtu/ft ² /yr)	95
Source (kBtu/ft ² /yr)	153

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	2,630
---	-------

Electric Distribution Utility

Public Service Electric & Gas Co

National Average Comparison

National Average Site EUI	98
National Average Source EUI	157
% Difference from National Average Source EUI	-2%
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 Standards⁶ 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	<input checked="" type="checkbox"/>
Building Name	Cherry Hill BOE - High School East	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	K-12 School	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	1750 Kresson Road, Cherry Hill, NJ 08003	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		<input type="checkbox"/>
Cherry Hill BOE - High School East (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	369,107 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.		<input type="checkbox"/>
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.		<input type="checkbox"/>
Number of PCs	472	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		<input type="checkbox"/>
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".		<input type="checkbox"/>
Percent Cooled	60 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>

High School?	Yes	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'.	<input type="checkbox"/>
--------------	-----	--	--------------------------

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))
04/01/2011	04/30/2011	184,328.00
03/01/2011	03/31/2011	199,343.00
02/01/2011	02/28/2011	223,580.00
01/01/2011	01/31/2011	204,980.00
12/01/2010	12/31/2010	238,244.00
11/01/2010	11/30/2010	222,071.00
10/01/2010	10/31/2010	183,276.00
09/01/2010	09/30/2010	218,678.00
08/01/2010	08/31/2010	185,732.00
07/01/2010	07/31/2010	208,604.00
06/01/2010	06/30/2010	247,540.00
05/01/2010	05/31/2010	200,580.00
Electric Consumption (kWh (thousand Watt-hours))		2,516,956.00
Electric Consumption (kBtu (thousand Btu))		8,587,853.87
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		8,587,853.87
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
Meter: Gas (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
04/01/2011	04/30/2011	15,981.60
03/01/2011	03/31/2011	32,743.07
02/01/2011	02/28/2011	50,585.02
01/01/2011	01/31/2011	52,509.66
12/01/2010	12/31/2010	49,900.26
11/01/2010	11/30/2010	21,673.06
10/01/2010	10/31/2010	8,235.33
09/01/2010	09/30/2010	5,952.14
08/01/2010	08/31/2010	8,152.61
07/01/2010	07/31/2010	7,312.45

06/01/2010	06/30/2010	7,656.72
05/01/2010	05/31/2010	5,136.22
Gas Consumption (therms)		265,838.14
Gas Consumption (kBtu (thousand Btu))		26,583,814.00
Total Natural Gas Consumption (kBtu (thousand Btu))		26,583,814.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		<input type="checkbox"/>

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

Cherry Hill BOE - High School East
1750 Kresson Road
Cherry Hill, NJ 08003

Facility Owner

Cherry Hill Public Schools
45 Ranoldo Terrace
Cherry Hill, NJ 08034

Primary Contact for this Facility

James Devereaux
45 Ranoldo Terrace
Cherry Hill, NJ 08034

General Information

Cherry Hill BOE - High School East	
Gross Floor Area Excluding Parking: (ft ²)	369,107
Year Built	1967
For 12-month Evaluation Period Ending Date:	April 30, 2011

Facility Space Use Summary

Cherry Hill BOE - High School East	
Space Type	K-12 School
Gross Floor Area(ft ²)	369,107
Open Weekends?	No
Number of PCs	472
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	60
Percent Heated	90
Months ^o	10
High School?	Yes
School District ^o	Cherry Hill

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 04/30/2011)	Baseline (Ending Date 04/30/2011)	Rating of 75	Target	National Average
Energy Performance Rating	52	52	75	N/A	50
Energy Intensity					
Site (kBtu/ft ²)	95	95	76	N/A	98
Source (kBtu/ft ²)	153	153	123	N/A	157
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 ₂ e/year	2,630	2,630	2,108	N/A	2,695
kgCO ₂ e/ft ² /year	7	7	6	N/A	7

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

Notes:

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

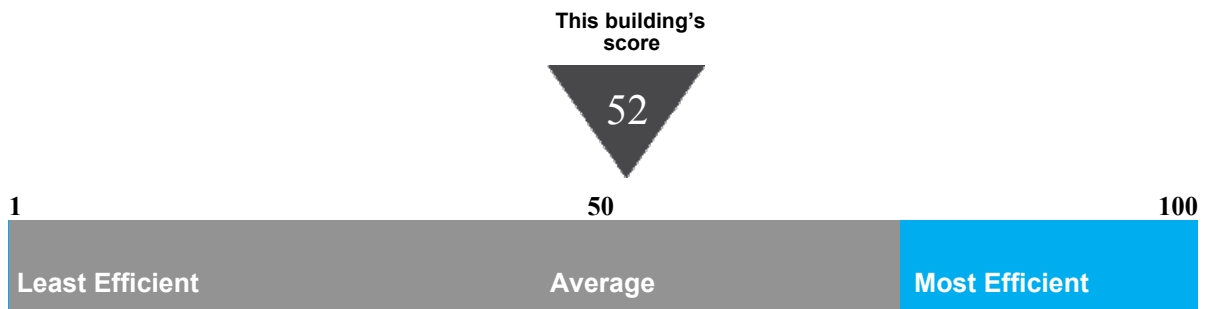
Statement of Energy Performance

2011

Cherry Hill BOE - High School East
1750 Kresson Road
Cherry Hill, NJ 08003

Portfolio Manager Building ID: 2787788

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 153 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending April 2011

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



MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Boilers

Tag	Hot Water Boilers		
Unit Type	Fire-tube hot water		
Qty	4		
Location	Boiler room		
Area Served	Entire facility		
Manufacturer	Cleaver Brooks		
Model #	CB655-300		
Serial #	L-37690, L-37691, L-37692, L-45105		
Input Capacity (Btu/Hr)	12,554 MBH		
Rated Output Capacity (Btu/Hr)	300 HP (10,042 MBH)		
Approx. Efficiency %	80%		
Fuel	Natural Gas		
Approx Age	46		
ASHRAE Service Life	25		
Remaining Life	(21)		
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Cooling Tower

Tag	Electric Chiller	Absorption Chiller	
Unit Type	Hermetic recip, water cooled	Direct fired	
Qty	1	1	
Location	Boiler Room	Boiler Room	
Area Served	A, D wings	A, D, B, C wings	
Manufacturer	Carrier	York	
Model #	30HH045400	YPC-FN-16G-17-H-A	
Serial #	6380785	HABM-093014	
Refrigerant	R22	Li-Br / Water	
Cooling Capacity (Tons)	45	400	
Cooling Efficiency (KW/Ton)	0.94	1.2 (Est)	
Volts / Phase / Hz	208/3/60	208/3/60	
Fuel	Electricity	Direct Fired Natural Gas	
Chilled Water GPM / ΔT	11	-	
Condenser Water GPM / ΔT	10	10	
Approx Age	40	40	
ASHRAE Service Life	20	20	
Remaining Life	(20)	(20)	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Domestic Water Heaters

Tag	HW Heaters		
Unit Type	Gas fired tank type, condensing HWH		
Qty	2		
Location	Boiler room		
Area Served	Entire facility		
Manufacturer	PVI		
Model #	Turbopower 99 2791 N 600A-TP		
Serial #	0611132281		
Size (Gallons)	600		
Input Capacity (MBH/KW)	1,950 MBH		
Recovery (Gal/Hr)	2,971 (40F - 120F)		
Efficiency %	80%		
Fuel	Natural Gas		
Approx Age	1		
ASHRAE Service Life	12		
Remaining Life	11		
Comments	1 HP burner		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Pumps

Tag	CW Pump	Condenser Pump	HW Pump
Unit Type	Base mounted	Base mounted	Base mounted
Qty	1	1	2
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	B,C,D wings AHUs	Absorber	Heating Zone 4
Manufacturer	-	Taco	BG
Model #	-	-	-
Serial #	-	-	-
Horse Power	50	30	15
Flow	-	1,200	300
Pump Head (ft)	-	76	90
Motor Info	Nema Premium Eff. Motor	93.6	-
Electrical Power	208	208	208
RPM	1750	1750	1750
Motor Efficiency %	94.1%	93.6%	88.5%
Approx Age	10 (Est)	10 (Est)	10 (Est)
ASHRAE Service Life	20	20	20
Remaining Life	10 (Est)	10 (Est)	10 (Est)
Comments			1 Active / 1 Spare

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Pumps

Tag	HW Pump	HW Pump	HW Pump
Unit Type	Base mounted	Base mounted	Base mounted
Qty	2	2	2
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Heating Zone 1	Heating Zone 2	Heating Zone 3
Manufacturer	BG	BG	BG
Model #	-	-	-
Serial #	-	-	-
Horse Power	7.5	7.5	7.5
Flow	-	-	-
Pump Head (ft)	-	-	-
Motor Info	-	-	-
Electrical Power	208	208	208
RPM	1750	1750	1750
Motor Efficiency %	88.5%	88.5%	88.5%
Approx Age	10 (Est)	10 (Est)	10 (Est)
ASHRAE Service Life	20	20	20
Remaining Life	10 (Est)	10 (Est)	10 (Est)
Comments	1 Active / 1 Spare	1 Active / 1 Spare	1 Active / 1 Spare

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Cooling Tower

Tag	CT	CT	
Unit Type	Forced Draft	Forced Draft	
Qty	1	1	
Location	E Wing Roof	Ground near E Wing	
Area Served	Carrier Electric Chiller	York Absorber	
Manufacturer	BAC	Evapco	
Model #	VXT45CR	LSTA 10-183	
Serial #	91101027	928-	
Rated Flow GPM	150 Est	1200 (Est)	
EWI / LWT	95 / 85	95 / 85	
Motor HP	3 (Est)	2 x 7.5 HP 2 x 20 HP	
Electrical	208 / 3	208 / 3	
Approx Age	20	3	
ASHRAE Service Life	20	20	
Remaining Life	0	17	
Comments		Two speed tower fans	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

RTUs

Tag	RTU	RTU	
Unit Type	Packaged Rooftop Unit	Packaged Rooftop Unit	
Qty	1	1	
Location	E Wing Roof	F Wing Roof	
Area Served	E100	Photo Room	
Manufacturer	York	Carrier	
Model #	-	Weathermaker 50CD006520	
Serial #	-	2085G35 343	
Cooling Type	Direct Expansion	Direct Expansion	
Cooling Capacity (Tons)	10 (Est)	5	
Cooling Efficiency (SEER/EER)	8 (Est)	8.4 SEER	
Heating Type	N/A	N/A	
Heating Input (MBH)	-	-	
Efficiency	-	-	
Fuel	-	-	
Approx Age	20 (Est)	21	
ASHRAE Service Life	15	15	
Remaining Life	(5)	(6)	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

AC Units

Tag	CU1, CU2	Window Units	CU
Unit Type	Split AC System	Window AC Units	Split AC System
Qty	2	35	1
Location	Auditorium	Various Classrooms and Offices	Roof
Area Served	Auditorium	Various Classrooms and Offices	Teachers Lounge
Manufacturer	TRANE	Friedrich	Intertherm
Model #	RAUCC604CY13ABD0020	-	31BA-060K
Serial #	C06H08064 C06H08065	-	-
Cooling Type	Direct Expansion	Direct Expansion	Direct Expansion
Cooling Capacity (Tons)	60	1.5	5
Cooling Efficiency (SEER/EER)	11 EER 16.2 IPLV	9 - 10.7 EER	10 SEER (Est)
Heating Type	Hot Water	N/A	N/A
Heating Input (MBH)	-	N/A	N/A
Efficiency	-	N/A	N/A
Fuel	Natural Gas	N/A	N/A
Approx Age	3	-	15 Est
ASHRAE Service Life	15	15	15
Remaining Life	12	-	-
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

AC Units

Tag	CU	CU	CU
Unit Type	Split AC System	Split AC System	Split AC System
Qty	2	2	2
Location	F Wing Roof	F Wing Roof	F Wing Roof
Area Served	Labs	Labs	Labs
Manufacturer	Lennox	Lennox	Lennox
Model #	HS26-048-3Y	HS26-048-3Y	HS26-048-3Y
Serial #	5800K 17395 5800K 17398	5800K 17389 5800K 17399	5800K 17396 5800K 17388
Cooling Type	Direct Expansion	Direct Expansion	Direct Expansion
Cooling Capacity (Tons)	4	4	4
Cooling Efficiency (SEER/EER)	13 SEER	13 SEER	13 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	11	11	11
ASHRAE Service Life	15	15	15
Remaining Life	4	4	4
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

AC Units

Tag	CU	CU	
Unit Type	Split AC System	Split AC System	
Qty	1	1	
Location	Main Gymnasium Offices	Near Student Entrance	
Area Served	Main Gymnasium Offices	Main Gymnasium Offices	
Manufacturer	York	-	
Model #	HABA-T048SA	-	
Serial #	WKKM002466	-	
Cooling Type	Direct Expansion	Direct Expansion	
Cooling Capacity (Tons)	4	4	
Cooling Efficiency (SEER/EER)	13 SEER	10 SEER	
Heating Type	N/A	N/A	
Heating Input (MBH)	N/A	N/A	
Efficiency	N/A	N/A	
Fuel	N/A	N/A	
Approx Age	10	15	
ASHRAE Service Life	15	15	
Remaining Life	5	0	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

AHUs

Tag	AHU	AHU	AHU
Unit Type	Air Handling Units	Air Handling Units	Air Handling Units
Qty	3	6	-
Location	Main Gymnasium	Cafeteria #1,2	Ceiling mounted in various spaces
Area Served	Main Gymnasium	Cafeteria #1,2	-
Manufacturer	-	-	-
Model #	-	-	-
Serial #	-	-	-
Cooling Type	N/A	N/A	N/A
Cooling Capacity (Tons)	-	-	-
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	-	-
Approx Age	40	40	40
ASHRAE Service Life	15	15	15
Remaining Life	-	-	-
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Unit Ventilators and Fan Coil Units

Tag	UV	FC	UV
Unit Type	Unit Ventilator 2-pipe system	Fan Coil Units 2-pipe system	Fan Coil Units 2-pipe system
Qty	50 (Est)	8	20
Location	Classrooms, offices	Corridors, offices	Corridors, offices
Manufacturer	Nesbitt	Trane	Trane
Model #	-	-	-
Serial #	-	-	-
Flow Capacity	-	-	-
Cooling Type	Chilled Water	Chilled Water	Chilled Water
Cooling Capacity (Tons)	2-5 Tons	2-5 Tons	2-5 Tons
Estimated Cooling Efficiency (EER)	-	-	-
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	-	-	-
Approx Age	46	5	15
Ashrae Service Life	15	15	15
Remaining Life	-	10	-

Comments

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill BOE - High School EAST

Air Compressor

Tag	Air Compressor		
Unit Type	Duplex Reciprocating, Air Cooled		
Qty	1		
Location	Boiler Room		
Area Served	Pneumatic System		
Manufacturer	Quincy Compressor		
Model #	-		
Serial #	-		
Tank Capacity	100		
Voltage / Phase	208/1		
Motor HP	2 x 7.5 HP		
Approx Age	3 Est		
Ashrae Service Life	20		
Remaining Life	17		
Comments	Unit is in good condition		

Investment Grade Lighting Audit

APPENDIX E
1 of 30

CEG Job #: 9C11001

Project: Cherry Hill High School East

Cherry Hill High School East

KWH COST: \$0.150

Bldg. Sq. Ft. 364,000

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING					PROPOSED LIGHTING										SAVINGS							
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 302	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16
221.11	Classroom 304	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 306	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 308	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16
221.11	Classroom 310	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 312	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	\$48.36	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$14.00	\$28.00	0.02	62.4	\$9.36	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 314	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
221.11	Clasroom 318	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99

Investment Grade Lighting Audit

APPENDIX E
2 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING														PROPOSED LIGHTING						SAVINGS							
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback					
221.11	Classroom 317	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99					
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99					
221.11	Classroom 313	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99					
221.11	Classroom 311	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	\$72.54	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$14.00	\$42.00	0.04	93.6	\$14.04	2.99					
121.11		2600	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.39	1,014.0	\$152.10	5	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$100.00	\$500.00	0.14	364	\$54.60	9.16					
222.21	Corridor - 3rd Floor	2600	24	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.49	3,868.8	\$580.32	24	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.20	3120	\$468.00	\$14.00	\$336.00	0.29	748.8	\$112.32	2.99					
601		3000	3	2	(2) 7w CFL Exit Sign	16	0.05	144.0	\$21.60	3	1	LED Exit Sign	2	0.01	18	\$2.70	\$65.00	\$195.00	0.04	126	\$18.90	10.32					
221.11	Faculty Lounge	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	\$24.18	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$14.00	\$14.00	0.01	31.2	\$4.68	2.99					
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16					
221.11	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99					
221.11	Boy's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99					
221.11	Custodian Closet	800	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	49.6	\$7.44	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	40	\$6.00	\$14.00	\$14.00	0.01	9.6	\$1.44	9.72					
221.11	Classroom 307	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99					
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16					
221.11	Classroom 303	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99					
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16					
221.11	Classroom 301	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99					
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16					

Investment Grade Lighting Audit

APPENDIX E
3 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
222.21	Corridor - 2nd Floor	3000	64	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	3.97	11,904.0	\$1,785.60	64	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	3.20	9600	\$1,440.00	\$14.00	\$896.00	0.77	2304	\$345.60	2.59	
601		3000	8	2	(2) 7w CFL Exit Sign	16	0.13	384.0	\$57.60	8	1	LED Exit Sign	2	0.02	48	\$7.20	\$65.00	\$520.00	0.11	336	\$50.40	10.32	
221.11	Classroom 201	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99	
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16	
221.11	Classroom 202	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 203	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 204	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.50	1,289.6	\$193.44	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	\$156.00	\$14.00	\$112.00	0.10	249.6	\$37.44	2.99	
221.11	Classroom 205	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99	
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16	
221.11	Classroom 206	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99	
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16	
221.11	Classroom 208	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99	
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16	
221.11	Classroom 209	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 207	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99	

Investment Grade Lighting Audit

APPENDIX E
4 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING															PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						
221.11	Classroom 210	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.21	Boy's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
221.21	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
612	Custodian Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	80.0	\$12.00	1	1	(1) 26w CFL Lamp	26	0.03	20.8	\$3.12	\$20.00	\$20.00	0.07	59.2	\$8.88	2.25						
221.11	Room 211	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	\$24.18	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$14.00	\$14.00	0.01	31.2	\$4.68	2.99						
221.11	Teacher's Lounge	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	\$48.36	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$14.00	\$28.00	0.02	62.4	\$9.36	2.99						
221.11	Classroom 215	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.11	Classroom 212	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						
221.11	Classroom 217	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99						
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16						
221.11	Classroom 216	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.11	Classroom 219	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						

Investment Grade Lighting Audit

APPENDIX E
5 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 218	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 221	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 220	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	\$72.54	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$14.00	\$42.00	0.04	93.6	\$14.04	2.99
121.11		2600	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.39	1,014.0	\$152.10	5	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$100.00	\$500.00	0.14	364	\$54.60	9.16
221.11	Classroom 223	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 225	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16
221.11	Classroom 222	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16
221.11	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	\$72.54	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$14.00	\$42.00	0.04	93.6	\$14.04	2.99
221.11	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
5	Faculty Restroom	2600	1	1	34w Circuline Fluor.	40	0.04	104.0	\$15.60	1	2	2 Lamp, 9w PL; new fixture	19	0.02	49.4	\$7.41	\$100.00	\$100.00	0.02	54.6	\$8.19	12.21
221.11	Classroom 239	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 241	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99

Investment Grade Lighting Audit

APPENDIX E
6 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING													PROPOSED LIGHTING										SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.11	Room 243	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	\$24.18	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$14.00	\$14.00	0.01	31.2	\$4.68	2.99						
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16						
221.11	Classroom 245	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						
221.11	Classroom 247	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.50	1,289.6	\$193.44	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	\$156.00	\$14.00	\$112.00	0.10	249.6	\$37.44	2.99						
221.11	Classroom 248	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						
221.11	Classroom 246	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99						
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16						
221.11	Classroom 244	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.11	Classroom 242	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99						
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16						
221.11	Classroom 240	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						
221.11	Classroom 238	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99						
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16						

Investment Grade Lighting Audit

APPENDIX E
7 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
221.11	Classroom 236	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 232	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99	
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99	
221.11	Classroom 231	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99	
221.11	Classroom 233	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99	
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99	
221.11	Classroom 235	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 144	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 146	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	
221.11	Classroom 148	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99	
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16	
221.11	Classroom 150	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16	

Investment Grade Lighting Audit

APPENDIX E
8 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 149	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 147	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16
221.11	Classroom 143	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Faculty Lounge	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
5		2600	1	1	34w Circuline Fluor.	40	0.04	104.0	\$15.60	1	2	2 Lamp, 9w PL; new fixture	19	0.02	49.4	\$7.41	\$100.00	\$100.00	0.02	54.6	\$8.19	12.21
221.21	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99
221.21	Boy's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
221.11	Classroom 140	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 139	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 138	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.50	1,289.6	\$193.44	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	\$156.00	\$14.00	\$112.00	0.10	249.6	\$37.44	2.99
221.11	Classroom 137	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16

Investment Grade Lighting Audit

APPENDIX E
9 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
222.11	Classroom 135	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
221.11	Classroom 134	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 133	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 132	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 131	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
211.11	Library	2600	62	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	2.05	5,319.6	\$797.94	62	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	1.55	4030	\$604.50	\$7.00	\$434.00	0.50	1289.6	\$193.44	2.24
211.11	Library AV	2600	26	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.86	2,230.8	\$334.62	26	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.65	1690	\$253.50	\$7.00	\$182.00	0.21	540.8	\$81.12	2.24
211.11	Library Office	2600	10	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.33	858.0	\$128.70	10	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.25	650	\$97.50	\$7.00	\$70.00	0.08	208	\$31.20	2.24
111.11		2600	4	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	38	0.15	395.2	\$59.28	4	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.10	260	\$39.00	\$80.00	\$320.00	0.05	135.2	\$20.28	15.78
211.11	Library Balcony	2600	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.06	2,745.6	\$411.84	32	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.80	2080	\$312.00	\$7.00	\$224.00	0.26	665.6	\$99.84	2.24
111.11		2600	6	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	38	0.23	592.8	\$88.92	6	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$58.50	\$80.00	\$480.00	0.08	202.8	\$30.42	15.78
221.11	Classroom 110	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99
221.11	Classroom 114	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99

Investment Grade Lighting Audit

APPENDIX E
10 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING					PROPOSED LIGHTING										SAVINGS							
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 121	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.60	6,770.4	\$1,015.56	42	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.10	5460	\$819.00	\$14.00	\$588.00	0.50	1310.4	\$196.56	2.99
221.11	Classroom 119	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 117	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	811.2	\$121.68	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$100.00	\$400.00	0.11	291.2	\$43.68	9.16
221.11	Classroom 115	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 113	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	\$48.36	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$14.00	\$28.00	0.02	62.4	\$9.36	2.99
121.11		2600	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.47	1,216.8	\$182.52	6	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$100.00	\$600.00	0.17	436.8	\$65.52	9.16
221.21	Boy's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
221.21	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
612	Custodian Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	80.0	\$12.00	1	1	(1) 26w CFL Lamp	26	0.03	20.8	\$3.12	\$20.00	\$20.00	0.07	59.2	\$8.88	2.25
221.11	Classroom 108	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	\$120.90	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	\$14.00	\$70.00	0.06	156	\$23.40	2.99
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16
221.11	Classroom 106	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16

Investment Grade Lighting Audit

APPENDIX E
11 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING					PROPOSED LIGHTING									SAVINGS								
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.21	Faculty Restroom	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
221.11	Mail Room	3000	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	558.0	\$83.70	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	450	\$67.50	\$14.00	\$42.00	0.04	108	\$16.20	2.59
121.11		3000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	234.0	\$35.10	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	150	\$22.50	\$100.00	\$100.00	0.03	84	\$12.60	7.94
221.11	Bus Department	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	\$24.18	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$14.00	\$14.00	0.01	31.2	\$4.68	2.99
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	\$30.42	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	\$100.00	\$100.00	0.03	72.8	\$10.92	9.16
221.11	Classroom 102	2600	10	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.62	1,612.0	\$241.80	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	\$195.00	\$14.00	\$140.00	0.12	312	\$46.80	2.99
121.11		2600	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.47	1,216.8	\$182.52	6	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$100.00	\$600.00	0.17	436.8	\$65.52	9.16
221.11	Classroom 105	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 103	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
221.11	Classroom 101	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	\$169.26	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	\$14.00	\$98.00	0.08	218.4	\$32.76	2.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	405.6	\$60.84	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$39.00	\$100.00	\$200.00	0.06	145.6	\$21.84	9.16
211.11	Nurse	2600	13	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.43	1,115.4	\$167.31	13	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.33	845	\$126.75	\$7.00	\$91.00	0.10	270.4	\$40.56	2.24
111.11		2600	3	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	38	0.11	296.4	\$44.46	3	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.08	195	\$29.25	\$80.00	\$240.00	0.04	101.4	\$15.21	15.78
211.11	Attendance Office	3000	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.06	3,168.0	\$475.20	32	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.80	2400	\$360.00	\$7.00	\$224.00	0.26	768	\$115.20	1.94
211.11	Office 006	3000	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.20	594.0	\$89.10	6	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	450	\$67.50	\$7.00	\$42.00	0.05	144	\$21.60	1.94

Investment Grade Lighting Audit

APPENDIX E
12 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
211.11	Guidance Office 004	3000	16	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.53	1,584.0	\$237.60	16	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.40	1200	\$180.00	\$7.00	\$112.00	0.13	384	\$57.60	1.94
211.11	Kitchen	2600	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.20	514.8	\$77.22	6	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$58.50	\$7.00	\$42.00	0.05	124.8	\$18.72	2.24
211.11	Side Office (16)	2600	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.06	2,745.6	\$411.84	32	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.80	2080	\$312.00	\$7.00	\$224.00	0.26	665.6	\$99.84	2.24
211.11	Room 01	2600	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.40	1,029.6	\$154.44	12	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.30	780	\$117.00	\$7.00	\$84.00	0.10	249.6	\$37.44	2.24
211.11	Security	3000	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.40	1,188.0	\$178.20	12	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.30	900	\$135.00	\$7.00	\$84.00	0.10	288	\$43.20	1.94
211.11	Principal's Office & Conference Room	3000	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.50	1,485.0	\$222.75	15	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.38	1125	\$168.75	\$7.00	\$105.00	0.12	360	\$54.00	1.94
613		3000	3	1	Table Lamp, (2) 100w A Lamp	200	0.60	1,800.0	\$270.00	3	2	(2) 26w CFL Lamp	52	0.16	468	\$70.20	\$40.00	\$120.00	0.44	1332	\$199.80	0.60
211.11	Side Office	3000	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.13	396.0	\$59.40	4	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.10	300	\$45.00	\$7.00	\$28.00	0.03	96	\$14.40	1.94
211.11	Main Office	3000	30	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.99	2,970.0	\$445.50	30	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.75	2250	\$337.50	\$7.00	\$210.00	0.24	720	\$108.00	1.94
211.11	Main Office Side Offices (14)	3000	30	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.99	2,970.0	\$445.50	30	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.75	2250	\$337.50	\$7.00	\$210.00	0.24	720	\$108.00	1.94
111.11		3000	8	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	38	0.30	912.0	\$136.80	8	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.20	600	\$90.00	\$80.00	\$640.00	0.10	312	\$46.80	13.68
221.11	Lecture Hall 1	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2,418.0	\$362.70	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	\$14.00	\$210.00	0.18	468	\$70.20	2.99
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16
221.11	Lecture Hall 2	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2,418.0	\$362.70	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	\$14.00	\$210.00	0.18	468	\$70.20	2.99
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	608.4	\$91.26	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	\$100.00	\$300.00	0.08	218.4	\$32.76	9.16
558	Auditorium	2600	16	1	Recessed Down Light, 100w R30 Lamp	100	1.60	4,160.0	\$624.00	16	1	Energy Star Rated, Dimmable 26w CFL Lamp	26	0.42	1081.6	\$162.24	\$20.00	\$320.00	1.18	3078.4	\$461.76	0.69
142.21	DO 44	2600	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	2,433.6	\$365.04	6	3	3 Lamp, 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.43	1123.2	\$168.48	\$100.00	\$600.00	0.50	1310.4	\$196.56	3.05
142.21	DO 48	2600	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	2,433.6	\$365.04	6	3	3 Lamp, 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.43	1123.2	\$168.48	\$100.00	\$600.00	0.50	1310.4	\$196.56	3.05

Investment Grade Lighting Audit

APPENDIX E
13 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING					PROPOSED LIGHTING									SAVINGS								
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
211.11	Props	800	7	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.23	184.8	\$27.72	7	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.18	140	\$21.00	\$7.00	\$49.00	0.06	44.8	\$6.72	7.29
211.11	DO 55	2600	22	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.73	1,887.6	\$283.14	22	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.55	1430	\$214.50	\$7.00	\$154.00	0.18	457.6	\$68.64	2.24
211.11	DO 41	2600	22	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.73	1,887.6	\$283.14	22	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.55	1430	\$214.50	\$7.00	\$154.00	0.18	457.6	\$68.64	2.24
211.11	Choir & Music	2600	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.40	1,029.6	\$154.44	12	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.30	780	\$117.00	\$7.00	\$84.00	0.10	249.6	\$37.44	2.24
211.11	Offices (6)	2600	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.13	343.2	\$51.48	4	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.10	260	\$39.00	\$7.00	\$28.00	0.03	83.2	\$12.48	2.24
142.21	Little Theater	2600	9	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	1.40	3,650.4	\$547.56	9	3	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.65	1684.8	\$252.72	\$100.00	\$900.00	0.76	1965.6	\$294.84	3.05
221.21	Girl's Restroom	2600	9	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.56	1,450.8	\$217.62	9	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.45	1170	\$175.50	\$14.00	\$126.00	0.11	280.8	\$42.12	2.99
221.21	Boy's Restroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.93	2,418.0	\$362.70	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	\$14.00	\$210.00	0.18	468	\$70.20	2.99
211.11	Classroom 031	2600	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.50	1,287.0	\$193.05	15	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.38	975	\$146.25	\$7.00	\$105.00	0.12	312	\$46.80	2.24
211.11	Classroom 033	2600	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.50	1,287.0	\$193.05	15	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.38	975	\$146.25	\$7.00	\$105.00	0.12	312	\$46.80	2.24
769	Dibart Gym	3200	25	1	400w MH, Hi-Bay	465	11.63	37,200.0	\$5,580.00	25	6	2x4 54w T5HO 6 Lamp w/Prismatic Lens	354	8.85	28320	\$4,248.00	\$240.00	\$6,000.00	2.78	8880	\$1,332.00	4.50
601		3200	8	2	(2) 7w CFL Exit Sign	16	0.13	409.6	\$61.44	8	1	LED Exit Sign	2	0.02	51.2	\$7.68	\$65.00	\$520.00	0.11	358.4	\$53.76	9.67
211.11	Mech. Room	800	2	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.07	52.8	\$7.92	2	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.05	40	\$6.00	\$7.00	\$14.00	0.02	12.8	\$1.92	7.29
769	Aux. Gym	3000	17	1	400w MH, Hi-Bay	465	7.91	23,715.0	\$3,557.25	17	6	2x4 54w T5HO 6 Lamp w/Prismatic Lens	354	6.02	18054	\$2,708.10	\$240.00	\$4,080.00	1.89	5661	\$849.15	4.80
242.11		3000	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.43	1,284.0	\$192.60	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1176	\$176.40	\$28.00	\$112.00	0.04	108	\$16.20	6.91
242.11	Wrestling Room	3000	10	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.07	3,210.0	\$481.50	10	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.98	2940	\$441.00	\$28.00	\$280.00	0.09	270	\$40.50	6.91
221.21	Basement Corridor	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.12	2,901.6	\$435.24	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.90	2340	\$351.00	\$14.00	\$252.00	0.22	561.6	\$84.24	2.99
601		2600	2	2	(2) 7w CFL Exit Sign	16	0.03	83.2	\$12.48	2	1	LED Exit Sign	2	0.00	10.4	\$1.56	\$65.00	\$130.00	0.03	72.8	\$10.92	11.90

Investment Grade Lighting Audit

APPENDIX E
14 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
222.21	Trainer's Room	2600	14	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.87	2,256.8	\$338.52	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	\$273.00	\$14.00	\$196.00	0.17	436.8	\$65.52	2.99
211.11	Girl's Locker Room	2600	38	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.25	3,260.4	\$489.06	38	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.95	2470	\$370.50	\$7.00	\$266.00	0.30	790.4	\$118.56	2.24
211.11	Football Locker Room	2600	24	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.79	2,059.2	\$308.88	24	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.60	1560	\$234.00	\$7.00	\$168.00	0.19	499.2	\$74.88	2.24
211.11	Boy's Locker Room	2600	34	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.12	2,917.2	\$437.58	34	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.85	2210	\$331.50	\$7.00	\$238.00	0.27	707.2	\$106.08	2.24
612	Mech. Room	800	4	1	Pendant Mnt., 100w A19 Lamp	100	0.40	320.0	\$48.00	4	1	(1) 26w CFL Lamp	26	0.10	83.2	\$12.48	\$20.00	\$80.00	0.30	236.8	\$35.52	2.25
222.11	Office 22	2600	6	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
232.21	Cafeteria 1	2600	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	4.64	12,074.4	\$1,811.16	54	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	3.89	10108.8	\$1,516.32	\$21.00	\$1,134.00	0.76	1965.6	\$294.84	3.85
232.21	Cafeteria 2	2600	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	4.64	12,074.4	\$1,811.16	54	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	3.89	10108.8	\$1,516.32	\$21.00	\$1,134.00	0.76	1965.6	\$294.84	3.85
211.11	Kitchen	2600	28	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.92	2,402.4	\$360.36	28	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.70	1820	\$273.00	\$7.00	\$196.00	0.22	582.4	\$87.36	2.24
617	Hood	2600	16	1	Hood Light w/Globe & Cage, 100w A Lamp	100	1.60	4,160.0	\$624.00	16	1	26w CFL Lamp	26	0.42	1081.6	\$162.24	\$20.00	\$320.00	1.18	3078.4	\$461.76	0.69
232.21	Faculty Dining Room	2600	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	3,577.6	\$536.64	16	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	1.15	2995.2	\$449.28	\$21.00	\$336.00	0.22	582.4	\$87.36	3.85
211.11	Maintenance	2600	38	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.25	3,260.4	\$489.06	38	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.95	2470	\$370.50	\$7.00	\$266.00	0.30	790.4	\$118.56	2.24
221.21	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	\$96.72	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$78.00	\$14.00	\$56.00	0.05	124.8	\$18.72	2.99
221.11	Classroom 068	2600	44	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.73	7,092.8	\$1,063.92	44	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.20	5720	\$858.00	\$14.00	\$616.00	0.53	1372.8	\$205.92	2.99
221.11	Classroom 064	2600	44	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.73	7,092.8	\$1,063.92	44	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.20	5720	\$858.00	\$14.00	\$616.00	0.53	1372.8	\$205.92	2.99
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	\$145.08	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	\$117.00	\$14.00	\$84.00	0.07	187.2	\$28.08	2.99
221.11	Classroom 070	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.05	5,319.6	\$797.94	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	\$14.00	\$462.00	0.40	1029.6	\$154.44	2.99

Investment Grade Lighting Audit

APPENDIX E
15 of 30

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 072	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.30	3,385.2	\$507.78	21	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.05	2730	\$409.50	\$14.00	\$294.00	0.25	655.2	\$98.28	2.99
221.11	Classroom 074	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.05	5,319.6	\$797.94	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	\$14.00	\$462.00	0.40	1029.6	\$154.44	2.99
221.11	Classrom 076	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.30	3,385.2	\$507.78	21	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.05	2730	\$409.50	\$14.00	\$294.00	0.25	655.2	\$98.28	2.99
221.11	Classroom 078	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.05	5,319.6	\$797.94	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	\$14.00	\$462.00	0.40	1029.6	\$154.44	2.99
221.11	Classroom 077	2600	27	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.67	4,352.4	\$652.86	27	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.35	3510	\$526.50	\$14.00	\$378.00	0.32	842.4	\$126.36	2.99
221.11	Classroom 083	2600	30	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.86	4,836.0	\$725.40	30	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.50	3900	\$585.00	\$14.00	\$420.00	0.36	936	\$140.40	2.99
221.11	Classroom 085	2600	29	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.80	4,674.8	\$701.22	29	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.45	3770	\$565.50	\$14.00	\$406.00	0.35	904.8	\$135.72	2.99
221.11	Classroom 087	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	2.05	5,319.6	\$797.94	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	\$14.00	\$462.00	0.40	1029.6	\$154.44	2.99
211.11	Classroom 089	2600	33	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.09	2,831.4	\$424.71	33	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.83	2145	\$321.75	\$7.00	\$231.00	0.26	686.4	\$102.96	2.24
211.11	Classroom 091	2600	33	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	1.09	2,831.4	\$424.71	33	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.83	2145	\$321.75	\$7.00	\$231.00	0.26	686.4	\$102.96	2.24
211.31	Classroom 092	2600	49	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	1.47	3,822.0	\$573.30	49	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.31	Classroom 088	2600	48	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	1.44	3,744.0	\$561.60	48	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.31	Classroom 086	2600	60	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	1.80	4,680.0	\$702.00	60	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.31	Classroom 082	2600	60	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	1.80	4,680.0	\$702.00	60	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.11	Girl's Restroom	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.10	257.4	\$38.61	3	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.08	195	\$29.25	\$7.00	\$21.00	0.02	62.4	\$9.36	2.24
211.11	Boy's Restroom	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.10	257.4	\$38.61	3	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.08	195	\$29.25	\$7.00	\$21.00	0.02	62.4	\$9.36	2.24
769	East Gym	3000	30	1	400w MH, Hi-Bay	465	13.95	41,850.0	\$6,277.50	30	6	2x4 54w T5HO 6 Lamp w/Prismatic Lens	354	10.62	31860	\$4,779.00	\$240.00	\$7,200.00	3.33	9990	\$1,498.50	4.80
612	Gym Storage	800	3	1	Pendant Mnt., 100w A19 Lamp	100	0.30	240.0	\$36.00	3	1	(1) 26w CFL Lamp	26	0.08	62.4	\$9.36	\$20.00	\$60.00	0.22	177.6	\$26.64	2.25

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General & Re-Lamping

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback		
232.11	Dance Gym	2800	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	1.29	3,612.0	\$541.80	15	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Weight Room	3000	14	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.46	1,386.0	\$207.90	14	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.35	1050	\$157.50	\$7.00	\$98.00	0.11	336	\$50.40	1.94		
Totals			2,387	371				430,817	\$64,622	2,387	377			114.4	310,877	\$46,632		\$57,653	36.9	99,402	\$14,910	3.87		

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.
2. Lamp totals only include T-12 tube replacement calculations

CEG Job #: 9C11001

Project: Cherry Hill High School East
Address:

Cherry Hill High School East

KWH COST: \$0.150

Building SF:

#REF!

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS					Yearly Simple				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Payback
221.11	Classroom 302	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Classroom 304	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 306	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 308	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Classroom 310	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 312	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	50	0.08	20%	208	\$31.20	\$150.00	\$150.00	0.02	52	\$7.80	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 314	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	0	no change	50	0.30	0%	780	\$117.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 318	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Classroom 317	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	0	no change	50	0.30	0%	780	\$117.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS				SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 313	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Classroom 311	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.12	20%	312	\$46.80	\$300.00	\$300.00	0.03	78	\$11.70	9.62
121.11		2600	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5			50	0.20	20%	520	\$78.00			0.05	130	\$19.50	
222.21	Corridor - 3rd Floor	2600	24	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.2	3120	\$468.00	24	0	no change	50	1.20	0%	3120	\$468.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
601		3000	3	2	(2) 7w CFL Exit Sign	LED Exit Sign	2	0.006	18	\$2.70	3	0	no change	2	0.01	0%	18	\$2.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Faculty Lounge	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Boy's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Custodian Closet	800	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	40	\$6.00	1	0	no change	50	0.05	0%	40	\$6.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 307	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Classroom 303	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Classroom 301	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	8.55
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
222.21	Corridor - 2nd Floor	3000	64	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	3.2	9600	\$1,440.00	64	0	no change	50	3.20	0%	9600	\$1,440.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
601		3000	8	2	(2) 7w CFL Exit Sign	LED Exit Sign	2	0.016	48	\$7.20	8	0	no change	2	0.02	0%	48	\$7.20	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 201	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS					Yearly Simple				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 202	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 203	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 204	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.4	1040	\$156.00	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.32	20%	832	\$124.80	\$300.00	\$300.00	0.08	208	\$31.20	9.62
221.11	Classroom 205	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 206	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 208	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Classroom 209	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	12.82
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 207	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	12.82
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 210	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.21	Boy's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.21	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
612	Custodian Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	(1) 26w CFL Lamp	26	0.026	20.8	\$3.12	1	0	no change	26	0.03	0%	20.8	\$3.12	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Room 211	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Teacher's Lounge	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2	0	no change	50	0.10	0%	260	\$39.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 215	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Classroom 212	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 217	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Classroom 216	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Classroom 219	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 218	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 221	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 220	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.12	20%	312	\$46.80	\$300.00	\$300.00	0.03	78	\$11.70	9.62
121.11		2600	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5			50	0.20	20%	520	\$78.00			0.05	130	\$19.50	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofit Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 223	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 225	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Classroom 222	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3	0	no change	50	0.15	0%	390	\$58.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	0	no change	50	0.20	0%	520	\$78.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
5	Faculty Restroom	2600	1	1	34w Circuline Fluor.	2 Lamp, 9w PL; new fixture	19	0.019	49.4	\$7.41	1	0	no change	19	0.02	0%	49.4	\$7.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 239	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 241	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11	Room 243	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50			0.00	0	\$0.00	
221.11	Classroom 245	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 247	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.4	1040	\$156.00	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.32	20%	832	\$124.80	\$300.00	\$300.00	0.08	208	\$31.20	9.62
221.11	Classroom 248	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS															SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
221.11	Classroom 246	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62	
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90		
221.11	Classroom 244	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62	
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70		
221.11	Classroom 242	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80		
221.11	Classroom 240	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62	
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70		
221.11	Classroom 238	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62	
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70		
221.11	Classroom 236	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80		
221.11	Classroom 232	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66	
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
221.11	Classroom 231	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66	
221.11	Classroom 233	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66	
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
221.11	Classroom 235	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80		

ECM #2: Lighting Controls

EXISTING LIGHTING												PROPOSED LIGHTING CONTROLS										SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofit Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback			
221.11	Classroom 144	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80				
221.11	Classroom 146	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80				
221.11	Classroom 148	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62			
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90				
221.11	Classroom 150	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80				
221.11	Classroom 149	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80				
221.11	Classroom 147	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$300.00	\$300.00	0.04	104	\$15.60	9.62			
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4			50	0.16	20%	416	\$62.40			0.04	104	\$15.60				
221.11	Classroom 143	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80				
221.11	Faculty Lounge	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62			
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90				
5		2600	1	1	34w Circuline Fluor.	2 Lamp, 9w PL; new fixture	19	0.019	49.4	\$7.41	1	0	no change	19	0.02	0%	49.4	\$7.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
221.21	Girl's Restroom	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	0	no change	50	0.25	0%	650	\$97.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
221.21	Boy's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	0	no change	50	0.20	0%	520	\$78.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
221.11	Classroom 140	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor -	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62			

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
121.11	Classroom 139	2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2	1	Remote Mnt	50	0.08	20%	208	\$31.20	\$300.00	\$300.00	0.02	52	\$7.80	9.62
221.11		2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60			0.06	156	\$23.40	
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 138	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.4	1040	\$156.00	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.32	20%	832	\$124.80	\$300.00	\$300.00	0.08	208	\$31.20	9.62
221.11	Classroom 137	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
222.11	Classroom 135	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	50	0.16	20%	416	\$62.40	\$150.00	\$150.00	0.04	104	\$15.60	9.62
221.11	Classroom 134	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 133	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 132	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	9.62
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1			50	0.04	20%	104	\$15.60			0.01	26	\$3.90	
221.11	Classroom 131	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
211.11	Library	2600	62	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	1.55	4030	\$604.50	62	3	Dual Technology Occupancy Sensor - Remote Mnt.	25	1.24	20%	3224	\$483.60	\$300.00	\$900.00	0.31	806	\$120.90	7.44
211.11	Library AV	2600	26	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.65	1690	\$253.50	26	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.52	20%	1352	\$202.80	\$300.00	\$300.00	0.13	338	\$50.70	5.92
211.11	Library Office	2600	10	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.25	650	\$97.50	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	10.99
111.11		2600	4	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.1	260	\$39.00	4			25	0.08	20%	208	\$31.20			0.02	52	\$7.80	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
211.11	Library Balcony	2600	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.8	2080	\$312.00	32	0	no change	25	0.80	0%	2080	\$312.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
111.11		2600	6	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$58.50	6	0	no change	25	0.15	0%	390	\$58.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 110	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Classroom 114	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Prep Room	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	10.99
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 121	2600	42	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.1	5460	\$819.00	42	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.68	20%	4368	\$655.20	\$300.00	\$600.00	0.42	1092	\$163.80	3.66
221.11	Classroom 119	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 117	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40	\$30.00	\$300.00	0.04	104	\$15.60	9.62
121.11		2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.16	20%	416	\$62.40			0.04	104	\$15.60	
221.11	Classroom 115	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 113	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.08	20%	208	\$31.20	\$300.00	\$300.00	0.02	52	\$7.80	9.62
121.11		2600	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6		Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60			0.06	156	\$23.40	
221.21	Boy's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	0	no change	50	0.20	0%	520	\$78.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.21	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	0	no change	50	0.20	0%	520	\$78.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
612	Custodian Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	(1) 26w CFL Lamp	26	0.026	20.8	\$3.12	1	0	no change	26	0.03	0%	20.8	\$3.12	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 108	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	\$97.50	5	1	Dual Technology Occupancy Sensor -	50	0.20	20%	520	\$78.00	\$300.00	\$300.00	0.05	130	\$19.50	9.62

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofit Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
121.11	Classroom 106	2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3		Remote Mnt	50	0.12	20%	312	\$46.80			0.03	78	\$11.70	
221.11		2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.21	Faculty Restroom	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	0	no change	50	0.30	0%	780	\$117.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Mail Room	3000	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	450	\$67.50	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	50	0.12	20%	360	\$54.00	\$150.00	\$150.00	0.03	90	\$13.50	8.33
121.11		3000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	150	\$22.50	1			50	0.04	20%	120	\$18.00			0.01	30	\$4.50	
221.11	Bus Department	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$19.50	1	0	no change	50	0.05	0%	130	\$19.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 102	2600	10	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.5	1300	\$195.00	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.40	20%	1040	\$156.00	\$300.00	\$300.00	0.10	260	\$39.00	4.81
121.11		2600	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6			50	0.24	20%	624	\$93.60			0.06	156	\$23.40	
221.11	Classroom 105	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 103	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	9.62
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
221.11	Classroom 101	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	\$136.50	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.28	20%	728	\$109.20	\$300.00	\$300.00	0.07	182	\$27.30	8.55
121.11		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.1	260	\$39.00	2			50	0.08	20%	208	\$31.20			0.02	52	\$7.80	
211.11	Nurse	2600	13	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.325	845	\$126.75	13	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.26	20%	676	\$101.40	\$300.00	\$300.00	0.07	169	\$25.35	9.62
111.11		2600	3	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.075	195	\$29.25	3			25	0.06	20%	156	\$23.40			0.02	39	\$5.85	
211.11	Attendance Office	3000	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.8	2400	\$360.00	32	0	no change	25	0.80	0%	2400	\$360.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS								SAVINGS		SAVINGS	
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback		
211.11	Office 006	3000	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	450	\$67.50	6	0	no change	25	0.15	0%	450	\$67.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Guidance Office 004	3000	16	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.4	1200	\$180.00	16	0	no change	25	0.40	0%	1200	\$180.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Kitchen	2600	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$58.50	6	0	no change	25	0.15	0%	390	\$58.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Side Office (16)	2600	32	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.8	2080	\$312.00	32	0	no change	25	0.80	0%	2080	\$312.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Room 01	2600	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.3	780	\$117.00	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	12.82		
211.11	Security	3000	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.3	900	\$135.00	12	0	no change	25	0.30	0%	900	\$135.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Principal's Office & Conference Room	3000	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.375	1125	\$168.75	15	2	Dual Technology Occupancy Sensor - Switch Mnt.	25	0.30	20%	900	\$135.00	\$150.00	\$300.00	0.08	225	\$33.75	6.28		
613		3000	3	1	Table Lamp, (2) 100w A Lamp	(2) 26w CFL Lamp	52	0.156	468	\$70.20	3			52	0.12	20%	374.4	\$56.16			0.03	93.6	\$14.04			
211.11	Side Office	3000	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.1	300	\$45.00	4	0	no change	25	0.10	0%	300	\$45.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
211.11	Main Office	3000	30	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.75	2250	\$337.50	30	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.60	20%	1800	\$270.00	\$300.00	\$600.00	0.15	450	\$67.50	8.89		
211.11	Main Office Side Offices (14)	3000	30	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.75	2250	\$337.50	30	0	no change	25	0.75	0%	2250	\$337.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
111.11		3000	8	1	1x4, 1-Lamp, 34w T12, Elec. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.2	600	\$90.00	8	0	no change	25	0.20	0%	600	\$90.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
221.11	Lecture Hall 1	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.60	20%	1560	\$234.00	\$300.00	\$300.00	0.15	390	\$58.50	4.27		
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70			
221.11	Lecture Hall 2	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.60	20%	1560	\$234.00	\$300.00	\$300.00	0.15	390	\$58.50	4.27		
121.11		2600	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	\$58.50	3			50	0.12	20%	312	\$46.80			0.03	78	\$11.70			
558	Auditorium	2600	16	1	Recessed Down Light, 100w R30 Lamp	Energy Star Rated, Dimmable 26w CFL Lamp	26	0.416	1081.6	\$162.24	16	0	no change	26	0.42	0%	1081.6	\$162.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
142.21	DO 44	2600	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.432	1123.2	\$168.48	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	72	0.35	20%	898.56	\$134.78	\$300.00	\$300.00	0.09	224.64	\$33.70	8.90		
142.21	DO 48	2600	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.432	1123.2	\$168.48	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	72	0.35	20%	898.56	\$134.78	\$300.00	\$300.00	0.09	224.64	\$33.70	8.90		

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS														SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
211.11	Props	800	7	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.175	140	\$21.00	7	0	no change	25	0.18	0%	140	\$21.00			0.00	0	\$0.00	0.00
211.11	DO 55	2600	22	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.55	1430	\$214.50	22	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.44	20%	1144	\$171.60	\$300.00	\$600.00	0.11	286	\$42.90	13.99
211.11	DO 41	2600	22	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.55	1430	\$214.50	22	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.44	20%	1144	\$171.60	\$300.00	\$600.00	0.11	286	\$42.90	13.99
211.11	Choir & Music	2600	12	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.3	780	\$117.00	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.24	20%	624	\$93.60	\$300.00	\$300.00	0.06	156	\$23.40	12.82
211.11	Offices (6)	2600	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.1	260	\$39.00	4	0	no change	25	0.10	0%	260	\$39.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
142.21	Little Theater	2600	9	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	72	0.648	1684.8	\$252.72	9	0	no change	72	0.65	0%	1684.8	\$252.72	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.21	Girl's Restroom	2600	9	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.45	1170	\$175.50	9	0	no change	50	0.45	0%	1170	\$175.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.21	Boy's Restroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	\$292.50	15	0	no change	50	0.75	0%	1950	\$292.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.11	Classroom 031	2600	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.375	975	\$146.25	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.30	20%	780	\$117.00	\$300.00	\$300.00	0.08	195	\$29.25	10.26
211.11	Classroom 033	2600	15	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.375	975	\$146.25	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.30	20%	780	\$117.00	\$300.00	\$300.00	0.08	195	\$29.25	10.26
769	Dibart Gym	3200	25	1	400w MH, Hi-Bay	2x4 54w T5HO 6 Lamp w/Prismatic Lens	354	8.85	28320	\$4,248.00	25	3	Dual Technology Occupancy Sensor - Remote Mnt.	354	7.08	20%	22656	\$3,398.40	\$300.00	\$900.00	1.77	5664	\$849.60	1.06
601		3200	8	2	(2) 7w CFL Exit Sign	LED Exit Sign	2	0.016	51.2	\$7.68	8	0	no change	2	0.02	0%	51.2	\$7.68	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.11	Mech. Room	800	2	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.05	40	\$6.00	2	0	no change	25	0.05	0%	40	\$6.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
769	Aux. Gym	3000	17	1	400w MH, Hi-Bay	2x4 54w T5HO 6 Lamp w/Prismatic Lens	354	6.018	18054	\$2,708.10	17	2	Dual Technology Occupancy Sensor - Remote Mnt.	354	4.81	20%	14443.2	\$2,166.48	\$300.00	\$600.00	1.20	3610.8	\$541.62	1.04
242.11		3000	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.392	1176	\$176.40	4			98	0.31	20%	940.8	\$141.12			0.08	235.2	\$35.28	
242.11	Wrestling Room	3000	10	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.98	2940	\$441.00	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	98	0.78	20%	2352	\$352.80	\$300.00	\$300.00	0.20	588	\$88.20	3.40
601		2600	2	2	(2) 7w CFL Exit Sign	LED Exit Sign	2	0.004	10.4	\$1.56	2	0	no change	2	0.00	0%	10.4	\$1.56	\$0.00	\$0.00	0.00	0	\$0.00	0.00
222.21	Trainer's Room	2600	14	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.7	1820	\$273.00	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.56	20%	1456	\$218.40	\$300.00	\$300.00	0.14	364	\$54.60	5.49
211.11	Girl's Locker Room	2600	38	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.95	2470	\$370.50	38	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.76	20%	1976	\$296.40	\$300.00	\$600.00	0.19	494	\$74.10	8.10

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
211.11	Football Locker Room	2600	24	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.6	1560	\$234.00	24	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.48	20%	1248	\$187.20	\$300.00	\$300.00	0.12	312	\$46.80	6.41
211.11	Boy's Locker Room	2600	34	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.85	2210	\$331.50	34	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.68	20%	1768	\$265.20	\$300.00	\$600.00	0.17	442	\$66.30	9.05
612	Mech. Room	800	4	1	Pendant Mnt., 100w A19 Lamp	(1) 26w CFL Lamp	26	0.104	83.2	\$12.48	4	0	no change	26	0.10	0%	83.2	\$12.48	\$0.00	\$0.00	0.00	0	\$0.00	0.00
222.11	Office 22	2600	6	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	50	0.24	20%	624	\$93.60	\$150.00	\$150.00	0.06	156	\$23.40	6.41
232.21	Cafeteria 1	2600	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	3.888	10108.8	\$1,516.32	54	3	Dual Technology Occupancy Sensor - Remote Mnt.	72	3.11	20%	8087.04	\$1,213.06	\$300.00	\$900.00	0.78	2021.76	\$303.26	2.97
232.21	Cafeteria 2	2600	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	3.888	10108.8	\$1,516.32	54	3	Dual Technology Occupancy Sensor - Remote Mnt.	72	3.11	20%	8087.04	\$1,213.06	\$300.00	\$900.00	0.78	2021.76	\$303.26	2.97
211.11	Kitchen	2600	28	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.7	1820	\$273.00	28	0	no change	25	0.70	0%	1820	\$273.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
617	Hood	2600	16	1	Hood Light w/Globe & Cage, 100w A Lamp	26w CFL Lamp	26	0.416	1081.6	\$162.24	16	0	no change	26	0.42	0%	1081.6	\$162.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00
232.21	Faculty Dining Room	2600	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	1.152	2995.2	\$449.28	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	72	0.92	20%	2396.16	\$359.42	\$300.00	\$300.00	0.23	599.04	\$89.86	3.34
211.11	Maintenance	2600	38	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.95	2470	\$370.50	38	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.76	20%	1976	\$296.40	\$300.00	\$600.00	0.19	494	\$74.10	8.10
221.21	Girl's Restroom	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.2	520	\$78.00	4	0	no change	50	0.20	0%	520	\$78.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 068	2600	44	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.2	5720	\$858.00	44	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.76	20%	4576	\$686.40	\$300.00	\$600.00	0.44	1144	\$171.60	3.50
221.11	Classroom 064	2600	44	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.2	5720	\$858.00	44	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.76	20%	4576	\$686.40	\$300.00	\$600.00	0.44	1144	\$171.60	3.50
221.11	Prep Room	2600	6	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.3	780	\$117.00	6	0	no change	50	0.30	0%	780	\$117.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
221.11	Classroom 070	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.32	20%	3432	\$514.80	\$300.00	\$600.00	0.33	858	\$128.70	4.66
221.11	Classroom 072	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.05	2730	\$409.50	21	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.84	20%	2184	\$327.60	\$300.00	\$300.00	0.21	546	\$81.90	3.66
221.11	Classroom 074	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.32	20%	3432	\$514.80	\$300.00	\$600.00	0.33	858	\$128.70	4.66
221.11	Classroom 076	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.05	2730	\$409.50	21	1	Dual Technology Occupancy Sensor - Remote Mnt.	50	0.84	20%	2184	\$327.60	\$300.00	\$300.00	0.21	546	\$81.90	3.66
221.11	Classroom 078	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.32	20%	3432	\$514.80	\$300.00	\$600.00	0.33	858	\$128.70	4.66

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Existing Fixture For Reference Only	Retrofitted Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	Classroom 077	2600	27	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.35	3510	\$526.50	27	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.08	20%	2808	\$421.20	\$300.00	\$600.00	0.27	702	\$105.30	5.70
221.11	Classroom 083	2600	30	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.5	3900	\$585.00	30	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.20	20%	3120	\$468.00	\$300.00	\$600.00	0.30	780	\$117.00	5.13
221.11	Classroom 085	2600	29	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.45	3770	\$565.50	29	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.16	20%	3016	\$452.40	\$300.00	\$600.00	0.29	754	\$113.10	5.31
221.11	Classroom 087	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.65	4290	\$643.50	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	50	1.32	20%	3432	\$514.80	\$300.00	\$600.00	0.33	858	\$128.70	4.66
211.11	Classroom 089	2600	33	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.825	2145	\$321.75	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.66	20%	1716	\$257.40	\$300.00	\$600.00	0.17	429	\$64.35	9.32
211.11	Classroom 091	2600	33	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.825	2145	\$321.75	33	2	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.66	20%	1716	\$257.40	\$300.00	\$600.00	0.17	429	\$64.35	9.32
211.31	Classroom 092	2600	49	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	No Change	30	1.47	3822	\$573.30	49	2	Dual Technology Occupancy Sensor - Remote Mnt.	30	1.18	20%	3057.6	\$458.64	\$300.00	\$600.00	0.29	764.4	\$114.66	5.23
211.31	Classroom 088	2600	48	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	No Change	30	1.44	3744	\$561.60	48	2	Dual Technology Occupancy Sensor - Remote Mnt.	30	1.15	20%	2995.2	\$449.28	\$300.00	\$600.00	0.29	748.8	\$112.32	5.34
211.31	Classroom 086	2600	60	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	No Change	30	1.8	4680	\$702.00	60	3	Dual Technology Occupancy Sensor - Remote Mnt.	30	1.44	20%	3744	\$561.60	\$300.00	\$900.00	0.36	936	\$140.40	6.41
211.31	Classroom 082	2600	60	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	No Change	30	1.8	4680	\$702.00	60	3	Dual Technology Occupancy Sensor - Remote Mnt.	30	1.44	20%	3744	\$561.60	\$300.00	\$900.00	0.36	936	\$140.40	6.41
211.11	Girl's Restroom	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.075	195	\$29.25	3	0	no change	25	0.08	0%	195	\$29.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00
211.11	Boy's Restroom	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.075	195	\$29.25	3	0	no change	25	0.08	0%	195	\$29.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00
769	East Gym	3000	30	1	400w MH, Hi-Bay	2x4 54w TSHO 6 Lamp w/Prismatic Lens	354	10.62	31860	\$4,779.00	30	3	Dual Technology Occupancy Sensor - Remote Mnt.	354	8.50	20%	25488	\$3,823.20	\$300.00	\$900.00	2.12	6372	\$955.80	0.94
612	Gym Storage	800	3	1	Pendant Mnt., 100w A19 Lamp	(1) 26w CFL Lamp	26	0.078	62.4	\$9.36	3	0	no change	26	0.08	0%	62.4	\$9.36	\$0.00	\$0.00	0.00	0	\$0.00	0.00
232.11	Dance Gym	2800	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	No Change	86	1.29	3612	\$541.80	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.03	20%	2889.6	\$433.44	\$300.00	\$300.00	0.26	722.4	\$108.36	2.77
211.11	Weight Room	3000	14	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.35	1050	\$157.50	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	25	0.28	20%	840	\$126.00	\$300.00	\$300.00	0.07	210	\$31.50	9.52
	Totals		2,387	371				143.9	389111.8	58366.8	2833.0	175.0			118.7		320,821.8	\$48,123.26		\$51,600	25.23	68,290	\$10,244	5.04

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
Cherry Hill East High School	38,280	SHARP NU-U235F2	1560	17.5	27,363	366.60	447,859	296.9	65,364	13.40




Notes:

[Blue Box] := Proposed PV Layout

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


PVWatts Program Data Output - Flat Roof Panels



AC Energy

&

Cost Savings



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

Station Identification		Results			
City:	Atlantic_City	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	New_Jersey				
Latitude:	39.45° N				
Longitude:	74.57° W				
Elevation:	20 m				
PV System Specifications		1	2.58	23813	35.72
DC Rating:	366.6 kW	2	3.33	28120	42.18
DC to AC Derate Factor:	0.810	3	4.31	39272	58.91
AC Rating:	296.9 kW	4	5.20	44733	67.10
Array Type:	Fixed Tilt	5	5.85	51090	76.64
Array Tilt:	10.0°	6	6.14	49728	74.59
Array Azimuth:	180.0°	7	6.06	50235	75.35
Energy Specifications		8	5.54	46165	69.25
Cost of Electricity:	0.2 ¢/kWh	9	4.85	39694	59.54
		10	3.76	32412	48.62
		11	2.65	22710	34.07
		12	2.23	19887	29.83
		Year	4.38	447859	671.79

Project Name: LGEA Solar PV Project - 9C11001										
Location: Cherry Hill East High School										
Description: Photovoltaic System 100% Financing - 15 year										
Simple Payback Analysis										
		Photovoltaic System 100% Financing - 15 year								
Total Construction Cost		\$2,161,781								
Annual kWh Production		447,859								
Annual Energy Cost Reduction		\$67,179								
Average Annual SREC Revenue		\$172,697								
Simple Payback:		9.01						Years		
Life Cycle Cost Analysis										
Analysis Period (years):		15						Financing %:		100%
Discount Rate:		3%						Maintenance Escalation Rate:		3.0%
Average Energy Cost (\$/kWh)		\$0.150						Energy Cost Escalation Rate:		3.0%
Financing Rate:		6.00%						Average SREC Value (\$/kWh)		\$0.386
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	447,859	\$67,179	\$0	\$246,322	\$127,212	\$91,696	\$94,593	\$94,593	
2	\$0	445,620	\$69,194	\$0	\$245,091	\$121,557	\$97,351	\$95,377	\$189,970	
3	\$0	443,392	\$71,270	\$0	\$221,696	\$115,552	\$103,356	\$74,058	\$264,028	
4	\$0	441,175	\$73,408	\$0	\$198,529	\$109,178	\$109,730	\$53,029	\$317,057	
5	\$0	438,969	\$75,610	\$4,521	\$197,536	\$102,410	\$116,498	\$49,717	\$366,774	
6	\$0	436,774	\$77,879	\$4,499	\$196,548	\$95,224	\$123,684	\$51,020	\$417,794	
7	\$0	434,590	\$80,215	\$4,476	\$173,836	\$87,596	\$131,312	\$30,667	\$448,461	
8	\$0	432,417	\$82,622	\$4,454	\$172,967	\$79,497	\$139,411	\$32,226	\$480,687	
9	\$0	430,255	\$85,100	\$4,432	\$150,589	\$70,898	\$148,010	\$12,350	\$493,037	
10	\$0	428,104	\$87,653	\$4,409	\$149,836	\$61,769	\$157,139	\$14,172	\$507,209	
11	\$0	425,963	\$90,283	\$4,387	\$127,789	\$52,077	\$166,831	(\$5,224)	\$501,985	
12	\$0	423,833	\$92,991	\$4,365	\$127,150	\$41,788	\$177,120	(\$3,132)	\$498,853	
13	\$0	421,714	\$95,781	\$4,344	\$105,429	\$30,863	\$188,045	(\$22,042)	\$476,811	
14	\$0	419,606	\$98,654	\$4,322	\$104,901	\$19,265	\$199,643	(\$19,674)	\$457,137	
15	\$0	417,508	\$101,614	\$4,300	\$83,502	\$6,952	\$211,956	(\$38,093)	\$419,044	
Totals:		6,487,778	\$1,249,454	\$48,510	\$2,501,721	\$1,121,839	\$2,161,781	\$419,044	\$5,933,440	
Net Present Value (NPV)							\$371,578			