



## **ENERGY AUDIT – DRAFT REPORT**

### **WATCHUNG HILLS REGIONAL HIGH SCHOOL**

**108 STERLING ROAD**

**WARREN, NEW JERSEY 07059**

**ATTN: TIMOTHY M. STYS, CPA**

**BUSINESS ADMINISTRATOR**

**CEG PROJECT No. 9C09046**

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## I. EXECUTIVE SUMMARY

This report presents the findings of an energy audit conducted for:

Watchung Hills Regional High School  
108 Sterling Road  
Warren, NJ 07059

Contact Person: Timothy M. Stys, CPA  
Business Administrator, Board Secretary

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	\$709,271
Natural Gas	\$345,093
<u>Total</u>	<u>\$1,054,364</u>

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of several of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is  $\pm 20\%$ . The evaluations are based on engineering estimations and industry standard calculations methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

**Table 1  
Financial Summary Table**

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>					
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>NET INSTALLATION COST<sup>A</sup></b>	<b>ANNUAL SAVINGS<sup>B</sup></b>	<b>SIMPLE PAYBACK (Yrs)</b>	<b>SIMPLE LIFETIME ROI</b>
ECM #1	Lighting Upgrades-HID Replacement	\$31,050	\$11,114	2.8	336.9%
ECM #2	Lighting Upgrades-Incandescent Replacement	\$4,497	\$4,405	1.0	1369.3%
ECM #3	HVU Motor Replacement	\$4,595	\$1,190	3.9	366.2%
ECM #4	Steam Trap Replacement	\$23,000	\$103,982	0.2	8941.9%
ECM #5	Replace Exhaust Fans	\$123,000	\$42,942	2.9	423.7%
ECM #6	Replace Heating Water Pumps	\$13,800	\$800	17.3	15.9%
ECM #7	Pump Motor Replacement	\$3,000	\$800	3.8	300.0%
ECM #8	Water Heater Replacement	\$11,000	\$101	108.9	-86.2%
ECM #9	Replace Multizone Units	\$1,077,664	\$65,457	16.5	-8.9%
ECM #10	Rooftop Air Conditioner Replacement	\$8,625	\$373	23.1	-35.1%
<b>RENEWABLE ENERGY MEASURES (REM's)</b>					
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>COST<sup>A</sup></b>	<b>ANNUAL SAVINGS<sup>B</sup></b>	<b>SIMPLE PAYBACK (Yrs)</b>	<b>SIMPLE LIFETIME ROI</b>
REM #1	Solar Panel Installation	\$8,954,820	\$170,720	52.5	-52.3%

**Notes:** A. Cost takes into consideration applicable NJ Smart Start<sup>TM</sup> incentives.  
 B. Savings takes into consideration applicable maintenance savings.

The estimated demand and energy savings for each ECM and REM are shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's in Table 1.

**Table 2  
Estimated Energy Savings Summary Table**

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>ANNUAL UTILITY REDUCTION</b>		
		<b>ELECTRIC DEMAND (KW)</b>	<b>ELECTRIC CONSUMPTION (KWH)</b>	<b>NATURAL GAS (THERMS)</b>
ECM #1	Lighting Upgrades-HID Replacement	15.6	54,810.0	-
ECM #2	Lighting Upgrades-Incandescent Replacement	9.6	26,698.0	-
ECM #3	HVU Motor Replacement	-	7,220.0	-
ECM #4	Steam Trap Replacememnt	-	-	89,640.0
ECM #5	Replace Exhaust Fans	-	-	37,115.4
ECM #6	Replace Heating Water Pumps	-	4,846.0	-
ECM #7	Pump Motor Replacement	-	4,846.0	-
ECM #8	Water Heater Replacement	-	-	87.3
ECM #9	Replace Multizone Units	-	284,535.0	16,002.0
ECM #10	Rooftop Air Conditioner Replacement	-	2,261.7	-
<b>RENEWABLE ENERGY MEASURES (REM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>ANNUAL UTILITY REDUCTION</b>		
		<b>ELECTRIC DEMAND (KW)</b>	<b>ELECTRIC CONSUMPTION (KWH)</b>	<b>NATURAL GAS (THERMS)</b>
REM #1	Solar Panel Installation	-	1,034,666.0	-

Recommendation:

Concord Engineering Group strongly recommends the implementation of all ECM's that provide a calculated simple payback at or under seven (7) years. The potential energy and cost savings from these ECM's are too great to pass upon. The following Energy Conservation Measures are recommended for the high school:

- **ECM #1:** Lighting Upgrades – HID Replacement
- **ECM #2:** Lighting Upgrades – Incandescent Replacement
- **ECM #3:** Heating & Ventilating Unit Motor Replacement
- **ECM #4:** Steam Trap Replacement
- **ECM #5:** Exhaust Fan Replacement
- **ECM #6:** Replace Heating Water Pumps
- **ECM #9:** Replace Multizone Units

Although the energy savings does not exceed the cost of replacement over the life of the units, it is expected that the Heating Water Pumps and Rooftop Multizone Units will need replacement in the near future as the units are nearing or have reached the end of their expected life. CEG recommends the Board of Education consider replacing these units at an opportune time.

In addition to the ECMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

- A. Chemically clean 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. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.
- D. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

- E. Recalibrate existing temperature sensors within the facility.
- F. Clean all light fixtures to maximize light output.
- G. Confirm that outside air economizers are functioning properly to take advantage of free
- H. Balance air and water systems to specified flows.
- I. Verify major heating and cooling equipment have accurate control schedules and temperature settings for Occupied/Unoccupied modes of operation.
- J. Repair or replace piping insulation on steam and condensate return piping in the crawl space of the South Building.
- K. Verify all steam traps are operating properly. Replace as necessary.
- L. Verify variable frequency drives on West Wing Hot Water Pumps are calibrated and operating properly.

All in all, incentives provide financial motivation and much needed support for the implementation of energy conservation measures. Along with the NJ Smart Start program, the Pay for Performance Program incentives, sponsored by NJ Clean Energy Program, are applicable for this facility. The existing average operating demand above 200 KW and high energy consumption qualifies for the Pay for Performance Program. The incentive based on a 15% electrical energy reduction for this facility would qualify for an additional \$70,732 in the Pay for Performance Program. If natural gas consumption could be reduced by 15% the resultant incentive would be approximately \$31,306. This would equate to a total incentive equal to approximately \$102,038. This option is one to consider for a whole-building approach to energy reduction. The Pay for Performance Program represents a significant commitment to energy reduction of a facility. This option should be reviewed in more detail with a Pay for Performance Program partner.

## II. INTRODUCTION

This comprehensive energy audit covers the 400,000 square foot High School, originally constructed in 1957, including the numerous additions and renovations which have brought it to its present configuration. The most recent addition was completed approximately in 2005.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculating energy benchmarks for comparison to industry averages, estimating savings potential, and monitoring baseline usage/cost effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see Table 3 and Table 4).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft<sup>2</sup>/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance and therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

### III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$\text{Simple Payback} = \left( \frac{\text{Net Cost}}{\text{Yearly Savings}} \right)$$

$$\text{Simple Lifetime Savings} = (\text{Yearly Savings} \times \text{ECM Lifetime})$$

$$\text{Simple Lifetime ROI} = \frac{(\text{Simple Lifetime Savings} - \text{Net Cost})}{\text{Net Cost}}$$

$$\text{Lifetime Maintenance Savings} = (\text{Yearly Maintenance Savings} \times \text{ECM Lifetime})$$

$$\text{Internal Rate of Return} = \sum_{n=0}^N \left( \frac{\text{Cash Flow of Period}}{(1 + \text{IRR})^n} \right)$$

$$\text{Net Present Value} = \sum_{n=0}^N \left( \frac{\text{Cash Flow of Period}}{(1 + \text{DR})^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

## IV. HISTORIC ENERGY CONSUMPTION/COST

### A. Energy Usage / Tariffs

#### Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from June-08 to May-09. Jersey Central Power and Light (JCP&L) company provides electricity to the facility under the General Service Secondary Time of Day 3 Phase rate. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is calculated by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000 Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. There is also a component of the electric billing rate for electrical demand which is measured in kilowatts (KW). This component represents a charge for the maximum instantaneous electrical usage that occurred during the billing period.

It should be noted that as of March 2009, JCP&L was notified that the High School elected to use South Jersey Energy as their new electric generation supplier based on the New Jersey Energy Choice program. The High School receives a single, monthly electric bill from JCP&L which incorporates energy generation and transmission charges from South Jersey Industries. The basic usage charges in the bill are shown as generation service and delivery charges along with several non-utility generation charges. Billing rates used in this report reflect the most current rate structure available.

#### Natural Gas

Table 4 and Figure 2 show the entire natural gas energy usage for the surveyed facility from June-08 to May-09. Watchung Hills Regional High School receives natural gas from Public Service Electric and Gas Company (PSE&G) through two (2) separate, independent services to the building. One service provides gas to the North Building and the other serves the South Building. For the service to the South Building only, Hess Corporation is a Third Party Supplier (TPS) that the Board of Education (BOE) has contracted with to provide the commodity side of the natural gas supply. Public Service Electric and Gas Company (PSE&G), under their basic general delivery rate, provides delivery of the natural gas supply to the facility. Both Hess and PSE&G charge a rate per therm for delivery of the natural gas via their pipelines to the burners under their applicable billing rate.

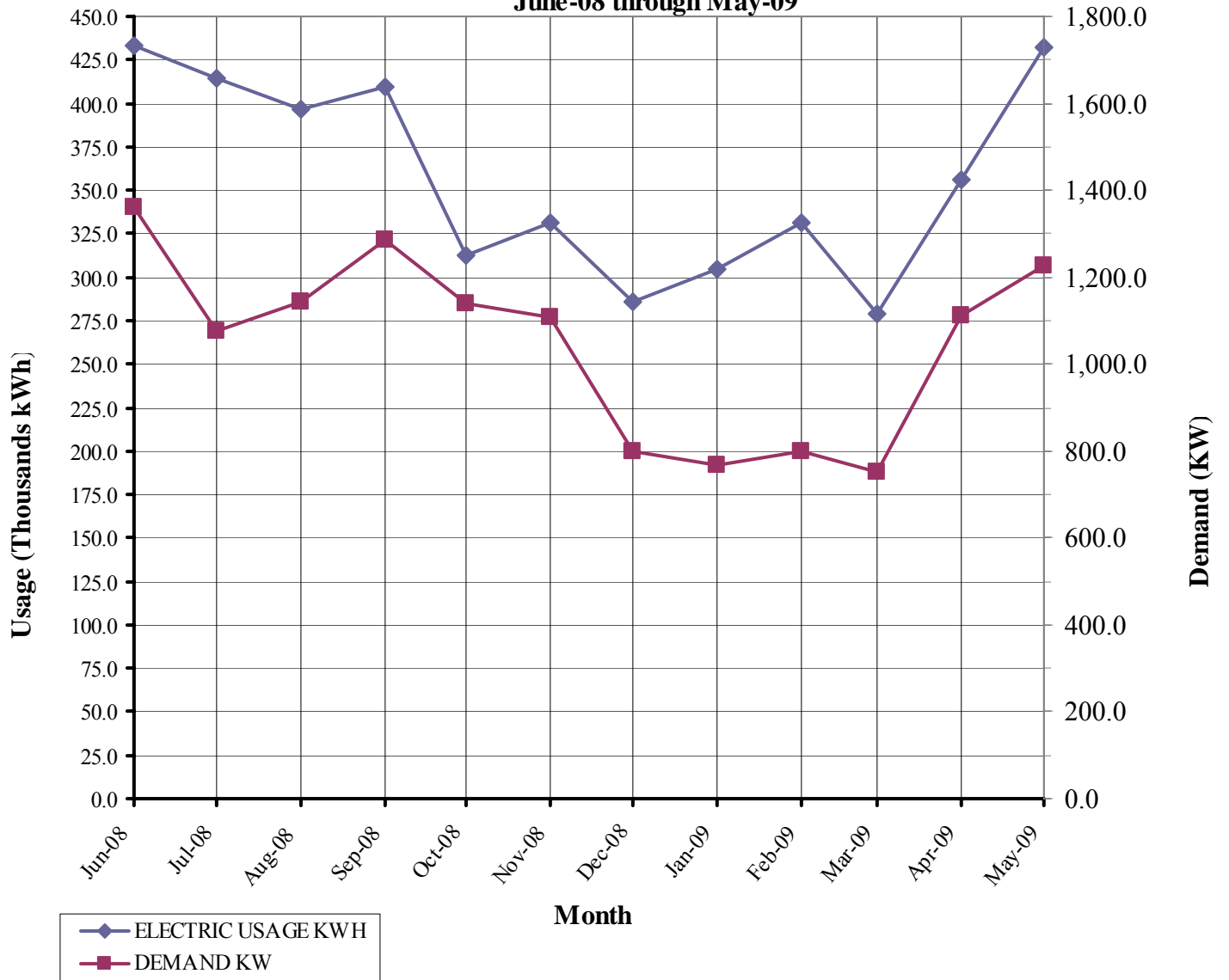
<u>Utility</u>	<u>Average Cost</u>
Electricity	16.5¢ /kWh
Natural Gas	\$1.157 /Therm

**Table 3  
Electricity Billing Data**

<b>Utility Provider:</b> JCP&L, General Service Secondary Time of Day 3 phase			
<b>Meter No.:</b> G28083523		<b>Account No.:</b> 10 00 60 7778 4 2	
<b>MONTH OF USE</b>	<b>CONSUMPTION KWH</b>	<b>DEMAND</b>	<b>TOTAL BILL</b>
Jun-08	432,800	1,359.2	\$78,659
Jul-08	414,800	1,077.6	\$74,089
Aug-08	396,800	1,142.0	\$70,597
Sep-08	409,600	1,284.0	\$65,110
Oct-08	312,400	1,141.2	\$51,002
Nov-08	331,600	1,106.0	\$53,879
Dec-08	286,000	799.6	\$46,077
Jan-09	304,400	768.0	\$49,070
Feb-09	331,600	800.4	\$52,328
Mar-09	279,200	752.0	\$44,153
Apr-09	355,600	1,113.6	\$56,248
May-09	432,000	1,226.0	\$68,059
<b>Totals</b>	<b>4,286,800</b>	<b>1,359.2 MAX</b>	<b>\$709,271</b>
<p><b>AVERAGE</b>  <b>DEMAND 1047.5 KW average</b>  <b>AVERAGE RATE \$0.165 \$/kWh</b></p>			

**Figure 1  
Electricity Usage Profile**

**Watchung Hills Regional High School  
Electric Usage Profile  
June-08 through May-09**

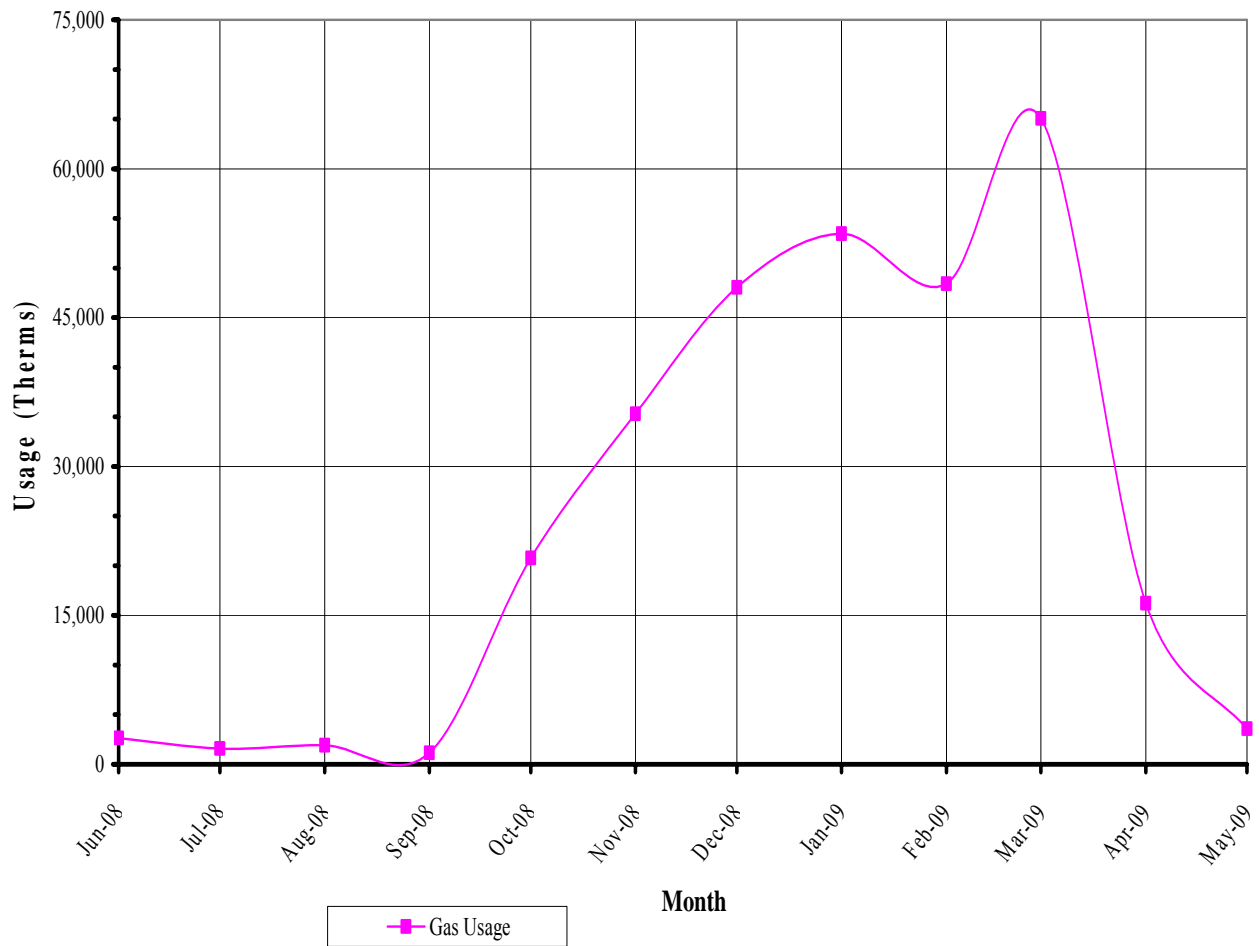


**Table 4  
Natural Gas Billing Data**

<b>Utility Provider:</b> PSE&G	<b>Rate:</b> LVG <b>Meter:</b> 3164420	<b>Rate:</b> TSGNF <b>Meter:</b> 3127742
<b>PoD ID:</b>	PG000011075509701073	PG000008374423545856
<b>Third Party Utility Provider:</b>	HESS	N/A
<b>HESS Meters:</b>	363204/362940	N/A
<b>MONTH OF USE</b>	<b>CONSUMPTION (THERMS)</b>	<b>TOTAL BILL</b>
Jun-08	2,656.45	\$2,733.92
Jul-08	1,573.64	\$3,415.38
Aug-08	1,901.14	\$1,973.03
Sep-08	1,148.14	\$2,087.69
Oct-08	20,785.05	\$27,618.75
Nov-08	35,303.62	\$42,993.79
Dec-08	48,057.97	\$58,659.25
Jan-09	53,463.39	\$63,750.33
Feb-09	48,397.22	\$51,876.24
Mar-09	65,053.86	\$67,920.63
Apr-09	16,228.06	\$16,934.82
May-09	3,590.78	\$5,129.42
<b>TOTALS</b>	298,159.32	\$345,093.25
<b>AVERAGE RATE:</b>	<b>\$1.157</b>	<b>\$/THERM</b>

**Figure 2**  
**Natural Gas Usage Profile**

Watchung Hills Regional High School  
Gas Usage Profile  
June-08 through May-09



## B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

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

The site and source EUI for this facility is calculated as follows. (See Table 5 for details):

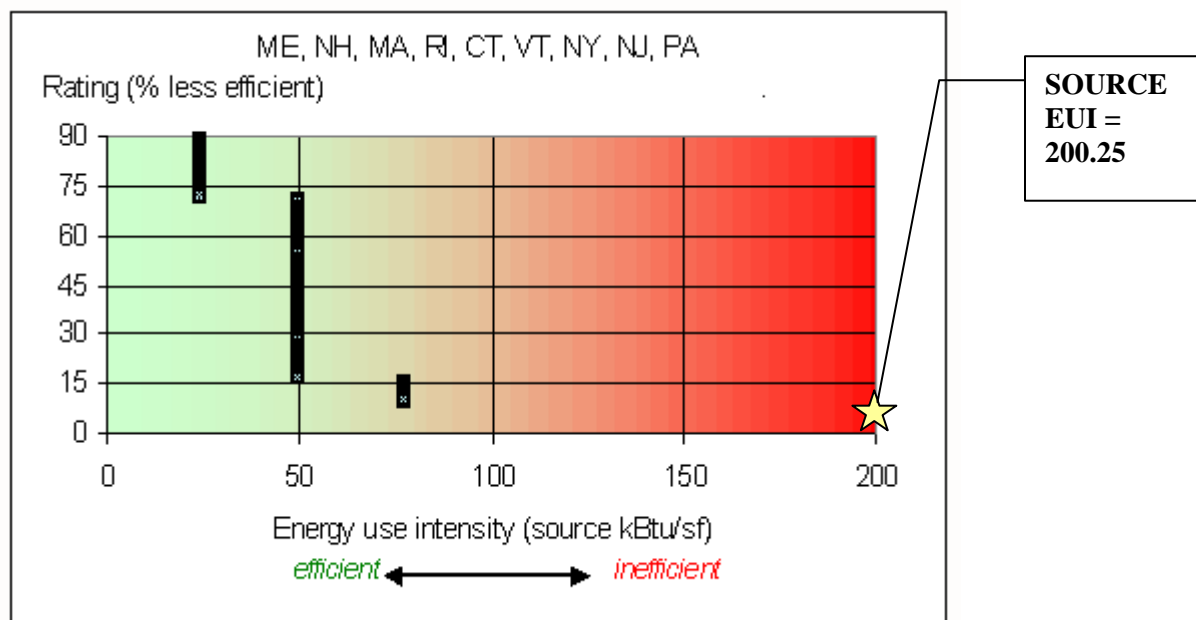
$$\text{Building Site EUI} = \frac{(\text{Electric Usage in kBtu} + \text{Gas Usage in kBtu})}{\text{Building Square Footage}}$$

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

**Table 5**  
**Facility Energy Use Index (EUI) Calculations**

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURC	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	4,286,800			14,635,135	3.340	48,881,352
NATURAL GAS		298,159.32		29,815,932	1.047	31,217,281
TOTAL				44,451,067		80,098,632
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
<b>BUILDING AREA</b>	400,000			SQUARE FEET		
<b>BUILDING SITE EUI</b>	111.13			kBtu/SF/YR		
<b>BUILDING SOURCE EUI</b>	200.25			kBtu/SF/YR		

**Figure 3**  
**Source Energy Use Intensity Distributions: High Schools**



### C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows you to track and assess energy consumption via the template forms located on the ENERGY STAR website ([www.energystar.gov](http://www.energystar.gov)). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and more emphasis is being placed throughout multiple arenas on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than \$10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorities and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Start account for the municipal in order to allow the municipal access to monitoring their yearly energy usage as it compares to facilities of similar type. This account can be used to calculate the EUI which can be used to monitor the energy performance of the building. The account can be accessed at the following address; the username and password are also listed below:

<https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login>

Username: WatchungHills (no space)

Password: lgeaceg2009

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an “Other” category. The “Other” category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Performance Rating cannot be calculated if more than 10% of a building is classified as “Other.” DPW 25 Storage Building would be classified as “Other” and therefore cannot be given an Energy Performance Rating. However, Portfolio Manager can still be used to track the buildings energy use index.

Refer to Appendix C for detailed energy benchmarking report entitled “STATEMENT OF ENERGY PERFORMANCE.”

**Table 6**  
**Energy Star Performance Rating**

<b>Facility Name</b>	<b>Energy Performance Rating</b>	<b>National Average</b>
High School	32	50

## V. FACILITY DESCRIPTION

The Watchung Hills Regional High School was originally constructed in 1957 with a floor area of approximately 75,000 square feet. The building is of concrete block construction with a 4" brick façade. Windows are operable casement type with clear, single-pane, non-insulating glass and aluminum mullions. Steel roof framing supports an insulated, corrugated metal deck with asphalt roll-roofing. Large areas of the mostly one-story structure have an excavated crawl space which serves as a pipe chase for the various piping systems within the building. The current day room names or numbers for the spaces constructed then are classrooms 10-14, classrooms 20-28 with the library where 23B and Computer Files are today, classrooms 30-38, classrooms 40-45A (excluding 44A), the stage and auditorium, gyms 7-8, the south building cafeteria, Special Ed 1-2, and all ancillary spaces within that footprint.

In 1961 the first addition to the building was constructed. The architectural style of the new construction matched the original building. Classrooms 44A, 46-51, 52-59, 251-259, Gym 3, Fine Arts (Clrm 3,5), Science Technology (Clrm 4) were added. The added floor area was approximately 25,000 square feet and the total floor area was about 100,000 square feet.

The next addition was constructed in 1964. At this time, the cafeteria was expanded, the library was expanded (Suite 23 today), Gym 4 and team rooms were added, the Child Development space behind the stage and the Science Labs were added, room 19, and the 2-story classroom wing with classrooms 70-82 and 270-285 was also added. All of the aforementioned areas comprise what is known today as the South Building. This expansion increased the size of the school by about 65,000 square feet for a total floor area of 165,000 square feet.

The North Building was constructed in 1972. The building's architectural style was similar to the South Building, having 4" red face brick however pre-cast concrete panels were also used on the exterior façade. The addition consisted of an independent building connected to the existing school only by an exterior, covered walkway. The new building included a library, food and clothing labs, kitchen and cafeteria, wood and auto shops, administrative offices, gyms 5, 6, weight rooms, team rooms, locker room, classrooms 114-128 and 301-315A, etc. and all other spaces necessary for a complete stand-alone school building. The North Building addition expanded the school by approximately 135,000 square feet bringing the new total area to about 300,000 square feet.

With the construction of the North Building, new services from utility companies were established. A new natural gas service for the North Building was provided from Public Service Electric & Gas (PSE & G). This service is 6" on the "load" side of the meter and serves new boilers, rooftop heating equipment, food service equipment and classroom labs. The new gas service at the North Building is independent of the previously existing service at the South Building. Both gas services remain active to date.

A new 4000 amp, 480 volt electrical service was installed by Jersey Central Power & Light (JCP & L) with the construction of the North Building. This electrical service had the capacity to serve both the new North Building and the existing South Building. Therefore, the existing pole-mounted, overhead electrical service that previously served the South Building was removed and

the existing South Building electrical gear was “back-fed” from the new North Building switchboard thus consolidating the electrical service to a single service handling both buildings.

A new water service was also brought into the new school. Plans indicate the new water service coming from the main at Sterling Road is a 10” combined water service which means it provides water for both domestic use and fire suppression. Once inside the building the service splits into a 6” domestic water supply and an 8” fire protection line. The fire protection line serves automatic sprinklers throughout the North Building and fire hydrants around the perimeter of both school buildings. The domestic water supply splits into two (2) 4” lines, one serving the new North building and the other “back-feeding” the existing South building water supply, arranged such that it replaces the previous water supply from in-ground wells. The well system was to remain active but isolated from the new city water supply.

In 2005 the building was expanded again. The new West Wing was created which added new administrative and guidance offices, a new theater, band and music rooms, art studios, an elevator, classrooms and science labs. Also included in this construction was the addition to the North Building of gyms 1 and 2 and the auxiliary gym with associated locker rooms. This construction project also involved numerous alterations and renovations throughout the existing facility. The South Building Library was converted to Suite 23 and the heating and air conditioning systems in the existing building were almost entirely replaced with new equipment. The additions to the building brought another 87,600 square feet for a current total area of 387,600 square feet

### Heating Systems

Heating in the South Building is produced is produced by Boilers 1, 2, and 3 which are Cleaver Brooks model CB-200-125. Boilers produce low pressure steam and are capable of burning either No. 2 fuel oil or natural gas. The firing rate for each boiler is 5283 MBH (5,283,000 Btu/Hr) for natural gas or 37.5 GPH (gallons per hour) for No. 2 oil and is equivalent to 150 boiler horsepower. These boilers were manufactured in June of 1989 and obviously replaced the original boilers installed in the South Building boiler room in 1957.

Low pressure steam generated by the boilers fills the heating system piping throughout the South Building. Heating equipment within the building provides forced or convective air across heating coils utilizing the steam’s energy and warms the occupied spaces. Condensate from the heating coils drains by gravity back to a condensate receiver tank in the boiler room. Condensate pumps return the condensate from the tank back to the boilers. Heating equipment in the building consists of unit ventilators, sill-line radiators, heating and ventilating units, finned-tube radiators, blower-coil units, and duct-mounted steam reheat coils.

The North Building has two (2) different methods for producing heat for the building. Gas-fired boilers installed in the Mechanical Equipment Room produce heating hot water which is pumped to various pieces of heating equipment around the building and, gas-fired rooftop units also produce forced hot air for space heating and serve numerous areas in the building as well.

Cleaver Brooks model CB-700-100 are installed as boilers 4, 5, and 6 with boilers 5 and 6 manufactured in 1972 and boiler 4 manufactured in 2004. Boiler 4 was added as part of the 2004

expansion and had never been used at the time this survey was conducted. All boilers have a natural gas input of 4184 MBH which is equivalent to 125 boiler horsepower. Boilers provide heating hot water to equipment such as finned-tube radiators, convectors, cabinet unit heaters, unit ventilators (UV), and heating and ventilating (HV) units. The HV and UV units handle larger spaces such as gyms 5 and 6, the weight room, locker rooms, team rooms, and shops near the cafeteria. The remainder of the aforementioned equipment serve spaces such as storage areas, vestibules, toilet rooms, or offer supplemental heat to areas such as the library and classrooms.

Rooftop air handlers utilize natural gas to provide forced hot air to classrooms, the library, the cafeteria and Board Room/Faculty Dining, food and clothing labs. The nine (9) units serving these areas are rooftop multi-zone type, manufactured by Nesbitt. All units have a natural gas input of 600 MBH, an output of 480 MBH, and a combustion efficiency of 80% when new.

The new West Wing, constructed in 2005, utilizes boiler water from boilers 4, 5, and 6 for heating all of the new areas except the auditorium and lobby, student commons, new gyms 1, 2, and the auxiliary gym (wrestling room). The excluded areas are heated from natural-gas fired, packaged rooftop units ranging in gas input from 180 MBH to 500 MBH. Units are manufactured by McQuay and Lennox.

As part of the scope of work for the 2005 addition, mechanical equipment throughout both the North and South Buildings were replaced with new. All instructional areas, corridors, special education spaces, assembly areas, etc. were given new unit ventilators, fan-coil units, and blower-coil units. All existing equipment was demolished and replaced with new, state-of-the-art products controlled by the new building management system. New equipment was connected to the existing steam piping in the South Building and hot water piping in the North Building.

### Air Conditioning Systems

New air-cooled, packaged water chillers were installed during the 2005 construction project. The chillers, new pumps, and chilled water piping were installed to serve all areas of the South Building. With that, almost the entire South Building was retrofit with new mechanical equipment to provide air conditioning utilizing chilled water. Some areas such as Gyms 3 and 4 and the old Stage/Auditorium remain un-air conditioned and are ventilated only during the cooling season. Spaces not connected to chilled water in the South Building are Room 19 which uses a 5-ton rooftop air conditioner, the TV Studio uses a new packaged rooftop heating and cooling unit, and existing AHU-1 serving Child Development uses an evaporator coil and remote air-cooled condensing unit for cooling.

The two (2) chillers installed are York air-cooled screw type liquid chillers model YCAS0288EB46XG. Chillers have a nominal capacity of 275 tons each, were manufactured in 2004, and have an EER equal to 9.7. The chilled water piping is filled with a 30 % solution of propylene glycol to prevent freezing during the winter and to avoid draining the system every year.

Pumping for the system is arranged in a de-coupled, Primary/Secondary configuration with constant speed primary pumps serving the chillers and secondary pumps with variable frequency

drives (VFD) feeding the cooling equipment throughout the school. Secondary pumps will vary their flow and corresponding power consumption based on system pressure as cooling requirements change in the school. As most cooling equipment in the South Building are installed with 2-way control valves, system pressure will increase when space temperatures are satisfied and 2-way valves modulate closed, thereby causing the VFD to slow down the pumps, reducing flow and horsepower to meet the need. As space temperatures increase, the process reverses.

For the South Building, cooling units serving classrooms are typically unit ventilators. Larger instructional areas such as Fine Arts and Science Technology and locker and team rooms are cooled with blower coil units. Smaller specialized spaces such as server rooms, projector rooms, some offices, etc. are served with ductless split systems referred to as CRAC units (Computer Room Air Conditioners).

The North Building was constructed in 1972 with nine (9) packaged rooftop multi-zone units HVAC-1 through HVAC-9 providing air conditioning to the classrooms, library, offices, home economics, and the cafeteria. Units on the roof serve between five (5) and (10) zones each. Cool air is distributed through ductwork to the various spaces comprising each zone. All other areas of the North Building are ventilated only during the cooling season.

The construction in 2005 added gymnasiums, locker rooms, trainers room, storage, and offices to the existing North Building adjacent to gyms 5 and 6. These new areas are air conditioned by means of four (4) new packaged rooftop units. Two (2) CRAC units were also added to the first floor near the superintendent's office and the computer applications room.

Cooling in the new West Wing is accomplished using a variety of different types of systems. The theater lobby is cooled by two (2) packaged rooftop units RTU's 6A and 6B, both 20 ton units. The theater is cooled by three (3) 40 ton packaged rooftop units, RTU's 4A, 4B, and 5. The front office and guidance office area is cooled by several split air conditioning systems using remote, air-cooled condensing units. The remainder of the West Wing expansion utilizes chilled water as the source of cooling. Spaces such as the band, orchestra, and choir rooms have blower coils using chilled water, as does the art studios and new second floor classrooms 400- 407. Corridors are also cooled with chilled water by means of fan-coil units.

### Exhaust Systems

Exhaust systems installed with the 2005 addition are in good condition and appropriately designed for efficient use and operation based on their application. Classroom exhaust is accomplished using desiccant-wheel energy recovery units to extract usable energy from the exhaust air. Toilet rooms are exhausted using dedicated fans as are special applications such kiln exhaust or fume hood exhaust in the new science labs.

Many of the exhaust fans installed at the North (1971 construction) and South (1956, 1961, 1964 construction) buildings are in poor condition or are inoperable. In many instances, defunct fans and associated intake air louvers (also inoperable) have been abandoned in place. Today these "dead" fans act as a hole in the building envelope, allowing unconditioned outdoor air to enter the building and conditioned indoor air to exit. In either case, the inoperable equipment

increases energy consumption as it causes extended operation of heating or cooling equipment to compensate for the unwanted heat exchange. With respect to exhaust fans, the school's equipment list indicates 90 % of 150 fans are not running. These fans and louvers exist in gymnasiums, above classroom and corridor ceilings, in locker rooms, toilet rooms, etc.

### Automatic Controls

A Building Management System (BMS) was installed with the 2005 construction to control the heating, ventilating, and air conditioning (HVAC) equipment. Equipment is indexed to Occupied/Unoccupied modes of operation through the operators interface. Controlled equipment is programmed for operation with specific schedules according to the school's calendar. Local temperature sensors in occupied spaces allow for local adjustments of +/- 2° F from the setpoint. Setpoints for space temperatures are programmed at the operators interface.

At the time of survey, the BMS was incomplete and a large portion of the mechanical equipment was not in control. Currently, contractors and in-house personnel are working to finalize and commission the new BMS.

### Domestic Hot Water

The South Building domestic hot water is produced in the boiler room by a natural gas fired domestic water heater coupled with a separate storage tank. The water heater heats incoming cold water mixed with re-circulated hot water and pumps it continuously through the storage tank. The domestic water heater is a Lochinvar model CWN399PM with 400,000 Btu/Hr. input and 397 gallons per hour recovery at a 100° F rise. The heater is a copper-fin boiler manufactured for domestic water applications, capable of raising 30 gallon per minute (GPM) approximately 27° F. This water heater was retrofitted to the previously existing steam heated hot water generator, replacing steam as the heat source at the integral tube bundle within the tank.

The storage tank is a Patterson Kelly Control Flo Series 500 Domestic Hot Water Generator, model PK #175534. This was the original hot water heater installed in 1956 which used to use 2 psig steam to generate 180° F hot water. Water at this temperature is used in the kitchen. Mixing valves are also employed to reduce the hot water temperature to 120° F for use in hand sinks, showers, lavatories, etc. The tube bundle heat exchanger within the generator was abandoned in place and re-piped to the aforementioned water heater which represents the current assembly to generate domestic hot water.

The North Building has a recently installed assembly of a natural gas fired domestic water heater coupled with two (2) hot water storage tanks located in the boiler room. The heater is a Teledyne Laars model PW0500 1N 09 K1AC XXX with 500,000 Btu/Hr input and 405,000 output. This water heater has a combustion efficiency of 81 % and a recovery rate of 486 gph at a 100° F rise. The two storage tanks are both A.O. Smith tanks model TJV120M000 with 120 gallon capacity. Both tanks were manufactured in 2008. Hot water in this system is generated at 140°F which is used in the kitchen. A mixing valve is used to reduce the water temperature to 120° F for use in hand sinks, showers, lavatories, etc.

Also installed in the North Building in the mechanical room above Gyms 5 and 6 are three (3) A.O. Smith “Cyclone XHE” water heaters model BTH 199 970. Water heaters each have 100 gallons storage capacity and 228 gph recovery with 199,900 Btu/Hr natural gas input. Water heaters were manufactured in 2003 and serve the plumbing fixtures in the vicinity of the gyms.

With the “West Wing” expansion in 2005, new toilet rooms were added to support the classrooms, dressing rooms, and theater lobby. The water heaters installed to serve the plumbing fixtures in those locations are A.O. Smith “Cyclone XHE” model BTH 250A 970 with 100 gallons storage, 273.5gph recovery, and 240, 000 Btu/Hr natural gas input. Two (2) identical units were installed. Each unit was manufactured in 2005.

### Lighting

Lighting throughout the building is accomplished primarily with T8 fluorescent lamps and fixtures with electronic ballasts. The older sections of the school underwent a lighting retrofit in the recent past to modernize the school’s lighting with energy efficient fixtures. The design of the West Wing in 2005 incorporated the use of this style of lighting fixture resulting in a standardized lighting installation throughout the facility. The Gymnasiums throughout the facility are currently utilizing HID metal-halide light fixtures are being reviewed for replacement with energy efficient fluorescent high bay fixtures.

Refer to Appendix E for a listing of the installed fixtures throughout the facility.

## **VI. MAJOR EQUIPMENT LIST**

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial energy savings. Additionally, 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 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 Appendix D for the Major Equipment List.

## VII. ENERGY CONSERVATION MEASURES

### ECM #1: Lighting Upgrades – HID Replacement

#### Description:

There are currently three (3) areas within the Watchung Hills High School that are still utilizing high-intensity metal halide fixtures. These spaces are Gymnasium 7/8, the Physical Education Weight Room and another Gymnasium area. Gymnasium 7/8 is currently lit via thirty-four (34) HID, 400 W Metal Halide fixtures, the Physical Education Weight Room is currently lit via eighteen (18) HID, 400 W Metal Halide fixtures and the other Gymnasium area is currently lit via seventeen (17) HID, 400 W Metal Halide fixtures. In each space the fixtures are mounted approximately 20'-0" above the finished floor. The lighting system is antiquated and the spaces would be better served with more efficient, fluorescent lighting systems. 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 the spaces noted above 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 T5HO lamps are rated for 20,000 hours versus the 10,000 hours for the 250W Metal Halide lamps so there would be a savings in replacement cost and labor. In addition to the standard lighting features of the T-5 fixtures; a day-lighting option could be selected for the outside rows of light to take advantage of the natural daylight that provides light to the room during the day via the clerestory.

This measure replaces all the HID, 400 W Metal Halide fixtures in the spaces noted above with a well-designed T-5 lighting system. The existing fixtures will be replaced one-for-one with a 4-lamp T5HO high bay fixture with reflector and high-efficiency, electronic ballast in order to meet the mandated 50 foot-candle average within the spaces noted above.

#### Energy Savings Calculations:

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

SPACE	SAVINGS KW SAVED		COST	SIMPLE PAYBACK
	KWH SAVED	KW SAVED		
Gym 7/8	28,892	7.7	\$18,700	3.9
Phys Ed Wt Rm	11,472	4.1	\$9,900	5.2
Gymnasium	14,446	3.8	\$9,350	3.9
<b>Totals</b>	54,810	15.6	\$37,950	4.2

NJ Smart Start<sup>®</sup> Program Incentives are calculated as follows:

From Appendix B, the replacement of a 400 W HID fixture to a T-5 or T-8 fixture warrants the following incentive: \$100 per fixture.

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (\# \text{ of fixtures} \times \$50) = (69 \times \$100) = \underline{\$6,900}$$

Maintenance savings are calculated based on the facility operational hours as indicated by the Owner. For the spaces above, the estimated operational hours are 3,760 hours per year for the Gymnasiums and 2,820 hours per year for the Weight Room. Based on the lamp life comparison, there will be two (2) complete lamp replacements required for the metal halide system at the time when one (1) complete lamp replacement would be required for the fluorescent lighting system. Based on industry pricing, the lamp cost for a 400W metal halide lamp is approximately ±\$30 per lamp and a T-5 54HO fluorescent lamp is approximately ±\$5 per lamp. Therefore, the maintenance savings are calculated as follows:

$$\text{Maintenance Savings} = (\# \text{ of MH lamps} \times \$25 \text{ per lamp}) - (\# \text{ of T5HO lamps} \times \$5 \text{ per lamp})$$

$$\text{Maintenance Savings} = ((69 \text{ lamps} \times 2) \times \$25 \text{ per lamp}) - (276 \text{ lamps} \times \$5 \text{ per lamp}) = \underline{\$2,070}$$

It is pertinent to note, that installation labor was not included in the maintenance savings.

**Energy Savings Summary:**

<b>ECM #1 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$37,950
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$6,900
<b>Net Installation Cost (\$):</b>	\$31,050
<b>Maintenance Savings (\$/Yr):</b>	\$2,070
<b>Energy Savings (\$/Yr):</b>	\$9,044
<b>Total Yearly Savings (\$/Yr):</b>	\$11,114
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	2.8
<b>Simple Lifetime ROI</b>	336.9%
<b>Simple Lifetime Maintenance Savings</b>	\$31,050
<b>Simple Lifetime Savings</b>	\$135,660
<b>Internal Rate of Return (IRR)</b>	35%
<b>Net Present Value (NPV)</b>	\$101,628.21

## ECM #2: Lighting Upgrades – Incandescent Replacement

### Description:

There are various rooms throughout the Watchung Hills High School that still utilize incandescent lamps to provide lighting. It has been well documented that incandescent lamps are inefficient and that their compact fluorescent lamp (CFL) replacements should be utilized.

This ECM includes the replacement of all incandescent fixtures to compact fluorescent fixtures. The energy usage of an incandescent compared to a compact fluorescent is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours.

**Note:** The replacement of the incandescent lamps in the Old Auditorium is being included as part of this ECM. However, it is highly recommended that the Owner seek engineering guidance from a lighting designer to insure 42W CFL lamps (equal to 150W incandescent) will provide adequate light as replacement to the existing 200W incandescent lamps.

### Energy Savings Calculations:

Refer to the Appendix E, Investment Grade Lighting Audit that outlines the proposed replacements, costs, savings, and payback periods. Currently, a lighting incentive is not available for the installation of CFL lamps with the Smart Start<sup>®</sup> program.

SPACE	SAVINGS KW SAVED		COST	SIMPLE PAYBACK
	KWH SAVED	KW SAVED		
CR 312	209	0.07	\$200	5.8
Health Office	161	0.06	\$5.75	0.2
Phys Ed Office	322	0.11	\$11.50	0.2
Auditorium Balcony	3,909	1.4	\$189.75	0.3
Library	3,212	1.1	\$114.75	0.2
Auditorium Lobby	6,565	2.3	\$183.60	0.2
Old Auditorium	7,129	2.5	\$3,600	3.1
TV Office Track Lights	3,556	1.3	\$99.45	0.2
Hood Lights	1,060	0.38	\$54	0.3
Storage Rm 4	108.6	0.15	\$15.30	0.9
Work Area 4	217.1	0.08	\$7.65	0.2
Storage Closet 5	33.1	0.05	\$6.75	1.2
Gym Office Shower	217.1	0.08	\$7.65	0.2
<b>Totals</b>	26,698	9.6	\$4,496	1.0

**Energy Savings Summary:**

<b>ECM #2 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$4,497
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$4,497
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$4,405
<b>Total Yearly Savings (\$/Yr):</b>	\$4,405
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	1.0
<b>Simple Lifetime ROI</b>	1369.3%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$66,075
<b>Internal Rate of Return (IRR)</b>	98%
<b>Net Present Value (NPV)</b>	\$48,089.60

### ECM #3: Heating and Ventilating Unit Motor Replacement

#### Description:

The existing heating and ventilating (H&V) units (5 total) in the gymnasiums and the old auditorium were installed in 1956 and 1971. All units possess standard efficiency, 7-1/2 HP fan motors. Installing new NEMA premium efficiency motors will reduce the electricity required to drive the fans resulting in a cost savings to the School. This ECM investigates replacing the standard efficiency motors with new NEMA premium efficiency motors in Gyms 5,6,7,and 8 and the old auditorium. Gyms 3 and 4 have (8) H&V units, each possessing a ½ HP motor. NEMA premium efficiency motors are not available for that small size.

#### Energy Savings Calculations:

As each motor is 7-1/2 HP, the ECM will be calculated for one (1) motor and the results will be multiplied by the number of motors (5).

Annual cost savings from using premium efficiency motors versus standard efficiency can be calculated as follows:

$$\text{Annual Savings} = .746 \text{ kw/hp} \times \text{HP} \times \text{L} \times \text{C} \times \text{N} \times (100/\text{E}_1 - 100/\text{E}_2)$$

where

- HP = Motor Horsepower
- L = motor load, percent
- C = Cost of electricity (\$.165/kwh)
- N = Number of operating hours per year (4380)
- E<sub>1</sub> = Efficiency of standard efficiency motor (%)
- E<sub>2</sub> = Efficiency of premium efficiency motor (%)

$$\text{Annual Saving} = .746 \text{ kw/hp} \times 7.5 \text{ HP} \times 1.00 \times \$.165/\text{kwh} \times 2820 \times \left( \frac{100}{84} - \frac{100}{91} \right) = \$238/\text{yr}$$

$$\text{Energy Saving} = .746 \text{ kw/hp} \times 7.5 \text{ HP} \times 1.00 \times 2820 \times \left( \frac{100}{84} - \frac{100}{91} \right) = 1445 \text{ kwh/yr}$$

$$\text{Total Annual Savings} = 5 \times \$238 = \$1190/\text{yr.}$$

$$\text{Total Energy Savings} = 5 \times 1445 \text{ kwh} = 7220 \text{ kwh}$$

#### Installation Cost:

The installed cost of each NEMA premium efficiency motors is estimated at \$1,000 each.

$$\text{Total Installed Cost} = 5 \times \$1,000 = \$5,000$$

NJ Smart Start<sup>®</sup> Program Incentives offer \$81 per premium motor of this size for this ECM.

$$\text{Total Incentive} = 5 \times \$81 = \$405.$$

**Energy Savings Summary:**

<b>ECM #3 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$5,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$405
<b>Net Installation Cost (\$):</b>	\$4,595
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$1,190
<b>Total Yearly Savings (\$/Yr):</b>	\$1,190
<b>Estimated ECM Lifetime (Yr):</b>	18
<b>Simple Payback</b>	3.9
<b>Simple Lifetime ROI</b>	366.2%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$21,420
<b>Internal Rate of Return (IRR)</b>	25%
<b>Net Present Value (NPV)</b>	\$11,771.68

## ECM #4: Steam Trap Replacement

### Description:

This ECM investigates the amount of energy saved by replacing steam traps that have “failed open”, allowing steam to pass through heating elements without utilizing the available energy in the steam. Boilers (3) in the central plant fire using fuel oil or natural gas to produce steam. The cost of natural gas or fuel oil can be directly converted into the cost of the steam produced. Failed steam traps allow the steam produced to pass through and out of the steam piping essentially unused and therefore waste the cost associated with producing it.

With the recent construction project of 2005, most of the terminal heating and air conditioning units have been replaced. In the South Building where steam is used for heating however, none of the steam traps were replaced. It has been stated by in-house maintenance personnel that “none of the traps work”. Another school representative close to the problem estimates 50 % of the traps don’t work. Discussions with Spirax/Sarco, an industry leading steam specialties manufacturer and consultant, reveal that statistics indicate approximately 17% of the total number of steam traps fail in applications such as this. As a conservative estimate for this ECM, it is assumed that 15% of the steam traps have failed.

### Failed Steam Traps and Capacities:

An equipment “take-off” from the plans of the 2005, 1964, 1961, and 1956 construction established there are more than 153 steam traps serving heating equipment such as unit ventilators, heating and ventilating units, blower coil units, unit heaters, cabinet heaters, finned-tube radiators and convectors. Due to the absence of some plans because of age, not all equipment information was available. The 153 traps accounted for in the “take-off” represent the majority of steam heated appliances. This quantity being some percentage of the actual total allows for a conservative evaluation of this ECM. This conservative evaluation also applies to the heating capacity of the heating equipment. The heating capacity associated with the 153 steam traps is 12,000 lb/hr. As this capacity is some percentage of the actual total, it allows for a conservative evaluation for this ECM.

By definition, 1 lb saturated steam = 1000 Btu (approximate)

*Cost of Natural Gas* = \$1.157/Therm = \$1.157/100,000 Btu (from historical data)

$$\text{Cost To Produce Steam} = \left[ \frac{\$1.157/100,000 \text{ Btu} \times 1000 \text{ Btu/lb}}{.80 \text{ Boiler Efficiency}} \right] = \$1.45/100 \text{ lbs steam}$$

*Number of Failed Traps* = 15 % x 153 = 23 traps

### *Amount of Lost Steam*

Connected Steam Load = 12,000 lb/hr.

15 % traps failed open x 12,000 lb/hr = 1,800 lb/hr steam lost

*Hours of Operation:*

An estimate of the number of hours the boilers maintain steam pressure in the piping system is:

24 hours/day from November 1 through April 15 (166 days)

24 hr/day x 166 days = 3,984 hours of steam production/yr

*Savings:*

By replacing the failed traps, energy savings will result when the steam is no longer lost.

*Annual Steam Savings* = 1800 lb/hr x 3,984 hr/yr = 7,171,200 lb steam/yr

*Annual Cost Savings* = 7,171,200 lb/yr x \$1.45/100 lbs = \$103,982/yr

*Ann. Energy Savings* = [7,171,200 lb/yr x 1000 Btu/lb x 1 Therm/100,000 Btu ]/ .80 Boiler Eff.  
 = 89,640 Therm/Yr

Installation cost for twenty three (23) 1-1/4"(Average) Float and thermostatic traps is estimated at \$23,000. It is pertinent to note that this estimate includes the demolition of the existing traps and piping modifications (if required).

**Energy Savings Summary:**

<b>ECM #4 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$23,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$23,000
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$103,982
<b>Total Yearly Savings (\$/Yr):</b>	\$103,982
<b>Estimated ECM Lifetime (Yr):</b>	20
<b>Simple Payback</b>	0.2
<b>Simple Lifetime ROI</b>	8941.9%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$2,079,640
<b>Internal Rate of Return (IRR)</b>	452%
<b>Net Present Value (NPV)</b>	\$1,523,989.59

## ECM #5: Exhaust Fan Replacement

### Description:

The school's maintenance department reports that 90% of the 150 roof-mounted exhaust fans do not operate. By inspection, a large number of exhaust fans exist from the original construction of 1956 as well as the 1961 and 1964 additions to the South Building. These fans are non-operational with dampers rusted in the open position. Similarly, fans on the North Building exist from the 1971 construction that are also non-operational. As these fans are supposed to be a functioning part of the buildings ventilation system, they should be replaced.

Since existing roof-mounted fans are failed with open dampers, energy is being lost when conditioned air exists the building through these open exhaust systems. If the fans were operating normally, they would still expel conditioned air to the outdoors during normal operating hours. However, when the mechanical systems are indexed to "Unoccupied" mode of operation by the building management system, exhaust fans should de-energize and dampers should close so that conditioned air is not lost from the building.

This ECM investigates the energy savings that will result from replacing the fans with new fans and dampers that will de-energize and close respectively, preventing exfiltration of conditioned air, when indexed to "Unoccupied" by the building management system.

### Energy Savings Calculations:

From fluid mechanics, conservation of mass states that for an amount of mass that enters a control volume, an equal mass must leave the control volume.

ASHRAE Handbook of Fundamentals states wind is a driving force that effects infiltration and ventilation in buildings. Winds hitting upwind building walls are under positive pressure while the same wind blowing across the flat roof creates a negative pressure. These pressure differentials cause infiltration of outdoor air which displaces conditioned air within the building. The open exhaust systems provide a path for conditioned air to leave the building. "Chimney effect" due to wind blowing across the open roof-mounted exhaust fans induces an "outward" draft of conditioned air from the open exhaust systems, thereby aiding the infiltration process.

ASHRAE lists the following equation to estimate the amount of airflow forced through ventilation system openings by wind:

$$Q = C_4 C_v A V$$

where

Q = airflow rate, cfm

$C_v$  = effectiveness of opening ( $.25 \leq C_v \leq .6$ )

A = free area of inlet openings, ft<sup>2</sup>

V = wind speed, mph

$C_4$  = unit conversion factor = 88.0

The Wind Energy Resource Atlas indicates that average wind speed for Watchung for both winter and spring is 15 miles per hour (mph).

Historical weather data for Watchung indicates the following monthly average temperatures for the winter and spring based on the past 30 years

Month	Dec	Jan	Feb	Mar	Apr	May	Jun
Temperature, °F	34.2	29.4	32.4	41.5	51.3	61.7	70.3

The free area of all non-operational exhaust fans taken from building plans is 190 square feet for the 1956, 1961, 1964, and 1971 additions.

Using  $C_v$  as .25, the amount of airflow leaving the building due to 15 mph winds is

$$Q = (88) \times (.25) \times (190) \times (15) = 62,700 \text{ cfm}$$

This unwanted airflow occurs during “Unoccupied” modes of operation from 10 PM to 6 AM (8 hrs/day), seven (7) days per week. The analysis reviews this problem during winter and spring or from December through June (182 days).

The energy lost due to these open exhaust systems is calculated as follows:

$$\text{Heat Loss} = (\text{cfm} \times 1.08 \times \Delta t) \times \text{No. Hrs}/1000, \text{ kBTU}$$

Where:

cfm = the calculated airflow

1.08 = conversion factor

$\Delta t$  = the indoor temperature (70 °F) minus the monthly outdoor temperature

No. Hrs = number of unoccupied hours during month

Energy loss for each month is as follows:

Month	Dec	Jan	Feb	Mar	Apr	May	Jun
Avg. $\Delta t$ (°F)	35.8	40.6	37.6	28.5	18.7	8.3	-.3
No. of Hours	248	248	224	248	240	248	240
HL (kBTU)	644,360	730,753	611,264	512,967	325,721	149,390	-5,225
Total (kBTU)	2,969,230						

The *Annual Energy Savings* for replacing the exhaust fans is

$$\text{Energy Savings} = [2,969,230 \text{ kBTU} \times 1 \text{ Therm}/100 \text{ kBTU} \times \$1.157/\text{Therm}] / .80 \text{ Boiler Eff.}$$

$$\text{Energy Savings} = \$42,942/\text{yr}$$

Installed cost of the replacement equipment is estimated at \$125,000. It is pertinent to note that this estimate includes the demolition of the existing equipment.

NJ Smart Start<sup>®</sup> Program Incentives do not apply for this ECM.

**Energy Savings Summary:**

<b>ECM #5 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$123,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$123,000
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$42,942
<b>Total Yearly Savings (\$/Yr):</b>	\$42,942
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	2.9
<b>Simple Lifetime ROI</b>	423.7%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$644,130
<b>Internal Rate of Return (IRR)</b>	35%
<b>Net Present Value (NPV)</b>	\$389,638.81

## ECM #6: Hot Water Pump Replacement

### Description:

The existing Bell & Gossett heating hot water pumps (2) installed in the North Building have standard efficiency motors driving them. The pumps are approximately 37 years old and have exceeded their average life expectancy. Installing new pumps with NEMA premium efficiency motors will reduce the electricity required to drive the pumps as well as improve the hydraulic efficiency of the pump performance. This ECM investigates the annual cost savings associated in using high-efficiency motors on the pumps.

### Energy Savings Calculations:

Annual cost savings from using premium efficiency motors versus standard efficiency can be calculated as follows:

$$\text{Annual Savings} = .746 \text{ kw/hp} \times \text{HP} \times \text{L} \times \text{C} \times \text{N} \times (100/\text{E}_1 - 100/\text{E}_2)$$

where

- HP = Motor Horsepower
- L = motor load, percent
- C = Cost of electricity (\$.165/kwh)
- N = Number of operating hours per year (4380)
- E<sub>1</sub> = Efficiency of standard efficiency motor (%)
- E<sub>2</sub> = Efficiency of premium efficiency motor (%)

$$\text{Annual Saving} = .746 \text{ kw/hp} \times 20 \text{ HP} \times 1.00 \times \$0.165/\text{kwh} \times 4380 \times \left( \frac{100}{87} - \frac{100}{93} \right) = \$800/\text{yr}$$

$$\text{Energy Saving} = .746 \text{ kw/hp} \times 20 \text{ HP} \times 1.00 \times 4380 \times \left( \frac{100}{87} - \frac{100}{93} \right) = 4846 \text{ kwh/yr}$$

### Installation Cost:

Two pumps are installed however one pump operates while the other pump is on “Stand-by”. Both pumps do not operate simultaneously therefore the energy savings is calculated for one pump only. It is recommended however that both pumps are replaced.

The installed cost of two (2) end-suction, base mounted centrifugal pumps with matching hydraulic performance is estimated at \$14,100.

NJ Smart Start<sup>®</sup> Program Incentives offer approximately \$150 per premium motor of this size for this ECM.

**Energy Savings Summary:**

<b>ECM #6 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$14,100
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$300
<b>Net Installation Cost (\$):</b>	\$13,800
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$800
<b>Total Yearly Savings (\$/Yr):</b>	\$800
<b>Estimated ECM Lifetime (Yr):</b>	20
<b>Simple Payback</b>	17.3
<b>Simple Lifetime ROI</b>	15.9%
<b>Simple Lifetime Maintenance Savings</b>	0
<b>Simple Lifetime Savings</b>	\$16,000
<b>Internal Rate of Return (IRR)</b>	1%
<b>Net Present Value (NPV)</b>	<b>(\$1,898.02)</b>

## ECM #7: Pump Motor Replacement

### Description:

The existing Bell & Gossett heating hot water pumps (2) installed in the North Building have standard efficiency motors driving them. The pumps are approximately 37 years old and have exceeded their average life expectancy, however if the pumps are well maintained, it may be more feasible to replace the standard efficiency motors only with new NEMA premium efficiency motors. Installing new NEMA premium efficiency motors will reduce the electricity required to drive the pumps resulting in a cost savings to the School. This ECM investigates the annual cost savings associated in using high-efficiency motors on the pumps.

### Energy Savings Calculations:

Annual cost savings from using premium efficiency motors versus standard efficiency can be calculated as follows:

$$\text{Annual Savings} = .746 \text{ kw/hp} \times \text{HP} \times \text{L} \times \text{C} \times \text{N} \times (100/E_1 - 100/E_2)$$

where

- HP = Motor Horsepower
- L = motor load, percent
- C = Cost of electricity (\$.165/kwh)
- N = Number of operating hours per year (4380)
- E<sub>1</sub> = Efficiency of standard efficiency motor (%)
- E<sub>2</sub> = Efficiency of premium efficiency motor (%)

$$\text{Annual Saving} = .746 \text{ kw/hp} \times 20 \text{ HP} \times 1.00 \times \$0.165/\text{kwh} \times 4380 \times \left( \frac{100}{87} - \frac{100}{93} \right) = \$800/\text{yr}$$

$$\text{Energy Saving} = .746 \text{ kw/hp} \times 20 \text{ HP} \times 1.00 \times 4380 \times \left( \frac{100}{87} - \frac{100}{93} \right) = 4846 \text{ kwh/yr}$$

### Installation Cost:

Two pumps are installed however one pump operates while the other pump is on “Stand-by”. Both pumps do not operate simultaneously therefore the energy savings is calculated for one pump only. It is recommended however that both pump motors are replaced.

The installed cost of two (2) NEMA premium efficiency motors is estimated at \$3,300.

NJ Smart Start<sup>®</sup> Program Incentives offer approximately \$150 per premium motor of this size for this ECM.

**Energy Savings Summary:**

<b>ECM #7 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$3,300
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$300
<b>Net Installation Cost (\$):</b>	\$3,000
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$800
<b>Total Yearly Savings (\$/Yr):</b>	\$800
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	3.8
<b>Simple Lifetime ROI</b>	300.0%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$12,000
<b>Internal Rate of Return (IRR)</b>	26%
<b>Net Present Value (NPV)</b>	\$6,550.35

## ECM #8: Domestic Hot Water Heater Replacement

### Description:

The South Building domestic water heater is approximately 20 years old and at the end of its expected life. When new, the combustion efficiency of the existing water heater was 82.3 %. This ECM investigates replacing the existing water heater with a new, high efficiency unit having a combustion efficiency of 98%.

### Energy Savings Calculations:

#### Existing Gas DHW Heater

Rated Capacity = 400,000 BTU/Hr. Combustion Efficiency = 82.3 %

#### Proposed High-Efficiency Water Heater

Rated Capacity = 400,000 BTU/Hr. Combustion Efficiency = 98 %

From the New Jersey Administrative Code, NJAC 7:10, allowance for domestic water is 25 gallons per day per person for schools with cafeterias, showers, and laboratories. Assuming 30% of this allowance is used as hot water, 7.5 gallons per day per person is heated by the water heaters.

The school has over 2100 students and 270 employees. Assuming half of those people are in the South Building implies this water heater serves 1185 people.

Daily hot water consumption =  $1185 \times 25 \times .30 = 8437.5$  gallons per day. This number converts to an average of 5.86 gallons per minute of hot water. This is assumed to occur daily through the school year for 180 days per year.

The average entering water temperature during the year is 55 °F.

Water temperature in the water heater is raised from 55 °F to 140 °F.

Annual Energy Savings for using the high efficiency water heater in lieu of the existing water heater can be determined as follows:

$$\text{Annual Energy Savings} = 180 \times [\text{GPM} \times 500 \times \Delta T \times (100/E_1 - 100/E_2)] / 100,000, \text{ Therms/yr.}$$

Where

- 180 = school days per year
- GPM = gallons per minute of domestic hot water
- 500 = conversion factor
- $\Delta T$  = change in water temperature =  $140 - 55 = 85$  °F
- $E_1$  = efficiency of existing water heater (%)
- $E_2$  = efficiency of new water heater (%)
- 100,000 = Btu per Therm

$$\text{Annual Energy Saving} = 180 \times 5.86 \times 500 \times 85 \times \left( \frac{100}{82.3} - \frac{100}{98} \right) / 100,000 = 87.3 \text{ Therms / yr}$$

Average cost of natural gas = \$1.157/Therm

$$\text{Annual Cost Savings} = 87.3 \times \$1.157 = \$101/\text{ yr.}$$

Installed cost of the new high efficiency water heater = \$12,000

NJ Smart Start<sup>®</sup> Program Incentives are calculated as follows:

From Appendix C, a natural gas-fired domestic hot water heater with an input  $\geq 300$  MBH -1500 MBH and an 85%AFUE warrants the following incentive:

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\text{Quantity} \times \$1.75 \text{ per MBH input}) = (1 \times \$1.75 \times 400) = \underline{\$700}$$

### Energy Savings Summary:

<b>ECM #8 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$11,700
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$700
<b>Net Installation Cost (\$):</b>	\$11,000
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$101
<b>Total Yearly Savings (\$/Yr):</b>	\$101
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	108.9
<b>Simple Lifetime ROI</b>	-86.2%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$1,515
<b>Internal Rate of Return (IRR)</b>	-18%
<b>Net Present Value (NPV)</b>	(\$9,794.27)

## ECM #9: Multizone Rooftop Unit Replacement

### Description:

The rooftop multizone units on the North Building were installed in 1971. These rooftop units have reached the end of their service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. Due to escalating owning and maintenance costs, these units should be replaced. The units are have electric cooling at a capacity of 32 tons of refrigeration and have gas heat with an input of 600,000 Btu/Hr. There are a total of 9 units of this type.

This measure would replace these units with new higher efficiency, state-of-the-art heating and cooling rooftop units, equivalent to Seasons 4 Custom Packaged Multizone Rooftop Units.

Calculations for energy savings will be performed for a single unit as this calculation is typical for all 9 units.

### Heating Energy Savings Calculations:

The combustion efficiency of the existing units was approximately 80% when new. Due to the age and condition of the existing units, the combustion efficiency of these units is estimated at 70%.

To estimate the amount of energy consumed by the existing gas-fired unit throughout the heating season, the Degree Day method of energy estimating is be used.

$$EnergyUsed = \frac{H_L \times D \times 24}{\Delta t \times k \times V} \times (C_D)$$

where:

$H_L$  = Building Heat Loss, BTU/Hr.

$D$  = number of 65 F Heating Degree Days

$\Delta t$  = Design temperature difference, deg. F

$k$  = a correction factor that includes the effects of rated full load efficiency, part load performance, oversizing and energy conservation devices.

$V$  = Heating value of fuel, BTU/Therm

$C_D$  = empirical correction factor for heating effect vs. 65 F degree days

$$EnergyUsed = \frac{(480,000) \times (5570) \times 24}{70 \times .6 \times 100,000} \times (.6)$$

*Energy Used* = 9167 Therms/Year

As the proposed new unit's combustion efficiency is 81%, it is estimated to be 11% more efficient than the existing unit. The proposed energy savings is;

*Energy Savings* = 9167 x (1/.7 - 1/.81) = 1778 Therms/Year

This can occur for each unit. Therefore, we can multiply this result by 9 units

*Total Cost Savings* = 9 x (\$1.157/Therm x 1778 Therms) = \$18,513/yr.

### **Cooling Energy Savings Calculations:**

$$\text{Energy Savings} = \frac{[\text{Cooling Tons} \times 12,000 \text{ Btu / ton-hr}]}{[1000 \text{ W / kW}]} \times \left( \frac{1}{\text{EER}_{\text{OLD}}} - \frac{1}{\text{EER}_{\text{NEW}}} \right) \times \text{Equivalent Full Load Hrs. of Cooling}$$

#### Existing Mutizone Unit

Rated Capacity = 32 Tons per unit

Condenser Section Efficiency = 5.0 EER

Cooling Season Equivalent Full Load Hrs. of Operation = 800 hrs/yr.

Average Cost of Electricity - \$0.165/kWh

#### Proposed Mutizone Unit

Rated Capacity = 32 Tons per Unit

New Cooling Unit Efficiency = 10.3 EER

$$\text{Energy Savings} = \frac{[32 \text{ Tons} \times 12,000 \text{ Btu / ton-hr}]}{[1000 \text{ W / kW}]} \times \left( \frac{1}{5.0} - \frac{1}{10.3} \right) \times 800 = 31,615 \text{ kWh}$$

This can occur for each unit. Therefore, we can multiply this result by 9 units

Energy Cost Savings = 9 x (31,615 kWh x \$0.165/kWh) = \$46,944/ Yr

*Total Cost Savings* = \$18,513 + \$ 46,944 = \$65,457/yr.

Smart Start Equipment Incentive = (\$73/Ton) = (32 Tons x \$73) = \$2,336

**Energy Savings Summary:**

<b>ECM #9 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$1,080,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$2,336
<b>Net Installation Cost (\$):</b>	\$1,077,664
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$65,457
<b>Total Yearly Savings (\$/Yr):</b>	\$65,457
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	16.5
<b>Simple Lifetime ROI</b>	-8.9%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$981,855
<b>Internal Rate of Return (IRR)</b>	-1%
<b>Net Present Value (NPV)</b>	<b>(\$296,242.58)</b>

## ECM #10: Rooftop Air Conditioner Replacement

### Description:

Room 19 in the South Building has a 5-ton rooftop air conditioner that serves the room. The unit is beyond the end of its service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook and is due for replacement.

This measure would replace the unit with a new high unit, equivalent to Trane Precedent Series model THC060.

### Cooling Energy Savings Calculations:

$$EnergySavings = \frac{[CoolingTons \times 12,000 \text{ Btu} / \text{ton-hr}]}{[1000 \text{ W} / \text{kW}]} \times \left( \frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}} \right) \times EquivalentFullLoadHrs.ofCooling$$

#### Existing Rooftop Unit

Rated Capacity = 5

Condenser Section Efficiency = 8.0 EER

Cooling Season Equivalent Full Load Hrs. of Operation = 800 hrs/yr.

Average Cost of Electricity - \$0.165/kWh

#### Proposed High-Efficiency 5-Ton Rooftop Unit

Rated Capacity = 5 Tons

New Cooling Unit Efficiency = 12.84 EER

$$Energy \text{ Savings} = \frac{[5 \text{ Tons} \times 12,000 \text{ Btu} / \text{ton-hr}]}{[1000 \text{ W} / \text{kW}]} \times \left( \frac{1}{8.0} - \frac{1}{12.84} \right) \times 800 = 2261.7 \text{ kWh}$$

Energy Cost Savings = 2261.7 kWh x \$0.165/kWh = \$373/ Yr

Smart Start Equipment Incentive = (\$75/Ton) = (5 Tons x \$75) = \$375.

The installed cost of the replacement unit is estimated at \$9,000.

**Energy Savings Summary:**

<b>ECM #10 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$9,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$375
<b>Net Installation Cost (\$):</b>	\$8,625
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$373
<b>Total Yearly Savings (\$/Yr):</b>	\$373
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	23.1
<b>Simple Lifetime ROI</b>	-35.1%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$5,595
<b>Internal Rate of Return (IRR)</b>	-5%
<b>Net Present Value (NPV)</b>	<b>(\$4,172.15)</b>

## VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for Watchung Hills Regional High School, and concluded that there is potential for solar energy generation. The solar photovoltaic system summary will be shown as REM #1 within this report.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof is necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around \$350, this value was used in our financial calculations. This equates to \$0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 63,600 S.F. can be utilized for a PV system on the South and North Buildings. A depiction of the area utilized is shown in the Renewable / Distributed Energy Measures Calculation Appendix. Using this square footage it was determined that a system size of 895.4 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 1,034,666 KWh annually, reducing the overall utility bill by 24.0 % percent. A detailed financial analysis can be found in Appendix F. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory

PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the Renewable/Distributed Energy Measures Calculation Appendix, Appendix F.

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the school district paying for 100% of the total project cost upfront. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

**Table 7  
Financial Summary – Photovoltaic System**

<b>FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM</b>			
<b>PAYMENT TYPE</b>	<b>SIMPLE PAYBACK</b>	<b>SIMPLE ROI</b>	<b>INTERNAL RATE OF RETURN</b>
Self-Finance	16.8 Years	5.9%	0%
Direct Purchase	16.8 Years	5.9%	4.0%

\*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

The resultant Internal Rate of Return indicates that if the Owner was able to “Direct Purchase” the solar project, the project would be slightly more beneficial to the Owner. However, if the Owner was able to work out a Power Purchase Agreement with a third-party and agree upon a decent base energy rate for kilowatt hour production, this can prove to be a advantageous route.

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG’s review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

## IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

### **Load Profile:**

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to the Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

### Electricity:

This facility has a very large consumption pattern throughout the year. The facility is made up as South Building, North Building and West Wing. The West Wing also houses the Auditorium (full Theatre).

The Electric Usage Profile demonstrates a fairly flat load shape throughout the year. This is a bit unusual for a school, because typically schools are closed in the summer. This facility has a new Auditorium facility (full Theatre) that keeps the energy usage elevated in the summer and causes the flat load profile throughout the year. There is an increase in consumption March through September, and this elevation is typical for cooling or air conditioner load. New air-cooled packaged water chillers were installed in 2005 in the South Building. The South Building also has a 5-ton rooftop air conditioner and a new packaged rooftop heating and cooling unit. The North Building was constructed in 1972 with (9) nine, packaged roof-top multi-zone units. Construction in 2005 added gymnasiums, locker rooms, trainer's rooms, storage and offices to the existing North Building. These new areas are cooled by (4) four, new rooftop packaged units. There are also (2) two, CRAC units present. The West Wing is cooled by various systems. The theatre lobby is cooled by (2) two, 20 ton packaged roof-top units. The theatre is cooled by (3) three, 40 ton packaged roof-top units. The offices are cooled by several split air conditioning systems. The remainder of the West Wing utilizes chilled water as the source of cooling. All of these systems add to the elevated yet flat load profile throughout the year. JCP&L is the electric utility which provides Delivery Service to the High School. South Jersey Energy Company provides electric Commodity Service to the High School. A flatter load profile of this type, will allow for more competitive energy prices when shopping for alternative energy suppliers.

### Natural Gas:

The Natural Gas Usage Profile demonstrates a typical heating load profile. An increase in consumption is observed September through March. A new natural gas service was provided by PSE&G (Public Service Electric and Gas) for the North Building. This new service is independent of the service of the South Building. This provides service to new boilers, rooftop heating equipment, food service equipment and classroom labs. Heating in the South Building is provided by (3) three, boilers (boilers 1, 2 and 3). The boilers are capable of burning natural gas or #2 fuel oil. The North Building has (2) two, different methods for heating the building. There

are natural gas-fired boilers that pump hot water throughout the building as well as natural gas fired rooftop units that produce forced hot air. Boilers 4, 5 and 6 are present. Boilers 4 and 5 were built in 1972 and boiler 6 was built in 2004. The boilers provide hot water to finned-tube radiators, convectors, cabinet unit heaters, unit ventilators and heating and ventilating units. (9) nine, multi-zone rooftop air handlers use natural gas to provide forced hot air to various parts of the building. The new West Wing was built in 2005 and utilizes boiler water from boilers 4, 5 and 6 for various areas; while the balance of the building is supplied via packaged gas-fired units. Natural gas service is provided by Public Service Electric and Gas Company (PSE&G). Commodity service is supplied to the South Building by Hess Corporation, the Third Party Supplier. PSE&G remains the delivery mechanism to this building as well as for the North Building, and as Commodity Supplier to the North Building as well. The consistent load profile is beneficial when looking at supply options with a Third Party Supplier.

#### Heating Oil (HO; #2 Fuel Oil)

There is a Heating Oil (HO; # 2 Fuel Oil) back-up at the High School South Building; PSE&G Account Number 65 291 395 08; Meter #: 3164420. The main energy source here is natural gas however the boilers have dual-fuel service and the HO is a back up. The school did not use the HO in the previous year. Therefore the HO was not analyzed.

#### **Tariff:**

#### Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary – 3 Phase) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This facility's rate is a three phase service at secondary voltages. For electric supply (generation), the customer now uses the service of a Third Party Supplier (TPS), South Jersey Energy Company. This contract is administered by The Alliance for Competitive Service (ACES). ACES is the energy aggregation program of the New Jersey School Boards Association of School Administrators. The term per the contract is April 30, 2009 meter read date and expiring on the last meter read date May 2011. The process was reviewed and approved by the New Jersey Department of Community Affairs. This facility uses the Delivery Service of the utility (JCP&L). The Delivery Service includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGL.

#### Natural Gas:

This facility receives utility service through Public Service Electric and Gas Company (PSE&G). The North Building receives both Delivery and Commodity from PSE&G while the South Building receives Commodity service from a Third Party Supplier (TPS), Hess Corporation. The North Building is on a TSGNF (Transportation Service Gas-Non Firm) rate classification while the South Building is on an LVG (Large Volume Service) rate classification. The North Building only uses the services of PSE&G for both Commodity and Delivery service.

LVG Rate: This utility tariff is for “firm” delivery service for general purposes. This rate schedule has a Delivery Charge, Balancing Charge, Societal Benefits Charge, Realignment Adjustment Charge, Margin Adjustment Charge, RGGI Charge and Customer Account Service Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). Note: Should the TPS not deliver, the customer may receive service from PSE&G under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service.

“Firm” delivery service defines the reliability of the transportation segment of the pricing. Much like the telecom industry, natural gas pipelines were un-bundled in the late 1990’s and the space was divided up and marketed into reliability of service. Firm Service is said to be the most reliable and last in the pecking order for interruption. This service should not be interrupted.

TSG-NF Rate: Non-Firm Transportation Gas Service. This is applicable to use of service for: Interruptible delivery for general purposes where the maximum requirement for interruptible gas is not less than 150 therm’s per hour and where the customer has the installed capacity to utilize an alternate type of fuel, except as provided in Special Provision (a). Customers may either purchase natural gas from a Third Party Supplier (TPS) or from Public Services Basic Gas Supply Service default service as detailed in this rate schedule. The Delivery Charges for this rate schedule include the following charges: Service Charge, Distribution Charges, Societal Benefits Charges, RGGI Recovery Charge, and Capital Adjustment Charge. Commodity Charges: Customer may choose to receive gas supply from either: A TPS, or PSE&G through its Basic Gas Supply Service default service. PSE&G may also supply Emergency Sales Service in certain instances. This is at a much higher than normal rate. It should be perceived as a penalty.

This facility (South Building only) utilizes the services of a Third Party Supplier, The Hess Corporation. The contract is administered by The Alliance for Competitive Service (ACES). ACES is the energy aggregation program of the New Jersey School Board Association of School Administrators. The term per the contract is on or before June 1, 2008 and expiring on or before May 2011. The process was reviewed and approved by the New Jersey Department of Community Affairs.

Please see CEG recommendations below.

### **Recommendations:**

CEG recommends a global approach that will be consistent with all facilities. The primary area for potential improvement is seen in the electric costs. The average price per kWh (kilowatt hour) for the High Schools’; Meter G28083523 based on 1-year fixed price is \$.10659 / kWh (this is the fixed “price to compare” supplied by South Jersey Energy Company). The fixed price per decatherm for natural gas service in the South Building; Meter 3164420 provided by Hess Corporation (TPS) is \$ 12.08 / dth (dth, is the common unit of measure). Natural Gas Service at the North Building; Meter 3127742, is still provided by PSE&G at an average rate of \$9.43 / Dth. This rate is competitive because it is a TSG-NF (interruptible rate). Watchung Hills could ask PSE&G if it can get on this rate for the South Building as option one, and what the risks would be if they did.

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. Watchung Hills could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on the alternative supply from South Jersey Energy Company, and utilizing Watchung Hill's historical consumption data (June 2008 through May 2009) and current electric rates, the school(s) could see an improvement in its electric costs of up to 15% annually (up to \$70,000). (Note: Savings were calculated using Average Annual Consumption, South Jersey Energy Company's fixed price contract and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach."

CEG's second recommendation coincides with the natural gas costs. Based on the current alternative market pricing from Hess Corporation (ACES Agreement-fixed up-charge of \$3.186 / dth which includes basis and margin) CEG feels that Watchung Hills could see an improvement of up to 30 % in the basis. The basis price is the reason that the overall average price per dekatherm is (\$12.08 / dth). Therefore the average pricing formula supplied by Hess is 30 % above today's competitive market pricing. CEG recommends the school receive further advisement on these prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends scheduling a meeting with the current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the municipality can learn more about the competitive supply process. The county can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at [www.nj.gov/bpu](http://www.nj.gov/bpu). They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. Watchung Hills should ask the utility representative about alternative billing options, such as consolidated billing when utilizing the service of a Third Party Supplier. Finally, if the supplier for energy (natural gas) is changed, closely monitor balancing, particularly when the contract is close to termination. This could be performed with the aid of an "energy advisor".

## X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the Owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

- i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. The “Energy Savings Improvement Program (ESIP)” law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.
- ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.
- iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as “power purchase agreements.” These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party’s work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.
- iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings with average demand loads above 200 KW. The facility’s participation in the program is assisted by an approved program partner. An “Energy Reduction Plan” is created with the facility and approved partner to show at least 15% reduction in the building’s current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project

Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. Energy Reduction Plan – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant \$0.10 per square foot between \$5,000 and \$50,000, and not to exceed 50% of the facility’s annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)
2. Project Implementation – Upon installation of the recommended measures along with the “Substantial Completion Construction Report,” the incentive will grant savings per KWH or Therm based on the program’s rates. Minimum saving must be 15%. (Example \$0.11 / kWh for 15% savings, \$0.12/ kWh for 17% savings, ... and \$1.10 / Therm for 15% savings, \$1.20 / Therm for 17% saving, ...) Increased incentives result from projected savings above 15%.
3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program’s rates. Minimum savings must be 15%. (Example \$0.07 / kWh for 15% savings, \$0.08/ kWh for 17% savings, ... and \$0.70 / Therm for 15% savings, \$0.80 / Therm for 17% saving, ...) Increased incentives result from verified savings above 15%.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

## **XI. 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 condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
- M. Maintain all weather stripping on windows and doors.
- N. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.
- O. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.
- P. Recalibrate existing temperature sensors within the facility.
- Q. Clean all light fixtures to maximize light output.
- R. Confirm that outside air economizers are functioning properly to take advantage of free
- S. Balance air and water systems to specified flows.
- T. Verify major heating and cooling equipment have accurate control schedules and temperature settings for Occupied/Unoccupied modes of operation.
- U. Repair or replace piping insulation on steam and condensate return piping in the crawl space of the South Building.
- V. Verify all steam traps are operating properly. Replace as necessary.
- W. Verify variable frequency drives on West Wing Hot Water Pumps are calibrated and operating properly.

**ECM COST & SAVINGS BREAKDOWN**  
CONCORD ENGINEERING GROUP  
Wachusett Hills Regional High School

ECM NO.	DESCRIPTION	INSTALLATION COST			YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS (Yearly Savings * ECM Lifetime)	LIFETIME MAINTENANCE SAVINGS (Yearly Maint. Savings * ECM Lifetime)	LIFETIME ROI (Lifetime Savings - Net Cost) / (Net Cost)	SIMPLE PAYBACK (Net cost / Yearly Savings)	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL (\$)	LABOR (\$)	REBATES, INCENTIVES (\$)	NET INSTALLATION COST (\$)	ENERGY (\$/yr)	MAINT. (\$/yr)							
ECM #1	Lighting Upgrades-HID Replacement	\$22,770	\$14,180	\$6,900	\$31,050	\$9,044	\$2,070	\$11,114	\$135,660	\$31,050	336.9%	2.8	35.41%	\$10,628.21
ECM #2	Lighting Upgrades-Fluorescent Replacement	\$1,207	\$3,200	\$0	\$4,407	\$4,405	\$0	\$4,405	\$66,075	\$0	1360.3%	1.0	97.95%	\$48,089.60
ECM #3	HVU Motor Replacement	\$2,500	\$2,500	\$405	\$4,505	\$1,190	\$0	\$1,190	\$21,420	\$0	366.2%	3.9	25.46%	\$11,771.68
ECM #4	Steam Trap Replacement	\$5,750	\$17,250	\$0	\$23,000	\$103,982	\$0	\$103,982	\$2,079,640	\$0	894.9%	0.2	482.10%	\$1,523,989.59
ECM #5	Replace Exhaust Fans	\$33,000	\$90,000	\$0	\$123,000	\$42,942	\$0	\$42,942	\$644,130	\$0	423.7%	2.9	34.50%	\$39,638.81
ECM #6	Replace Heating Water Pumps	\$11,500	\$2,600	\$300	\$13,800	\$800	\$0	\$800	\$16,000	\$0	15.9%	17.3	1.45%	(\$1,898.02)
ECM #7	Pump Motor Replacement	\$2,000	\$1,300	\$300	\$3,000	\$800	\$0	\$800	\$12,000	\$0	300.0%	3.8	25.82%	\$6,550.35
ECM #8	Water Heater Replacement	\$8,700	\$3,000	\$700	\$11,000	\$101	\$0	\$101	\$1,515	\$0	-86.2%	108.9	-18.37%	(\$9,794.27)
ECM #9	Replace Multizone Units	\$990,000	\$180,000	\$2,336	\$1,077,664	\$65,457	\$0	\$65,457	\$981,855	\$0	-8.9%	16.5	-1.14%	(\$296,242.58)
ECM #10	Rooftop Air Conditioner Replacement	\$6,000	\$3,000	\$375	\$8,625	\$373	\$0	\$373	\$5,595	\$0	-35.1%	23.1	-4.98%	(\$4,172.15)
<b>RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY</b>														
REM #1	Solar Panel Installation	\$8,954,820	\$0	\$0	\$8,954,820	\$170,720	\$0	\$170,720	\$4,268,000	\$0	-52.3%	\$2.5	-5.04%	(\$5,982,047.43)

**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 January, 2009:

### **Electric Chillers**

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

### **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	
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### **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

### **Ground Source Heat Pumps**

Closed Loop & Open Loop	\$370 per ton
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### **Gas Heating**

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

### 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 ≤ 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

### Premium Motors

Three-Phase Motors	\$45 - \$700 per motor
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### Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	\$10 - \$30 per fixture, (depending on quantity)
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

### 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

### 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



# STATEMENT OF ENERGY PERFORMANCE

## Watchung Hills Regional High School

**Building ID:** 1925151  
**For 12-month Period Ending:** May 31, 2009<sup>1</sup>  
**Date SEP becomes ineligible:** N/A

**Date SEP Generated:** November 02, 2009

### Facility

Watchung Hills Regional High School  
 108 Sterling Road  
 Warren, NJ 07059

### Facility Owner

Watchung Hills Regional High School  
 108 Sterling Road  
 Warren, NJ 07059

### Primary Contact for this Facility

Timothy Stys  
 108 Sterling Road  
 Warren, NJ 07059

**Year Built:** 1956

**Gross Floor Area (ft<sup>2</sup>):** 387,600

**Energy Performance Rating<sup>2</sup> (1-100)** 32

### Site Energy Use Summary<sup>3</sup>

Electricity - Grid Purchase(kBtu)	14,626,562
Natural Gas (kBtu) <sup>4</sup>	29,717,445
Total Energy (kBtu)	44,344,007

### Energy Intensity<sup>5</sup>

Site (kBtu/ft <sup>2</sup> /yr)	114
Source (kBtu/ft <sup>2</sup> /yr)	206

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	3,808
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### Electric Distribution Utility

Jersey Central Power & Lt Co

### National Average Comparison

National Average Site EUI	98
National Average Source EUI	176
% Difference from National Average Source EUI	17%
Building Type	K-12 School

### Meets Industry Standards<sup>6</sup> for Indoor Environmental Conditions:

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

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

### Certifying Professional

Raymond Johnson  
 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. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. 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) 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 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"/>
<b>Building Name</b>	Watchung Hills Regional High School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
<b>Type</b>	K-12 School	Is this an accurate description of the space in question?		<input type="checkbox"/>
<b>Location</b>	108 Sterling Road, Warren, NJ 07059	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
<b>Single Structure</b>	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"/>
North Building (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	155,100 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"/>
<b>Open Weekends?</b>	Yes	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"/>
<b>Number of PCs</b>	200	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	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"/>
<b>Presence of cooking facilities</b>	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"/>
<b>Percent Cooled</b>	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
<b>Percent Heated</b>	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>
<b>Months</b>	12 (Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>

<b>High School?</b>	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"/>
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South Building (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	165,000 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"/>
<b>Open Weekends?</b>	Yes	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"/>
<b>Number of PCs</b>	200	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	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"/>
<b>Presence of cooking facilities</b>	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"/>
<b>Percent Cooled</b>	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
<b>Percent Heated</b>	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>
<b>Months</b>	12 (Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>
<b>High School?</b>	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"/>

West Wing (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	67,500 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"/>

<b>Open Weekends?</b>	Yes	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"/>
<b>Number of PCs</b>	100	Is this the number of personal computers in the K12 School?	<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	0	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"/>
<b>Presence of cooking facilities</b>	No	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"/>
<b>Percent Cooled</b>	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?	<input type="checkbox"/>
<b>Percent Heated</b>	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?	<input type="checkbox"/>
<b>Months</b>	12 (Optional)	Is this school in operation for at least 8 months of the year?	<input type="checkbox"/>
<b>High School?</b>	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:** Jersey Central Power & Lt Co

Fuel Type: Electricity		
<b>Meter: 10 00 60 7778 4 2 (kWh (thousand Watt-hours))</b> <b>Space(s): Entire Facility</b> <b>Generation Method: Grid Purchase</b>		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2009	05/31/2009	432,000.00
04/01/2009	04/30/2009	355,600.00
03/01/2009	03/31/2009	279,200.00
02/01/2009	02/28/2009	331,600.00
01/01/2009	01/31/2009	304,400.00
12/01/2008	12/31/2008	286,000.00
11/01/2008	11/30/2008	331,600.00
10/01/2008	10/31/2008	312,400.00
09/01/2008	09/30/2008	409,600.00
08/01/2008	08/31/2008	396,800.00
07/01/2008	07/31/2008	414,800.00
06/01/2008	06/30/2008	432,800.00
<b>10 00 60 7778 4 2 Consumption (kWh (thousand Watt-hours))</b>		<b>4,286,800.00</b>
<b>10 00 60 7778 4 2 Consumption (kBtu (thousand Btu))</b>		<b>14,626,561.60</b>
<b>Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))</b>		<b>14,626,561.60</b>
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
<b>Meter: 65 291 395 08 (therms)</b> <b>Space(s): South Building</b>		
Start Date	End Date	Energy Use (therms)
05/01/2009	05/31/2009	3,432.10
04/01/2009	04/30/2009	8,843.10
03/01/2009	03/31/2009	38,256.50
02/01/2009	02/28/2009	17,838.30
01/01/2009	01/31/2009	21,574.40
12/01/2008	12/31/2008	17,064.30
11/01/2008	11/30/2008	14,148.90
10/01/2008	10/31/2008	8,481.10
09/01/2008	09/30/2008	967.50
08/01/2008	08/31/2008	884.80

07/01/2008	07/31/2008	1,437.90
06/01/2008	06/30/2008	2,506.05
<b>65 291 395 08 Consumption (therms)</b>		<b>135,434.95</b>
<b>65 291 395 08 Consumption (kBtu (thousand Btu))</b>		<b>13,543,495.00</b>
<b>Meter: 42 000 549 06 (therms)</b> <b>Space(s): North Building, West Wing</b>		
<b>Start Date</b>	<b>End Date</b>	<b>Energy Use (therms)</b>
05/01/2009	05/31/2009	158.69
04/01/2009	04/30/2009	7,384.94
03/01/2009	03/31/2009	26,797.36
02/01/2009	02/28/2009	30,558.88
01/01/2009	01/31/2009	31,888.95
12/01/2008	12/31/2008	30,993.68
11/01/2008	11/30/2008	21,154.71
10/01/2008	10/31/2008	12,203.91
09/01/2008	09/30/2008	180.65
08/01/2008	08/31/2008	131.60
07/01/2008	07/31/2008	135.74
06/01/2008	06/30/2008	150.39
<b>42 000 549 06 Consumption (therms)</b>		<b>161,739.50</b>
<b>42 000 549 06 Consumption (kBtu (thousand Btu))</b>		<b>16,173,950.00</b>
<b>Total Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>29,717,445.00</b>
<b>Is this the total Natural Gas consumption at this building including all Natural Gas meters?</b>		<input type="checkbox"/>

<b>Additional Fuels</b>	
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.	<input type="checkbox"/>

<b>On-Site Solar and Wind Energy</b>	
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.	<input type="checkbox"/>

## Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same as the PE 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

Watchung Hills Regional High School  
108 Sterling Road  
Warren, NJ 07059

## Facility Owner

Watchung Hills Regional High School  
108 Sterling Road  
Warren, NJ 07059

## Primary Contact for this Facility

Timothy Stys  
108 Sterling Road  
Warren, NJ 07059

## General Information

Watchung Hills Regional High School	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	387,600
Year Built	1956
For 12-month Evaluation Period Ending Date:	May 31, 2009

## Facility Space Use Summary

North Building		West Wing	
Space Type	K-12 School	Space Type	K-12 School
Gross Floor Area(ft <sup>2</sup> )	155,100	Gross Floor Area(ft <sup>2</sup> )	67,500
Open Weekends?	Yes	Open Weekends?	Yes
Number of PCs	200	Number of PCs	100
Number of walk-in refrigeration/freezer units	2	Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes	Presence of cooking facilities	No
Percent Cooled	90	Percent Cooled	100
Percent Heated	100	Percent Heated	100
Months <sup>o</sup>	12	Months <sup>o</sup>	12
High School?	Yes	High School?	Yes
School District <sup>o</sup>	Watchung Hills	School District <sup>o</sup>	Watchung Hills

South Building	
Space Type	K-12 School
Gross Floor Area(ft <sup>2</sup> )	165,000
Open Weekends?	Yes
Number of PCs	200
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	90
Percent Heated	100
Months <sup>o</sup>	12
High School?	Yes
School District <sup>o</sup>	Watchung Hills

## Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 05/31/2009)	Baseline (Ending Date 05/31/2009)	Rating of 75	Target	National Average
Energy Performance Rating	32	32	75	N/A	50
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	114	114	76	N/A	98
Source (kBtu/ft <sup>2</sup> )	206	206	138	N/A	176
Energy Cost					
\$/year	\$ 1,051,374.25	\$ 1,051,374.25	\$ 702,447.76	N/A	\$ 898,276.66

\$/ft <sup>2</sup> /year	\$ 2.71	\$ 2.71	\$ 1.81	N/A	\$ 2.32
Greenhouse Gas Emissions					
MtCO <sub>2</sub> /year	3,808	3,808	2,544	N/A	3,253
kgCO <sub>2</sub> /ft <sup>2</sup> /year	10	10	7	N/A	9

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.

## MAJOR EQUIPMENT LIST

Concord Engineering Group

"Watchung Hills Regional High School"

### Boilers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
South Boiler Room	South Building	Cleaver Brooks	3	CB-200-125	Unknown	5283	4184	79.2	Light Oil/Natural Gas	20 yrs	Unknown	5	One (1) North Building boiler added in 2005 has never been used and has its full service life available
North Boiler Room	North Building/ West Wing	Cleaver Brooks	3	CB-700-100	Unknown	4184	3348	80	Natural gas	37, 37, 4	25	0, 0, 25	

### Heating Water Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
North Boiler Room	North Building	Bell & Gossett	2	U4C 11-314BF	Unknown	20	1750	450	115	480	3	37	20	0	West Wing pumps equipped with Variable Frequency Drives
North Boiler Room	North Building/ West Wing	Paco	1	316029	Unknown	15	1750	450	75	480	3	4	20	16	
North Boiler Room	West Wing	Paco	2	310287	Unknown	7 1/2	1750	150	90	480	3	4	20	16	

### Chillers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Unit Tag	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Courtyard	South Bldg/ West Wing	York	2	YCAS 0288E46XGADBTX	RENMO08425	Chiller 1, 2	275 Tons	10.4	R-407C	480	3	60	4	23	19

### Chilled Water Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
South Bldg Meter Rm	Chiller 1, 2	Unknown	2	Unknown	Unknown	25	1150	784	75	480	3	60	4	20	16
South Bldg Meter Rm	South Bldg/ West Wing	Unknown	2	Unknown	Unknown	60	1750	1200	150	480	3	60	4	20	16

### Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input (MBh)	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
North Boiler Room	North Building	Teledyne Laars	1	PW500 1N 09	Unknown	500	486	240	81	Natural Gas	10	15	5	North and South Boiler room heaters use external storage tanks
North Mech Rm 315	North Bldg Gym	A.O. Smith	3	BTH 199 970	Unknown	200	228	100	95	Natural Gas	6	15	9	
400 Wing Mech Rm	West Wing	A.O. Smith	2	BTH 250 A 970	Unknown	240	273.45	100	95	Natural Gas	4	15	11	
South Boiler Room	North Building	Lochinvar	1	CWN399PM	Unknown	400	397	500	82.3	Natural Gas	20	15	0	

### Rooftop Air Handling Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Cooling Coil	Cooling Eff. (EER)	Cooling Capacity	Heating Type	Input (MBh)	Output (MBh)	Heating Eff. (%)	Fuel	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
South Bldg Roof	TV Studio	McQuay	1	RPS 018 CSA	FBOU04000997 00	4-Row	10.2	18 Tons	Gas Burner	312	250	80%	Natural Gas	480	3	40	4	15	11	
North Bldg Roof	Classrooms	Nesbitt	5	RMA100NG6S3215HB0514	Unknown	Unknown	5.05	32 Tons	Gas Burner	600	488	81%	Natural Gas	480	3	93	37	15	0	
North Bldg Roof	Home Ec./ Lib.	Nesbitt	2	RMA100NG6S3215HB0514	Unknown	Unknown	5.05	32 Tons	Gas Burner	600	488	81%	Natural Gas	480	3	93	37	15	0	
North Bldg Roof	Dining Areas	Nesbitt	2	RMA100NG6S3215HB0514	Unknown	Unknown	5.05	32 Tons	Gas Burner	600	488	81%	Natural Gas	480	3	93	37	15	0	
West Wing Roof	Auditorium	McQuay	2	RPR 040 CLA	FBOU040900801 02	4-Row	9.8	40 Tons	Gas Burner	500	400	80%	Natural Gas	480	3	4	4	15	11	
West Wing Roof	Stage	McQuay	1	RPS 040 CLA	Unknown	4-Row	9.8	40 Tons	Gas Burner	400	320	80%	Natural Gas	480	3	4	4	15	11	
West Wing Roof	Aud. Lobby	McQuay	1	RPS 020 CSA	Unknown	4-Row	10.2	20 Tons	Gas Burner	400	320	80%	Natural Gas	480	3	49	4	15	11	
West Wing Roof	Student Commons	McQuay	1	RPS 020 CSA	Unknown	4-Row	10.2	20 Tons	Gas Burner	400	320	80%	Natural Gas	480	3	49	4	15	11	
West Wing Roof	Wrestling Room	McQuay	1	RPS 020 CSA	FBOU04090094800	4-Row	10.2	20 Tons	Gas Burner	312	250	80%	Natural Gas	480	3	49	4	15	11	
New Gym Roof	Gyms 1 & 2	McQuay	2	RPS 020 CSA	FBOU04090094600	4-Row	10.2	20 Tons	Gas Burner	312	250	80%	Natural Gas	480	3	61	4	15	11	
New Gym Roof	New Gym Corridor	Lennox	1	LGC120S2BMZG	5604J07801	4-Row	10.3	10 Tons	Gas Burner	180	144	80%	Natural Gas	480	3	30	4	15	11	

### Rooftop Air Conditioner

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
South Bldg Roof	Room 19	Addison	1	PCF00R-3	Unknown	5 ton	8.5	R-22	208	3	20	15	0	
South Bldg Roof	Science Technology	Carrier	1	50TF008-511	270ZG0648	7-1/2 ton	8.9	R-22	208	3	7	15	8	

### Split Systems and AC Condensers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	EER	Refrigerant	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
North Bldg	Library Offices	EMI	2	MC4D0404	Unknown	15.9 MBH	10	R-22	208	1	20.2	4	15	11	
North Bldg	Various	EMI	6	MC2 2200	Unknown	12 MBH	10.2	R-22	208	1	10.6	4	15	11	
South Bldg	Various	EMI	6	MC2 2200	Unknown	12 MBH	10.2	R-22	208	1	10.6	4	15	11	
West Wing	Security Office	EMI	1	MC2 2200	Unknown	12 MBH	10.2	R-22	208	1	10.6	4	15	11	
West Wing	Guidance Areas/Vestibul	Trane	3	2TTA072A4	Unknown	72 MBH	10	R-22	480	3	14	4	15	11	
West Wing	Guidance Areas/Vestibul	Trane	3	TB012C100A2	Unknown	12 MBH	10	R-22	208	1	11	4	15	11	
West Wing	Auditorium	EMI	3	MC4D0404	Unknown	15.9 MBH	10	R-22	208	1	20.2	4	15	11	
West Wing	Auditorium Listening Booth	EMI	1	SCC12DM	Unknown	12 MBH	10.2	R-22	208	1	6.1	4	15	11	
South Bldg	TV Studio	EMI	1	MC2 2200	Unknown	12 MBH	10.2	R-22	208	1	10.6	4	15	11	
North Bldg	Elevator Machine Room	EMI	1	SCC18DF	Unknown	18.6 MBH	10	R-22	208	1	8.4	4	15	11	

### Heating and Ventilation Units

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Heating Coil	Capacity (MBH)	Fan HP	Fan RPM	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Mech Rm 315	Gyms 5 & 6	Trane	2	Climate Changer L-31	Unknown	2-Row HW	794	7 1/2	Unknown	480	3	11	37	20	0	
Gyms 3, 4	Gyms 3, 4	Unknown	8	LP-25	Unknown	2-Row Steam	280	1/2	800	208	3	2.2	48	20	0	
Gyms 7, 8	Gyms 7, 8	Unknown	2	LP-85	Unknown	2-Row Steam	Unknown	Unknown	Unknown	208	3	Unknown	48	20	0	
Lg. Group Instruction	Lg. Group Instruction	Unknown	1	LP-70	Unknown	2-Row Steam	556.8	Unknown	Unknown	208	3	Unknown	48	20	0	

### Energy Recovery Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	OA Supply Fan HP	Exhaust Fan HP	CFM	Cooling Effect (MBH)	Heating Effect (MBH)	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
ERU-1A	Classroom Area 1st Floor	AnnexAir	1	ERV-E-04	Unknown	5	5	4400	79.2	163	480	3	20	4	15	11	
ERU-1B	Classroom Area 2nd Floor	AnnexAir	1	ERV-E-03	Unknown	5	5	3000	47.3	97.4	480	3	20	4	15	11	
ERU-2	Band- Orchestra Rooms	AnnexAir	1	ERV-E-03	0743-020100504	5	5	3000	68.9	148.4	480	3	20	4	15	11	

CEG Job #: 9C09046  
Project: Watchung Hills  
Address:

"Watchung Hills High School"

KWH COST: \$0.165

Building SF: 400,000

**Investment Grade Lighting Audit - Entire Facility**

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
1.21	2nd Floor Electrical Room (no rm. #)	705	10	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.86	606.3	\$100.04	10	0	No Change	86	0.86	606.3	\$100.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Science Classroom 302	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Prep Room 302	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 304	2820	24	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.37	3,857.8	\$636.53	24	0	No Change	57	1.37	3857.76	\$636.53	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Prep Room 304	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 301	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 303	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.11	Storage S-32	705	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 305	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 306	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.11	Storage 304/06	705	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	80.4	\$13.26	2	0	No Change	57	0.11	80.37	\$13.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Prep Room 306	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 308	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 307	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Prep Room 308/10	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 309	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 310	2820	18	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.03	2,893.3	\$477.40	18	0	No Change	57	1.03	2893.32	\$477.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.11	Storage Room (no rm. #)	705	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00

CEG Job #: 9C09046  
Project: Watchung Hills  
Address:

"Watchung Hills High School"

KWH COST: \$0.165

Building SF: 400,000

**Investment Grade Lighting Audit - Entire Facility**

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	
2.21	Classroom 311	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 312	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage 312/10	705	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Classroom 312, equipment hood	2820	2	2	2 Lamp, 34w T-12, under hood	94	0.19	530.2	\$87.48	2	2	2-Lamp, 32W T-8 Elect. Ballast	57	0.11	321.48	\$53.04	\$100.00	\$200.00	0.07	208.68	\$34.43	5.81	
2.21	Prep Room 312	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 313	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 314	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Prep Room 314	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	2nd Floor, Girls Bathroom	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	2nd Floor, Boys Bathroom	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 316	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Prep Room 316	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Computer Room 315	2820	15	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.86	2,411.1	\$397.83	15	0	No Change	57	0.86	2411.1	\$397.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.14	Boiler Room 315	705	7	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., No Lens	57	0.40	281.3	\$46.41	7	0	No Change	57	0.40	281.295	\$46.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.11	Office 315A	2820	4	2	1x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.11	Small Office 315A	2820	2	2	1x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.31	Storage/Valve Room 315A	705	1	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21		2820	19	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.08	3,054.1	\$503.92	19	0	No Change	57	1.08	3054.06	\$503.92	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
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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	
6	Corridor (rms 301-316)	2820	4	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.45	1,263.4	\$208.45	4	0	No Change	112	0.45	1263.36	\$208.45	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
7		2820	2	6	2x4 6 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	172	0.34	970.1	\$160.06	2	0	No Change	172	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Stairwell to room 302	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Stairwell to room 114	2820	2	4	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Stairwell to Gym	2820	2	4	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Stairwell to room 316	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Corridor (rms 400-407)	2820	4	1	Recessed Down Light, (1) 42w CFL, Primatic Diffuser	46	0.18	518.9	\$85.62	4	0	No Change	46	0.18	518.88	\$85.62	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10		2820	10	1	Recessed Down Light, (1) 42w CFL, Primatic Diffuser	46	0.46	1,297.2	\$214.04	10	0	No Change	46	0.46	1297.2	\$214.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	16	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.38	3,880.3	\$640.25	16	0	No Change	86	1.38	3880.32	\$640.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.34	Janitor's Closet	705	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Pendant Mnt., No Lens	86	0.09	60.6	\$10.00	1	0	No Change	86	0.09	60.63	\$10.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom, 2nd Floor	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom, 2nd Floor	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.33	Classroom 400	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.33	Classroom 401	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10		2820	1	1	Recessed Down Light, (1) 42w CFL, Primatic Diffuser	46	0.05	129.7	\$21.40	1	0	No Change	46	0.05	129.72	\$21.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Prep & Storage Room 401/03	2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 403	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
10		2820	1	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.05	129.7	\$21.40	1	0	No Change	46	0.05	129.72	\$21.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 402	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 404	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 405	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21		2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00
10		2820	1	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.05	129.7	\$21.40	1	0	No Change	46	0.05	129.72	\$21.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Prep & Storage Room 405/07	2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 407	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
10		2820	1	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.05	129.7	\$21.40	1	0	No Change	46	0.05	129.72	\$21.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Classroom 406	2820	12	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.68	1,928.9	\$318.27	12	0	No Change	57	0.68	1928.88	\$318.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
		2820	5	1	T-5, Electronic, Recessed	33	0.17	465.3	\$76.77	5	1	No Change	33	0.17	465.3	\$76.77	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Classroom 114	2820	9	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.51	1,446.7	\$238.70	9	0	No Change	57	0.51	1446.66	\$238.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00

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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	
2.21	Classroom 115	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Main Office 116	2820	15	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.86	2,411.1	\$397.83	15	0	No Change	57	0.86	2411.1	\$397.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6		2820	1	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.11	315.8	\$52.11	1	0	No Change	112	0.11	315.84	\$52.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Board Secretary 116	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Ex. Asst. to Super. Office 116	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Payroll 116	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Meeting Room 116	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 117	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Offices 118	2820	15	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.86	2,411.1	\$397.83	15	0	No Change	57	0.86	2411.1	\$397.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11		2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Adult School Office 118	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Vice Principal Office 118	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	S.A.C. Office 118	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classsroom 119	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 120	2820	18	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.03	2,893.3	\$477.40	18	0	No Change	57	1.03	2893.32	\$477.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 121	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Computer Lab 122	2820	36	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.05	5,786.6	\$954.80	36	0	No Change	57	2.05	5786.64	\$954.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage/Office 122	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
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KWH COST: \$0.165

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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	
9.11	S-11	2820	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	203.0	\$33.50	2	0	No Change	36	0.07	203.04	\$33.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 123	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Computer Lab 124	2820	36	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.05	5,786.6	\$954.80	36	0	No Change	57	2.05	5786.64	\$954.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 125	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Offices 126	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Girl's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Boy's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Back Office 126	2820	8	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.46	1,285.9	\$212.18	8	0	No Change	57	0.46	1285.92	\$212.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage 126	705	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	80.4	\$13.26	2	0	No Change	57	0.11	80.37	\$13.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21	Boy's Bathroom	2820	1	4	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21	Girl's Bathroom	2820	1	4	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Corridor (rms. 114-126)	2820	21	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.20	3,375.5	\$556.96	21	0	No Change	57	1.20	3375.54	\$556.96	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	3	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
7		2820	2	6	2x4 6 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	172	0.34	970.1	\$160.06	2	0	No Change	172	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Men's Faculty Bathroom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Women's Faculty Bathroom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Gym Corridor	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
7		2820	1	6	2x4 6 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	172	0.17	485.0	\$80.03	1	0	No Change	172	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
6		2820	3	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.34	947.5	\$156.34	3	0	No Change	112	0.34	947.52	\$156.34	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
12	Wiegth Room 127	2820	6	8	HiBay (8) 54w T5	458	2.75	7,749.4	\$1,278.64	6	0	No Change	458	2.75	7749.36	\$1,278.64	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 128	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 129	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 130	2820	13	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.74	2,089.6	\$344.79	13	0	No Change	57	0.74	2089.62	\$344.79	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Gym Entrance	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
12	Gym 5/6	3760	24	1	HiBay (8) 54w T5	458	10.99	41,329.9	\$6,819.44	24	0	No Change	458	10.99	41329.92	\$6,819.44	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Gym Corridor	2820	23	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.31	3,697.0	\$610.01	23	0	No Change	57	1.31	3697.02	\$610.01	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10			2820	10	1	Recessed Down Light, (1) 42w CFL, Primatic Diffuser	46	0.46	1,297.2	\$214.04	10	0	No Change	46	0.46	1297.2	\$214.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00
10	Gym 1/2 New Wing	3760	28	1	Recessed Down Light, (1) 42w CFL, Primatic Diffuser	46	1.29	4,842.9	\$799.08	28	0	No Change	46	1.29	4842.88	\$799.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.31	Baseball Corridor	2820	4	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.31	Baseball Locker Room	2820	14	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	0.80	2,250.4	\$371.31	14	0	No Change	57	0.80	2250.36	\$371.31	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.31	Health & Phys. Ed. Office/Conf. Rm.	2820	4	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	36	0.14	406.1	\$67.00	4	0	No Change	36	0.14	406.08	\$67.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Health & Phys. Ed. Office	2820	5	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.29	803.7	\$132.61	5	0	No Change	57	0.29	803.7	\$132.61	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
43			2820	1	1	1 Lamp Incandescents	75	0.08	211.5	\$34.90	1	0	18 W CFL Lamp	18	0.02	50.76	\$8.38	\$5.75	\$5.75	0.06	160.74	\$26.52	0.22
9.11	Bathroom	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
43	Phys. Ed. Office	2820	2	2	1 Lamp Incandescents	75	0.15	423.0	\$69.80	2	0	18 W CFL Lamp	18	0.04	101.52	\$16.75	\$5.75	\$11.50	0.11	321.48	\$53.04	0.22	
9.11	Locker Room Storage	705	4	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.14	101.5	\$16.75	4	0	No Change	36	0.14	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Boy's Locker Room	2820	18	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.65	1,827.4	\$301.51	18	0	No Change	36	0.65	1827.36	\$301.51	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Boy's Shower	2820	3	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.11	304.6	\$50.25	3	0	No Change	36	0.11	304.56	\$50.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Boy's Bathroom	2820	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	203.0	\$33.50	2	0	No Change	36	0.07	203.04	\$33.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
2.21	Coach's Room	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.31	Coach's Locker Room	2820	26	1	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	1.48	4,179.2	\$689.57	26	0	No Change	57	1.48	4179.24	\$689.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Exit/Entry Way	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Locker Room	2820	13	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.47	1,319.8	\$217.76	13	0	No Change	36	0.47	1319.76	\$217.76	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Shower Area	2820	3	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.11	304.6	\$50.25	3	0	No Change	36	0.11	304.56	\$50.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Boy's Locker Rm Bathrm	2820	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	203.0	\$33.50	2	0	No Change	36	0.07	203.04	\$33.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Storage 127	705	6	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.28	194.6	\$32.11	6	0	No Change	46	0.28	194.58	\$32.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Gym Entry from Exterior (6 doors)	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.34	Basketball Gym 1st Rm. Storage	705	2	3	2x4, 3 Lamp, 32w T-8, Electronic, Pendant, Direct	82	0.16	115.6	\$19.08	2	0	No Change	82	0.16	115.62	\$19.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.34	Basketball Gym Middle Storage	705	2	3	2x4, 3 Lamp, 32w T-8, Electronic, Pendant, Direct	82	0.16	115.6	\$19.08	2	0	No Change	82	0.16	115.62	\$19.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.34	Basketball Gym Far End Storage	705	6	3	2x4, 3 Lamp, 32w T-8, Electronic, Pendant, Direct	82	0.49	346.9	\$57.23	6	0	No Change	82	0.49	346.86	\$57.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
13	Gym Exterior	4380	2	1	Wallpack, (1) 42w CFL	46	0.09	403.0	\$66.49	2	0	No Change	46	0.09	402.96	\$66.49	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Trainer's Room	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Trainer's Room Bathroom	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21	Boy's Locker Room	2820	2	2	2x2, 2 Lamp, U-Tube, Electronic, Recessed, Prismatic	73	0.15	411.7	\$67.93	2	0	No Change	73	0.15	411.72	\$67.93	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Boy's Shower	2820	6	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.22	609.1	\$100.50	6	0	No Change	36	0.22	609.12	\$100.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.22	Office - Mr. Smith	2820	2	2	2x4, 2 Lamp, 32w T-8, Electronic, Recessed, Parabolic	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
11	Wrestling Room	2820	12	6	(6) 42w CFL, Prismatic	270	3.24	9,136.8	\$1,507.57	12	0	No Change	270	3.24	9136.8	\$1,507.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.22	Office - Mrs. Cacchio	2820	2	2	2x4, 2 Lamp, 32w T-8, Electronic, Recessed, Parabolic	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21	Girl's Locker Room	2820	2	2	2x2, 2 Lamp, U-Tube, Electronic, Recessed, Prismatic	73	0.15	411.7	\$67.93	2	0	No Change	73	0.15	411.72	\$67.93	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
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KWH COST: \$0.165

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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	
1.21		2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Locker Rm. Bathrm	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Girl's Shower	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Conference Rm. Office 112	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Home Economics 108	2820	27	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.54	4,340.0	\$716.10	27	0	No Change	57	1.54	4339.98	\$716.10	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	108B (locked)	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 110	2820	35	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.00	5,625.9	\$928.27	35	0	No Change	57	2.00	5625.9	\$928.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 110C	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Girl's Bathroom	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom	2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	2	2	2x2, 2 Lamp, U-Tube, Electronic, Recessed, Prismatic	73	0.15	411.7	\$67.93	2	0	No Change	73	0.15	411.72	\$67.93	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.33	Classroom 98	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage	705	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.34	Shop	705	10	3	2x4, 3 Lamp, 32w T-8, Electronic, Pendant, Direct	82	0.82	578.1	\$95.39	10	0	No Change	82	0.82	578.1	\$95.39	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.33	Classroom 96	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage	705	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Music Rm. 97	2820	27	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	2.32	6,548.0	\$1,080.43	27	0	No Change	86	2.32	6548.04	\$1,080.43	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	Office 97A	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Office 110A	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Dressing Rooms	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Dressing Room Bathrm	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Men's Dressing Room	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	73	0.07	205.9	\$33.97	1	0	No Change	73	0.07	205.86	\$33.97	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Women's Dressing Room	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Auditorium Stage	2820	18	1	Spot Light, PAR Lamp	1000	18.00	50,760.0	\$8,375.40	18	1	No Change; See Note 5	1000	18.00	50760	\$8,375.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
		2820	85	1	Spot Light, PAR Lamp	575	48.88	137,827.5	\$22,741.54	85	1	No Change; See Note 5	575	48.88	137827.5	\$22,741.54	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
		2820	12	1	Down Light	150	1.80	5,076.0	\$837.54	12	1	No Change; See Note 5	150	1.80	5076	\$837.54	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Auditorium Seating	2820	48	3	Surface Mnt., (3) 60w A19 Lamps	180	8.64	24,364.8	\$4,020.19	48	3	No Change; See Note 5	180	8.64	24364.8	\$4,020.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
43		Auditorium below Balcony	2820	33	1	1 Lamp Incandescents	60	1.98	5,583.6	\$921.29	33	0	18 W CFL Lamp	18	0.59	1675.08	\$276.39	\$5.75	\$189.75	1.39	3908.52	\$644.91	0.29
2.21	Projection Room	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Auditorium Entry	2820	4	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.18	518.9	\$85.62	4	0	No Change	46	0.18	518.88	\$85.62	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor - West Wing Theater	2820	16	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.38	3,880.3	\$640.25	16	0	No Change	86	1.38	3880.32	\$640.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Corridor	2820	16	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.74	2,075.5	\$342.46	16	0	No Change	46	0.74	2075.52	\$342.46	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor - Library & Auditorium	2820	18	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.55	4,365.4	\$720.28	18	0	No Change	86	1.55	4365.36	\$720.28	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor - Auditorium & Orchestra	2820	16	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.38	3,880.3	\$640.25	16	0	No Change	86	1.38	3880.32	\$640.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.22	Band Rm 92	2820	35	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Parabolic Lens	86	3.01	8,488.2	\$1,400.55	35	0	No Change	86	3.01	8488.2	\$1,400.55	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	Office 92A	2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #1	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #2	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Band Storage Rm.	705	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	545.7	\$90.04	9	0	No Change	86	0.77	545.67	\$90.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Ensemble Room	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Ensemble Room Storage	705	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	363.8	\$60.02	6	0	No Change	86	0.52	363.78	\$60.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Ensemble Room Entry	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Orchestral Music	2820	35	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	3.01	8,488.2	\$1,400.55	35	0	No Change	86	3.01	8488.2	\$1,400.55	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Storage - Orch. Music	705	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	181.9	\$30.01	3	0	No Change	86	0.26	181.89	\$30.01	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Storage - Orch. Music	705	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	303.2	\$50.02	5	0	No Change	86	0.43	303.15	\$50.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office/Lounge 94A	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #4	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #3	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #2	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Practice Room #1	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office - Mr Valenti	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Stairwell	2820	6	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.28	778.3	\$128.42	6	0	No Change	46	0.28	778.32	\$128.42	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Classroom 109	2820	9	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.51	1,446.7	\$238.70	9	0	No Change	57	0.51	1446.66	\$238.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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
2.21	Lounge 107A	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Small Rm off Lounge 107A	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Faculty Cafeteria 107	2820	18	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.03	2,893.3	\$477.40	18	0	No Change	57	1.03	2893.32	\$477.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.14	Copier Room	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., No Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Cafeteria Serving Area	2820	36	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.05	5,786.6	\$954.80	36	0	No Change	57	2.05	5786.64	\$954.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.14	Cafeteria Cooking Area	2820	51	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., No Lens	57	2.91	8,197.7	\$1,352.63	51	0	No Change	57	2.91	8197.74	\$1,352.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.33	Library	2820	128	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	7.30	20,574.7	\$3,394.83	128	0	No Change	57	7.30	20574.72	\$3,394.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00
10		2820	47	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	2.16	6,096.8	\$1,005.98	47	0	No Change	46	2.16	6096.84	\$1,005.98	\$0.00	\$0.00	0.00	0	\$0.00	0.00
91		2820	17	2	40w Incandescent	80	1.36	3,835.2	\$632.81	17	2	13W CFL	13	0.22	623.22	\$102.83	\$6.75	\$114.75	1.14	3211.98	\$529.98	0.22
2.21	Work Room 102	2820	9	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.51	1,446.7	\$238.70	9	0	No Change	57	0.51	1446.66	\$238.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Comp. Office 104M	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Office 104K	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Office 104J	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	IDF Room	705	7	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.40	281.3	\$46.41	7	0	No Change	57	0.40	281.295	\$46.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.21	Office 104I	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.11	Storage 104H	705	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.17	120.6	\$19.89	3	0	No Change	57	0.17	120.555	\$19.89	\$0.00	\$0.00	0.00	0	\$0.00	0.00
8.22	Sm. Group Instruction 104G	2820	4	2	2x2 2 Lamp 32w T8 Utube, Elect. Ballast, Recessed, Parabolic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
8.22	Sm. Group Instruction 104F	2820	6	2	2x2 2 Lamp 32w T8 Utube, Elect. Ballast, Recessed, Parabolic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.22	Library Office 104D	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Parabolic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00

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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	
2.22	Work Room 104C	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Parabolic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.22	Sm. Group Instruction 104B	2820	4	2	2x2 2 Lamp 32w T8 Utube, Elect. Ballast, Recessed, Parabolic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Kitchen Office	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Kitchen Corridor	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Janitor's Supply Room	705	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.17	120.6	\$19.89	3	0	No Change	57	0.17	120.555	\$19.89	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Locker Area	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Locker Room Bathroom	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.11	General	2820	42	2	1x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	2.39	6,751.1	\$1,113.93	42	0	No Change	57	2.39	6751.08	\$1,113.93	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Staff Eating Area	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Men's Bathrm - Staff area	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Men's Bathrm & Locker Room	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Women's Bathrm & Locker Room	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
3.11		2820	1	1	1x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.14	Boiler Room	705	18	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., No Lens	57	1.03	723.3	\$119.35	18	0	No Change	57	1.03	723.33	\$119.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Dept. of Building & Grounds	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Dept. of Building & Grounds, 2nd Office	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Computer Room	2820	24	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.37	3,857.8	\$636.53	24	0	No Change	57	1.37	3857.76	\$636.53	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Cafeteria	2820	48	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.74	7,715.5	\$1,273.06	48	0	No Change	57	2.74	7715.52	\$1,273.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
2.11	Maintenance Office	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Garage Area	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage Room - Garage Area	705	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	80.4	\$13.26	2	0	No Change	57	0.11	80.37	\$13.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	2nd Floor above Offices	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.23	Meeting/Eating Area 105	2820	22	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Indirect	57	1.25	3,536.3	\$583.49	22	0	No Change	57	1.25	3536.28	\$583.49	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.23	Coach's office	2820	8	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Indirect	57	0.46	1,285.9	\$212.18	8	0	No Change	57	0.46	1285.92	\$212.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Wood Shop	2820	65	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	3.71	10,448.1	\$1,723.94	65	0	No Change	57	3.71	10448.1	\$1,723.94	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Office - Wood Shop	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.34	Wood Storage	705	4	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., No Lens	57	0.23	160.7	\$26.52	4	0	No Change	57	0.23	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Storage/Finish Room	705	2	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.09	64.9	\$10.70	2	0	No Change	46	0.09	64.86	\$10.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Corridor - Cafeteria & Wood Shop	2820	22	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.25	3,536.3	\$583.49	22	0	No Change	57	1.25	3536.28	\$583.49	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Corridor - Library & Cafeteria	2820	35	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	2.00	5,625.9	\$928.27	35	0	No Change	57	2.00	5625.9	\$928.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
7	Entry Doors	2820	1	6	2x4 6 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	172	0.17	485.0	\$80.03	1	0	No Change	172	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21		2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom	2820	7	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.60	1,697.6	\$280.11	7	0	No Change	86	0.60	1697.64	\$280.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.34	Janitor's Closet	705	1	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., No Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Sprinkler Control Room 101	705	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	50.8	\$8.38	2	0	No Change	36	0.07	50.76	\$8.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage next to Rm. 101	705	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.11	80.4	\$13.26	2	0	No Change	57	0.11	80.37	\$13.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
2.21	106	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Corridor	2820	18	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	1.03	2,893.3	\$477.40	18	0	No Change	57	1.03	2893.32	\$477.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Vestibule/ Theater Entrance	2820	13	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	0.60	1,686.4	\$278.25	13	0	No Change	46	0.60	1686.36	\$278.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10	Auditorium Lobby	2820	85	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	3.91	11,026.2	\$1,819.32	85	0	No Change	46	3.91	11026.2	\$1,819.32	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
		2820	24	1	PAR38 120W Track	120	2.88	8,121.6	\$1,340.06	24	1	23W CFL PAR38 Replacement	23	0.55	1556.64	\$256.85	\$7.65	\$183.60	2.33	6564.96	\$1,083.22	0.17	
1.21		2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Auditorium Wall Lighting	2820	23	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.83	2,335.0	\$385.27	23	0	No Change	36	0.83	2334.96	\$385.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.21		2820	1	2	2x2 2 lamp 32w T8 Utube, Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	School Resource Office	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 10	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 11	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Janitor's Closet	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Stage	705	6	1	1 Lamp, 150w Halogen bulbs, Pendant Mnt., Direct/Indirect Lens	150	0.90	634.5	\$104.69	6	1	No Change; Stage Lighting	150	0.90	634.5	\$104.69	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Old Auditorium	2820	16	1	Down Light, 200w PAR	200	3.20	9,024.0	\$1,488.96	16	1	42W CFL (150W Equivalent); See Note 6	42	0.67	1895.04	\$312.68	\$225.00	\$3,600.00	2.53	7128.96	\$1,176.28	3.06	
1.21	Computer Classroom 12	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.31	Classroom 13	2820	30	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	1.71	4,822.2	\$795.66	30	0	No Change	57	1.71	4822.2	\$795.66	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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**Investment Grade Lighting Audit - Entire Facility**

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	
2.31	entry way & Closet 13	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Classroom 14	2820	16	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.91	2,571.8	\$424.35	16	0	No Change	57	0.91	2571.84	\$424.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Electric Room	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Electric Room 15	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21		705	1	1	2x4 1 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Entry Way 15	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 15	2820	26	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	2.24	6,305.5	\$1,040.41	26	0	No Change	86	2.24	6305.52	\$1,040.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Bathroom 15	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Storage 15	705	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	60.6	\$10.00	1	0	No Change	86	0.09	60.63	\$10.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	exit area 15	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 15	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 16	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Back room 16	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 16	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Small Office 16 across from Office 16	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Director of Operations 17	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
Project: Watchung Hills  
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KWH COST: \$0.165

Building SF: 400,000

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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	
9.21	19	2820	16	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	36	0.58	1,624.3	\$268.01	16	0	No Change	36	0.58	1624.32	\$268.01	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Back Office 19	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	TV Studio Office Area	2820	8	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.69	1,940.2	\$320.13	8	0	No Change	86	0.69	1940.16	\$320.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	TV Office Track Lighting	2820	13	1	Flat Back Track Heads, 120w PAR 38 Lamp	120	1.56	4,399.2	\$725.87	13	1	23W CFL PAR38 Replacement	23	0.30	843.18	\$139.12	\$7.65	\$99.45	1.26	3556.02	\$586.74	0.17	
1.21	TV Distribution	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor between TV Studio & Old Auditorium	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Studio behind Old Auditorium access for TV editing room	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor	2820	19	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.63	4,607.9	\$760.30	19	0	No Change	86	1.63	4607.88	\$760.30	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Gym 7/8	3760	34	1	400w Metal Halides, Pendant Mount, Prismatic Lens	455	15.47	58,167.2	\$9,597.59	34	4	2'X4' 4-Lamp 54W T-5HO Reflector/Elect Ballast; Metalux F-BAY or equal	229	7.79	29275.36	\$4,830.43	\$550.00	\$18,700.00	7.68	28891.84	\$4,767.15	3.92	
2.11	Gym Office	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Bathroom in Gym Office	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Gym Exit	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Gym Locker/Shower	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Gym Locker/Shower	2820	9	1	2x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.51	1,446.7	\$238.70	9	0	No Change	57	0.51	1446.66	\$238.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Gym Office Miss Brennen	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Office Bathroom	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Exit Way	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Storage Room	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
9.11	Gym Storage Room	705	9	2	3"x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.32	228.4	\$37.69	9	0	No Change	36	0.32	228.42	\$37.69	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Storage Room	705	4	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.14	101.5	\$16.75	4	0	No Change	36	0.14	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Girls Locker Exit	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Girls Locker Exit	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor between Gym 7/8 Dance Studio	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Boy's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.22		2820	1	2	2x2 2 Lamp 32w T8 Utube, Elect. Ballast, Recessed, Parabolic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Girl's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
8.22		2820	1	2	2x2 2 Lamp 32w T8 Utube, Elect. Ballast, Recessed, Parabolic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Special Education	2820	27	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	2.32	6,548.0	\$1,080.43	27	0	No Change	86	2.32	6548.04	\$1,080.43	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Small Office	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor between Gym & Cafeteria	2820	38	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	3.27	9,215.8	\$1,520.60	38	0	No Change	86	3.27	9215.76	\$1,520.60	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor Special Reviews Ste. 23 20 - 59	2820	22	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.89	5,335.4	\$880.35	22	0	No Change	86	1.89	5335.44	\$880.35	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor 41 - 59 Gym 3/4 250 - 258	2820	37	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	3.18	8,973.2	\$1,480.58	37	0	No Change	86	3.18	8973.24	\$1,480.58	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Phys. Ed. Weight Room	2820	18	1	400w Metal Halides, Pendant Mount, Prismatic Lens	455	8.19	23,095.8	\$3,810.81	18	4	2'X4' 4-Lamp 54W T-5HO Reflector/Elect Ballast; Metalux F-BAY or equal	229	4.12	11624.04	\$1,917.97	\$550.00	\$9,900.00	4.07	11471.76	\$1,892.84	5.23	
	Gym	3760	17	1	400w Metal Halides, Pendant Mount, Prismatic Lens	455	7.74	29,083.6	\$4,798.79	17	4	2'X4' 4-Lamp 54W T-5HO Reflector/Elect Ballast; Metalux F-BAY or equal	229	3.89	14637.68	\$2,415.22	\$550.00	\$9,350.00	3.84	14445.92	\$2,383.58	3.92	
2.11	Locker Room	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Locker Room	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
2.21	Bathroom Entry Way Locker Room	2820	6	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.34	964.4	\$159.13	6	0	No Change	57	0.34	964.44	\$159.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Corridor outside Gym by 3 doors	2820	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	203.0	\$33.50	2	0	No Change	36	0.07	203.04	\$33.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor 52 - 59	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	13	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.12	3,152.8	\$520.21	13	0	No Change	86	1.12	3152.76	\$520.21	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Main Office Admin. Waiting	2820	10	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.86	2,425.2	\$400.16	10	0	No Change	86	0.86	2425.2	\$400.16	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Mail Room	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Conference Room	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Principal's Office	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Bathroom	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G12	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G1	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G2	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G10	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G8	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G11	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G9	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G3	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G4	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
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KWH COST: \$0.165

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**Investment Grade Lighting Audit - Entire Facility**

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	
1.21	G5	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G6	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Guidance Waiting	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	G7	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Conference Area	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor between Office	2820	7	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.60	1,697.6	\$280.11	7	0	No Change	86	0.60	1697.64	\$280.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Girl's Bathroom	2820	3	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.34	947.5	\$156.34	3	0	No Change	112	0.34	947.52	\$156.34	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Computer Room 82	2820	20	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.72	4,850.4	\$800.32	20	0	No Change	86	1.72	4850.4	\$800.32	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage 82	705	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.17	120.6	\$19.89	3	0	No Change	57	0.17	120.555	\$19.89	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 81	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 79	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Computer Classroom 80	2820	20	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.72	4,850.4	\$800.32	20	0	No Change	86	1.72	4850.4	\$800.32	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage 80	705	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.17	120.6	\$19.89	3	0	No Change	57	0.17	120.555	\$19.89	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.2	Classroom 77	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.2	Classroom 78	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.2	Classroom 75	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage/Office Room 78A	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 76	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	Office 73A	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 73B	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 74	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 71	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Bathroom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Janitor's Closet	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Closet	705	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	242.5	\$40.02	4	0	No Change	86	0.34	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 72B	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor	2820	25	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	2.15	6,063.0	\$1,000.40	25	0	No Change	86	2.15	6063	\$1,000.40	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Lab Prep Area 70B	2820	5	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.43	1,212.6	\$200.08	5	0	No Change	86	0.43	1212.6	\$200.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 70-13	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor outside 70B & 70	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 70	2820	8	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.69	1,940.2	\$320.13	8	0	No Change	86	0.69	1940.16	\$320.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Bathroom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Storage/IDF Room	705	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	50.8	\$8.38	2	0	No Change	36	0.07	50.76	\$8.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Walkway to Exterior	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	-0.05	-141	(\$23.27)	0.00	
1.21	Classroom 38	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 37	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	Classroom 36	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 35	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 34	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Men's Faculty Bathroom	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 21	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 20	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 22	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 23A	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Learning Consultant	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Storage	705	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	60.6	\$10.00	1	0	No Change	86	0.09	60.63	\$10.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Psychologist	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Kitchen Area 123E	2820	11	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.95	2,667.7	\$440.17	11	0	No Change	86	0.95	2667.72	\$440.17	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	File Room	705	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	121.3	\$20.01	2	0	No Change	86	0.17	121.26	\$20.01	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 23C	2820	11	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.95	2,667.7	\$440.17	11	0	No Change	86	0.95	2667.72	\$440.17	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 23D	2820	11	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.95	2,667.7	\$440.17	11	0	No Change	86	0.95	2667.72	\$440.17	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Special Services	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21		2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	School Social Worker	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Psychologist	2820			2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.00	0.0	\$0.00	0	0	No Change	86	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Conference Room	2820	7	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.60	1,697.6	\$280.11	7	0	No Change	86	0.60	1697.64	\$280.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Transition Coordinator	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Esther Carnell - School Psychologist	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	LTD	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor in Suite 23 Loop	2820	17	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.46	4,122.8	\$680.27	17	0	No Change	86	1.46	4122.84	\$680.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 23	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 24	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 26	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 25	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 28	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Nurse's Office 6	2820	7	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.60	1,697.6	\$280.11	7	0	No Change	86	0.60	1697.64	\$280.11	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Storage Nurse 6	705	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	60.6	\$10.00	1	0	No Change	86	0.09	60.63	\$10.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office Nurse 6	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Bathroom Nurse 6	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Office Boiler Room	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
Project: Watchung Hills  
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"Watchung Hills High School"

KWH COST: \$0.165

Building SF: 400,000

**Investment Grade Lighting Audit - Entire Facility**

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	
2.34	Boiler Room	705	14	2	1x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., No Lens	57	0.80	562.6	\$92.83	14	0	No Change	57	0.80	562.59	\$92.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Senior Lounge	2820	15	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.86	2,411.1	\$397.83	15	0	No Change	57	0.86	2411.1	\$397.83	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.33	Cafeteria	2820	72	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Indirect	57	4.10	11,573.3	\$1,909.59	72	0	No Change	57	4.10	11573.28	\$1,909.59	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
10		2820	48	1	Recessed Down Light, (1) 42w CFL, Prismatic Diffuser	46	2.21	6,226.6	\$1,027.38	48	0	No Change	46	2.21	6226.56	\$1,027.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
		2820	4	*	Globe Lights	0	0.00	0.0	\$0.00	4	*	No Change; See Note 7	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Kitchen	2820	29	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	1.65	4,661.5	\$769.14	29	0	No Change	57	1.65	4661.46	\$769.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Hood Lights	2820	8	1	Incandescent 60w	60	0.48	1,353.6	\$223.34	8	1	13W CFL	13	0.10	293.28	\$48.39	\$6.75	\$54.00	0.38	1060.32	\$174.95	0.31	
2.11	Kitchen Office	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Kitchen Storage	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Kitchen Locker	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Bathroom	2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Storage	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Electric Room	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Janitor's Room	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Computer Room 1	2820	16	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.38	3,880.3	\$640.25	16	0	No Change	86	1.38	3880.32	\$640.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.31	Classroom 4	2820	36	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	2.05	5,786.6	\$954.80	36	0	No Change	57	2.05	5786.64	\$954.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage Room 4	705	5	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.29	200.9	\$33.15	5	0	No Change	57	0.29	200.925	\$33.15	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage/Office 4	2820	3	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.17	482.2	\$79.57	3	0	No Change	57	0.17	482.22	\$79.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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
	Storage Room 4	705	2	1	1 Lamp, Incandescent 100w, Pendant Mnt., Direct/Indirect Lens	100	0.20	141.0	\$23.27	2	1	23W CFL	23	0.05	32.43	\$5.35	\$7.65	\$15.30	0.15	108.57	\$17.91	0.85
	Work area 4	2820	1	1	1 Lamp, Incandescent 100w, Surface Mnt., Prismatic Lens	100	0.10	282.0	\$46.53	1	1	23W CFL	23	0.02	64.86	\$10.70	\$7.65	\$7.65	0.08	217.14	\$35.83	0.21
2.31	Art Room 3	2820	30	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	1.71	4,822.2	\$795.66	30	0	No Change	57	1.71	4822.2	\$795.66	\$0.00	\$0.00	0.00	0	\$0.00	0.00
2.11	Art Room 5	2820	26	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	1.48	4,179.2	\$689.57	26	0	No Change	57	1.48	4179.24	\$689.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00
9.11	Corridor into Classroom 5	2820	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	203.0	\$33.50	2	0	No Change	36	0.07	203.04	\$33.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00
	Storage Closet 5	705	1	1	Incandescent 60w	60	0.06	42.3	\$6.98	1	1	13W CFL	13	0.01	9.165	\$1.51	\$6.75	\$6.75	0.05	33.135	\$5.47	1.23
1.21	Classroom 59	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 56	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Vice Principal Office 57A	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 54	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 57	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 52	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 55	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 53	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
9.11	Storage	705	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	50.8	\$8.38	2	0	No Change	36	0.07	50.76	\$8.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Stairwell	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00
9.11	Stairwell	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Lounge 251A	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 251	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00

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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	
1.21	Classroom 252	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 252	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 253	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 254	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 255	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 256	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 257	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 258	2820	9	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.77	2,182.7	\$360.14	9	0	No Change	86	0.77	2182.68	\$360.14	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Storage/Books	705	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	50.8	\$8.38	2	0	No Change	36	0.07	50.76	\$8.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Girl's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Storage Closet	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Storage	705	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	80.4	\$13.26	2	0	No Change	57	0.11	80.37	\$13.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 48	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Classroom 48B	2820	2	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.11	321.5	\$53.04	2	0	No Change	57	0.11	321.48	\$53.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Classroom 48B	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 51	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 49	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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1.21	Classroom 46	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Lounge 44A	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 47	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office/Lab 45B	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 45A	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 44	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 42	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 45	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Small Office Corridor	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 40	2820	17	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.46	4,122.8	\$680.27	17	0	No Change	86	1.46	4122.84	\$680.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Prep Room/Office	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Prep Room 42	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 43	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Prep Room/Storage 43B	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 41	2820	15	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.29	3,637.8	\$600.24	15	0	No Change	86	1.29	3637.8	\$600.24	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Electric Room	705	2	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.07	50.8	\$8.38	2	0	No Change	36	0.07	50.76	\$8.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Boy's Bathroom	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

CEG Job #: 9C09046  
Project: Watchung Hills  
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KWH COST: \$0.165

Building SF: 400,000

**Investment Grade Lighting Audit - Entire Facility**

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	
1.21	Copier Room	705	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	121.3	\$20.01	2	0	No Change	86	0.17	121.26	\$20.01	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 30	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office and Storage Room 31	2820	10	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.86	2,425.2	\$400.16	10	0	No Change	86	0.86	2425.2	\$400.16	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 32	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 33	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Corridor between Classrooms 30 & 38	2820	24	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	2.06	5,820.5	\$960.38	24	0	No Change	86	2.06	5820.48	\$960.38	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Girl's Bathroom	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Boy's Bathroom	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Gym Office	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Gym Office Bathroom	2820	1	1	1 Lamp, 32w T8, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
	Gym Office Shower	2820	1	1	1 Lamp, 100w A19, Surface Mnt., Prismatic Lens	100	0.10	282.0	\$46.53	1	1	23W CFL	23	0.02	64.86	\$10.70	\$7.65	\$7.65	0.08	217.14	\$35.83	0.21	
9.11	Girl's Locker Room	2820	15	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.54	1,522.8	\$251.26	15	0	No Change	36	0.54	1522.8	\$251.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Storage	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Janitor's Closet	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	106 across Wood Shop	2820	42	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	3.61	10,185.8	\$1,680.66	42	0	No Change	86	3.61	10185.84	\$1,680.66	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.11	Office 106	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Men outside Bathroom	2820	3	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.11	304.6	\$50.25	3	0	No Change	36	0.11	304.56	\$50.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Janitor's room in Men's Bathroom	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Bathroom women for outside	2820	3	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.11	304.6	\$50.25	3	0	No Change	36	0.11	304.56	\$50.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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	
1.21	Office 108A	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office 108B	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Corridor Room 112 to Storage area	2820	12	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	1.34	3,790.1	\$625.36	12	0	No Change	112	1.34	3790.08	\$625.36	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
7		2820	2	6	2x4 6 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	172	0.34	970.1	\$160.06	2	0	No Change	172	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Superintendent Office	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Student Assistant Office	2820	4	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.23	643.0	\$106.09	4	0	No Change	57	0.23	642.96	\$106.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Stairwell to 270 - 285	2820	5	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.56	1,579.2	\$260.57	5	0	No Change	112	0.56	1579.2	\$260.57	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21		2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Top of Stairwell 270 - 285	2820	2	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.22	631.7	\$104.23	2	0	No Change	112	0.22	631.68	\$104.23	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Book Storage	705	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	363.8	\$60.02	6	0	No Change	86	0.52	363.78	\$60.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
6	Boy's Bathroom	2820	3	4	2x4 4 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	112	0.34	947.5	\$156.34	3	0	No Change	112	0.34	947.52	\$156.34	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
9.11	Janitor's Closet J-8	2820	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	101.5	\$16.75	1	0	No Change	36	0.04	101.52	\$16.75	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	English Office 285	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 284	2820	20	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.72	4,850.4	\$800.32	20	0	No Change	86	1.72	4850.4	\$800.32	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.31	Storage	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Pendant Mnt., Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Classroom 282	2820	16	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.38	3,880.3	\$640.25	16	0	No Change	86	1.38	3880.32	\$640.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
2.21	Storage	705	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	57	0.06	40.2	\$6.63	1	0	No Change	57	0.06	40.185	\$6.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
1.21	Office/Lounge Copy Room 283	2820	4	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.34	970.1	\$160.06	4	0	No Change	86	0.34	970.08	\$160.06	\$0.00	\$0.00	0.00	0	\$0.00	0.00	

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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
1.21	Small Computer Room 283	2820	1	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.09	242.5	\$40.02	1	0	No Change	86	0.09	242.52	\$40.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 281	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 279	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 277	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 280	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Spare Room/Teacher Lounge 278/76	2820	8	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.69	1,940.2	\$320.13	8	0	No Change	86	0.69	1940.16	\$320.13	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 275	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 274	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 272	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 273	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 271A	2820	6	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.52	1,455.1	\$240.09	6	0	No Change	86	0.52	1455.12	\$240.09	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 270	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
9.11	Storage	705	1	1	3"x4 1 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	36	0.04	25.4	\$4.19	1	0	No Change	36	0.04	25.38	\$4.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Girl's Bathroom	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Classroom 271	2820	12	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.03	2,910.2	\$480.19	12	0	No Change	86	1.03	2910.24	\$480.19	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Corridor between Classrooms 285 - 271	2820	23	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	1.98	5,578.0	\$920.36	23	0	No Change	86	1.98	5577.96	\$920.36	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Stairwell Top	2820	3	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.26	727.6	\$120.05	3	0	No Change	86	0.26	727.56	\$120.05	\$0.00	\$0.00	0.00	0	\$0.00	0.00
1.21	Stairwell Bottom	2820	2	3	2x4 3 Lamp 32w T8 Elect. Ballast, Recessed, Prismatic Lens	86	0.17	485.0	\$80.03	2	0	No Change	86	0.17	485.04	\$80.03	\$0.00	\$0.00	0.00	0	\$0.00	0.00

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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
2.11		2820	1	2	2x4 2 Lamp 32w T8 Elect. Ballast, Surface Mnt., Prismatic Lens	57	0.06	160.7	\$26.52	1	0	No Change	57	0.06	160.74	\$26.52	\$0.00	\$0.00	0.00	0	\$0.00	0.00
	Exterior		28	1	Wallpack, (1) 100w HPS	125	3.50	0.0	\$0.00	28	1	No Change	125	3.50	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
			57	2	Wallpack, (2) 42w CFL	92	5.24	0.0	\$0.00	57	2	No Change	92	5.24	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
			27	1	Wallpack, (1) 42w CFL	46	1.24	0.0	\$0.00	27	1	No Change	46	1.24	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
	<b>Totals</b>		5031	1339			448.35	1,266,260	\$208,932.83	4919	39			423.18	1,184,893	\$195,507.42		\$42,446.15	25.16	81366	\$13,425.42	3.16

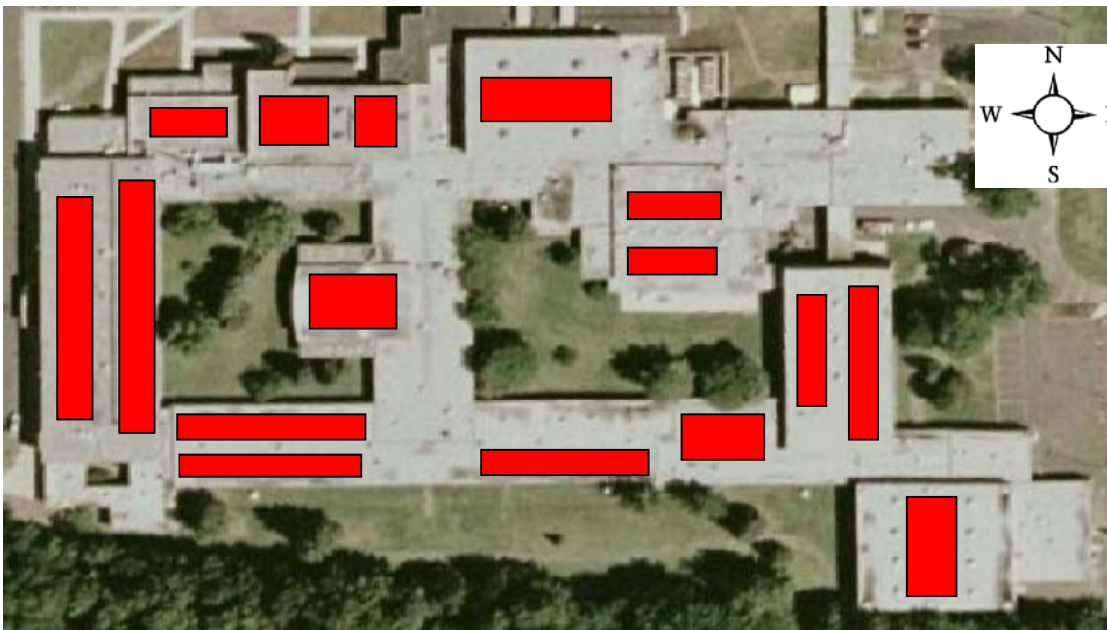
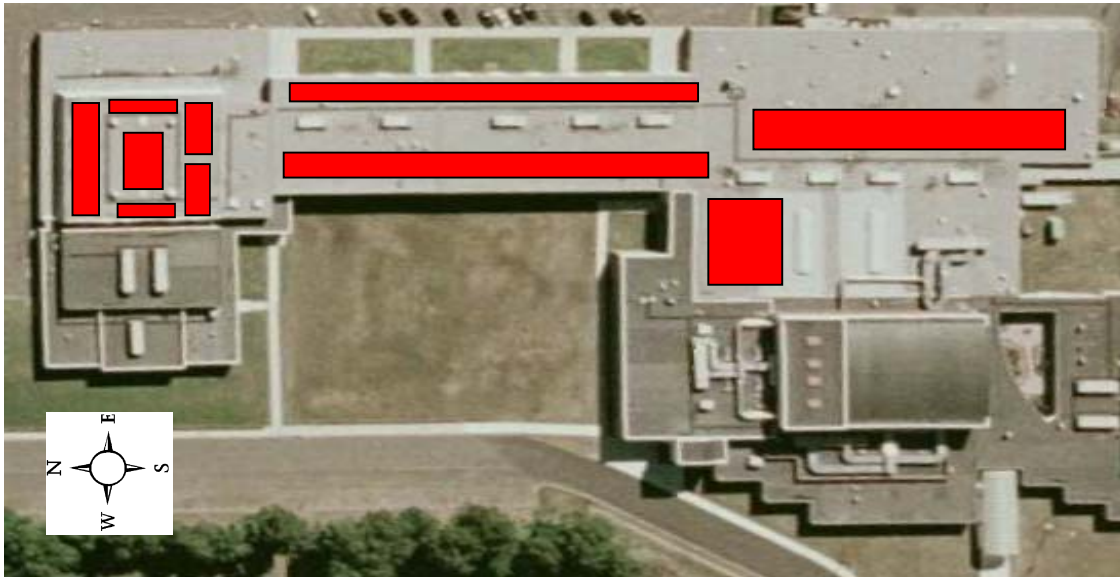
**NOTES:** 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

- 2. Room S-11 was locked at time of survey.
  - 3. Office 118 was locked; auditor made assumption based on similar rooms.
  - 4. Home Economics 108B was locked at time of survey.
  - 5. Auditorium Stage & Seating - Auditor has chosen to not replace these fixtures at this time due to issues with partial dimming capability of CFL type fixtures.
  - 6. Old Auditorium - Currently CFL replacement for a 200W incandescent is not available. However, Owner should review possibility of replacing 200W incandescent with a 150W equivalent, 42W CFL.
- Light levels should be reviewed with a lighting designer prior to implementation.

Project Name: LGEA Solar PV Project - Wachung Hills Regional High School									
Location: Warren, NJ									
Description: Photovoltaic System 95% Financing - 20 year									
<b>Simple Payback Analysis</b>									
		<b>Photovoltaic System 95% Financing - 20 year</b>							
Total Construction Cost		\$8,954,820							
Annual kWh Production		1,034,666							
Annual Energy Cost Reduction		\$170,720							
Annual SREC Revenue		\$362,133							
First Cost Premium		<b>\$8,954,820</b>							
Simple Payback:		<b>16.81</b> Years							
<b>Life Cycle Cost Analysis</b>									
Analysis Period (years):	25							Financing %:	95%
Financing Term (mths):	300							Maintenance Escalation Rate:	3.0%
Average Energy Cost (\$/kWh):	<b>\$0.165</b>							Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%							SREC Value (\$/kWh):	\$0.350
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	\$447,741	0	0	0	\$0	0	0	(447,741)	0
1	\$0	1,034,666	\$170,720	\$0	\$362,133	\$591,373	\$130,142	(\$188,662)	(\$636,403)
2	\$0	1,029,493	\$175,841	\$0	\$360,322	\$581,965	\$139,550	(\$185,351)	(\$821,754)
3	\$0	1,024,345	\$181,117	\$0	\$358,521	\$571,877	\$149,639	(\$181,878)	(\$1,003,632)
4	\$0	1,019,223	\$186,550	\$0	\$356,728	\$561,059	\$160,456	(\$178,237)	(\$1,181,869)
5	\$0	1,014,127	\$192,147	\$10,446	\$354,945	\$549,460	\$172,055	(\$184,869)	(\$1,366,738)
6	\$0	1,009,057	\$197,911	\$10,393	\$353,170	\$537,022	\$184,493	(\$180,827)	(\$1,547,566)
7	\$0	1,004,011	\$203,848	\$10,341	\$351,404	\$523,685	\$197,830	(\$176,604)	(\$1,724,170)
8	\$0	998,991	\$209,964	\$10,290	\$349,647	\$509,384	\$212,131	(\$172,194)	(\$1,896,364)
9	\$0	993,996	\$216,263	\$10,238	\$347,899	\$494,049	\$227,466	(\$167,592)	(\$2,063,955)
10	\$0	989,026	\$222,751	\$10,187	\$346,159	\$477,605	\$243,910	(\$162,792)	(\$2,226,747)
11	\$0	984,081	\$229,433	\$10,136	\$344,428	\$459,973	\$261,542	(\$157,789)	(\$2,384,537)
12	\$0	979,161	\$236,316	\$10,085	\$342,706	\$441,066	\$280,449	(\$152,578)	(\$2,537,115)
13	\$0	974,265	\$243,406	\$10,035	\$340,993	\$420,792	\$300,723	(\$147,152)	(\$2,684,266)
14	\$0	969,394	\$250,708	\$9,985	\$339,288	\$399,053	\$322,462	(\$141,504)	(\$2,825,771)
15	\$0	964,547	\$258,229	\$9,935	\$337,591	\$375,742	\$345,773	(\$135,629)	(\$2,961,400)
16	\$0	959,724	\$265,976	\$9,885	\$335,903	\$350,746	\$370,769	(\$129,521)	(\$3,090,921)
17	\$0	954,925	\$273,955	\$9,836	\$334,224	\$323,943	\$397,572	(\$123,172)	(\$3,214,093)
18	\$0	950,151	\$282,174	\$9,787	\$332,553	\$295,203	\$426,312	(\$116,575)	(\$3,330,668)
19	\$0	945,400	\$290,639	\$9,738	\$330,890	\$264,385	\$457,130	(\$109,724)	(\$3,440,391)
20	\$0	940,673	\$299,358	\$9,689	\$329,236	\$231,339	\$490,176	(\$102,610)	(\$3,543,001)
21	\$0	935,970	\$308,339	\$9,640	\$327,589	\$210,767	\$450,622	(\$35,101)	(\$3,578,102)
22	\$0	931,290	\$317,589	\$9,592	\$325,951	\$170,316	\$370,821	\$92,812	(\$3,485,290)
23	\$0	926,633	\$327,117	\$9,544	\$324,322	\$0	\$0	\$641,894	(\$2,843,396)
24	\$0	922,000	\$336,930	\$9,497	\$322,700	\$0	\$0	\$650,134	(\$2,193,262)
25	\$0	917,390	\$347,038	\$9,449	\$321,087	\$0	\$0	\$658,676	(\$1,534,586)
<b>Totals:</b>	19,739,259	19,739,259	\$4,587,307	\$161,005	\$6,908,740	\$8,959,721	\$5,470,583	\$6,292,026	(\$58,115,998)
Net Present Value (NPV)								(\$1,564,676)	
Internal Rate of Return (IRR)								#DIV/0!	

Project Name: LGEA Solar PV Project - Wachung Hills Regional High School							
Location: Warren, NJ							
Description: Photovoltaic System - Direct Purchase							
<b>Simple Payback Analysis</b>							
	<b>Photovoltaic System - Direct Purchase</b>						
Total Construction Cost	\$8,954,820						
Annual kWh Production	1,034,666						
Annual Energy Cost Reduction	\$170,720						
Annual SREC Revenue	\$362,133						
First Cost Premium	<b>\$8,954,820</b>						
Simple Payback:	<b>16.81</b>						Years
<b>Life Cycle Cost Analysis</b>							
Analysis Period (years):	25			Financing %:	0%		
Financing Term (mths):	0			Maintenance Escalation Rate:	3.0%		
Average Energy Cost (\$/kWh)	<b>\$0.165</b>			Energy Cost Escalation Rate:	3.0%		
Financing Rate:	0.00%			SREC Value (\$/kWh)	\$0.350		
Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	\$8,954,820	0	0	0	\$0	(8,954,820)	0
1	\$0	1,034,666	\$170,720	\$0	\$362,133	\$532,853	(\$8,421,967)
2	\$0	1,029,493	\$175,841	\$0	\$360,322	\$536,164	(\$7,885,803)
3	\$0	1,024,345	\$181,117	\$0	\$358,521	\$539,638	(\$7,346,166)
4	\$0	1,019,223	\$186,550	\$0	\$356,728	\$543,278	(\$6,802,887)
5	\$0	1,014,127	\$192,147	\$10,446	\$354,945	\$536,646	(\$6,266,241)
6	\$0	1,009,057	\$197,911	\$10,393	\$353,170	\$540,688	(\$5,725,554)
7	\$0	1,004,011	\$203,848	\$10,341	\$351,404	\$544,911	(\$5,180,642)
8	\$0	998,991	\$209,964	\$10,290	\$349,647	\$549,321	(\$4,631,321)
9	\$0	993,996	\$216,263	\$10,238	\$347,899	\$553,923	(\$4,077,398)
10	\$0	989,026	\$222,751	\$10,187	\$346,159	\$558,723	(\$3,518,675)
11	\$0	984,081	\$229,433	\$10,136	\$344,428	\$563,726	(\$2,954,949)
12	\$0	979,161	\$236,316	\$10,085	\$342,706	\$568,937	(\$2,386,012)
13	\$0	974,265	\$243,406	\$10,035	\$340,993	\$574,364	(\$1,811,648)
14	\$0	969,394	\$250,708	\$9,985	\$339,288	\$580,011	(\$1,231,637)
15	\$0	964,547	\$258,229	\$9,935	\$337,591	\$585,886	(\$645,751)
16	\$0	959,724	\$265,976	\$9,885	\$335,903	\$591,994	(\$53,757)
17	\$0	954,925	\$273,955	\$9,836	\$334,224	\$598,343	\$544,586
18	\$0	950,151	\$282,174	\$9,787	\$332,553	\$604,940	\$1,149,527
19	\$0	945,400	\$290,639	\$9,738	\$330,890	\$611,792	\$1,761,318
20	\$0	940,673	\$299,358	\$9,689	\$329,236	\$618,905	\$2,380,223
21	\$1	935,970	\$308,339	\$9,640	\$327,589	\$626,288	\$3,006,511
22	\$2	931,290	\$317,589	\$9,592	\$325,951	\$633,948	\$3,640,460
23	\$3	926,633	\$327,117	\$9,544	\$324,322	\$641,894	\$4,282,354
24	\$4	922,000	\$336,930	\$9,497	\$322,700	\$650,134	\$4,932,488
25	\$5	917,390	\$347,038	\$9,449	\$321,087	\$658,676	\$5,591,164
<b>Totals:</b>		19,739,259	\$4,587,307	\$161,005	\$6,908,740	\$14,545,984	\$11,335,043
<b>Net Present Value (NPV)</b>						<b>\$5,591,189</b>	
<b>Internal Rate of Return (IRR)</b>						<b>4.0%</b>	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW <sub>DC</sub>	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
WHRHS	63600	Sunpower SPR230	4326	14.7	63,610	994.98	1,034,666	142,758	15.64



[Red Rectangle] := Proposed PV Layout

Notes:

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