HILLSBOROUGH TOWNSHIP SCHOOL DISTRICT
AMSTERDAM ELEMENTARY SCHOOL
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24455

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REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

The Hillsborough Township School District recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Amsterdam Elementary School	301 Amsterdam Drive Hillsborough, NJ 08844	58,000	1989

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey Clean Energy Program (NJCEP) incentives. Potential annual savings of $14,840 for the recommended ECMs may be realized with a payback of 22.6 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures

Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1a	HP Split Systems Replacement (Nurse office)	5,000	40	>20	300	>20	X
ECM-1b	DX Split Systems Replacement (4 Unit)	8,000	100	>20	400	>20	X
ECM-1c	DX Split Systems Replacement (5 Unit)	16,000	100	>20	500	>20	X
ECM-1d	DX Split Systems Replacement (7.5 Unit)	23,000	100	>20	700	>20	X
ECM-1e	HP Split Systems Replacement -Library	27,000	100	>20	900	>20	X
ECM-2	Boiler Replacement	199,000	1,500	>20	6,000	>20	X
ECM-3	Domestic Hot Water System Improvements	4,000	400	10.0	300	9.3	X
ECM-4	Install VSDs and Premium Motors on HW Pumps	11,000	1,500	7.3	2,000	6.0	X
ECM-5	Lighting Replacement / Upgrades	17,000	2,400	7.1	100	7.0	
ECM-6	Install Lighting Controls (Occupancy Sensors)	17,000	5,300	3.2	2,900	2.7	
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	34,000	7,600	4.5	3,000	4.1	X
ECM-8	Install Low Flow Plumbing Fixtures	23,000	3,400	6.8	0	6.8	X

* Incentive shown is the maximum amount potentially available per the NJ SmartStart Program

2.0 INTRODUCTION AND BACKGROUND

The Amsterdam Elementary School building is a single story 58,000 square foot facility. The building was constructed in 1989 and has not received any additions. The building is configured with four wings radiating out from a central commons area. Three wings contain classrooms, with the fourth wing containing the cafeteria, gymnasium, music room, and boiler room. The school hours of operation are from 7:50 AM – 2:25 PM Monday through Friday, with various after-school activities. The building is occupied approximately 10 hours per day Monday through Friday; totaling 50-60 hours per week. The school has approximately 500 students and 80 facility members.

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

3.0 EXISTING CONDITIONS

3.1 Building - General

The building envelopes of the main building and the addition are constructed of 6" block walls (CMU), 2" rigid insulation, 2" air space, 4" CMU and plaster. The majority of the interior walls are also painted plaster walls. The roof is constructed of asphalt impregnated fiberglass shingle roof system. The entire roof has been replaced within the last ten years and is in good condition per the ARMM Associates assessment

Windows and doors have been upgraded within the last decade. Windows are double pane glazing with an aluminum frame.

3.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered by PSE&G and supplied by Direct Energy. Natural gas supplied by Hess and Woodruff Energy and delivered by PSE&G. Water is paid for through New Jersey American Water.

The school has one electric meter serving the site. From June 2011 through May 2012, the electric usage for the facility was approximately 387,700 kWh at a cost of about $58,100. Review of electricity bills during this period showed that the facility was charged at the following rates: supply unit cost of $0.126 per kWh; demand unit cost of $6.66 per kW; and blended unit cost of $0.15 per kWh. Electrical usage was generally higher in the winter months when heating equipment was operational. From June 2011 through May 2012, gas-fired equipment consumed about 16,500 therms of natural gas. Based on the annual cost of about $17,000, the blended price for natural gas was $1.03 per therm. Natural gas consumption was highest in winter months for heating. See Appendix A for a detailed utility analysis.

The delivery component of the electric and natural gas bills will always be the responsibility of the utility that connects the facility to the power grid or gas line; however, the supply can be purchased from a third party; as is currently the case with electricity and natural gas. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers. According to the U.S. Energy Information Administration, the average commercial unit costs of electricity and natural gas in New Jersey during the same periods as those noted above was $0.141 per kWh and $0.959 per therm. When compared to the average state values, it is recommended that the present natural gas and electricity supply rate be maintained.

3.3 HVAC Systems

Boilers create hot water which provides heat to the school. There are three (3) Weil-McLain gas fired hot water boilers located in the mechanical room that each has inputs of 2,048 MBH, outputs of 1,632 MBH and 82% efficiency. They were installed in 1989 and are in good condition, although some indications of recent ongoing repairs were noted. These boilers are controlled using a hot water reset schedule based on outdoor air temperatures. The supply water temperature can only be reset to 160 F due to the non-condensing construction of the boilers. The

heating hot water is pumped throughout the building by two 5 HP pumps operating in a lead/lag fashion. The electrical efficiency of these pumps is 82.5%.

The boilers produce hot water that is distributed to classroom unit ventilators and large heating and ventilation units (HV) that serve the gym, cafeteria and auditorium. The heating hot water is also used by small terminal units such as cabinet heaters and unit heaters.

Of the school's 58,000 square feet, approximately 25%, or 14,500 square feet, is mechanically cooled using ducted split system heat pumps. These units resemble residential air handling unit that are piped to individual ground mounted heat pump condenser units. Each air handling unit serves at least one area; some units supply multiple offices. Each office served has a duct mounted hot water re-heat coil to control the space temperatures in the winter.

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

3.4 Control Systems

The majority of the building is controlled by pneumatic controls manufactured by Automated Logic. A portion of the school's mechanical systems are based on a different vender, Pro-logic, which are remotely monitored and programmed by the third party energy managers Energy for America (EFA). The units that are controlled by EFA are turned off after 3pm, unless they are requested to be operated after regular occupied times.

Occupied heating temperatures are maintained between 68-72 F. Unoccupied heat temperatures are regulated to be above freezing. Occupied cooling is maintained between 72 and 76 F during occupied times and "off" during unoccupied times.

3.5 Lighting/Electrical Systems

The facility has upgraded incandescent fixtures to compact florescent lighting (CFLs). The ballasts have been upgraded from magnetic to electronic as well. A majority of the lighting fixtures in instructional areas, office spaces, corridors, etc., are T8 fluorescent fixtures, with specialty lighting in the gymnasiums and building exterior. There are also a very small percentage of ancillary areas lit from incandescent bulbs. The majority of lights are switched manually; exception is the gymnasium.

Parking lot lighting consists of pole mounted high pressure sodium light fixtures which are on a timer. The building exterior utilizes 175W metal halide lamps.

3.6 Plumbing Systems

The school utilizes an AO Smith 250 gallon domestic hot water heater having an input of 300 MBH which was installed in 1989.The unit is in good condition and of standard efficiency (80%). The domestic hot water is provided to toilet rooms and custodial closet sinks. The school does not have a full cooking kitchen or locker room showers.

The school has a mixture of older and newer style fixtures in the restrooms. It was determined that there is are 35toilets, 21 sinks and 6 urinals.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Replace Heat Pump Split Systems

The facility is seven heat pump split systems to that provide heating and cooling to spaces. These units are 1989 vintage and have estimated cooling EERs of 9.0. The units use R-22 refrigerant which is being phased out of production and will become increasingly expensive. The replacement units are of the same capacity, and use environmentally friendly 410A refrigerant and have higher efficiencies. It is recommended that the complete systems be replaced through attrition with higher energy efficiency ratio (EER) systems. This ECM assesses replacing each size of split system with a new high efficiency system and shows the respective energy savings. The total energy savings would be the sum of the savings for each size unit.

The assumption of this calculation is that the operating hours and capacity remain the same. The energy savings is the result of operating a higher efficiency unit.

Split systems units have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 31,500 kWh and $4,500.

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

ECM-1a Replace Heat Pumps Split Systems (Nurse Office)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
5,000	0	300	0	0	40	0	40	(0.9)	300	>20	>20

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

ECM-1b Replace Heat Pumps Split Systems (4 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
8,000	0	400	0	0	100	0	100	(0.9)	400	>20	>20

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

ECM-1c Replace Heat Pumps Split Systems (5 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
16,000	0	500	0	0	100	0	100	(0.9)	500	>20	>20

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

ECM-1d Replace Heat Pumps Split Systems (7.5 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
23,000	0	500	0	0	100	0	100	(1.0)	900	>20	>20

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

ECM-1e Replace Heat Pumps Split Systems (Library)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
27,000	0	500	0	0	100	0	100	(0.9)	900	>20	>20

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

This measure is recommended due to the remaining estimated useful life of the equipment

4.2 ECM-2 Boiler Replacement

Three Weil-McLain gas fired hot water boilers located in the mechanical room having inputs of 2,048 MBH, outputs of 1,632 MBH and 82% efficiency. They were installed in 1989 and appear to be in good condition. These boilers utilize a hot water reset schedule based on outdoor air temperature. This ECM addresses replacing one of the three boilers with a higher efficiency condensing type boiler. This new boiler would be sized for 100% of the building peak load, but would rarely operate at that capacity. The new boiler would be the primary heating boiler while the remaining two boilers would be used as a back-up heat source. The condensing boiler could also be used for dual duty, providing heating hot water part of the year and creating domestic hot water all of the year. The increased system efficiency will result in lower natural gas usage.

Natural gas-fired boilers have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 45,000 therms of natural gas and $45,000.
The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Boiler Replacement

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Gals	$	$	$		$	Years	Years
199,000	0	0	1,500	0	1,500	0	1,500	(0.8)	6,000	>20	>20

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

This measure is recommended due to the estimated useful life of the boilers which may require their replacement in the near future.

4.3 ECM-3 Domestic Hot Water System Improvements

The facility utilizes an AO Smith 250 gallon domestic hot water heater with an input of 300 MBH which was installed in 1989. The unit is in good condition however it is oversized based on the typical usage for an elementary school. This ECM assesses replacing the large tank-type water heater with an instantaneous high- efficiency water heater that will produce an adequate amount of hot water with having stand-by losses.

According to the U.S. Department of Energy, 2.5% of stored capacity is lost every hour during DHW heater standby. This value was applied to the total volume to determine annual standby losses. Proposed efficiency was based on a typical high efficiency natural gas condensing type hot water heater; it was calculated that $400 would be saved per year. The new water heaters will require water and gas piping modifications, venting, and electrical connections.

Domestic hot water heaters have an expected life of 12 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 4,800 therms and $4,800.

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

ECM-3 Domestic Hot Water System Improvements

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Kgals	$	$	$		$	Years	Years
4,000	0	0	400	0	400	0	400	0.2	300	10.0	9.3

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

This measure is recommended.

4.4 ECM-4 Install Variable Speed Drives and Premium Motors for Heating Pumps

The hot water system is served by two 5 HP pumps. The pumps are constant speed / constant flow and have standard efficiency motors. The hot water system pumps operate at a constant speed (constant water flows) even though the building load does not require all of the flow to maintain temperatures. By adding variable speed drives (VSDs) and inverter duty premium efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved.

The calculation uses an “on” setpoint of 55°F and bin weather data to estimate the heating hours of the building for the year. It was calculated that the heating hours are 4,887. The assumption of this calculation is that the operating hours, motor horsepower, and capacity remain constant.

VSD’s have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 151,500 kWh and $22,500.
The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-4 Install VSDs and Premium Motors for heating pumps

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Kgals	$	$	$		$	Years	Years
11,000	0	10,100	0	0	1,500	0	1,500	0.6	2,000	7.3	6.0

* Does not qualify for an Incentive per the New Jersey SmartStart Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.5 ECM-5 Lighting Replacement / Upgrades

The facility has upgraded incandescent fixtures to compact florescent lighting (CFLs). The ballasts have been upgraded from magnetic to electronic as well. A majority of the lighting fixtures in instructional areas, office spaces, corridors, etc., are T8 fluorescent fixtures, with specialty lighting in the gymnasiums and building exterior. There are also a very small percentage of ancillary areas lit from incandescent bulbs. The majority of lights are switched manually; exception is the gymnasium. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C). There is an opportunity to continue to reduce consumption more by upgrading the classrooms to a super T-8 fixture.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 16,200 kWh with an electrical demand reduction of about 4.2 kW. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 243,000 kWh and $36,000.

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

ECM-5 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
17,000	4.2	16,200	0	0	2,400	0	2,400	1.1	100	7.1	7.1

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

This measure is not recommended in lieu of ECM-7.

4.6 ECM-6 Install Lighting Controls (Occupancy Sensors)

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

Using a process similar to that utilized in section 4.6, the energy savings for this measure were calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture. The difference between the two values resulted in an annual savings of 41,600 kWh. Ceiling-mounted occupancy sensors with dimmer control are required for this measure.

Occupancy sensors have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 624,000 kWh and $79,500.

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

ECM-6 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
17,000	0.0	41,600	0	0	5,300	0	5,300	4.6	2,900	3.2	2.7

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

This measure is not recommended in lieu of ECM-7.

4.7 ECM-7 Lighting Replacements with Controls (Occupancy Sensors)

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECMs-6 and 7 to reflect actual expected energy and demand reduction.

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 867,000 kWh and $114,000.

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

ECM-7 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Gals	$	$	$		$	Years	Years
34,000	4.2	57,800	0	0	7,600	0	7,600	2.4	3,000	4.5	4.1

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

This measure is recommended.

4.8 ECM-8 Install Low Flow Plumbing Fixtures

The facility has a mixture of older and newer style plumbing fixtures in the restrooms. The older style fixtures consume more water than modern plumbing fixtures. It was determined that there is a combination of 35toilets, 21 sinks and 6 urinals with an average water use of 3.5 gal/flush. Per the number of occupants, it was estimated that each toilet and faucet is utilized approximately nine times per day.

The water savings associated from replacing these fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the number of times each fixture is used, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 gals/flush toilets, 0.5 gal/flush urinal and 0.5 gallon per minute metered or infrared faucets would save approximately 310 kGallons of water annually.

Toilets and faucets have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 300 KGal and $3,400.

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

ECM-8 Install Low Flow Plumbing

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
23,000	0	0	0	310	3,400	0	3,400	1.2	0	6.8	6.8

* There is no incentive available through the New Jersey Smart Start or Direct Install Programs for this ECM. See section 5.0 for other incentive opportunities.

This measure is recommended.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

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

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

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

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

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

<u>Electric</u>

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

<u>Gas</u>

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

Incentive cap: 25% of total project cost

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

<u>Electric</u>

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.

- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

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

Combining incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above the 15% minimum target to 20%, calculated with the EPA Portfolio Manager benchmarking tool, not to exceed 50% of total project cost.

Total P4P incentives are summarized below:

	Incentives $		
	Electric	**Gas**	**Total**
Incentive #1	$0	$0	$5,800
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total	**$0**	**$0**	**$5,800**

The current ECM's does not meet the minimum savings of 15% and therefore the building will not be eligible for incentives #2 and #3. See Appendix D for additional details.

A separate calculation was done which didn't include the roof replacement measure. The results are shown in Appendix D.

5.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 201 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the facility qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

The facility is eligible for several incentives available under New Jersey Smart Start Programs. The total amount of all qualified incentives is about $14,000.

5.1.3 Direct Install Program

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

case-by-case basis, the program manager may accept a project for a customer that is within 10% of the 150 kW peak demand threshold.

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

The program pays 70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

This program is applicable to the school based on the school's average peak demand of 132.8 kW.

5.1.4 Energy Savings Improvement Plans (ESIP)

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

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

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

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

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The facility was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the facility does not pay taxes this project is not eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about $95/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The existing load justifies the use of a 40 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 40 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
$	kW	kWh	Therms	$	$	$	$	Years	Years
160,000	40.0	47,061	0	7,059	7,059	0	3,530	>20	15.1

** Estimated Solar Renewable Energy Certificate Program (SREC) for 15 years at $75/1000 kWh

This measure is not recommended due to the long payback time. It is suggested, however, that the market for SREC credits is closely monitored. This market is fluctuating, and if the value per SREC is increased the measure could potentially show for a shorter payback in the near future.

6.1.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by gas-fired water heaters and, therefore, this measure would offer natural gas utility savings.

6.2 Demand Response Curtailment

Presently, Electricity is delivered by Public Service Electric and Gas (PSE&G), which receives the electricity from regional power grid RFC. PSE&G is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From June 2011 through May 2012 the facility had a maximum electricity demand of 132.8 kW and a minimum of 89.6 kW. The monthly average over the observed 12 month period was 115.2 kW.

This measure is not recommended.

7.0 EPA PORTFOLIO MANAGER

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

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

Building	Site EUI kBtu/ft^2/yr	Source EUI Btu/ft^2/yr	Energy Star Rating (1-100)
Amsterdam Elementary School	51	106	62

The facility has an above average EUI. By implementing the measures discussed in this report, it is expected that the EUI can be reduced.

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

Username: hillsboroughboe
Password: energystar

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

The user name and password for the building's EPA Portfolio Manager Account has been provided to Dave Frusco, Director of Facilities

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Amsterdam Elementary School in Hillsborough, New Jersey identified potential ECMs for installing VSDs and Premium Motors on HW pumps, Domestic Hot Water Improvements, installing low flow fixtures, and lighting and control replacement. Potential annual savings of $14,840 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1a Replace Heat Pumps Split Systems (Nurse Office)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
5,000	0	300	0	0	40	0	40	(0.9)	300	>20	>20

ECM-1b Replace Heat Pumps Split Systems (4 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
8,000	0	400	0	0	100	0	100	(0.9)	400	>20	>20

ECM-1c Replace Heat Pumps Split Systems (5 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
16,000	0	500	0	0	100	0	100	(0.9)	500	>20	>20

ECM-1d Replace Heat Pumps Split Systems (7.5 Ton Unit)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
23,000	0	500	0	0	100	0	100	(1.0)	900	>20	>20

ECM-1e Replace Heat Pumps Split Systems (Library)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
27,000	0	500	0	0	100	0	100	(0.9)	900	>20	>20

ECM-2 Boiler Replacement

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Gals	$	$	$		$	Years	Years
199,000	0	0	1,500	0	1,500	0	1,500	(0.8)	6,000	>20	>20

ECM-3 Domestic Hot Water System Improvements

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Kgals	$	$	$		$	Years	Years
4,000	0	0	400	0	400	0	400	0.2	300	10.0	9.3

ECM-4 Install VSDs and Premium Motors for heating pumps

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Kgals	$	$	$		$	Years	Years
11,000	0	10,100	0	0	1,500	0	1,500	0.6	2,000	7.3	6.0

ECM-7 Lighting Replacements with Occupancy Controls (Sensors)

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Gals	$	$	$		$	Years	Years
34,000	4.2	57,800	0	0	7,600	0	7,600	2.4	3,000	4.5	4.1

ECM-8 Install Low Flow Plumbing

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	kGals	$	$	$		$	Years	Years
23,000	0	0	0	310	3,400	0	3,400	1.2	0	6.8	6.8

APPENDIX A

Utility Usage Analysis

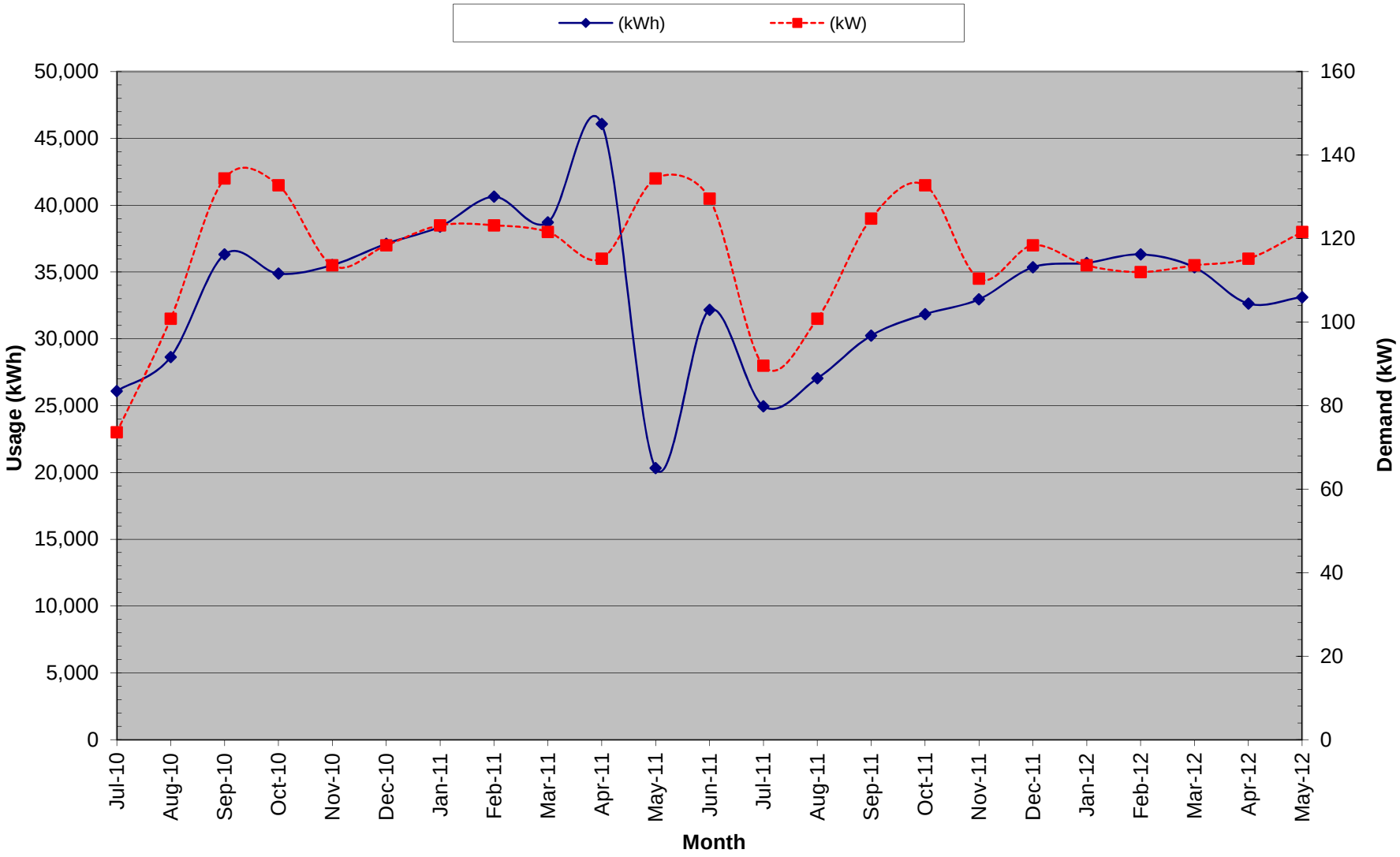
Hillsborough Township BOE
379 South Branch Rd., Hillsborough, NJ 08844

Electric Service
Delivery - PSE&G
Supplier - Direct Energy

For Service at: **Amsterdam Elementary School**
Account No.: **70-056-097-00 / 1116707**
Meter No.: **9193431**

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
July-10	26,080	73.60	n/a	$ 1,838.29	n/a	n/a	n/a	$ 11.88
August-10	28,640	100.80	n/a	$ 2,262.55	n/a	n/a	n/a	$ 11.88
September-10	36,320	134.40	n/a	$ 2,949.65	n/a	n/a	n/a	$ 11.88
October-10	34,880	132.80	n/a	$ 1,630.79	n/a	n/a	n/a	$ 4.16
November-10	35,520	113.60	n/a	$ 1,574.76	n/a	n/a	n/a	$ 4.16
December-10	37,120	118.40	n/a	$ 1,644.59	n/a	n/a	n/a	$ 4.16
January-11	38,400	123.20	$ 5,786.36	$ 1,624.82	$ 4,161.54	$ 0.151	$ 0.137	$ 4.16
February-11	40,640	123.20	n/a	$ 1,686.92	n/a	n/a	n/a	$ 4.16
March-11	38,720	121.60	$ 5,205.27	$ 1,624.99	$ 3,580.28	$ 0.134	$ 0.121	$ 4.16
April-11	46,080	115.20	$ 6,270.49	$ 1,906.81	$ 4,363.68	$ 0.136	$ 0.126	$ 4.16
May-11	20,320	134.40	$ 3,352.32	$ 1,191.06	$ 2,161.26	$ 0.165	$ 0.137	$ 4.16
June-11	32,160	129.60	$ 6,182.28	$ 2,741.23	$ 3,441.05	$ 0.192	$ 0.144	$ 11.88
July-11	24,960	89.60	$ 5,009.23	$ 2,008.10	$ 3,001.13	$ 0.201	$ 0.158	$ 11.95
August-11	27,040	100.80	$ 4,921.75	$ 2,240.33	$ 2,681.42	$ 0.182	$ 0.137	$ 12.10
September-11	30,240	124.80	$ 5,519.29	$ 2,650.99	$ 2,868.30	$ 0.183	$ 0.133	$ 12.10
October-11	31,840	132.80	$ 4,073.38	$ 1,451.31	$ 2,622.07	$ 0.128	$ 0.114	$ 3.43
November-11	32,960	110.40	$ 4,432.46	$ 1,514.18	$ 2,918.28	$ 0.134	$ 0.120	$ 4.24
December-11	35,360	118.40	$ 4,737.26	$ 1,625.58	$ 3,111.68	$ 0.134	$ 0.120	$ 4.24
January-12	35,680	113.60	$ 4,769.06	$ 1,629.22	$ 3,139.84	$ 0.134	$ 0.120	$ 4.24
February-12	36,320	112.00	$ 4,839.52	$ 1,643.36	$ 3,196.16	$ 0.133	$ 0.120	$ 4.24
March-12	35,360	113.60	$ 4,731.03	$ 1,619.35	$ 3,111.68	$ 0.134	$ 0.120	$ 4.24
April-12	32,640	115.20	$ 4,411.24	$ 1,538.92	$ 2,872.32	$ 0.135	$ 0.120	$ 4.24
May-12	33,120	121.60	$ 4,495.99	$ 1,581.43	$ 2,914.56	$ 0.136	$ 0.120	$ 4.24
Total (12-months)	**387,680**	**132.80**	**$58,122.49**	**$22,244.00**	**$35,878.49**	**$ 0.150**	**$ 0.126**	**$ 6.66**

Electric Usage - Amsterdam Elementary School



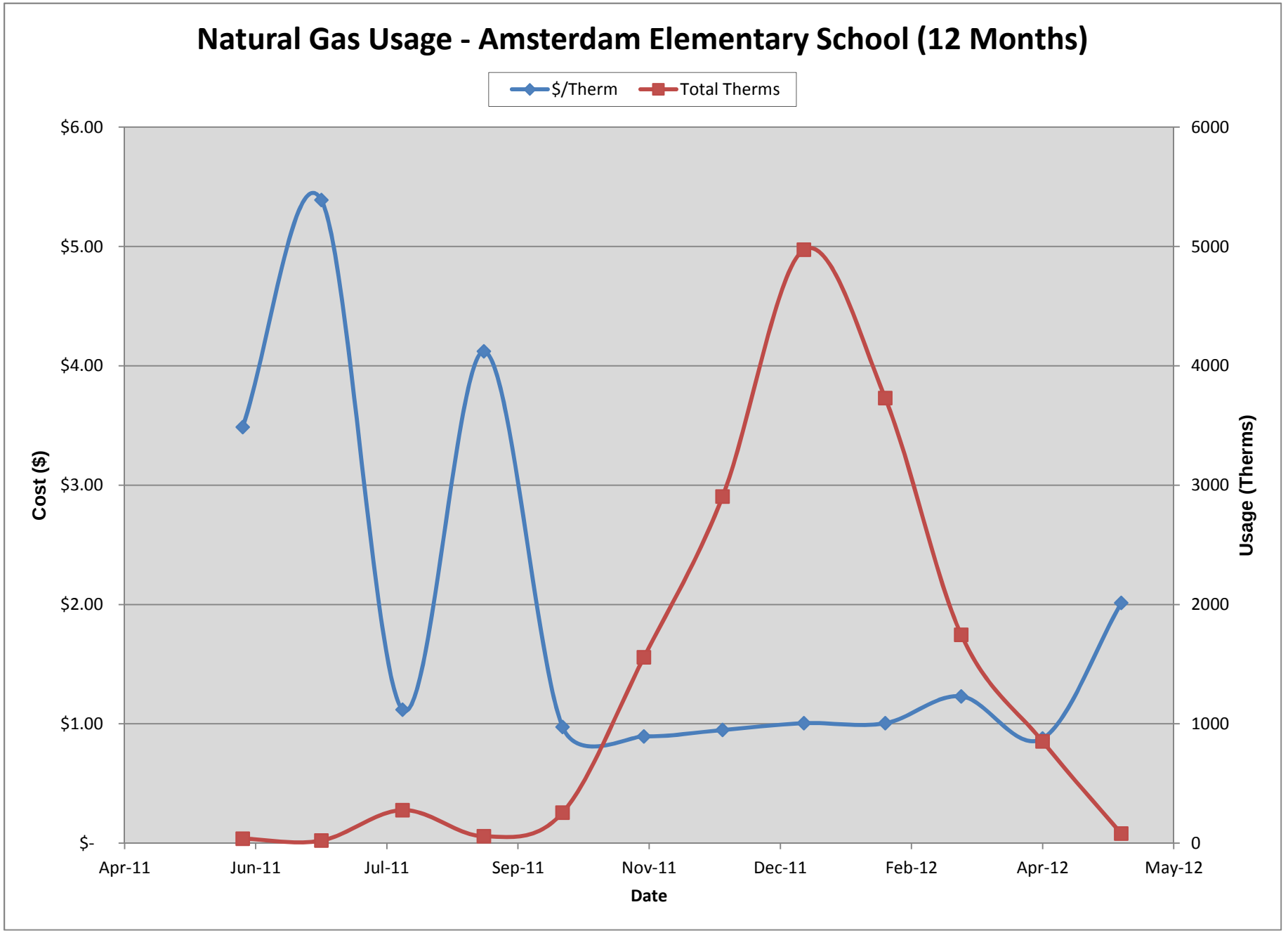
Hillsborough Township BOE
379 South Branch Rd., Hillsborough, NJ 08844

Gas Service
Delivery - PSE&G
Supplier - Woodruff / Hess

For Service at: Amsterdam Elementary School
Account No.: 70-056-097-00 / 507394 & 361490
Meter No.: 1874099 / 3275501

Month	Total ($)	Delivery ($)	Supply ($)	Total Therms	$/Therm
Jul-10	n/a	$ 99.24	n/a	19.709	n/a
Aug-10	n/a	$ 99.89	n/a	17.634	n/a
Sep-10	n/a	$ 103.01	n/a	38.418	n/a
Oct-10	n/a	$ 139.27	n/a	282.421	n/a
Nov-10	n/a	$ 1,299.12	n/a	2013.612	n/a
Dec-10	n/a	$ 2,034.01	n/a	5675.653	n/a
Jan-11	n/a	$ 2,346.34	n/a	7017.481	n/a
Feb-11	$ 5,635.83	$ 1,975.09	$ 3,660.74	5165.754	$ 1.09
Mar-11	$ 3,988.07	$ 1,611.64	$ 2,376.43	3353.428	$ 1.19
Apr-11	$ 1,043.71	$ 251.44	$ 792.27	1114.109	$ 0.94
May-11	$ 1,124.05	$ 348.01	$ 776.04	1073.673	$ 1.05
Jun-11	$ 129.82	$ 102.61	$ 27.21	37.234	$ 3.49
Jul-11	$ 116.83	$ 101.08	$ 15.75	21.677	$ 5.39
Aug-11	$ 309.78	$ 139.89	$ 169.89	277.183	$ 1.12
Sep-11	$ 234.52	$ 207.29	$ 27.23	56.913	$ 4.12
Oct-11	$ 249.29	$ 133.48	$ 115.81	255.963	$ 0.97
Nov-11	$ 1,394.13	$ 615.14	$ 778.99	1557.541	$ 0.90
Dec-11	$ 2,755.14	$ 1,057.18	$ 1,697.96	2904.44	$ 0.95
Jan-12	$ 5,001.65	$ 1,674.23	$ 3,327.42	4973.165	$ 1.01
Feb-12	$ 3,745.94	$ 1,440.50	$ 2,305.44	3729.012	$ 1.00
Mar-12	$ 2,147.63	$ 1,068.42	$ 1,079.21	1745.561	$ 1.23
Apr-12	$ 747.16	$ 220.29	$ 526.87	852.217	$ 0.88
May-12	$ 159.91	$ 110.76	$ 49.15	79.45	$ 2.01
Total (12-months)	**$ 16,991.80**	**$ 6,870.87**	**$ 10,120.93**	**16490.36**	**$ 1.03**

*Blue text indicates estimation


Natural Gas Usage - Amsterdam Elementary School (12 Months)
$/Therm
Total Therms
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
$-
Cost ($)
6000
5000
4000
3000
2000
1000
0
Usage (Therms)
Apr-11
Jun-11
Jul-11
Sep-11
Nov-11
Dec-11
Feb-12
Apr-12
May-12
Date

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24455
Hillsborough BOE
Amsterdam Elementary School
Original Construction Date: 1989
Renovation/Addtion Date: -

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
HV-1	1	York	CS113 FOLP	-	HW	3HP 81.5% Eff fan	Mezzanine	Cafeteria	1989	2	
HV-2a	1	York	K4U090A33A	NLW5608247	HV	1 ½ HP fan	Mezzanine	Auditorium	1989	2	
HV-2b	1	York	NZAHDZ0A06C	MHW5464184	HV	2 ½ HP fan	Mezzanine	Auditorium	1989	2	
HV-3	1	York	CS156 FOLP	-	HV	5 HP fan @ 86.5% Eff.	Mezzanine	Gym	1989	2	
HV-4	1	York	CS156 FOLP	-	HV	5 HP fan @ 86.5% Eff.	Mezzanine	Gym	1989	2	
B-1	1	Weil McLain	788	SN01597	Boiler	Input: 2048 MBH / Output: 1632 MBH	MER	School	1989	10	
B-2	1	Weil McLain	788	SN01598	Boiler	Input: 2048 MBH / Output: 1632 MBH	MER	School	1989	10	
B-3	1	Weil McLain	788	SN01599	Boiler	Input: 2048 MBH / Output: 1632 MBH	MER	School	1989	10	
PP	3	Thrush			Primary Pump	1.5 HP	MER	School	1989	10	
SP	2	Thrush	3X9TV26	107216 / 107215	Secondary Pump	5 HP @ 82.5 Eff. Lead/Lag	MER	School	1989	-	
DHW	1	AO Smith	BCO-300 872		DHW / NG.	300 MBH input	MER	School	1989	-	
Stoeage Tank	1	-	-	-	-	250 Gallon	MER	School	1989	-	
Compressor	1	Air Compessor Products		1947757	Air Compressor	Dual Head, (2) 1.5 HP 78.5% motors	MER	School	1989	-	
CU-1	1	York	HABA-T0605A	WDKM028270	Condenser	5 ton	Ground	Dining	1989	-8	Has blower above ceiling on mezzanine
CU-2	1	York	H2C8036525A	MHXM239771	Condenser	3 ton	Ground	Nurse	1989	-8	Has blower above ceiling on mezzanine
CU-3	1	York	HABA-T0605A	WFLM000263	Condenser	5 ton	Ground	Main Office	1989	-8	Has blower above ceiling on mezzanine
CU-4	1	York	H1CE-090A25A	NNWM603315	Condenser	7.5 ton	Ground	Music	1989	-8	Has blower above ceiling on mezzanine
CU-5	1	York	H2CB04825A	MGWM390296	Condenser	4 ton	Ground	Workroom	1989	-8	Has blower above ceiling on mezzanine
CU-6	1	York	H2CB04825A	MGWM390231	Condenser	4 ton	Ground	Computer / Classroom	1989	-8	Has blower above ceiling on mezzanine
CU-7	1	York	H2CA120A25C	MAXM000179	Condenser	10 ton	Ground	Library	1989	-8	Has blower above ceiling on mezzanine
Unit Ventilators	25	McQuay	HUV1000	N/A	Unit ventilator	Varies	Classrooms	Classrooms	1989	25	

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	DX Split Systems Replacement	79,000	300	>20	2,700	>20	X
ECM-2	Boiler Replacement	199,000	1,500	>20	6,000	>20	X
ECM-3	Domestic Hot Water System Improvements	4,000	400	10.0	300	9.3	X
ECM-4	Install VSDs and Premium Motors on HW Pumps	11,000	1,500	7.3	2,000	6.0	X
ECM-5	Lighting Replacement / Upgrades	17,000	2,400	7.1	100	7.0	
ECM-6	Install Lighting Controls (Occupancy Sensors)	17,000	5,300	3.2	2,900	2.7	
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	34,000	7,600	4.5	3,000	4.1	X
ECM-8	Install Low Flow Plumbing Fixtures	23,000	3,400	6.8	0	6.8	X

Hillsborough Township School District - NJBPU
CHA Project #24455
Amsterdam Elementary School

ECM Summary Sheet

ECM-1 DX Split Systems Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
79,000	2,100	0	0	300	0	300	(0.9)	2,700	>20	>20

ECM-2 Boiler Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
199,000	0	0	1,500	1,500	0	1,500	(0.8)	6,000	>20	>20

ECM-3 Domestic Hot Water System Improvements

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,000	0	0	400	400	0	400	0.2	300	10.0	9.3

ECM-4 Install VSDs and Premium Motors on HW Pumps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
11,000	10,100	0	0	1,500	0	1,500	0.6	2,000	7.3	6.0

ECM-5 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
17,000	16,200	0	0	2,400	0	2,400	1.1	100	7.1	7.0

ECM-6 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
17,000	41,600	0	0	5,300	0	5,300	4.6	2,900	3.2	2.7

ECM-7 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
34,000	57,800	0	0	7,600	0	7,600	2.4	3,000	4.5	4.1

ECM-8 Install Low Flow Plumbing Fixtures

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Water	Total						
$	kWh	kW	kgal/yr	$	$	$		$	Years	Years
23,000	0	0	310	3,400	0	3,400	1.2	0	6.8	6.8

Hillsborough Township School District - NJBPU
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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.150	$/kWh blended		0.00042021	58,000	Electric	Natural Gas
$ 0.126	$/kWh supply	387,680	0.00042021		$58,122.49	$16,991.80
$ 6.66	$/kW	132.80	0			
$ 1.03	$/Therm	16,490	0.00533471			
$ 10.72	$/kgals	478	0			

Amsterdam Elementary School

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	DX Split Systems Replacement	0.0	0	0	2,140	0	$ 300	$ 79,395	264.6	0.9	15	$ 2,714	Y	$ 55,600	$ 2,714	255.6	0.0	0	0	32,097	0	$ 4,812	(0.9)
ECM-2	Boiler Replacement	0.0	0	1,470	0	0	$ 1,500	$ 199,122	132.7	7.8	25	$ 6,000	Y	$ 75,000	$ 6,000	128.7	0.0	0	36,745	0	0	$ 37,862	(0.8)
ECM-3	Domestic Hot Water System Improvements	0.0	0	377	0	0	$ 400	$ 4,049	10.1	2.0	12	$ 300	Y	$ 2,800	$ 300	9.4	0.0	0	4,530	0	0	$ 4,668	0.2
ECM-4	Install VSDs and Premium Motors on HW Pumps	0.0	10,091	0	0	0	$ 1,500	$ 11,093	7.4	4.2	12	$ 2,000	Y	$ 7,800	$ 2,000	6.1	0.0	121,088	0	0	0	$ 18,154	0.6
ECM-5	Lighting Replacement / Upgrades	4.2	16,225	0	0	0	$ 2,400	$ 17,176	7.2	6.8	15	$ 91	Y	$ 12,000	$ 91	7.1	62.7	243,377	0	0	0	$ 35,723	1.1
ECM-6	Install Lighting Controls (Occupancy Sensors)	0.0	41,620	0	0	0	$ 5,300	$ 16,808	3.2	17.5	15	$ 2,905	Y	$ 11,800	$ 2,905	2.6	0.0	624,294	0	0	0	$ 93,597	4.6
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	4.2	57,845	0	0	0	$ 7,600	$ 33,983	4.5	24.3	15	$ 2,996	Y	$ 23,800	$ 2,996	4.1	62.7	867,671	0	0	0	$ 114,496	2.4
ECM-8	Install Low Flow Plumbing Fixtures	0.0	0	0	0	315	$ 3,400	$ 23,035	6.8	0.0	15	$ -		$ -	$ -	6.8	0.0	0	0	0	4,718	$ 50,568	1.2
	Total (Does Not Include ECM-12 & ECM-13)	**4.2**	**67,935**	**1,847**	**2,140**	**315**	**$ 14,700**	**$ 350,677**	23.9		16	$ 14,010		$ 165,000	$ 14,010	22.9	62.7	988,759	41,275	32,097	4,718	$ 230,560	(0.3)
	Total Measures with Payback <15	**4.2**	**67,935**	**377**	**0**	**315**	**$ 12,900**	**$ 72,160**	5.6		14	$ 5,296		$ 34,400	$ 5,296	5.2	62.7	988,759	4,530	0	4,718	$ 187,886	1.6

Hillsborough Township School District - NJBPU
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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
CU-2	Nurse	36
	Total Electric DX Cooling:	*36* *MBH*

ECM-1a: HP Split Systems Replacement (Nurse office)

ECM Description Summary

By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.130	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	70	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	36,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	9.0		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	1,119	kWh	

Item	Value	Units	Comments
Proposed EER	12.0		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	839	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	280	kWh
Annual Cost Savings	$36	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	6	2	89%	2
92.5	45	16	79%	13
87.5	146	52	68%	36
82.5	298	106	58%	62
77.5	476	170	47%	81
72.5	662	237	37%	87
67.5	740	0	0%	0
62.5	765	0	0%	0
57.5	733	0	0%	0
52.5	668	0	0%	0
47.5	659	0	0%	0
42.5	685	0	0%	0
37.5	739	0	0%	0
32.5	717	0	0%	0
27.5	543	0	0%	0
22.5	318	0	0%	0
17.5	245	0	0%	0
12.5	156	0	0%	0
7.5	92	0	0%	0
2.5	36	0	0%	0
-2.5	19	0	0%	0
-7.5	8	0	0%	0
Total	8,760	583	48%	280

Hillsborough Township School District - NJBPU
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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1a: HP Split Systems Replacement (Nurse office) - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
3 ton Split System	1	EA	$ 1,500	$ 500		$ 1,650	$ 675	$ -	$ 2,325	
Piping	1	EA	$ 250	$ 500		$ 275	$ 675	$ -	$ 950	
Wiring	1	EA	$ 250	$ 500		$ 275	$ 675	$ -	$ 950	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$	4,225	Subtotal
$	422.50	10% Contingency
$	697.13	15% Contractor O&P
$	-	
$	**5,345**	**Total**

Hillsborough Township School District - NJBPU
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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
CU-5	Workroom	48
	Total Electric DX Cooling:	*48* *MBH*

ECM-1b: DX Split Systems Replacement (4 Unit)

ECM Description Summary

By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.130	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	70	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	48,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	9.0		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	1,492	kWh	

Item	Value	Units	Comments
Proposed EER	12.0		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	1,119	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	373	kWh
Annual Cost Savings	$49	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	6	2	89%	2
92.5	45	16	79%	13
87.5	146	52	68%	36
82.5	298	106	58%	62
77.5	476	170	47%	81
72.5	662	237	37%	87
67.5	740	0	0%	0
62.5	765	0	0%	0
57.5	733	0	0%	0
52.5	668	0	0%	0
47.5	659	0	0%	0
42.5	685	0	0%	0
37.5	739	0	0%	0
32.5	717	0	0%	0
27.5	543	0	0%	0
22.5	318	0	0%	0
17.5	245	0	0%	0
12.5	156	0	0%	0
7.5	92	0	0%	0
2.5	36	0	0%	0
-2.5	19	0	0%	0
-7.5	8	0	0%	0
Total	8,760	583	48%	280

Hillsborough Township School District - NJBPU
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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1b: DX Split Systems Replacement (4 Unit) - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
4 ton Split System	1	EA	$ 2,000	$ 1,000		$ 2,200	$ 1,350	$ -	$ 3,550	
Piping	1	EA	$ 500	$ 750		$ 550	$ 1,013	$ -	$ 1,563	
Wiring	1	EA	$ 250	$ 500		$ 275	$ 675	$ -	$ 950	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$	6,063	Subtotal
$	606.25	10% Contingency
$	1,000.31	15% Contractor O&P
$	-	
$	**7,669**	**Total**

Hillsborough Township School District - NJBPU
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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
CU-3	Main Office	60
	Total Electric DX Cooling:	*60* *MBH*

ECM-1c: DX Split Systems Replacement (5 Unit)

ECM Description Summary

By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.130	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	70	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	60,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	9.0		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	1,864	kWh	

Item	Value	Units	Comments
Proposed EER	12.0		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	1,398	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	466	kWh
Annual Cost Savings	$61	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	6	2	89%	2
92.5	45	16	79%	13
87.5	146	52	68%	36
82.5	298	106	58%	62
77.5	476	170	47%	81
72.5	662	237	37%	87
67.5	740	0	0%	0
62.5	765	0	0%	0
57.5	733	0	0%	0
52.5	668	0	0%	0
47.5	659	0	0%	0
42.5	685	0	0%	0
37.5	739	0	0%	0
32.5	717	0	0%	0
27.5	543	0	0%	0
22.5	318	0	0%	0
17.5	245	0	0%	0
12.5	156	0	0%	0
7.5	92	0	0%	0
2.5	36	0	0%	0
-2.5	19	0	0%	0
-7.5	8	0	0%	0
Total	8,760	583	48%	280

Hillsborough Township School District - NJBPU
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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1c: DX Split Systems Replacement (5 Unit) - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
5 ton Split System	1	EA	$ 5,000	$ 2,500		$ 5,500	$ 3,375	$ -	$ 8,875	
Piping	1	EA	$ 500	$ 1,000		$ 550	$ 1,350	$ -	$ 1,900	
Wiring	1	EA	$ 500	$ 1,000		$ 550	$ 1,350	$ -	$ 1,900	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$	12,675	Subtotal
$	1,267.50	10% Contingency
$	2,091.38	15% Contractor O&P
$	-	
$	**16,034**	**Total**

Hillsborough Township School District - NJBPU
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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
CU-4	Music	90
	Total Electric DX Cooling:	*90* *MBH*

ECM-1d: DX Split Systems Replacement (7.5 Unit)

ECM Description Summary
By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.130	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	70	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	90,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	9.5		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	2,649	kWh	

Item	Value	Units	Comments
Proposed EER	11.6		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	2,170	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	480	kWh
Annual Cost Savings	$63	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	6	2	89%	2
92.5	45	16	79%	13
87.5	146	52	68%	36
82.5	298	106	58%	62
77.5	476	170	47%	81
72.5	662	237	37%	87
67.5	740	0	0%	0
62.5	765	0	0%	0
57.5	733	0	0%	0
52.5	668	0	0%	0
47.5	659	0	0%	0
42.5	685	0	0%	0
37.5	739	0	0%	0
32.5	717	0	0%	0
27.5	543	0	0%	0
22.5	318	0	0%	0
17.5	245	0	0%	0
12.5	156	0	0%	0
7.5	92	0	0%	0
2.5	36	0	0%	0
-2.5	19	0	0%	0
-7.5	8	0	0%	0
Total	8,760	583	48%	280

Hillsborough Township School District - NJBPU
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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1d: DX Split Systems Replacement (7.5 Unit) - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
7.5 ton Split System	1	EA	$ 7,000	$ 5,000		$ 7,700	$ 6,750	$ -	$ 14,450	
Piping	1	EA	$ 500	$ 1,000		$ 550	$ 1,350	$ -	$ 1,900	
Wiring	1	EA	$ 500	$ 1,000		$ 550	$ 1,350	$ -	$ 1,900	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$	18,250	Subtotal
$	1,825.00	10% Contingency
$	3,011.25	15% Contractor O&P
$	-	
$	**23,086**	**Total**

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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
CU-7	Library	120
	Total Electric DX Cooling:	*120* *MBH*

ECM-1e: HPSplit Systems Replacement -Library

ECM Description Summary

By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.130	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	70	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	120,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	9.7		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	3,460	kWh	

Item	Value	Units	Comments
Proposed EER	11.5		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	2,918	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	542	kWh
Annual Cost Savings	$71	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	6	2	89%	2
92.5	45	16	79%	13
87.5	146	52	68%	36
82.5	298	106	58%	62
77.5	476	170	47%	81
72.5	662	237	37%	87
67.5	740	0	0%	0
62.5	765	0	0%	0
57.5	733	0	0%	0
52.5	668	0	0%	0
47.5	659	0	0%	0
42.5	685	0	0%	0
37.5	739	0	0%	0
32.5	717	0	0%	0
27.5	543	0	0%	0
22.5	318	0	0%	0
17.5	245	0	0%	0
12.5	156	0	0%	0
7.5	92	0	0%	0
2.5	36	0	0%	0
-2.5	19	0	0%	0
-7.5	8	0	0%	0
Total	8,760	583	48%	280

Hillsborough Township School District - NJBPU
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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1e: HPSplit Systems Replacement -Library - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
10 ton Split System	1	EA	$ 9,000	$ 5,000		$ 9,900	$ 6,750	$ -	$ 16,650	
Piping	1	EA	$ 1,500	$ 1,000		$ 1,650	$ 1,350	$ -	$ 3,000	
Wiring	1	EA	$ 500	$ 1,000		$ 550	$ 1,350	$ -	$ 1,900	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$	21,550	Subtotal
$	2,155.00	10% Contingency
$	3,555.75	15% Contractor O&P
$	-	
$	**27,261**	**Total**

ECM-2: Boiler Replacement

Existing Fuel	Nat.Gas
Proposed Fuel	Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.03	/ Therm	
Proposed Fuel Cost	$ 1.03	/ Therm	
Baseline Fuel Use	13,522	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	82%		Estimated or Measured
Baseline Boiler Load	1,108,812	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 13,933		
Proposed Boiler Plant Efficiency	92%		New Boiler Efficiency
Proposed Fuel Use	12,052	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 12,419		

*Note to engineer: Link savings back to summary sheet in appropriate column.

BOILER REPLACEMENT SAVINGS SUMMARY					
	Electric Demand	**Electric Usage**	**Nat Gas Usage**	**Maint.**	**Total Cost**
	(kW)	**(kWh)**	**(Therms)**	**($)**	**($)**
Savings			**1,470**	**$0**	**$1,514**

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-2: Boiler Replacement - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Demo one boiler	1	EA		$ 5,000		$ -	$ 6,750	$ -	$ 6,750	
2,000 MBH NG Condensing Boiler	1	EA	$ 45,000	$ 20,000		$ 49,500	$ 27,000	$ -	$ 76,500	
Flue Installation	1	EA	$ 10,000.0	$ 5,000.00		$ 11,000	$ 6,750	$ -	$ 17,750	
Pump	1	EA	$ 2,500	$ 1,500		$ 2,750	$ 2,025	$ -	$ 4,775	
Miscellaneous Electrical	3	LS	$ 1,500	$ 2,500		$ 4,950	$ 10,125	$ -	$ 15,075	
Miscellaneous HW Piping	3	LS	$ 5,000	$ 5,000		$ 16,500	$ 20,250	$ -	$ 36,750	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 150,850	Subtotal
$ 15,085.00	10% Contingency
$ 33,187.00	20% Contractor O&P
$ -	
$ 199,122	**Total**

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

Hillsborough Township School District - NJBPU
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ECM-3 Domestic Hot Water System Improvements

Summary

* Replace Existing NG 250 gallon DHWH w/ Instantaneous, Condensing, LPG DHW Heater

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	60	˚F	Termperature of water coming into building
Hot Water Temperature	120	˚F	
Hot Water Usage per day	567	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	56,627	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	250	Gallons	Per manufacturer nameplate
Hot Water Temperature	120	˚F	Per building personnel
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	2.6	MBH	
Annual Standby Hot Water Load	22,813	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	79,440	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	80%		Per Manufacturer
Total Annual Energy Required	99,300	Mbtu/yr	
Total Annual Propane Required	**993.0**	**Therms /yr**	**Per Utility Bills**
New Tank Size	0	Gallons	tankless
Hot Water Temperature	120	˚F	
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.0	MBH	
Annual Standby Hot Water Load	0	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	56,627	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on condensing tankless DHW Heater
Proposed Total Annual Energy Required	61,551	MBTU/yr	
Proposed Fuel Use	616	Therms /yr	Standby Losses and inefficient DHW heater eliminated
Proposed Fuel Savings	**377**	**Therms /yr**	
Propane Utility Unit Cost	$1.03	$/Therm	
Existing Operating Cost of DHW	$1,023	$/yr	
Proposed Operating Cost of DHW	$634	$/yr	
Annual Utility Cost Savings	**$389**	**$/yr**	

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-3 Domestic Hot Water System Improvements - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		$ 50		$ -	$ 68	$ -	$ 68	
Rannai Tankless Gas-Fired DHW Heater	1	LS	$ 1,000	$ 1,000		$ 1,100	$ 1,350	$ -	$ 2,450	
Miscellaneous Electrical	1	LS	$ 300			$ 330	$ -	$ -	$ 330	
Miscellaneous Piping and Valves	1	LS	$ 200			$ 220	$ -	$ -	$ 220	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 3,068	Subtotal
$ 307	10% Contingency
$ 675	20% Contractor O&P
$ -	
$ 4,049	**Total**

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

ECM-4: Install VSDs & Premium Motors on HW Pumps

Variable Inputs

Blended Electric Rate	$0.15
Heating System "On" Point	55
VFD Efficiency	98.5%

ECM Description Summary

Install VFDs & Premium motors on (2) 5 HP Pumps.

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
HWP-1, HWP-2	1	5.0	5.0	82.5%	91.7%	3.62	3.25
					Total:	3.62	3.25

SAVINGS ANALYSIS

OAT - DB Avg Temp F	OAT - WB Avg Temp F	Annual Hours in Bin	Heating Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) See Note 3	(D) =IF(A>TP,0,C)	(E) =0.5+0.5*(50-A)/(50-10)) See Note 4	(F) =D*AA	(G) =BB*E^2.5/CC See Note 5	(H)	(I) =D*G	(J) =F-H
97.5	75	6	0	0%	0	0.0	0.0%	0	0
92.5	74	45	0	0%	0	0.0	0.0%	0	0
87.5	72	146	0	0%	0	0.0	0.0%	0	0
82.5	69	298	0	0%	0	0.0	0.0%	0	0
77.5	67	476	0	0%	0	0.0	0.0%	0	0
72.5	64	662	0	0%	0	0.0	0.0%	0	0
67.5	62	740	0	0%	0	0.0	0.0%	0	0
62.5	58	765	0	0%	0	0.0	0.0%	0	0
57.5	53	733	0	0%	0	0.0	0.0%	0	0
52.5	47	668	668	53%	2,417	0.7	84.1%	531	1,886
47.5	43	659	659	58%	2,385	0.9	88.8%	637	1,747
42.5	38	685	685	64%	2,479	1.1	92.7%	797	1,682
37.5	34	739	739	69%	2,674	1.3	95.9%	1,024	1,650
32.5	30	717	717	75%	2,595	1.6	98.2%	1,176	1,419
27.5	25	543	543	81%	1,965	1.9	99.8%	1,048	917
22.5	20	318	318	86%	1,151	2.3	100.0%	723	428
17.5	16	245	245	92%	887	2.7	100.0%	651	235
12.5	11	156	156	97%	565	3.1	99.7%	482	83
7.5	6	92	92	100%	333	3.3	99.0%	307	26
2.5	2	36	36	100%	130	3.3	99.0%	120	10
-2.5	-3	19	19	100%	69	3.3	99.0%	63	5
-7.5	-8	8	8	100%	29	3.3	99.0%	27	2
		8,760	4,887		17,677			7,586	10,091

Notes:

1) Existing motor power was determined using…
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for …
4) The pump load is estimated at 100% at X deg. OAT and 50% at X deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 2.5 power relationship to load.

HW PUMP VFD - SAVINGS SUMMARY

	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings	0	10,091	0	$0	$1,513

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-4: Install VSDs & Premium Motors on HW Pumps - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
5.0 VFD	2	ea	$ 1,706	$ 431		$ 3,754	$ 1,162	$ -	$ 4,916	
5.0 Motor	2	ea	$ 373	$ 79		$ 820	$ 213	$ -	$ 1,033	
Electrical - misc.	2	ea	$ 200	$ 150		$ 440	$ 405	$ -	$ 845	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500		$ 935	$ 675	$ -	$ 1,610	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

$ 8,404	Subtotal
$ 840	10% Contingency
$ 1,849	20% Contractor O&P
$ -	
$ 11,093	**Total**

ECM-8: Install Low Flow Plumbing Fixtures

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$10.72	$ / kGal
Faucets in Building	21	
Average Uses / Faucet (per day)	9	Gal
Average Time of Use	0.5	min
Average Flowrate	2.2	gpm

PROPOSED CONDITIONS		
Proposed Faucets to be Replaced	21	
Proposed Flowrate	0.5	gpm
Proposed Material Cost of new Faucets	$105	
Proposed Installation cost of new Faucets	$56	
Total cost of new faucets	$3,381	

SAVINGS		
Current Faucet Water Use	76	kGal / year
Proposed Faucet Water Use	17	kGal / year
Water Savings	59	kGal / year
Cost Savings	$628	/ year
Simple Payback	5.4	years

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

ECM-8: Install Low Flow Plumbing Fixtures

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$10.72	$ / kGal
Urinals in Building	6	
Average Flushes / Urinal (per Day)	9	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	6	
Proposed Gallons / Flush	1.6	Gal
Proposed Material Cost	$360	
Proposed Installation Cost	$269	
Total cost of new urinals & valves	$3,773	

SAVINGS		
Current Urinal Water Use	69	kGal / year
Proposed Urinal Water Use	32	kGal / year
Water Savings	37	kGal / year
Cost Savings	$401	/ year
Simple Payback	9.4	years

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

ECM-8: Install Low Flow Plumbing Fixtures

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$10.72	$ / kGal
Toilets in Building	35	
Average Flushes / Toilet (per Day)	9	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	35	
Proposed Gallons / Flush	1.6	Gal
Proposed Material Cost of new Flush Valves	$315	
Proposed Installation cost of new Flush Valves	$139	
Total cost of new toilets & valves	$15,881	

SAVINGS		
Current Toilet Water Use	402	kGal / year
Proposed Toilet Water Use	184	kGal / year
Water Savings	218	kGal / year
Cost Savings	$2,341	/ year
Simple Payback	6.8	years

Note: Costs are for enrgy savings calcualtions only- do not use for procurement

ECM-1 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$17,176	**4.2**	**16,225**	**0**	**$2,382**	**0**	**$2,382**	**$91**	**7.2**	**7.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-2 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$16,808	**0.0**	**41,620**	**0**	**$5,252**	**0**	**$5,252**	**$2,905**	**3.2**	**2.6**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-3 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$33,983	**4.2**	**57,845**	**0**	**$7,633**	**0**	**$7,633**	**$2,996**	**4.5**	**4.1**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

Existing Lighting

Cost of Electricity: **$0.126** **$/kWh**

$6.66 **$/kW**

			EXISTING CONDITIONS								
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**
245	Main Office	Offices	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	C-OCC	1,584
245	Main Office	Offices	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	C-OCC	1,584
15	Main Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
245	Main Office	Offices	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Main Office	Offices	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
15	Main Office Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
245	Nurse	Offices	8	T 32 R F 3 (ELE)	F43LE	110	0.88	SW	2400	C-OCC	2,112
245	Nurse	Offices	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2400	C-OCC	528
5	Nurse	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	2400	C-OCC	144
15	Nurse	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Nurse	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	Nurse	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	Staff Dining	Cafeteria	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1600	C-OCC	864
15	Cafeteria	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	1600	C-OCC	1,344
15	Cafeteria	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	1600	C-OCC	1,344
15	Kitchen	Cafeteria	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1600	C-OCC	384
15	Kitchen	Cafeteria	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1600	C-OCC	384
45	Kitchen	Cafeteria	7	SP 26 R CF 1	CFQ26/1-L	27	0.19	SW	1600	C-OCC	302
15	Wing B Men's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Wing B Women's Bathroom	Bath Room	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	SW	240
15	Receiving	Storage Areas	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	1000	SW	1,260
15	Wing B Storage	Storage Areas	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	SW	360
15	Wing B Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	Wing B Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	Wing B Boiler Room	Storage Areas	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	1000	SW	720
15	Wing B Boiler Room	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
15	Wing B Custodial Room A	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Wing B Custodial Room B	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Wing B Custodial Upstairs Area	Storage Areas	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	1000	SW	600
15	Wing B Custodial Upstairs Area	Storage Areas	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	SW	180
15	Gym/Multi-Purpose Room	Classrooms	30	S 32 C F 2 (ELE)	F42LL	60	1.80	SW	2400	C-OCC	4,320
15	Gym Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Gym Storage 1	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Gym Storage 2	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Stage	Storage Areas	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1000	SW	480
15	Stage	Storage Areas	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1000	SW	480
15	Stage	Storage Areas	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	SW	420
245	Music	Classrooms	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	C-OCC	1,848
245	Music	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Music	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Music Room 1	Classrooms	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	C-OCC	792
245	Music Room 2	Classrooms	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	C-OCC	1,584
15	Staff Workroom	Offices	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	Staff Workroom	Offices	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2400	C-OCC	1,008
15	Staff Workroom	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
213	A	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
213	B	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
15	Central Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	Central Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
245	Art	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Art	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Art	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Art	Classrooms	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	C-OCC	792
213	Room 1	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 2	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

Existing Lighting

Cost of Electricity: **$0.126** **$/kWh**

$6.66 **$/kW**

			EXISTING CONDITIONS								
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**
213	Room 3	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
15	Room 3	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
213	Room 4	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
15	Room 4	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
213	Room 5	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
15	Room 5	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
213	Room 6	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
15	Room 6	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
245	Room K-A	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-A	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-A	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-A	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
15	Room K-A	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
245	Room K-B	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-B	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-B	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Room K-B	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
15	Room K-B	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Wing C Men's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Wing C Women's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Wing C Storage	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
245	Library	Classrooms	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	C-OCC	1,848
245	Library	Classrooms	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
245	Library	Classrooms	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	C-OCC	792
245	Library	Classrooms	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	C-OCC	1,584
245	Library	Classrooms	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	C-OCC	1,584
245	Library	Classrooms	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2400	C-OCC	1,320
245	Library	Classrooms	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	C-OCC	1,848
15	Library Office	Offices	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
245	Library Classroom	Classrooms	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	C-OCC	1,848
213	C	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
213	D	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
213	Room 7	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 8	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 9	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 10	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 11	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 12	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 13	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 14	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 14A	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
15	Wing D Faculty Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Wing D Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300
213	E	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
213	F	Classrooms	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728
213	Room 15	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 16	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
245	Room 16	Classrooms	1	T 32 R F 3 (ELE)	F43LE	110	0.11	SW	2400	C-OCC	264
245	Room 16	Classrooms	1	T 32 R F 3 (ELE)	F43LE	110	0.11	SW	2400	C-OCC	264
213	Room 17	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 18	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 19	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 20	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 21	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592
213	Room 22	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

Existing Lighting

Cost of Electricity: **$0.126** **$/kWh**

$6.66 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
213	Room 23	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
213	Room 24	Classrooms	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
15	Wing A Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
15	Wing A Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
15	Wing A Men's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120	
15	Wing A Women's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120	
15	Wing A Storage	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	Main Entrance Area	Hallways	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	SW	958	
8	Commons	Hallways	3	MH 175	MH175/1	215	0.65	SW	2280	SW	1,471	
15	Commons	Hallways	40	S 32 C F 2 (ELE)	F42LL	60	2.40	SW	2280	SW	5,472	
15	Auxillary Central Entrance Hallway	Hallways	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2280	SW	274	
15	Wing A Hallway	Hallways	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	SW	958	
245	Wing A Hallway	Hallways	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2280	SW	1,756	
8	Wing A Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing A Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
8	Wing A Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing A Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
8	Wing A Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing A Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
15	Wing B Hallway	Hallways	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2280	SW	684	
245	Wing B Hallway	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505	
15	Wing C Hallway	Hallways	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	SW	958	
245	Wing C Hallway	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505	
8	Wing C Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing C Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
8	Wing C Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing C Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
8	Wing C Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing C Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
15	Wing D Hallway	Hallways	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	SW	958	
245	Wing D Hallway	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505	
8	Wing D Hallway	Hallways	1	MH 175	MH175/1	215	0.22	SW	2280	SW	490	
15	Wing D Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
8	Exterior	Outdoor Lighting	23	MH 175	MH175/1	215	4.95	SW	4368	SW	21,600	
78	Exterior	Outdoor Lighting	13	EP I 100	I100/1	100	1.30	SW	4368	SW	5,678	
	Total		**972**				**82.81**				**198,353**	

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-1 Lighting Replacements

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	1584	0.00	0.00	$ -	$ -	$ -		
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	1584	0.00	0.00	$ -	$ -	$ -		
15	Main Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
15	Main Office Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Nurse	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2400	2,112	8	T 32 R F 3 (ELE)	F43LE	110	0.88	SW	2400	2112	0.00	0.00	$ -	$ -	$ -		
245	Nurse	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2400	528	0.00	0.00	$ -	$ -	$ -		
5	Nurse	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2400	144	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	2400	144	0.00	0.00	$ -	$ -	$ -		
15	Nurse	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	$ -	$ -	$ -		
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	$ -	$ -	$ -		
15	Staff Dining	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1600	864	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1600	864	0.00	0.00	$ -	$ -	$ -		
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	1600	1344	0.00	0.00	$ -	$ -	$ -		
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	1600	1344	0.00	0.00	$ -	$ -	$ -		
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1600	384	0.00	0.00	$ -	$ -	$ -		
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1600	384	0.00	0.00	$ -	$ -	$ -		
45	Kitchen	7	SP 26 R CF 1	CFQ26/1-L	27	0.2	SW	1600	302	7	SP 26 R CF 1	CFQ26/1-L	27	0.189	SW	1600	302.4	0.00	0.00	$ -	$ -	$ -		
15	Wing B Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing B Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	240	0.00	0.00	$ -	$ -	$ -		
15	Receiving	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1000	1,260	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	1000	1260	0.00	0.00	$ -	$ -	$ -		
15	Wing B Storage	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	360	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	1000	720	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	1000	720	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Room A	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Room B	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Upstairs Area	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Upstairs Area	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	180	0.00	0.00	$ -	$ -	$ -		
15	Gym/Multi-Purpose Room	30	S 32 C F 2 (ELE)	F42LL	60	1.8	SW	2400	4,320	30	S 32 C F 2 (ELE)	F42LL	60	1.8	SW	2400	4320	0.00	0.00	$ -	$ -	$ -		
15	Gym Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	420	0.00	0.00	$ -	$ -	$ -		
245	Music	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	1848	0.00	0.00	$ -	$ -	$ -		
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Music Room 1	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	792	0.00	0.00	$ -	$ -	$ -		
245	Music Room 2	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	1584	0.00	0.00	$ -	$ -	$ -		
15	Staff Workroom	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1296	0.00	0.00	$ -	$ -	$ -		
15	Staff Workroom	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	1,008	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2400	1008	0.00	0.00	$ -	$ -	$ -		
15	Staff Workroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	$ -	$ -	$ -		
213	A	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
213	B	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Central Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Central Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Art	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	792	0.00	0.00	$ -	$ -	$ -		
213	Room 1	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 2	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 3	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Room 3	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 4	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Room 4	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 5	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Room 5	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 6	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Room 6	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
15	Room K-A	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
15	Room K-B	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Storage	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	$ -	$ -	$ -		
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	1848	0.00	0.00	$ -	$ -	$ -		
245	Library	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	$ -	$ -	$ -		
245	Library	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2400	792	0.00	0.00	$ -	$ -	$ -		
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	1584	0.00	0.00	$ -	$ -	$ -		
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2400	1584	0.00	0.00	$ -	$ -	$ -		
245	Library	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2400	1,320	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2400	1320	0.00	0.00	$ -	$ -	$ -		
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	1848	0.00	0.00	$ -	$ -	$ -		
15	Library Office	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	432	0.00	0.00	$ -	$ -	$ -		
245	Library Classroom	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2400	1848	0.00	0.00	$ -	$ -	$ -		
213	C	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
213	D	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
213	Room 7	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 8	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 9	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 10	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 11	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 12	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-1 Lighting Replacements

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
213	Room 13	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 14	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 14A	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Wing D Faculty Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing D Storage	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	$ -	$ -	$ -		
213	E	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
213	F	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
213	Room 15	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 16	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264	1	T 32 R F 3 (ELE)	F43LE	110	0.11	SW	2400	264	0.00	0.00	$ -	$ -	$ -		
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264	1	T 32 R F 3 (ELE)	F43LE	110	0.11	SW	2400	264	0.00	0.00	$ -	$ -	$ -		
213	Room 17	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 18	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 19	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 20	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 21	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 22	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 23	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
213	Room 24	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	SW	2400	2592	0.00	0.00	$ -	$ -	$ -		
15	Wing A Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Storage	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
15	Main Entrance Area	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
8	Commons	3	MH 175	MH175/1	215	0.6	SW	2280	1,471	3	C 54 C F 6	F42GHL	117	0.351	SW	2280	800.28	670.32	0.29	$ 108.07	$ 1,537.50	$ -	14.2	2.3
15	Commons	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2280	5,472	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2280	5472	0.00	0.00	$ -	$ -	$ -		
15	Auxillary Central Entrance Hallway	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	274	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2280	273.6	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing A Hallway	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2280	1,756	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2280	1755.6	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing B Hallway	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	0.00	0.00	$ -	$ -	$ -		
245	Wing B Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing C Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing D Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing D Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing D Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	2.3
15	Wing D Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Exterior	23	MH 175	MH175/1	215	4.9	SW	4368	21,600	23	C 54 C F 6	F42GHL	117	2.691	SW	4368	11754.288	9845.47	2.25	$ 1,422.41	$ 11,787.50	$ -	8.3	1.2
78	Exterior	13	EP I 100	I100/1	100	1.3	SW	4368	5,678	13	CF 26	CFQ26/1-L	27	0.351	SW	4368	1533.168	4145.23	0.95	$ 598.87	$ 263.25	$ 91.00	0.4	0.0
	Total	**972**				**83**			**198,353**	**972**			**11,927**	**79**			**182127.456**	**16,225**	**4**	**$ 2,381.52**	**$ 17,175.75**	**$ 91.00**		
																		Demand Savings		**4.2**	**$ 334.25**			
																		kWh Savings		**16,225**	**$ 2,047.27**			
																		Total savings			**$ 2,381.52**		**7.2**	**7.2**

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-2 Install Occupancy Sensors

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584.0	6	T 32 R F 3 (ELE)	F43LE	110	0.7	C-OCC	1200	792	792.00	0.00	$ 99.93	$ 202.50	$ 35.00	2.0	1.7
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584.0	6	T 32 R F 3 (ELE)	F43LE	110	0.7	C-OCC	1200	792	792.00	0.00	$ 99.93	$ 202.50	$ 35.00	2.0	1.7
15	Main Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1200	528	528.00	0.00	$ 66.62	$ 202.50	$ 35.00	3.0	2.5
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1200	528	528.00	0.00	$ 66.62	$ 202.50	$ 35.00	3.0	2.5
15	Main Office Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Nurse	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2400	2,112.0	8	T 32 R F 3 (ELE)	F43LE	110	0.9	C-OCC	1200	1056	1056.00	0.00	$ 133.25	$ 202.50	$ 35.00	1.5	1.3
245	Nurse	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528.0	2	T 32 R F 3 (ELE)	F43LE	110	0.2	C-OCC	1200	264	264.00	0.00	$ 33.31	$ 202.50	$ 35.00	6.1	5.0
5	Nurse	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	C-OCC	1200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Nurse	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Staff Dining	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1600	864.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1200	648	216.00	0.00	$ 27.25	$ 202.50	$ 35.00	7.4	6.1
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344.0	14	S 32 C F 2 (ELE)	F42LL	60	0.8	C-OCC	1200	1008	336.00	0.00	$ 42.40	$ 202.50	$ 35.00	4.8	4.0
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344.0	14	S 32 C F 2 (ELE)	F42LL	60	0.8	C-OCC	1200	1008	336.00	0.00	$ 42.40	$ 202.50	$ 35.00	4.8	4.0
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	96.00	0.00	$ 12.11	$ 202.50	$ 35.00	16.7	13.8
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	96.00	0.00	$ 12.11	$ 202.50	$ 35.00	16.7	13.8
45	Kitchen	7	SP 26 R CF 1	CFQ26/1-L	27	0.2	SW	1600	302.4	7	SP 26 R CF 1	CFQ26/1-L	27	0.2	C-OCC	1200	226.8	75.60	0.00	$ 9.54	$ 202.50	$ 35.00	21.2	17.6
15	Wing B Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing B Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	0.00	0.00	$ -	$ -	$ -		
15	Receiving	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1000	1,260.0	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1000	1260	0.00	0.00	$ -	$ -	$ -		
15	Wing B Storage	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	1000	720.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	1000	720	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Room A	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Wing B Custodial Room B	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Wing B Custodial Upstairs Area	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Upstairs Area	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	0.00	0.00	$ -	$ -	$ -		
15	Gym/Multi-Purpose Room	30	S 32 C F 2 (ELE)	F42LL	60	1.8	SW	2400	4,320.0	30	S 32 C F 2 (ELE)	F42LL	60	1.8	C-OCC	1680	3024	1296.00	0.00	$ 163.53	$ 202.50	$ 35.00	1.2	1.0
15	Gym Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480.0	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480.0	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420.0	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	0.00	0.00	$ -	$ -	$ -		
245	Music	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848.0	7	T 32 R F 3 (ELE)	F43LE	110	0.8	C-OCC	1680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Music Room 1	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792.0	3	T 32 R F 3 (ELE)	F43LE	110	0.3	C-OCC	1680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
245	Music Room 2	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584.0	6	T 32 R F 3 (ELE)	F43LE	110	0.7	C-OCC	1680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
15	Staff Workroom	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1200	648	648.00	0.00	$ 81.76	$ 202.50	$ 35.00	2.5	2.0
15	Staff Workroom	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	1,008.0	7	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1200	504	504.00	0.00	$ 63.59	$ 202.50	$ 35.00	3.2	2.6
15	Staff Workroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
213	A	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	B	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
15	Central Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Central Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792.0	3	T 32 R F 3 (ELE)	F43LE	110	0.3	C-OCC	1680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
213	Room 1	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 2	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 3	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 3	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 4	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 4	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 5	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 5	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 6	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 6	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
15	Room K-A	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
15	Room K-B	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Storage	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	0.00	$ -	$ -	$ -		
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848.0	7	T 32 R F 3 (ELE)	F43LE	110	0.8	C-OCC	1680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
245	Library	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Library	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792.0	3	T 32 R F 3 (ELE)	F43LE	110	0.3	C-OCC	1680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584.0	6	T 32 R F 3 (ELE)	F43LE	110	0.7	C-OCC	1680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584.0	6	T 32 R F 3 (ELE)	F43LE	110	0.7	C-OCC	1680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
245	Library	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2400	1,320.0	5	T 32 R F 3 (ELE)	F43LE	110	0.6	C-OCC	1680	924	396.00	0.00	$ 49.97	$ 202.50	$ 35.00	4.1	3.4
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848.0	7	T 32 R F 3 (ELE)	F43LE	110	0.8	C-OCC	1680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
15	Library Office	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	216	216.00	0.00	$ 27.25	$ 202.50	$ 35.00	7.4	6.1
245	Library Classroom	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848.0	7	T 32 R F 3 (ELE)	F43LE	110	0.8	C-OCC	1680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
213	C	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	D	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	Room 7	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 8	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 9	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 10	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 11	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 12	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-2 Install Occupancy Sensors

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
213	Room 13	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 14	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 14A	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Wing D Faculty Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing D Storage	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	$ -	$ -	$ -		
213	E	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	F	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	Room 15	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 16	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264.0	1	T 32 R F 3 (ELE)	F43LE	110	0.1	C-OCC	1680	184.8	79.20	0.00	$ 9.99	$ 202.50	$ 35.00	20.3	16.8
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264.0	1	T 32 R F 3 (ELE)	F43LE	110	0.1	C-OCC	1680	184.8	79.20	0.00	$ 9.99	$ 202.50	$ 35.00	20.3	16.8
213	Room 17	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 18	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 19	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 20	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 21	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 22	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 23	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 24	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	C-OCC	1680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Wing A Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Storage	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
15	Main Entrance Area	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
8	Commons	3	MH 175	MH175/1	215	0.6	SW	2280	1,470.6	3	MH 175	MH175/1	215	0.6	SW	2280	1470.6	0.00	0.00	$ -	$ -	$ -		
15	Commons	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2280	5,472.0	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2280	5472	0.00	0.00	$ -	$ -	$ -		
15	Auxillary Central Entrance Hallway	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	273.6	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	273.6	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing A Hallway	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2280	1,755.6	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2280	1755.6	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing B Hallway	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	0.00	0.00	$ -	$ -	$ -		
245	Wing B Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,504.8	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing C Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,504.8	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing D Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing D Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,504.8	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing D Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	1	MH 175	MH175/1	215	0.2	SW	2280	490.2	0.00	0.00	$ -	$ -	$ -		
15	Wing D Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
8	Exterior	23	MH 175	MH175/1	215	4.9	SW	4368	21,599.8	23	MH 175	MH175/1	215	4.9	SW	4368	21599.76	0.00	0.00	$ -	$ -	$ -		
78	Exterior	13	EP I 100	I100/1	100	1.3	SW	4368	5,678.4	13	EP I 100	I100/1	100	1.3	SW	4368	5678.4	0.00	0.00	$ -	$ -	$ -		
	Total	**972**				**83**			**198,353**	**972**				**83**			**156,733**	**41,620**	**0**	**$ 5,251.54**	**$ 16,807.50**	**$ 2,905.00**		
																	Demand Savings		**0.0**	**$ -**				
																	kWh Savings		**41,620**	**$ 5,251.54**				
																	Total Savings			**$ 5,251.54**		**3.2**	**2.6**

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	C-OCC	1,200	792	792.00	0.00	$ 99.93	$ 202.50	$ 35.00	2.0	1.7
245	Main Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	C-OCC	1,200	792	792.00	0.00	$ 99.93	$ 202.50	$ 35.00	2.0	1.7
15	Main Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,200	528	528.00	0.00	$ 66.62	$ 202.50	$ 35.00	3.0	2.5
245	Main Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,200	528	528.00	0.00	$ 66.62	$ 202.50	$ 35.00	3.0	2.5
15	Main Office Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
245	Nurse	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2400	2,112	8	T 32 R F 3 (ELE)	F43LE	110	0.88	C-OCC	1,200	1056	1056.00	0.00	$ 133.25	$ 202.50	$ 35.00	1.5	1.3
245	Nurse	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528	2	T 32 R F 3 (ELE)	F43LE	110	0.22	C-OCC	1,200	264	264.00	0.00	$ 33.31	$ 202.50	$ 35.00	6.1	5.0
5	Nurse	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2400	144	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	C-OCC	1,200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Nurse	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	C-OCC	1,200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Nurse	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	C-OCC	1,200	72	72.00	0.00	$ 9.08	$ 202.50	$ 35.00	22.3	18.4
15	Staff Dining	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1600	864	9	S 32 C F 2 (ELE)	F42LL	60	0.54	C-OCC	1,200	648	216.00	0.00	$ 27.25	$ 202.50	$ 35.00	7.4	6.1
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344	14	S 32 C F 2 (ELE)	F42LL	60	0.84	C-OCC	1,200	1008	336.00	0.00	$ 42.40	$ 202.50	$ 35.00	4.8	4.0
15	Cafeteria	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	1600	1,344	14	S 32 C F 2 (ELE)	F42LL	60	0.84	C-OCC	1,200	1008	336.00	0.00	$ 42.40	$ 202.50	$ 35.00	4.8	4.0
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	96.00	0.00	$ 12.11	$ 202.50	$ 35.00	16.7	13.8
15	Kitchen	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1600	384	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	96.00	0.00	$ 12.11	$ 202.50	$ 35.00	16.7	13.8
45	Kitchen	7	SP 26 R CF 1	CFQ26/1-L	27	0.2	SW	1600	302	7	SP 26 R CF 1	CFQ26/1-L	27	0.189	C-OCC	1,200	226.8	75.60	0.00	$ 9.54	$ 202.50	$ 35.00	21.2	17.6
15	Wing B Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing B Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2,000	240	0.00	0.00	$ -	$ -	$ -		
15	Receiving	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1000	1,260	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	1,000	1260	0.00	0.00	$ -	$ -	$ -		
15	Wing B Storage	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1,000	360	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	1000	720	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	1,000	720	0.00	0.00	$ -	$ -	$ -		
15	Wing B Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1,000	240	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Room A	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Wing B Custodial Room B	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Wing B Custodial Upstairs Area	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1,000	600	0.00	0.00	$ -	$ -	$ -		
15	Wing B Custodial Upstairs Area	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1,000	180	0.00	0.00	$ -	$ -	$ -		
15	Gym/Multi-Purpose Room	30	S 32 C F 2 (ELE)	F42LL	60	1.8	SW	2400	4,320	30	S 32 C F 2 (ELE)	F42LL	60	1.8	C-OCC	1,680	3024	1296.00	0.00	$ 163.53	$ 202.50	$ 35.00	1.2	1.0
15	Gym Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1,000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1,000	120	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1,000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	480	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	1,000	480	0.00	0.00	$ -	$ -	$ -		
15	Stage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1,000	420	0.00	0.00	$ -	$ -	$ -		
245	Music	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	C-OCC	1,680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Music	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Music Room 1	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	C-OCC	1,680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
245	Music Room 2	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	C-OCC	1,680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
15	Staff Workroom	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	C-OCC	1,200	648	648.00	0.00	$ 81.76	$ 202.50	$ 35.00	2.5	2.0
15	Staff Workroom	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	1,008	7	S 32 C F 2 (ELE)	F42LL	60	0.42	C-OCC	1,200	504	504.00	0.00	$ 63.59	$ 202.50	$ 35.00	3.2	2.6
15	Staff Workroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	C-OCC	1,200	288	288.00	0.00	$ 36.34	$ 202.50	$ 35.00	5.6	4.6
213	A	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	B	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
15	Central Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
15	Central Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Art	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	C-OCC	1,680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
213	Room 1	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 2	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 3	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 3	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 4	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 4	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 5	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 5	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
213	Room 6	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Room 6	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-A	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
15	Room K-A	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Room K-B	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
15	Room K-B	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing C Storage	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1,000	240	0.00	0.00	$ -	$ -	$ -		
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	C-OCC	1,680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
245	Library	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	C-OCC	1,680	739.2	316.80	0.00	$ 39.97	$ 202.50	$ 35.00	5.1	4.2
245	Library	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2400	792	3	T 32 R F 3 (ELE)	F43LE	110	0.33	C-OCC	1,680	554.4	237.60	0.00	$ 29.98	$ 202.50	$ 35.00	6.8	5.6
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	C-OCC	1,680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
245	Library	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2400	1,584	6	T 32 R F 3 (ELE)	F43LE	110	0.66	C-OCC	1,680	1108.8	475.20	0.00	$ 59.96	$ 202.50	$ 35.00	3.4	2.8
245	Library	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2400	1,320	5	T 32 R F 3 (ELE)	F43LE	110	0.55	C-OCC	1,680	924	396.00	0.00	$ 49.97	$ 202.50	$ 35.00	4.1	3.4
245	Library	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	C-OCC	1,680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
15	Library Office	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	C-OCC	1,200	216	216.00	0.00	$ 27.25	$ 202.50	$ 35.00	7.4	6.1
245	Library Classroom	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2400	1,848	7	T 32 R F 3 (ELE)	F43LE	110	0.77	C-OCC	1,680	1293.6	554.40	0.00	$ 69.95	$ 202.50	$ 35.00	2.9	2.4
213	C	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	D	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	Room 7	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 8	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 9	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 10	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 11	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 12	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7

Energy Audit of Amsterdam Elementary School

CHA Project No.24455

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.126 $/kWh**

$6.66 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
213	Room 13	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 14	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 14A	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Wing D Faculty Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing D Storage	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1,000	300	0.00	0.00	$ -	$ -	$ -		
213	E	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	F	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 65.41	$ 202.50	$ 35.00	3.1	2.6
213	Room 15	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 16	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264	1	T 32 R F 3 (ELE)	F43LE	110	0.11	C-OCC	1,680	184.8	79.20	0.00	$ 9.99	$ 202.50	$ 35.00	20.3	16.8
245	Room 16	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2400	264	1	T 32 R F 3 (ELE)	F43LE	110	0.11	C-OCC	1,680	184.8	79.20	0.00	$ 9.99	$ 202.50	$ 35.00	20.3	16.8
213	Room 17	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 18	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 19	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 20	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 21	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 22	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 23	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
213	Room 24	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	1.08	C-OCC	1,680	1814.4	777.60	0.00	$ 98.12	$ 202.50	$ 35.00	2.1	1.7
15	Wing A Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,000	480	0.00	0.00	$ -	$ -	$ -		
15	Wing A Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	$ -	$ -	$ -		
15	Wing A Storage	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1,000	60	0.00	0.00	$ -	$ -	$ -		
15	Main Entrance Area	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2,280	957.6	0.00	0.00	$ -	$ -	$ -		
8	Commons	3	MH 175	MH175/1	215	0.6	SW	2280	1,471	3	C 54 C F 6	F42GHL	117	0.351	SW	2,280	800.28	670.32	0.29	$ 108.07	$ 1,537.50	$ -	14.2	14.2
15	Commons	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2280	5,472	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2,280	5472	0.00	0.00	$ -	$ -	$ -		
15	Auxillary Central Entrance Hallway	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	274	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2,280	273.6	0.00	0.00	$ -	$ -	$ -		
15	Wing A Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2,280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing A Hallway	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	2280	1,756	7	T 32 R F 3 (ELE)	F43LE	110	0.77	SW	2,280	1755.6	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing A Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing A Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing B Hallway	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2,280	684	0.00	0.00	$ -	$ -	$ -		
245	Wing B Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2,280	1504.8	0.00	0.00	$ -	$ -	$ -		
15	Wing C Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2,280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing C Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2,280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
8	Wing C Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing C Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
15	Wing D Hallway	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	958	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2,280	957.6	0.00	0.00	$ -	$ -	$ -		
245	Wing D Hallway	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2280	1,505	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2,280	1504.8	0.00	0.00	$ -	$ -	$ -		
8	Wing D Hallway	1	MH 175	MH175/1	215	0.2	SW	2280	490	1	C 54 C F 6	F42GHL	117	0.117	SW	2,280	266.76	223.44	0.10	$ 36.02	$ 512.50	$ -	14.2	14.2
15	Wing D Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
8	Exterior	23	MH 175	MH175/1	215	4.9	SW	4368	21,600	23	C 54 C F 6	F42GHL	117	2.691	SW	4,368	11754.288	9845.47	2.25	$ 1,422.41	$ 11,787.50	$ -	8.3	8.3
78	Exterior	13	EPT 100	I100/1	100	1.3	SW	4368	5,678	13	CF 26	CFQ26/1-L	27	0.351	SW	4,368	1533.168	4145.23	0.95	$ 598.87	$ 263.25	$ 91.00	0.4	0.3
	Total	**972**				**82.8**			**198,353**	**972**				**78.6**			**140,508**		**4.2**	**$ 7,633.06**	**$ 33,983.25**	**$ 2,996.00**		
																		Demand Savings		**4.2**	**$ 334.25**			
																		kWh Savings		**57845**	**$ 7,298.81**			
																		Total Savings			**$ 7,633.06**		**4.5**	**4.1**

APPENDIX D

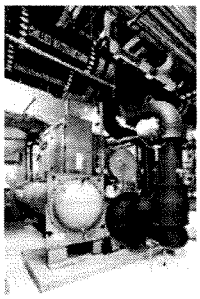
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

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



Eligibility

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

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

ENERGY STAR Portfolio Manager

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

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

Incentives

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

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

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

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

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

Energy Efficiency Revolving Loan Fund (EE RLF)

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

Steps to Participation

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

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

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

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

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

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: 15%

Electric Incentives

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

Gas Incentives

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

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

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

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: 15%

Electric Incentives

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

Gas Incentives

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

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

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

New Jersey Pay For Performance Incentive Program

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

Total Building Area (Square Feet)	58,000
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

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

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$58,122	$16,992
Existing Usage (from utility)	387,680	16,490
Proposed Savings	70,075	1,847
Existing Total MMBtus	2,972	
Proposed Savings MMBtus	424	
% Energy Reduction	**14.3%**	
Proposed Annual Savings	$14,700	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,800
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$5,800**

Total Project Cost	$350,677

		Allowable Incentive
% Incentives #1 of Utility Cost*	7.7%	$5,800
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$5,800**	
Project Cost w/ Incentives	$344,877	

Project Payback (years)	
w/o Incentives	w/ Incentives
23.9	23.5

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

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

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

APPENDIX E

Photovoltaic (PV) Rooftop Solar Power Generation

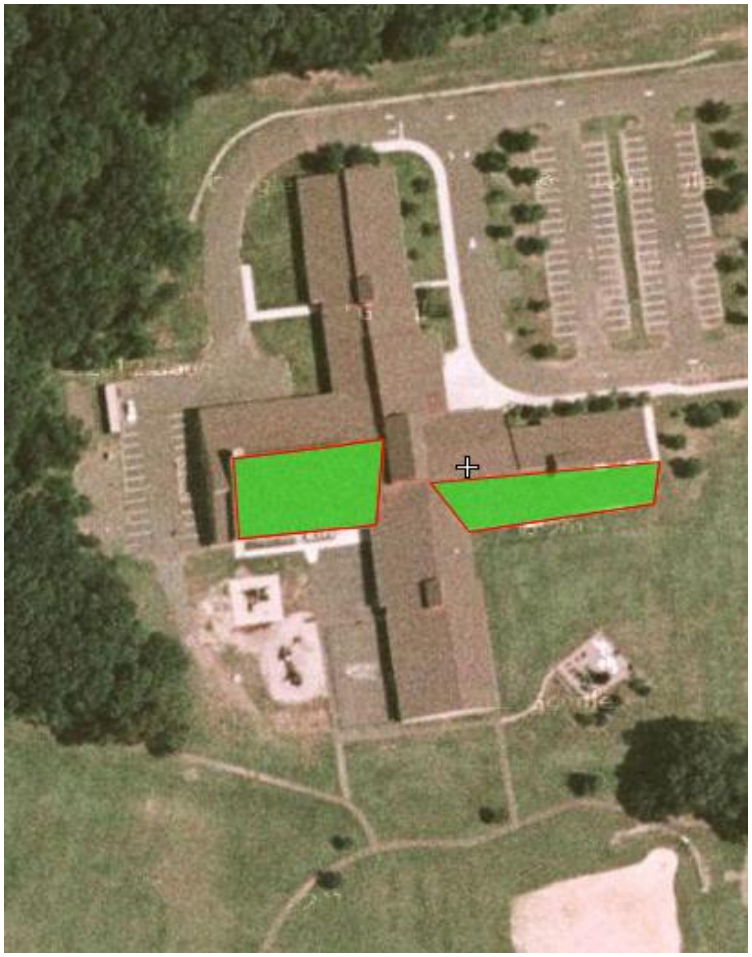
Hillsborough Township School District
Amsterdam Elementary School

Cost of Electricity	$0.150	/kWh
Electricity Usage	387,680	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$160,000	**40.0**	**47,061**	**0**	**$7,059**	**0**	**$7,059**	**$0**	**$3,530**	**22.7**	**15.1**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $75 /1000kwh



Area Output*
625 m2
6,729 ft2

Perimeter Output*
73 m
240 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
3,678 ft2

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

11.5 watt/ft2
42,295 DC watts
40 kW Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	60	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	08844	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
47,061 annual kWh calculated in PV Watts program

% Offset Calc

Usage	387,680	(from utilities)
PV Generation	47,061	(generated using PV Watts)
% offset	12%	

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

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

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

Station Identification	
City:	Newark
State:	New Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	40.0 kW
DC to AC Derate Factor:	0.820
AC Rating:	32.8 kW
Array Type:	Fixed Tilt
Array Tilt:	60.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	15.0 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	3.59	3770	565.50
2	4.18	3926	588.90
3	4.38	4408	661.20
4	4.31	4008	601.20
5	4.49	4179	626.85
6	4.39	3816	572.40
7	4.40	3916	587.40
8	4.60	4095	614.25
9	4.74	4261	639.15
10	4.47	4294	644.10
11	3.29	3201	480.15
12	3.09	3186	477.90
Year	4.16	47061	7059.15

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

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

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

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

APPENDIX F

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Amsterdam Elementary School

Building ID: 3209798
For 12-month Period Ending: May 31, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

Facility
Amsterdam Elementary School
301 Amsterdam Drive
Hillsborough, NJ 08844

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1989
Gross Floor Area (ft²): 58,000

Energy Performance Rating[2] (1-100) 62

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,322,764
Natural Gas (kBtu)[4]	1,649,035
Total Energy (kBtu)	2,971,799

Energy Intensity[4]

Site (kBtu/ft²/yr)	51
Source (kBtu/ft²/yr)	106

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	275

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	58
National Median Source EUI	119
% Difference from National Median Source EUI	-11%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, Licensed Professional facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Amsterdam Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	301 Amsterdam Drive, Hillsborough, NJ 08844	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	58,000 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.		☐
Open Weekends?	No (Default)	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	102 (Default)	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1 (Default)	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes (Default)	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	20 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	N/A(Optional)	Is this school in operation for at least 8 months of the year?		☐

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

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2012	05/31/2012	33,120.00
04/01/2012	04/30/2012	32,640.00
03/01/2012	03/31/2012	35,360.00
02/01/2012	02/29/2012	36,320.00
01/01/2012	01/31/2012	35,680.00
12/01/2011	12/31/2011	35,360.00
11/01/2011	11/30/2011	32,960.00
10/01/2011	10/31/2011	31,840.00
09/01/2011	09/30/2011	30,240.00
08/01/2011	08/31/2011	27,040.00
07/01/2011	07/31/2011	24,960.00
06/01/2011	06/30/2011	32,160.00
Electricity Consumption (kWh (thousand Watt-hours))		**387,680.00**
Electricity Consumption (kBtu (thousand Btu))		**1,322,764.16**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,322,764.16**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Natural Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
05/01/2012	05/31/2012	79.45
04/01/2012	04/30/2012	852.22
03/01/2012	03/31/2012	1,745.56
02/01/2012	02/29/2012	3,729.01
01/01/2012	01/31/2012	4,973.17
12/01/2011	12/31/2011	2,904.44
11/01/2011	11/30/2011	1,557.54
10/01/2011	10/31/2011	255.96
09/01/2011	09/30/2011	56.91
08/01/2011	08/31/2011	277.18

07/01/2011	07/31/2011	21.68
06/01/2011	06/30/2011	37.23
Natural Gas Consumption (therms)		**16,490.35**
Natural Gas Consumption (kBtu (thousand Btu))		**1,649,035.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**1,649,035.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Amsterdam Elementary School
301 Amsterdam Drive
Hillsborough, NJ 08844

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Amsterdam Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	58,000
Year Built	1989
For 12-month Evaluation Period Ending Date:	May 31, 2012

Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft^2)	58,000
Open Weekends? [d]	No
Number of PCs [d]	102
Number of walk-in refrigeration/freezer units [d]	1
Presence of cooking facilities [d]	Yes
Percent Cooled	20
Percent Heated	100
Months [o]	N/A
High School?	No
School District [o]	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 05/31/2012)	**Baseline** (Ending Date 05/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	62	62	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	51	51	45	N/A	58
Source ($kBtu/ft^2$)	106	106	93	N/A	119
Energy Cost					
$/year	$ 75,114.29	$ 75,114.29	$ 66,040.18	N/A	$ 84,437.61
$/$ft^2$/year	$ 1.30	$ 1.30	$ 1.14	N/A	$ 1.46
Greenhouse Gas Emissions					
$MtCO_2e$/year	275	275	242	N/A	309
$kgCO_2e/ft^2$/year	5	5	4	N/A	6

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

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

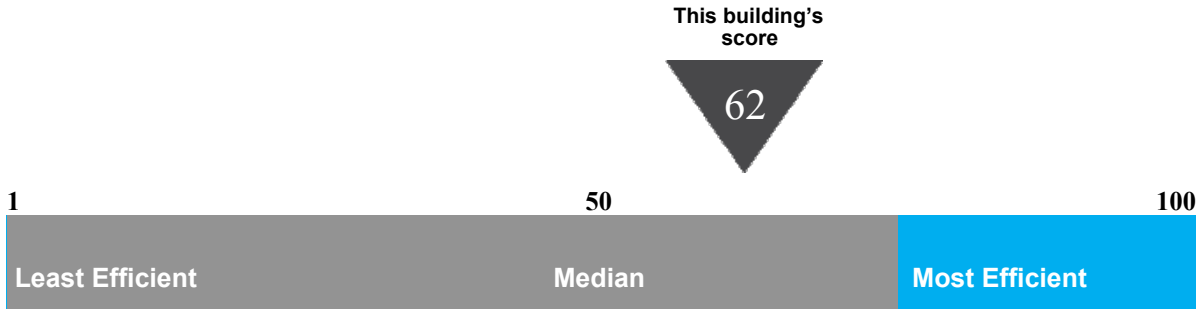
Statement of Energy Performance

2012

Amsterdam Elementary School
301 Amsterdam Drive
Hillsborough, NJ 08844

Portfolio Manager Building ID: 3209798

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



This building uses 106 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 08/17/2012