TABLE OF CONTENTS

SECTION 1

EXECUTIVE SUMMARY

ENERGY SAVINGS IMPROVEMENT PLAN – ESIP

This ESIP addresses three campuses of Mercer County Technical Schools:

- Assunpink Center, at 1085 Old Trenton Road, Trenton NJ, consists of three buildings and a Maintenance Garage totaling 87,894 ft2. The facility was built in 1972, with an addition in 1985.
- Sypek Center, at 129 Bull Run Road, Pennington NJ, consists of three buildings and an annex totaling 90,713 ft2. The facility was built in 1974, with the Building C Annex added in 1985.
- Health Careers Center, at 1070 Klockner Road, Trenton NJ, consists of one 26,987 ft2building. The facility was built in the early 1900's, with an addition in 1996.

ENERGY BASELINE

Baseline utility usage and cost used in this report are summarized below. The electric and natural gas utility data was analyzed based on a complete set of utility bills for the most recent 12-month period available (Assunpink: 12 months ending 11/11/10, Sypek: 12 months ending 10/28/2010, Health Careers: 12 months ending 11/22/2010). Marginal costs for each fuel type was determined based on the annual consumption provided and actual utility costs. The total energy usage for the campus for this 12 month period was 1,931,160 kwh and 144,743 therms for a total utility cost of $499,849.

Facility	Electric – 12 Months Ending November 2010							
	Rate	Total Annual kWh	Total Electric kBtu	Average Monthly kW	Blended Electric Rate $/ kWh	Marginal Consumption Rate $/kWh	Marginal Demand Rate $/ kWh	Total Annual Bill
Assunpink Center	LPLS	703,680	2,400,956	218.1	$ 0.1611	$ 0.1342	Annual: $3.42 Summer: $8.15	$ 113,369
Sypek Center	LPLS	1,044,600	3,564,175	412.3	$ 0.1653	$ 0.1342	Annual: $3.42 Summer: $8.16	$ 172,630
Health Careers Center	GLP	182,880	623,987	50.5	$ 0.1657	$ 0.1447	Annual: $4.16 Summer: $7.72	$ 30,308
TOTALS		1,931,160						$ 316,308

Facility	Natural Gas – 12 Months Ending November 2010				
	Rate	Total Annual Therms	Total Gas kBtu	Gas Rate $/Therm	Total Annual Bill
Assunpink Center	LVG	63,606	6,360,605	$ 1.26	$ 80,202
Sypek Center	Boiler/HW- LVG	72,317	7,231,674	$ 1.26	$ 91,215
Health Careers Center	LVG	8,820	881,991	$ 1.37	$ 12,124
TOTALS		144,743			$ 183,541

FACILITY IMPROVEMENT MEASURES (FIM)

FIM ID	Facility Improvement Measure	Assunpink - Building A	Assunpink - Building B	Assunpink - Building C	Assunpink - Maintenance Building	Spek - Building A	Spek - Building B	Spek - Building C	Spek - Building C Annex	Health Careers Center
1	Boiler Plant Measures		✓			✓				✓
1.3	Boiler Plant Upgrades		✓			✓				✓
2	Chiller Plant Measures									✓
2.1	Chiller Replacements									✓
2.6	Chilled Water Loop Modification									✓
3	HVAC Systems	✓	✓	✓		✓	✓	✓	✓	✓
3.2	Package Unit Replacement RTU's	✓	✓	✓		✓	✓	✓	✓	
3.5	AHU Replacement		✓	✓			✓		✓	✓
4	Building Automation	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.1	Building Automation Controls Upgrades - Central Plant		✓				✓			✓
4.2	Building Automation Controls Upgrades - Primary AHUs	✓	✓	✓		✓	✓	✓	✓	✓
4.4	Demand Control Ventilation	✓	✓	✓		✓	✓	✓	✓	✓
4.5	Boiler Controllers		✓				✓			✓
5	Lighting System Upgrades	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.3	Lighting Retrofits (Interior)	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Lighting Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.3	Lighting Occupancy Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Plug Load Solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓
8.2	Vending Miser	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Building Envelope	✓	✓	✓		✓	✓	✓	✓	✓
12.5	Roof Replacement		✓	✓		✓	✓	✓		
12.6	Window Film							✓	✓	
12.9	Insulating Garage Doors		✓	✓			✓		✓	
14	Renewable Solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.2	Solar PV	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.5	Renewable Kiosk Display	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Grants & Rebates	✓	✓	✓	✓	✓	✓	✓	✓	✓
15.2	Grants - Local, State & Federal	✓	✓	✓	✓	✓	✓	✓	✓	✓
15.3	Solar Renewable Energy Credits (SRECs)	✓	✓	✓	✓	✓	✓	✓	✓	✓
16	Information Technologies	✓	✓	✓	✓	✓	✓	✓	✓	✓
16.1	PC Computer Management System	✓	✓	✓	✓	✓	✓	✓	✓	✓
18	Academy of Energy Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.5	Energy Action Technology	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.6	Solar Energy in Action	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.8	Career Exploration	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.9	Externship	✓	✓	✓	✓	✓	✓	✓	✓	✓

Various facility improvement measures were evaluated during the initial energy audit, the RFP response and in the development of this Energy Savings Improvement Plans (ESIP). Johnson Controls has performed field verifications, collected data and taken field measurements to ensure the development of the most cost effective solutions as well as accurate savings calculations. Various solutions were reviewed with the school district's administration to develop a set of FIMs that allow the school district to address the facility's priority items while reducing the total annual energy spend for the campus. Priority items include roof replacement, upgrade of the building automation system, and addressing the ageing boilers and HVAC equipment.

ENERGY SAVINGS

Energy saving calculations performed in the development of this ESIP used a whole building energy modeling program called eQUEST. eQUEST allows you to perform detailed analysis of today's state-of-the-art building design technologies using today's most sophisticated building energy use simulation techniques. This is accomplished by combining a building creation wizard, an energy efficiency measure (EEM) wizard, and a graphical results display module with a simulation "engine" derived from an advanced version of the DOE-2 building energy use simulation program. DOE-2 is an up-to-date, unbiased computer program that predicts the hourly energy use and energy cost of a building given hourly weather information and a description of the building and its HVAC equipment and utility rate structure. Using DOE-2, designers determine the choice of building parameters that improve energy efficiency while maintaining thermal comfort and cost-effectiveness.

BENEFITS

By implementing this Energy Saving Improvement Plan the Mercer County Technical Schools will realize utility cost savings of _____ kwh and _____ therms totaling $_____, based on today's current cost of utilities. Additionally, these energy savings will result in a net reduction of green house gases a will reduce the school district's carbon foot by --------- tons of CO2.

All these savings are achieved while improving the classroom environment and renewing old HVAC equipment that has been in service beyond their useful life expectancy.

Section 2

UTILITY BASELINE DATA

Baseline Utility Usage and Marginal Cost Analysis

Baseline utility usage and cost are included in this section. The electric and natural gas utility data was analyzed based a complete set of utility bills for the most recent 12-month period available (Assunpink: 12 months ending 11/11/10, Sypek: 12 months ending 10/28/2010, Health Careers: 12 months ending 11/22/2010).

Marginal costs for each fuel type were determined based on the annual consumption provided and actual utility costs. The marginal costs determined below were used in the calculations of savings for each energy conservation measure included in this proposal.

The electricity and gas utility is PSE&G. The third party supplier for electric is South Jersey Energy. The third party supplier for natural gas is Hess. The PSE&G electric tariff for LPLS service includes on-peak and off-peak rates that are equal to the fifth decimal.

The total energy usage for the campus for this 12 month period was 1,931,160 kwh and 144,743 therms for a total utility cost of $499,849.

A preliminary analysis of water and sewer costs showed no opportunity for cost effective water FIMS, therefore water and sewer baseline analysis are not included in this report.

Facility	Electric – 12 Months Ending November 2010							
	Rate	Total Annual kWh	Total Electric kBtu	Average Monthly kW	Blended Electric Rate $/kWh	Marginal Consumption Rate $/kWh	Marginal Demand Rate $/kWh	Total Annual Bill
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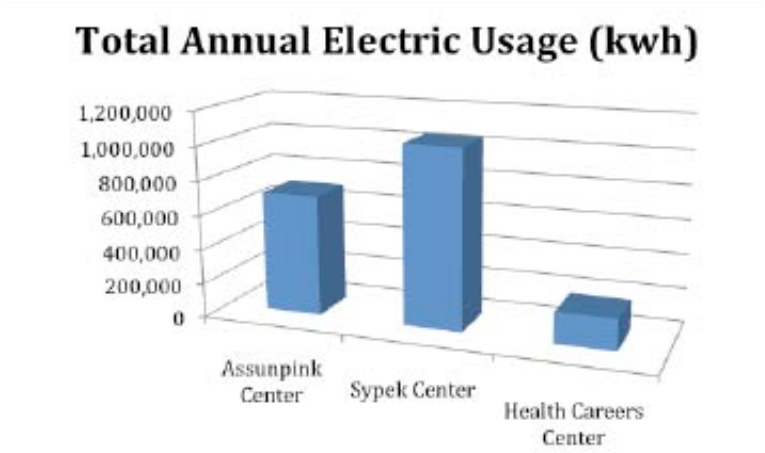

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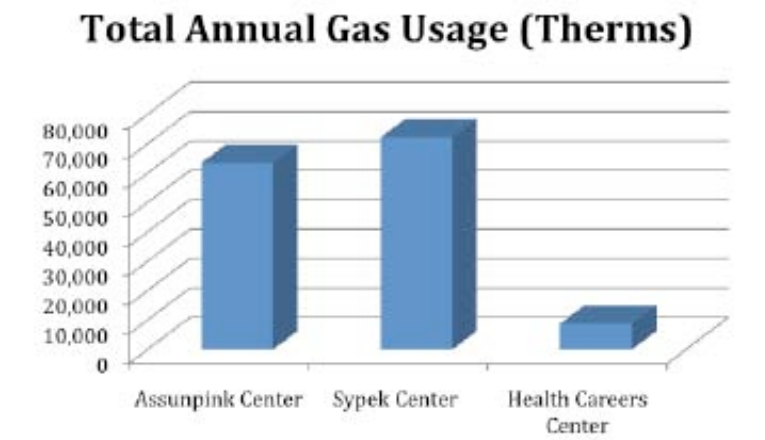
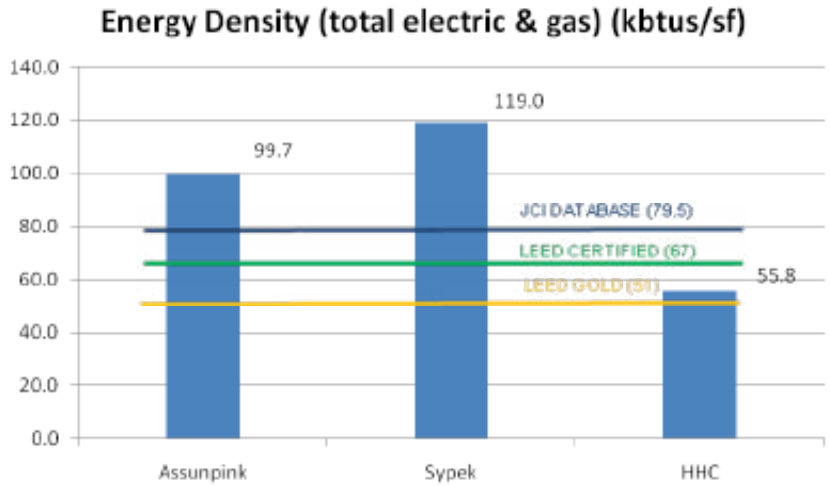


Energy Use Index

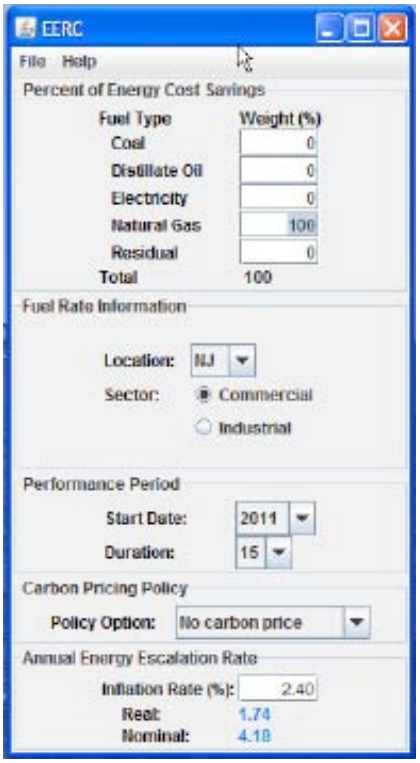
The Energy Use Index (EUI), or Energy Density, normalizes energy consumption by dividing total energy consumption by square footage. This allows schools of varying sizes to be compared. An accurate representation of how efficiently a building is being operated can be seen by comparing each building's "energy density" or usage per square foot to similar building types in the same geographic region. Any building type (school, hospital, office building, etc.) in a specific region should be operating within a range of energy densities, so if the building is operating above the range, there is good potential for energy conservation and if it is operating below the range, there is less opportunity for energy conservation. A table summarizing the electricity, fossil fuel (natural gas and oil) and the associated energy densities for each building is shown below.

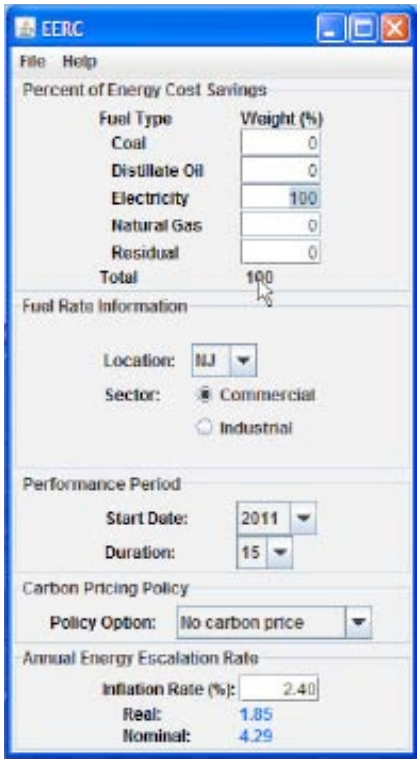
Electric and Gas Energy Densities Mercer County Technical Schools							
Building	Square Footage	Electric Usage (kWh)	Electric kWh/ SF	Electric kBtu/ SF	Gas MMBtu	Gas kBtu/ SF	Total kBtu/ SF
Assunpink	87,894	703,680	8.01	27.32	636,060	72.37	99.68
Sypek	90,713	1,044,600	11.52	39.29	723,167	79.72	119.01
HCC	26,987	182,880	6.78	23.12	88,199	32.68	55.80
Total / Average	***205,594***	***1,931,160***	***9.39***	***32.05***	***1,447,427***	***70.40***	***102.45***



Utility Escalation Rates

Utility escalation rates were determined by using the Escalation Rate Calculator developed by the National Institute of Standards and Technology (NIST).





The inflation rate used above is the Short Term Inflation Rate determined by the United States Office of Management and Budget (OMB).

- Based on treasury notes & bond maturities
- Analyzed from 3 to 30 years
- Two different rates:
  - For public investment and regulatory analyses
  - For cost-effectiveness, lease-purchase, and related analyses

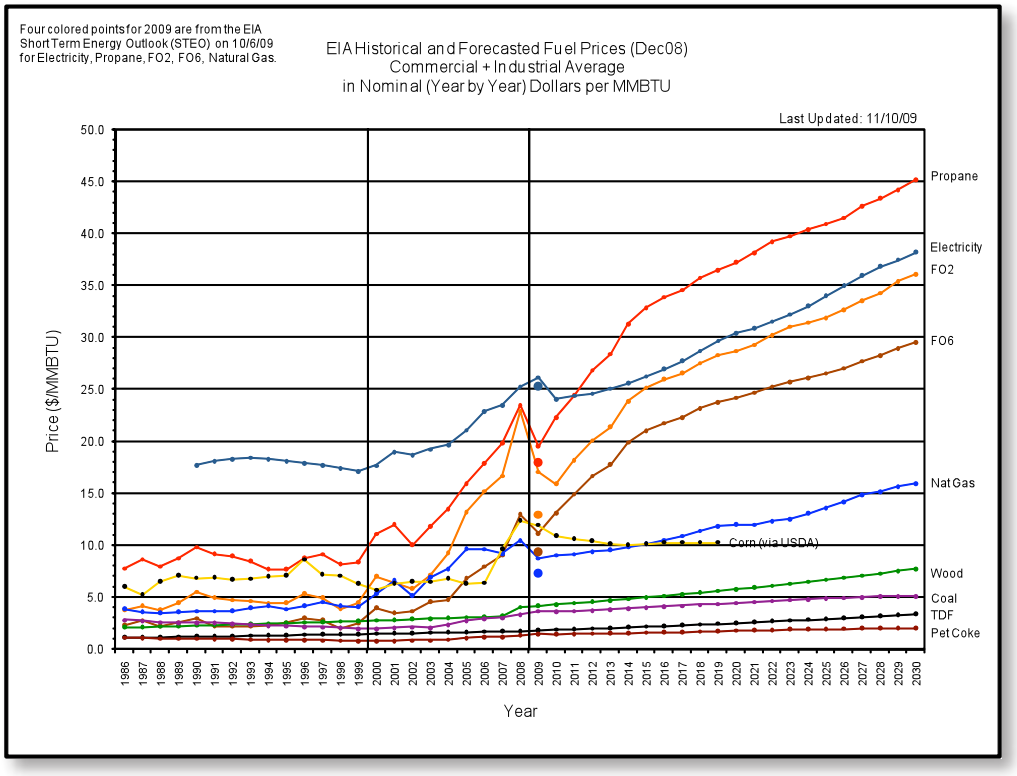
Rate for cost-effectiveness, lease-purchase, and related analyses

Maturity	3-year	5-year	7-year	10-year	30-year
Rate	0.9%	1.6%	1.9%	2.4%	2.7%

Utility Escalation Rate Methodology

Executive Summary

Given the volatility of energy prices (electricity, natural gas, fuel oil, etc.) and the many variables that these prices depend on, it is often a difficult task to determine the correct utility escalation rates to be used in performance contracts. However, there is a great deal of research done by the Department of Energy's Energy Information Administration (EIA) to forecast the future prices of energy. The latest projections for electricity and various fuels (natural gas, fuel oil, coal, etc) are shown in the graph below:



The National Institute of Standards and Technology (NIST) use these projections from the EIA to determine escalation rate factors specifically for performance contracts. These factors are tabulated and organized by census region, energy type, and sector (commercial or industrial). NIST has also developed a tool called the "Energy Escalation Rate Calculator" which takes the information for a specific project (location, duration, energy savings, etc.) and looks up the escalation rate factors from the tables. Johnson Controls uses this tool to determine the energy escalation rates for each project individually. The section below provides the escalation rate calculation methodology in greater detail.

Energy Escalation Rate Calculator (developed by NIST)

The Energy Escalation Rate Calculator (EERC) computes an average annual escalation rate for fuel prices, based on the annual energy price forecasts of the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE). This rate is used to escalate the contract payments in Energy Savings Performance Contracts (ESPC) and Utility Energy Services Contracts (UESC) when the payments are based on the projected annual energy cost savings. The rate is weighted by the share of each of the energy types used in the project.
In the life-cycle cost methodology and software of the DOE Federal Energy Management Program (FEMP), the base-year energy costs are escalated from year to year at rates projected by EIA to arrive at the total energy cost over a given period. The escalation rates, e, are projected by Census Region, energy type, and industrial sector and vary from year to year. The formula used to calculate total energy costs is:

$$C = A + (1 + e_1)A + (1 + e_1)(1 + e_2)A + \ \ldots \ + (1 + e_1)(1 + e_2) \ldots (1 + e_{n-1})A$$

where

C is the undiscounted sum total of future energy costs,
A is the base-year annual cost,
ei is the annual escalation rate, which varies from year to year
n is the number of years in the proposed study period

When the escalation rate is the same in each year of the study period, the series can be simplified to the Uniform Compound Amount formula:

$$F = \frac{(1 + i)^t - 1}{i} \times A$$

where

F is the future value of the series,
i is the interest rate,
t is the length of the series.
A is the base-year annual cost

Since a uniform escalation rate is needed to compute the contract payments in ESPC and UESC projects, the EERC uses the Uniform Compound Amount formula to approximate the total energy costs over the period, as calculated with EIA rates, and iteratively solves for the interest rate, i, the average annual escalation rate. The relationship between the Uniform Compound Amount factor and the variable EIA rates in the series can be expressed as follows for a project of n years duration:

$$\frac{(1 + e_{avg})^n - 1}{e_{avg}} \approx 1 + (1 + e_1) + (1 + e_1)(1 + e_2) + \ \ldots \ + (1 + e_1)(1 + e_2) \ldots (1 + e_{n-1})$$

The EERC prompts the user for information on the share of cost savings attributable to each fuel type, project location, industry sector, and the beginning date and duration of the performance period or contract term. It then retrieves the relevant energy price forecasts from the DOE/EIA database and computes the average escalation rate, as described above. If the performance period begins later than the base date, the calculated average rate includes the price escalation for the intermediate years.

The calculated average escalation rate is reported in both real (excluding inflation) and nominal (including inflation) terms. The EIA energy price projections exclude inflation and thus generate real rates. The inflation rate is an input to this tool, and is determined by the Office of Management and Budget (OMB). The OMB published data can be found in OMB Circular A-94, Appendix C. The table below describes the estimated inflation rates determined by Treasury Notes and Bonds with maturities ranging from 3 to 30 years, the contract period determines which inflation rate to be used:

Rate for cost-effectiveness, lease-purchase, and related analyses

Maturity	3-year	5-year	7-year	10-year	30-year
Rate	0.9%	1.6%	1.9%	2.4%	2.7%

To calculate the nominal escalation rate, which includes inflation, the calculator uses the following relationship:

$$r_{nominal} = (1 + r_{real})(1 + r_{inflation}) - 1$$

The calculated average annual escalation rate, eavg, when applied to the base-year energy costs or savings of ESPC or UESC projects, results in approximately the same undiscounted total amounts over the contract period as do the EIA-projected variable rates. If more than one fuel is used in the project, the EERC weights the average escalation rate according to the proportions stated by the user.

SECTION 3
FACILITY IMPROVEMENT MEASURES (FIMS)

FIM ID	Facility Improvement Measure	Assunpink - Building A	Assunpink - Building B	Assunpink - Building C	Assunpink - Maintenance Building	Sypek - Building A	Sypek - Building B	Sypek - Building C	Sypek - Building C Annex	Health Careers Center
1	Boiler Plant Measures		✓			✓				✓
1.3	Boiler Plant Upgrades		✓			✓				✓
2	Chiller Plant Measures									✓
2.1	Chiller Replacements									✓
2.6	Chilled Water Loop Modification									✓
3	HVAC Systems	✓	✓	✓		✓	✓	✓	✓	✓
3.2	Package Unit Replacement RTU's	✓	✓	✓		✓	✓	✓	✓	
3.5	AHU Replacement		✓	✓			✓		✓	✓
4	Building Automation	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.1	Building Automation Controls Upgrades - Central Plant		✓				✓			✓
4.2	Building Automation Controls Upgrades - Primary AHUs	✓	✓	✓		✓	✓	✓	✓	✓
4.4	Demand Control Ventilation	✓	✓	✓		✓	✓	✓	✓	✓
4.5	Boiler Controllers		✓				✓			✓
5	Lighting System Upgrades	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.3	Lighting Retrofits (Interior)	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Lighting Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.3	Lighting Occupancy Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Plug Load Solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓
8.2	Vending Miser	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Building Envelope	✓	✓	✓		✓	✓	✓	✓	✓
12.5	Roof Replacement		✓	✓		✓	✓	✓		
12.6	Window Film							✓	✓	
12.9	Insulating Garage Doors		✓	✓			✓		✓	
14	Renewable Solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.2	Solar PV	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.5	Renewable Kiosk Display	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Grants & Rebates	✓	✓	✓	✓	✓	✓	✓	✓	✓
15.2	Grants - Local, State & Federal	✓	✓	✓	✓	✓	✓	✓	✓	✓
15.3	Solar Renewable Energy Credits (SRECs)	✓	✓	✓	✓	✓	✓	✓	✓	✓
16	Information Technologies	✓	✓	✓	✓	✓	✓	✓	✓	✓
16.1	PC Computer Management System	✓	✓	✓	✓	✓	✓	✓	✓	✓
18	Academy of Energy Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.5	Energy Action Technology	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.6	Solar Energy in Action	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.8	Career Exploration	✓	✓	✓	✓	✓	✓	✓	✓	✓
18.9	Externship	✓	✓	✓	✓	✓	✓	✓	✓	✓

FIM 1.3: BOILER PLANT UPGRADES

FIM Summary

Each of the three campuses has a central hot water plant that is used to provide heating to the campus buildings. The addition of a high efficiency condensing boiler as the lead boiler, or the replacement of the existing boilers with a similar number of new high-efficiency units, will provide efficiency gains that will generate substantial operating and fuel cost savings. The radiant and convective heat losses will also be reduced with the installation of new boilers. Condensing hot water boilers are capable of 95% overall efficiencies (including thermal and combustion losses).

Facilities Recommended for this Measure

- Assunpink – Building B
- Sypek – Building B

Scope Narrative

The Assunpink campus is heated by two H.B. Smith "Mills 4500" cast-iron sectional boilers rated at 6,521.7 MBH output of hot water. Sypek has two similar boilers which are rated at 4,678.3 MBH output of hot water. At both campuses, the boilers are located centrally in Building B of each campus, and supply the campus with heating-hot water. The Health Careers Center has one H.B. Smith "Series 28" hot water boiler that is in good condition and will not be addressed as part of this FIM.

Domestic hot water is created at both Assunpink and Sypek campuses primarily by large heat-exchanging hot water tanks, which heat domestic hot water from heating-hot water. The storage tanks hold 2,115 gallons of DHW. During the summer, when the main heating boilers are not in operation, a small Lockinvar natural gas-fired boiler serves to heat the domestic hot water.

Figure 1: 2,115 gallon DHW storage tank at Sypek Center

Johnson Controls recommends that new high-efficiency condensing boilers be installed to carry a majority of the heating load. It was noted during the site visit that the boiler rooms at Assunpink and Sypek have adequate space to accommodate additional equipment. Johnson Controls will replace existing heating hot water boilers with new high-efficiency Aerco condensing boilers.

Figure 2: H.B. Smith Boiler at Assunpink

Figure 3: Free space in Assunpink boiler room

Scope of Work – Assunpink Building B

- Demolition of two existing H.B. Smith "Mills 4500" cast-iron sectional boilers
- Furnish and install the following:
    - o Aerco or equivalent high efficiency condensing boilers.
    - o New boiler breaching as required by boiler manufacturer.
    - o All piping, valves, and fittings to connect new boiler into existing piping system.
    - o All natural gas and/or oil piping required for a complete operational system.
    - o Insulate new portions of piping with fiberglass and PVC fittings.
    - o Electrical power and control wiring to new boiler
    - o Water treatment and shot feeder.
    - o Leak check piping.
    - o Coordinate with new DDC controls
    - o New fan coil unit to maintain minimum required temperature in the boiler room
    - o New gas meter for condensing boiler
- Provide new boiler start-up and commissioning
- Demolition of existing DHW storage tank
- Demolition of existing "summer" DHW heater
- Furnish and install the following:
    - o AO Smith Cyclone or equivalent high efficiency domestic hot water heater.
    - o Provide new domestic hot water heater start-up and commissioning

Scope of Work – Sypek Building B

- Demolition of two existing H.B. Smith M450L cast-iron sectional boilers
- Furnish and install the following:
    - o Aerco or equivalent high efficiency condensing boilers.
    - o New boiler breaching as required by boiler manufacturer.
    - o All piping, valves, and fittings to connect new boilers into existing piping system.
    - o All natural gas and/or oil piping required for a complete operational system.
    - o Insulate new portions of piping with fiberglass and PVC fittings.
    - o Electrical power and control wiring to new boiler
    - o Water treatment and shot feeder.
    - o Leak check piping.
    - o Coordinate with new DDC controls
    - o New fan coil unit to maintain minimum required temperature in the boiler room
    - o New gas meter for condensing boiler

- Provide new boiler start-up and commissioning
- Demolition of existing DHW storage tank
- Demolition of existing "summer" DHW heater
- Furnish and install the following:
    - o AO Smith Cyclone or equivalent high efficiency domestic hot water heater.
- Provide new domestic hot water heater start-up and commissioning

Savings Methodology

The savings for the boiler replacements were calculated based on improvement in the boiler efficiency. The existing boiler efficiency was based on the age of the boiler, any available combustion tests, published information from the manufacturer, and also results of the building simulation models. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance procedures should be followed as recommended by the boiler manufacturer.

Benefits

- Fossil fuel savings
- Operational savings based on new equipment requiring less maintenance
- Improved redundancy
- Capital improvements of heating plant

FIM 2.1: CHILLER REPLACEMENTS

FIM Summary

Chillers are used to provide chilled water for cooling purposes throughout the occupied spaces of the building. In buildings where the chillers are very old and in poor condition, the replacement of the chillers with new high-efficiency units will provide significant electrical energy and operational cost savings. Additionally, the new chillers will operate with new refrigerants (R-134a, R-410A, etc.) which meet environmental standards and will not be phased out in the near future unlike the refrigerants used in the older chillers.

Facilities Recommended for this Measure

- Health Careers Center

Scope Narrative

The existing chillers at the Health Careers Center are oversized and thus experience excessive cycling. It was found during the site survey that the original portion of Health Careers Center is served by a 25.5-ton Trane air-cooled chiller, and the newer portion of the facility is served by a 30-ton Trane air-cooled chiller. Chilled water with 30% glycol is circulated to the two portions of the building by separate chilled water pumps and loops. Efficiency of the existing chillers is approximately 1.26 kW/Ton. Efficiencies around 0.86 kW/Ton can be obtained through installation of a new high-efficiency chiller, and selection of appropriate chiller size will extend equipment service life.

Figure 1: Trane chiller serving original portion of Health Careers

Figure 2: Trane chiller serving new portion of Health Careers

Scope of Work

Description	Unit Location	Service Location	Manufacturer	Model
Chiller	Ground	Oriqinal Buildinq	Trane	CGABC306ABOOAF1
Chiller	Ground	Addition	Trane	CGAEC30GABA1YCDTG

- Demolition, removal and disposal:
  - Existing chiller(s) and refrigerant.
- Furnish and install the following:
  - YORK or equivalent high efficiency chillers.
  - Reconnect the chilled water and relief vent lines.
  - Pressure test, evacuate, and charge the chiller(s).
  - Insulate the chilled water piping.
  - Electrical power and control wiring to new chiller(s).
  - Leak check piping.
  - Coordinate with new DDC controls.
  - New refrigerant monitor as necessary to meet ASHRAE-15 compliance.
- Provide new chiller start-up and commissioning

Savings Methodology

The savings for the chiller replacements were calculated based on improvement in the chiller efficiency. The existing chiller efficiency was based on the age of the chiller, published information from the manufacturer, and also results of the building simulation models. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance procedures should be followed as recommended by the chiller manufacturer.

Benefits

- Electrical energy savings
- Increased environmental responsibility through removal of harmful refrigerants
- Extended equipment life
- Capital improvements of cooling plant

FIM 2.6: CHILLED WATER LOOP MODIFICATION

FIM Summary

Operating a chiller within a very low part-load range can compromise chiller performance and cause excessive cycling. Cycling during normal operation will increase the demand portion of the electric bill. This can also compromise the expected equipment life.

Facilities Recommended for this Measure

- Health Careers Center

Scope Narrative

The existing chillers at the Health Careers Center are oversized and thus experience excessive cycling. The original portion of Health Careers Center is served by a 25.5-ton Trane air-cooled chiller, and the newer portion of the facility is served by a 30-ton Trane air-cooled chiller. Chilled water with 30% glycol is circulated to the two portions of the building by separate chilled water pumps and loops. Johnson Controls proposes to combine the two loops and operate the chillers as lead and lag. This will allow a majority of the building's cooling load to be carried by one chiller at a time, and will decrease equipment cycling

Figure 1: Trane chiller serving original portion of Health Careers

Figure 2: Trane chiller serving new portion of Health Careers

Scope of Work

- Furnish and install the following:
  - o Piping to combine the two existing chilled water loops
  - o Insulate the chilled water piping.

Savings Methodology

The savings for the chilled water loop modification were calculated based on chiller operation as lead and lag. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance procedures should be followed as recommended by the chiller manufacturer.

Benefits

- Electrical energy savings
- Extended equipment life

FIM 3.2: PACKAGED UNIT REPLACEMENT

FIM Summary

Packaged units are often located on the roof of the buildings and contain a cooling section with either a gas-fired furnace or hot water coils for heating. Because the units are located outside, the expected life is limited to 15 years and the existing units have exceeded this life expectancy. The replacement of the existing units with high-efficiency units containing high-efficiency condensing units will provide significant energy and operational savings for the district. The replacement of aging condensing units will also remove harmful refrigerants which are being phased out of production allowing the district to achieve greater environmental responsibility. New units also come with packaged building automation controls and variable frequency drives, where applicable, which will reduce energy consumption even further.

Facilities Recommended for this Measure

- Assunpink – Building A
- Assunpink – Building B
- Assunpink – Building C
- Sypek – Building A
- Sypek – Building B
- Sypek – Building C
- Sypek – Building C Annex

Scope Narrative

This scope of work includes replacement of the packaged DX and split system cooling equipment serving the Assunpink and Sypek Campuses with new high-efficiency units. The existing equipment is in poor condition, and is costing the District a significant amount in annual repair costs. Johnson Controls has quantified this annual operational savings using actual bills.

Replacing these units will not only generate operational savings; Johnson Controls calculated the Energy Efficiency Ratio (EER) based on unit specifications from the as-built drawings. The units were found to be very inefficient as compared to today's standards. Replacing these units will save a considerable amount of energy during the cooling season. This savings has been quantified using existing equipment schedules as reported by on-site personnel.

Facility	Units	Total Cooling Tons	Average Cooling EER
Assunpink A	RTUs DX & HW	94.8	10.31
Assunpink B	AC Split Systems	18.0	7.30
Assunpink C	AC Split Systems	17.4	7.38
Sypek A	RTUs DX & HW	77.1	12.76
Sypek B	AC DX Units	21.4	7.15
Sypek C	RTUs DX & HW	90.4	11.40
Sypek C Annex	DX & HW AHUs	9.5	9.87

Figure 1: Cooling equipment serving portions of C Annex at the Sypek Center.

Figure 3: Equipment was found to be in poor condition

Figure 2: Split system common at the Assunpink and Sypek campuses

Scope of Work – Assunpink Building A

Description	Unit Location	Service Location	Manufacturer	Model
RTU-1	Bldg A Roof	Left Side of Building A	Lennox	5172E1664M
RTU-2	Bldg A Roof	Rear portion of Building A	Lennox	5172E0215M
RTU-3	Bldg A Roof	Right Side of Building A	Lennox	5172F0216R
RTU-4	Bldg A Roof	Middle portion of Building A	Lennox	5172F0216R
Condensing Unit	Ground	Media Center A-166	Trane	RAUF-B256-A
Condensing Unit	Ground	Computer Center A-159	York	H4DB030S06A
Condensing Unit	Ground	Building A 1985 Addition	Trane	RAUC-B626-B
Condensing Unit	Ground	Building A 1985 Addition	Trane	RAUF-B406-A

- Demolition, removal and disposal:
  - Existing packaged units.
- Furnish and install the following:
  - YORK or equivalent high efficiency packaged units.
  - Reconnect all applicable piping.
  - Install new roof curbs as needed for new equipment.
  - Insulate all piping.
  - Leak check piping.
  - Electrical power and control wiring to new unit(s).
  - Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Assunpink Building B

The unit serving B-108 was recently replaced and will not be included in this scope of work.

Description	Unit Location	Service Location	Manufacturer	Model
Condensing Unit	Bldg B Roof	B-109	Arcoaire	Unknown
Condensing Unit	Bldg B Roof	B-130	Rheem	RAKA-036DAS
Condensing Unit	Bldg B Roof	B-131	ICP Commercial Comfort	CAC036CAB

- Demolition, removal and disposal:
  - o Existing packaged units.
- Furnish and install the following:
  - o YORK or equivalent high efficiency packaged units.
  - o Reconnect all applicable piping.
  - o Install new roof curbs as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Assunpink Building C

Description	Unit Location	Service Location	Manufacturer	Model
Condensing Unit	Bldg C Roof	C-109	ICP Commercial Comfort	CA5536VLD4
Condensing Unit	Bldg C Roof	C-108	York	H4DB036S46A
Condensing Unit	Bldg C Roof	C-127	Trane	RAUB504A
Condensing Unit	Bldg C Roof	C-128	Arcoaire	Unknown

- Demolition, removal and disposal:
  - o Existing packaged units.
- Furnish and install the following:
  - o YORK or equivalent high efficiency packaged units.
  - o Reconnect all applicable piping.
  - o Install new roof curbs as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Sypek Building A

Description	Location	Service Location	Manufacturer	Model
RTU-A-1	Bldg A Roof	Front Half of Building A	Nesbitt	RMM0053G2R FFBBOAOFOA
RTU-A-2	Bldg A Roof	Rear Half of Building A	Nesbitt	RMA35053G2R JGBBOAOFOA

- Demolition, removal and disposal:
  - Existing packaged units.
- Furnish and install the following:
  - YORK or equivalent high efficiency packaged units.
  - Reconnect all applicable piping.
  - Install new roof curbs as needed for new equipment.
  - Insulate all piping.
  - Leak check piping.
  - Electrical power and control wiring to new unit(s).
  - Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Sypek Building B

The unit serving Classroom B-153 was recently replaced and will therefore not be included as part of the scope of work for unit replacement.

Description	Location	Service Location	Manufacturer	Model
Condensing Unit	Bldg B Roof	B-109	Trane	Unknown
Condensing Unit	Bldg B Roof	B-118 & 119	Trane	Unknown
Condensing Unit	Bldg B Roof	B-141 & 142	Trane	Unknown
Condensing Unit	Bldg B Roof	Auto Services Classroom & Office	Trane	Unknown

- Demolition, removal and disposal:
  - Existing packaged units.
- Furnish and install the following:
  - YORK or equivalent high efficiency packaged units.
  - Reconnect all applicable piping.
  - Install new roof curbs as needed for new equipment.

- Insulate all piping.
- Leak check piping.
- Electrical power and control wiring to new unit(s).
- Coordinate with new DDC controls.

- Provide new unit start-up and commissioning

Scope of Work – Sypek Building C

Description	Location	Service Location	Manufacturer	Model
RTU-C-1	Bldg C Roof	Front portion of Building C	Nesbitt	RMA30053G2R GGBBOAOOOA
RTU-C-2	Bldg C Roof	Rear portion of Building C	Nesbitt	RMA35053G2R JHBBOAOOOA
RTU-C-3	Bldg C Roof	Right Side of Building C	Nesbitt	RMA30053G2ROFBBOAOBOA

- Demolition, removal and disposal:
  - Existing packaged units.
- Furnish and install the following:
  - YORK or equivalent high efficiency packaged units.
  - Reconnect all applicable piping.
  - Install new roof curbs as needed for new equipment.
  - Insulate all piping.
  - Leak check piping.
  - Electrical power and control wiring to new unit(s).
  - Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Sypek Building C Annex

Description	Location	Service Location	Manufacturer	Model
Condensing Unit	Bldg C Annex Ground	AH-1	Trane	RAUC-356-0
Condensing Unit	Bldg C Annex Ground	AH-2	Trane	RAUE-B504-A

- Demolition, removal and disposal:
  - o Existing packaged units.
- Furnish and install the following:
  - o YORK or equivalent high efficiency packaged units.
  - o Reconnect all applicable piping.
  - o Install new roof curbs as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Savings Methodology

The savings for the package unit replacements were calculated based on improvement in the package unit efficiency. The existing package unit efficiency was based on the age of the package unit, published information from the manufacturer, and also results of the building simulation models. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance procedures should be followed as recommended by the package unit manufacturer.

Benefits

- Electrical energy savings
- Operational savings based on new equipment requiring less maintenance
- Environmental responsibility through removal of harmful refrigerants
- Capital improvements of HVAC systems
- Improved indoor air quality
- Improved occupant comfort

FIM 3.5: AIR HANDLER UNIT REPLACEMENT

FIM Summary

Air handling units supply conditioned air to the various zones throughout a building. In buildings where the air handling units are older and in poor condition, the installation of new high-efficiency air handlers will result in significant energy and operational cost savings. The new air handling units will distribute the air in a much more efficient manner by utilizing premium efficiency motors, variable frequency drives (where applicable), tighter unit construction eliminating leakage, heat recovery and economizer options (when possible), and more efficient heating and cooling coil designs. In addition to energy and operational cost savings the units will provide a more pleasant indoor environment resulting in increase productivity and occupant comfort.

Facilities Recommended for this Measure

- Assunpink – Building B
- Assunpink – Building C
- Sypek – Building B
- Sypek – Building C Annex
- Health Careers Center

Scope Narrative

At the Assunpink Center, most areas of Buildings B and C are comprised of shops which are served by heating and ventilating (H&V) units with hot water heating coils. Most areas throughout Sypek buildings B and C Annex are similarly served by H&V units. The original portion of the Health Careers Center is served by a large air-handler located in the attic mechanical room, while the new portion is served by several smaller single-zone air-handling units. The units serving the Health Careers Center provide cooling in addition to heat, with chilled water being provided by the air-cooled chillers located outside the building.

A considerable amount of maintenance costs are incurred annually by repair of the air-handlers and packaged units serving these facilities. Energy and operational costs will be attained by replacing the equipment, which is past it's useful service life.

Figure 1: Heating and Ventilating unit common throughout the Assunpink and Sypek Campuses

Scope of Work – Assunpink Building B

Description	Unit Location	Service Location	Manufacturer	Model
HV-1	B-100	B-100	Trane	Torrivent
HV-2	B-111	B-111	Trane	Torrivent
HV-3	B-122	B-122	Trane	Torrivent
HV-4	B-133	B-133	Trane	Torrivent

- Demolition, removal and disposal:
  - Existing air handling units.
- Furnish and install the following:
  - YORK or equivalent high efficiency air handling units.
  - Reconnect all applicable piping.
  - Install new housekeeping pads as needed for new equipment.
  - Insulate all piping.
  - Leak check piping.
  - Electrical power and control wiring to new unit(s).
  - Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Assunpink Building C

Description	Unit Location	Service Location	Manufacturer	Model
HV-5	C-100	C-100	Trane	Torrivent
HV-6	Telecomm Shop	Telecomm Shop	Trane	Torrivent
HV-8	C-119	C-119	Trane	Torrivent
HV-9	C-130	C-130	Trane	Torrivent

- **Demolition, removal and disposal:**
  - **Existing air handling units.**

- Furnish and install the following:
  - o YORK or equivalent high efficiency air handling units.
  - o Reconnect all applicable piping.
  - o Install new housekeeping pads as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Sypek Building B

Description	Location	Service Location	Manufacturer	Model
HV-9	Bldg B, B-160	B-160	Trane	Torrivent
HV-6	Bldg B, B-132	B-132	Nesbitt	Unknown
HV-7	Bldg B, B-144	B-144	Nesbitt	Unknown
HV-8	Bldg B, B-154	B-154	Nesbitt	Unknown
HV-1	Bldg B, B-100	B-100	Nesbitt	Unknown
HV-2	Bldg B, B-110	B-110	Nesbitt	Unknown
HV-3	Bldg B, B-120	B-120	Nesbitt	Unknown

- Demolition, removal and disposal:
  - o Existing air handling units.
- Furnish and install the following:
  - o YORK or equivalent high efficiency air handling units.
  - o Reconnect all applicable piping.
  - o Install new housekeeping pads as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Sypek Building C Annex

Description	Location	Service Location	Manufacturer	Model
AHU-l	Bldg C Annex, Room 114	D113	Trane	Climate Changer
AHU-2	Bldg C Annex, Room 114	D114	Trane	Climate Changer
HV-1	Bldg C Annex, Room 114	114	Trane	Climate Changer
HV-2	Bldg C Annex, Locker Room	D119	Trane	Torrivent

- Demolition, removal and disposal:
  - o Existing air handling units.
- Furnish and install the following:
  - o YORK or equivalent high efficiency air handling units.
  - o Reconnect all applicable piping.
  - o Install new housekeeping pads as needed for new equipment.
  - o Insulate all piping.
  - o Leak check piping.
  - o Electrical power and control wiring to new unit(s).
  - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Scope of Work – Health Careers Center

Description	Unit Location	Service Location	Manufacturer	Model
AHU	Attic	Oriqlnal Buildinq	Trane	Climate Changer
AHU	Ceilinq	Nurse's Lab	Maqic-Aire*	90BHW6
AHU	Ceilinq	Dental Lab	Maqlc-Aire *	90BHW6
AHU	Ceilinq	Cafeteria/Lounqe	Maqic-Aire*	60BHW6
AHU	Celllnq	Classroom E	Maqic-Aire*	90BHW6

- Demolition, removal and disposal:
  - o Existing air handling units.

- Furnish and install the following:
    - o YORK or equivalent high efficiency air handling units.
    - o Reconnect all applicable piping.
    - o Install new housekeeping pads as needed for new equipment.
    - o Insulate all piping.
    - o Leak check piping.
    - o Electrical power and control wiring to new unit(s).
    - o Coordinate with new DDC controls.
- Provide new unit start-up and commissioning

Savings Methodology

The savings for the AHU replacements were calculated based on improvement in the AHU efficiency. The existing AHU efficiency was based on the age of the AHU, published information from the manufacturer, and also results of the building simulation models. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance procedures should be followed as recommended by the AHU manufacturer.

Benefits

- Electrical energy savings
- Fuel energy savings
- Operational savings based on new equipment requiring less maintenance
- Capital improvements of HVAC systems
- Improved indoor air quality
- Improved occupant comfort

FIM 4.1: BUILDING AUTOMATION CONTROLS UPGRADES – CENTRAL PLANT

FIM Summary

The central plant of each building consists of all heating and cooling equipment and associated pumps and represents the largest energy consumption used in the course of conditioning the building. Therefore, the central plant has the greatest potential for energy savings through upgraded building automation controls. Older pneumatic controls systems often have issues because they are maintenance intensive; building personnel must ensure the air stays clean and dry, calibrate the controls and gauges regularly, and ensure that controls strategies are being implemented correctly. Often times, pneumatic systems are not functioning properly which results in increased energy consumption and occupant complaints. Providing new direct digital controls (DDC) to the central plant equipment will reduce the energy consumption of the entire building as well as ease the burden on the maintenance personnel.

The Building Automation System proposed for every school utilizes Johnson Controls Metasys System Extended Architecture (MSEA). MSEA provides a technologically advanced, open, standards based IT platform that will allow facility personnel to analyze the performance of its facilities and their systems. The MSEA system is completely BACnet Testing Labs (BTL) certified.

Facilities Recommended for this Measure

- Assunpink – Building B
- Sypek – Building B
- Health Careers Center

Scope Narrative

Each campus throughout the Mercer County Vocational School District is served by a single Central Plant. At Assunpink and Sypek Campuses, the central plant consists of two hot water boilers, located in Building B at each campus, and hot water pumps for loop circulation. At the Health Careers Center, the Central Plant consists of one hot water boiler located in the basement, two air-cooled chillers located outside of the buildings, and associated pumps located in the basement.

The hot water circulation loops at each building are already implementing temperature reset based upon outside air temperature. This was confirmed by JCI during the site audit by consulting boiler logs and notes located in the boiler room at each campus. Hot water reset is an energy-efficiency strategy which is implemented by the existing pneumatic controls system. Heating plant controls strategies will be optimized after installation of the DDC controls system. The new controls system will allow monitoring of the central plant systems to ensure the systems and strategies are operating properly. The new controls offer the added benefit that systems can be monitored from nearly any location.

The chilled water loop and primary equipment at Health Careers Center will also be tied into the proposed DDC control system. This will allow energy efficiency strategies such as temperature reset to be implemented, and will also offer benefits such as monitoring and data trending.

Scope of Work

The following is the proposed scope of work for the Mercer County Vocational Schools PC project:

- This scope will include all materials, labor, and electrical installation necessary to meet the scope of work as described in this document.
- Control wiring and tubing installation shall be in compliance with local codes or as described below.
- The project will be executed using the BACnet wireless field bus technology.
- Where new Metasys controls are to be installed, JCI will install a new NAE or NCE supervisory controller and connect it to the county LAN. The County is responsible for providing network drops at each location in order to connect the supervisory controllers.
- The scope of work will include the control components for each of the mechanical and electrical systems as described below.
- Each location will have its own Operator Workstation.
- Commission and validation of Johnson Controls furnished equipment.
- One-year parts and labor warranty on Johnson Controls equipment to start when work is completed on the building on a per building basis.
- Engineered Visio™ drawings and wiring diagrams reflecting new changes.

Scope of Work - Assunpink

Heating Hot Water System:
Add controls for the Hot Water System:

Modes of control provided:

- Pump rotation based on runtime
- Boiler rotation based on runtime
- Hot Water Reset based on outside air temperature

Monitoring and control points:

- Hot Water Boiler Start/Stop/Alarm (Typical of 3)
- Hot Water Supply Temperature
- Hot Water Return Temperature
- Hot Water Pump Start/Stop/Status (Total of 2)
- Hot Water Reset Valve Output
- Outdoor Air Temperature

Domestic Hot Water:
Add controls to monitor two (3) domestic hot water temperature points
Monitoring: (Typical of 3)

Modes of control provided:

- Monitoring Only

Monitoring and control points:

- Domestic Hot Water Temperature (Well or Strap)

Scope of Work - Sypek

Heating Hot Water System:
Add controls for the Hot Water System:

Modes of control provided:

- Pump rotation based on runtime
- Boiler rotation based on runtime
- Hot Water Reset based on outside air temperature

Monitoring and control points:

- Hot Water Boiler Start/Stop/Alarm (Typical of 3)
- Hot Water Supply Temperature
- Hot Water Return Temperature
- Hot Water Pump Start/Stop/Status (Total of 8)
- Hot Water Reset Valve Output
- Outdoor Air Temperature

Domestic Hot Water:
Add controls to monitor three (3) domestic hot water temperature points
Monitoring: (Typical of 3)

Modes of control provided:

- Monitoring Only

Monitoring and control points:

- Domestic Hot Water Temperature (Well or Strap)

Scope of Work – Health Careers

Heating Hot Water System:
Add controls for the Hot Water System:

Modes of control provided:

- Pump rotation based on runtime
- Boiler rotation based on runtime
- Hot Water Reset based on outside air temperature

Monitoring and control points:

- Hot Water Boiler Start/Stop/Alarm (Typical of 1)
- Hot Water Supply Temperature
- Hot Water Return Temperature
- Hot Water Pump Start/Stop/Status (Total of 4)
- Hot Water Reset Valve Output
- Outdoor Air Temperature

Chilled Water System:
Add controls for the Chilled Water System.

- Modes of control provided:
    - Chiller/Pump rotation based on runtime
    - Chilled Water Set-point Adjustment (If available)

- Monitoring and control points:
    - o Chiller Start/Stop/Alarm
    - o Chilled Water Pump Start/Stop/Status (Total of 2)
    - o Chilled Water Supply Temperature
    - o Chilled Water Return Temperature
    - o Chiller Water Reset (If available from chiller panel)

Domestic Hot Water:

Add controls to monitor two (2) domestic hot water temperature points

Monitoring: (Typical of 2)

- Modes of control provided:
    - o Monitoring Only
- Monitoring and control points:
    - o Domestic Hot Water Temperature (Well or Strap)

Savings Methodology

eQuest models were created which model the various types of systems in the schools as well as all mechanical data obtained from drawings and schedules provided during the detailed design phase. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance checks as recommended by the manufacturer should be scheduled for these systems to ensure proper functionality for the life of the system.

Benefits

- Electrical energy savings
- Fuel energy savings
- Operational savings based on new controls equipment requiring less maintenance
- Capital improvements of BAS systems
- Occupant comfort improvement

FIM 4.2: BUILDING AUTOMATION CONTROLS UPGRADES – PRIMARY AHUS

FIM Summary

The primary air handlers represent the second largest energy consumer of the building's heating and cooling equipment after the Central Plant equipment. Pneumatic controls on the primary air handler units do not easily allow for some of the advanced energy conservation strategies that are possible with new DDC controls and require the maintenance personnel to maintain the pneumatic system. By replacing the older pneumatic air handler controls significant energy savings at the air handlers may be achieved and tighter control over supply air temperature may be achieved which will result in increased occupant comfort.

Facilities Recommended for this Measure

- Assunpink – Building A
- Assunpink – Building B
- Assunpink – Building C
- Sypek – Building A
- Sypek – Building B
- Sypek – Building C
- Sypek – Building C Annex
- Health Careers Center

Scope Narrative

The main pneumatic control panel at each building currently controls units based upon schedules which switch the units into "unoccupied" mode at night. However, the occupied and unoccupied temperature setpoints are determined by the position of the thermostat in each room. Therefore, there is no way to centrally control the occupied and unoccupied temperature setpoints, or ensure that night setback is being performed throughout each campus. The proposed upgrade to DDC controls will allow energy strategies to be centrally implemented and monitored.

Figure 2: The position of "Night" thermostats currently control the unoccupied temperature setpoints in each space

The proposed DDC upgrades will have the additional benefit of remedying existing controls issues throughout the buildings. During the site survey, Johnson Controls found that the hot and cold-deck temperature controls for the roof-top multizone units at Assunpink were causing excessive simultaneous heating and cooling. Upgrade to DDC controls will allow a hot and cold-deck temperature reset control strategy to be implemented. Additionally, alarms can be set to notify on-site personnel when controls strategies are on manual override.

Scope of Work - Assunpink

Add new Metasys controllers or enhance the existing Metasys system according to the following scope:

Add controls for four (4) multi-zone Air Handler Units (AHUs).

AHU Zone Schedule:

Equipment	Quantity of Zones
AHU -1	3
AHU-2	2
AHU-3	7
AHU-4	4

Multi-zone AHU Controls:

Modes of control provided:

- Start/Stop based on scheduling
- Morning Warm-up
- Economizer based on outside and return air differential
- Night Setback
- Discharge Air Temperature Reset based on outside air

Monitoring and control points:

- Supply Fan Start/Stop/Status
- Cold Deck Temperature
- Hot Deck Temperature
- Mixed Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Reheat Valve Output
- Cooling Command
- Zone Damper Output (See AHU Zone Schedule for Quantity)
- Zone Temperature (See AHU Zone Schedule for Quantity)
- Zone Temperature Adjustment (See AHU Zone Schedule for Quantity)

Add controls for one (1) single zone Air Handler Unit.

Single Zone AHU 5

Modes of control provided:
- Occupied/Unoccupied scheduling
- Economizer based on outside and return air differential
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:
- Supply Fan start/stop, status
- Discharge Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Hot Water Valve Output
- Cooling Output
- Mixed Air Temperature

Add controls for three (3) Make-up AHUs.

Fresh Air AHUs: (Typical of 3)

Modes of control provided:
- Occupied/Unoccupied scheduling
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:
- Supply Fan start/stop, status
- Discharge Air Temperature
- Zone Temperature
- Zone Temperature Adjustment
- Low Temperature Alarm
- Hot Water Valve Output

Add controls for five (5) H&V units.
H&V Units: (Typical of 5)

Modes of control provided:

- Occupied/Unoccupied scheduling
- Discharge Air Temperature reset based on outside air temperature
- Economizer based on outside and return air differential

Monitoring and control points:

- Supply Fan start/stop, status
- Discharge Air Temperature
- Return Air Temperature
- Zone Temperature
- Low Temperature Alarm
- Outside Air Damper Output
- Hot Water Valve Output

Programmable Thermostats:

Modes of control provided:

- Local Temperature Control
- Occupied/Unoccupied scheduling

Monitoring and control points:

- Install Programmable Thermostat (Total of 1)

Scope of Work - Sypek

Add new Metasys controllers or enhance the existing Metasys system according to the following scope:

Add controls for five (5) multi-zone Roof Top Units (RTUs).

RTU Zone Schedule:

Equipment	Quantity of Zones
RAC-A-1	7
RAC-A-2	7
RAC-C-1	5
RAC-C-2	5
RAC-C-3	3

Multi-zone RTU Controls: (Typical of 5)

Modes of control provided:

- Start/Stop based on scheduling
- Morning Warm-up
- Economizer based on outside and return air differential
- Night Setback
- Discharge Air Temperature Reset based on outside air

Monitoring and control points:

- Supply Fan Start/Stop/Status
- Cold Deck Temperature
- Hot Deck Temperature
- Mixed Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Reheat Valve Output
- Cooling Command
- Zone Damper Output (See RTU Zone Schedule for Quantity)
- Zone Temperature (See RTU Zone Schedule for Quantity)
- Zone Temperature Adjustment (See RTU Zone Schedule for Quantity)

Add controls for two (2) Variable Volume Air Handler Units.

VAV AHUs 1&2: (Typical of 2)

Modes of control provided:

- Occupied/Unoccupied scheduling
- Economizer based on outside and return air differential
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:

- Supply Fan start/stop, status
- Supply Air Static Pressure
- Discharge Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Hot Water Valve Output
- Cooling Output
- Mixed Air Temperature

Add controls for five (5) Make-up AHUs.

Fresh Air AHUs: (Typical of 5)

Modes of control provided:

- Occupied/Unoccupied scheduling
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:

- Supply Fan start/stop, status
- Discharge Air Temperature
- Zone Temperature
- Zone Temperature Adjustment
- Low Temperature Alarm
- Hot Water Valve Output

Add controls for nine (9) H&V units.
H&V Units: (Typical of 9)

Modes of control provided:

- Occupied/Unoccupied scheduling
- Discharge Air Temperature reset based on outside air temperature
- Economizer based on outside and return air differential

Monitoring and control points:

- Supply Fan start/stop, status
- Discharge Air Temperature
- Return Air Temperature
- Zone Temperature
- Low Temperature Alarm
- Outside Air Damper Output
- Hot Water Valve Output

Programmable Thermostats:

Modes of control provided:

- Local Temperature Control
- Occupied/Unoccupied scheduling

Monitoring and control points:

- Install Programmable Thermostat (Total of 1)

Scope of Work - Health Careers Campus
Add new Metasys controllers or enhance the existing Metasys system according to the following scope:

Add controls for five (5) Constant Volume Air Handler Units.
Single Zone AHU 5

Modes of control provided:

- Occupied/Unoccupied scheduling
- Economizer based on outside and return air differential
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:

- Supply Fan start/stop, status
- Discharge Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Hot Water Valve Output
- Cooling Output (No Cooling Output for AHU 5)
- Mixed Air Temperature

Add controls for one (1) Variable Volume Air Handler Unit.
VAV AHU-1:

Modes of control provided:

- Occupied/Unoccupied scheduling
- Economizer based on outside and return air differential
- Discharge Air Temperature reset based on outside air temperature

Monitoring and control points:

- Supply Fan start/stop, status
- Return Fan start/stop, status
- Supply Air Static Pressure
- Discharge Air Temperature
- Return Air Temperature
- Low Temperature Alarm
- Mixed Air Damper Output
- Hot Water Valve Output
- Cooling Output
- Mixed Air Temperature

Programmable Thermostats:

Modes of control provided:

- Local Temperature Control
- Occupied/Unoccupied scheduling

Monitoring and control points:

- Install Programmable Thermostats

Savings Methodology

eQuest models were created which model the various types of systems in the schools as well as all mechanical data obtained from drawings and schedules during the detailed design phase. Savings are generated in eQuest by adjusting operating schedules to reduce temperatures when unoccupied and shut down fans when they are not necessary. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance checks as recommended by the manufacturer should be scheduled for these systems to ensure proper functionality for the life of the system.

Benefits

- Electrical energy savings
- Fuel energy savings
- Operational savings based on new controls equipment requiring less maintenance
- Capital improvements of BAS systems
- Occupant comfort improvement

FIM 4.4: DEMAND CONTROL VENTILATION

FIM Summary

There are air-handling units that require a large percentage of outside air but serve areas that have intermittent oc¬cupancy. If CO2 sensors are installed in those areas, the air-handling unit can decrease the amount of outside air based on occupancy. This control strategy saves a considerable amount of cooling and heating energy by lowering the amount of air to be conditioned at times of minimal occupancy while still maintaining adequate outdoor air levels.

Facilities Recommended for this Measure

- Assunpink – Building A
- Assunpink – Building B
- Assunpink – Building C
- Sypek – Building A
- Sypek – Building B
- Sypek – Building C
- Sypek – Building C Annex
- Health Careers Center

Scope Narrative

Air-handling systems are commonly designed to provide adequate amounts of outside air for the maximum number of occupants in a space. When spaces are occupied to less than full capacity, and when spaces undergo intermittent peri-ods of vacancy over the course of a day, significant amounts of energy can be saved by reducing the amount of outside air introduced to the space.

Johnson Controls consulted as-built drawings to determine the CFM of outside air provided by each air-handling unit when the outside air damper is at its minimum position. The amount of outside air being provided to each building was then compared to the number of occupants per building to confirm opportunity for outside air reduction. The outside air levels were found to be far above the industry standard of 15 outside air CFM per person.

Facility	Total OA CFM	Estimated OA CFM per Person
Assunpink A	9,900	63
Assunpink B	6,285	61
Assunpink C	26,330	257
Sypek A	6,680	63
Sypek B	18,454	111
Sypek C	6,835	53
Sypek C Annex	1,865	24
Health Careers Center - original section	1,000	20
Health Careers Center - new section	2,390	31

The total outside air CFM calculated in the table above does not include outside air from 100% dedicated outside air systems, for which percent of outside air cannot be reduced. This measure will involve implementation of CO2 sensors to control outside air dampers on units with existing return systems. This will cause a greater percentage of air to be returned from the space, thus reducing the amount of energy used in conditioning air from outside of the building.

Below is a list of air-handling units and the areas each serves:

Sypek

Building	Unit No.	Area Served	System Type	Zone Qty.
A	RAC-A-1	Front 1/2 of Block A	Multi-zone RTU: HW Heating + DX Cooling	7
A	RAC-A-2	Back 1/2 of Block A	Multi-zone RTU: HW Heating + DX Cooling	7
C	RAC-C-1	Front 1/3 of Block C	Multi-zone RTU: HW Heating + DX Cooling	5
C	RAC-C-2	Left 1/3 of Block C	Multi-zone RTU: HW Heating + DX Cooling	5
C	RAC-C-3	Right 1/3 of Block C	Multi-zone RTU: HW Heating + DX Cooling	3
C Annex	HV-1	Shop D-113	H&V Unit: HW Heating	1
C Annex	HV-2	Shop D-119	H&V Unit: HW Heating	1
C Annex	AH-1	D-107	Single Zone VAV Unit: HW Heating + DX Split System Cooling	1
C Annex	AH-2	D-114	Single Zone VAV Unit: HW Heating + DX Split System Cooling	1
B	H&V-B-1	B-100 Building Maint. Electrical Shop	H&V Unit: HW Heating	1
B	H&V-B-2	B-110 Plumbing & Heating Tech. Shop	H&V Unit: HW Heating	1
B	H&V-B-3	B-120 Auto Body Tech.	H&V Unit: HW Heating	1
B	H&V-B-5	B-131 Custodial Rooms	H&V Unit: HW Heating	1
B	H&V-B-6	B-132 Automotive Technology Shop	H&V Unit: HW Heating	1
B	H&V-B-7	B-144 Building Maint. Trades & Carpentry Shop	H&V Unit: HW Heating	1
B	H&V-B-8	B-154 Graphic Arts Technology	H&V Unit: HW Heating	1

Assunpink

Building	Unit No.	Area Served	System Type	Zone Qty.
A	AHU-1	Left 1/4 of Building A	Multiple zone RTU: HW Heating + DX Cooling	3
A	AHU-2	Back 1/4 of Building A	Multiple zone RTU: HW Heating + DX Cooling	2
A	AHU-3	Right 1/4 of Building A	Multiple zone RTU: HW Heating + DX Cooling	7
A	AHU-4	Center 1/4 of Building A	Multiple zone RTU: HW Heating + DX Cooling	4
C	AHU-5	C-138 Test Room	Single Zone	1
B	HV-1	B-100 Electrical Shop	H&V Unit: HW Heating	1
B	HV-2	B-111 Construction Shop	H&V Unit: HW Heating	1
C	HV-5	C-100 Machine Tool Shop	H&V Unit: HW Heating	1
C	HV-6	C-110 Auto Body Shop + Telecom. Shop	H&V Unit: HW Heating	1
C	HV-8	C-119 Truck Repair Shop	H&V Unit: HW Heating	1
C	HV-9	C-130 Auto. Maint. Shop	H&V Unit: HW Heating	1

Health Careers Center

Building	Unit No.	Area Served	System Type	Zone Qty.
New	AH-1	Dental Lab	Single-zone AHU: HW Heating + CHW Cooling	1
New	AH-2	Nurse Lab	Single-zone AHU: HW Heating + CHW Cooling	1
New	AH-3	Class 104	Single-zone AHU: HW Heating + CHW Cooling	1
New	AH-4	Lounge	Single-zone AHU: HW Heating + CHW Cooling	1
New	AH-5	Computer 103	Single-zone AHU: HW Heating	1
Original	AHU-1	Original Building	VAV with CHW cooling + HW Reheat	16

The scope of work includes the following:

- Furnish and install CO2 sensor(s) located in the return air stream for the AHU(s)
- Provide start-up and commissioning for the sensors.
- Provide all control programming to implement demand control ventilation on the applicable AHUs.
- Provide training for maintenance personnel.

Scope of Work - Assunpink

Add demand controlled ventilation sequence:

Multi-zone AHU Controls:

- Modes of control provided:
    - o Demand Controlled Ventilation based on high zone PPM
- Monitoring and control points:
    - o Zone Air CO2 (See AHU Zone Schedule for Quantity)

H&V Units: (Typical of 5)

- Modes of control provided:
    - o Demand Controlled Ventilation based on return air CO2
- Monitoring and control points:
    - o Return Air CO2

Scope of Work - Sypek

Add demand controlled ventilation sequence:

Multi-zone AHU Controls:

- Modes of control provided:
    - o Demand Controlled Ventilation based on high zone PPM
- Monitoring and control points:
    - o Zone Air CO2 (See AHU Zone Schedule for Quantity)

H&V and AH Units: (Typical of 11)

- Modes of control provided:
    - o Demand Controlled Ventilation based on return air CO2
- Monitoring and control points:
    - o Return Air CO2

Scope of Work – Health Careers Center

Add demand controlled ventilation sequence:

VAV AHU-1 Controls:

- Modes of control provided:
  - Demand Controlled Ventilation based on high zone PPM
- Monitoring and control points:
  - Return Air CO2

Constant Volume AHU Units: (Typical of 5)

- Modes of control provided:
  - Demand Controlled Ventilation based on return air CO2
- Monitoring and control points:
  - Return Air CO2

Savings Methodology

eQuest models were created which model the amount of outside air and occupancy in each space. Initially, the outside air in the model was determined based on a fixed fraction of air. Savings are generated by allowing the model to reduce the amount of outside air being brought into the space based on the occupancy pattern of the particular space. The details of the eQuest models are included later in this report.

Maintenance Requirements

Annual maintenance checks as recommended by the manufacturer should be scheduled for these systems to ensure proper functionality for the life of the system.

Benefits

- Electrical energy savings
- Fuel energy savings
- Improved indoor air quality

FIM 4.5: BOILER CONTROLLERS

FIM Summary

The existing boilers in operation cycle on-and-off based upon either water temperature setpoints . This measure incorporates a controller to optimize boiler operation by prolonging the boiler combustion cycle and minimizing boiler purge before and after the combustion cycle. As a result, the boilers will fire for longer durations but less frequently resulting in reduced fuel consumption.

Facilities Recommended for this Measure

- Assunpink – Building B
- Sypek – Building B
- Health Careers Center

Scope Narrative

The Assunpink Campus is currently heated by two gas-fired hot water boilers. Similarly, the Sypek Campus is also heated by two gas-fired boilers, while the Health Careers Center is heated by one boiler. This measure will involve the installation of boiler controllers on existing boilers to reduce boiler cycling and optimize boiler operation for energy conservation.

Figure 1: Typical gas-fired boiler at the Assunpink Center

Johnson Controls proposes to install combustion controllers to establish more appropriate sequences that would optimize the boiler operation. The new controllers will be installed to reduce fuel at each building. Intellidyne® is a patented, UL listed advanced technology, which produce 10% to 20% savings on the cost of heating bills. It is a computer device which will make nearly every boiler run more efficiently with no discomfort to building occupants and no additional responsibility for staff members. These sequences would be coordinated with those for hot water reset and reheat.

Typically boilers are sized to accommodate the coldest days (which only typically occur in 5% of the calendar year or less). During these periods of maximum demand, the burner is constantly on and the boiler is operating at its maximum capacity. At all other times, the burner cycles on-and-off maintaining temperature or pressure in the boiler. It is during these periods of lesser demand, that the controller will learn the boiler make up rate and efficiently manage the firing of the boiler. The length of the burner's off-cycle is the best measure of total heating demand or load. In other words, the load is directly related to the time it takes for water (or steam) in the boiler to drop from its high-limit temperature (or pressure) to its low-limit or "call" setting. When demand is high, these off-cycles are short and the on-cycles are longer. When demand is lower, off-cycles are longer and on-cycles are reduced. The controller calculates the optimum time between off and on cycles and controls burner ignitions accordingly. Unlike any other product, the controller can, at any time, actually compute its economy in terms of percentage savings and reduced ignitions, displaying it on the LCD screen.
Johnson Controls will provide each boiler with Intellidyne™ combustion controllers, installed and wired to the boiler. Controllers, in general will be installed in a NEMA 1 gasketed enclosure, with a door.

Johnson Controls will install cabinet or control unit on the boiler or boiler frame. Controls will include the electric programming relay, motor controllers and control switches.

Controls will include a programming relay for starting and stopping the burner, and provisions for pre-combustion and post-combustion purging. In addition provide a manual-automatic selector switch, to allow for fully automatic firing or manual control at any desired rate.

Work included for this FIM will be the installation of the controllers needed to implement the new sequences. New sequences will be checked and verified.

The school district will see a positive impact on the facility operation. Not only will this FIM save energy, it will help to prolong the useful life of the boilers by insuring that short cycle firing and other detrimental actions do not occur.

Scope of Work

- Provide and install a new IntelliCon controller on each existing boiler listed below.

Building	Equipment	Type	Manufacturer	Model #	Fuel	MBH
Assunpink Building B	Boiler - 1	HW	H.B. Smith	Mills 4500	Gas	6,521.7
Assunpink Building B	Boiler - 2	HW	H.B. Smith	Mills 4500	Gas	6,521.7
Sypek Building B	Boiler - 1	HW	H.B. Smith	M450L	Gas	4,678.3
Sypek Building B	Boiler - 2	HW	H.B. Smith	M450L	Gas	4,678.3
Health Careers Center	Boiler - 1	HW	H.B. Smith	Series 28	Gas	916.5

- Provide programming for each unit.
- Provide start up and warranty.
- Provide training for maintenance personnel.

Savings Methodology

The savings for the boiler controllers was calculated based on a reduction in boiler cycling at lower loads. The reduction in boiler cycling time was modeled in eQuest by improving the overall boiler efficiency by 1% and reducing the standby time of the boiler. The details of the eQuest models are included later in this report.

Maintenance Requirements

Once the boiler controllers are installed and commissioned, there is no significant maintenance required of School District facility staff. During the guarantee phase Johnson Controls will monitor the controllers to ensure they are operating correctly. District staff may inspect the controllers periodically to verify the amount of savings at any time although no maintenance on the system is required.

Benefits

- Fuel energy savings

FIM 5.3: LIGHTING RETROFITS

FIM Summary

Interior lighting represents a significant amount of the electric base load throughout a building. Optimizing the interior lighting system by retrofitting any existing T12 technology and older technology T8 fluorescent fixtures and removing existing incandescent lamps will results in a large reduction in electric demand and consumption charges. The new lighting system will also reduce operating costs due to extended lamp and ballast life and manufacturers' warranties.
Since the advent of energy efficient T8 lighting (with electronic ballast) there have been several generations of improvements. Today, 25-watt and 28-watt T8 lamps offer an opportunity to lower energy consumption in areas lit by the standard 32-watt T8. The 28-watt T8 lamp has been selected for this project due to it's optimum light output for this application.

Facilities Recommended for this Measure

- Assunpink – Building A
- Assunpink – Building B
- Assunpink – Building C
- Assunpink – Maintenance Building
- Sypek – Building A
- Sypek – Building B
- Sypek – Building C
- Sypek – Building C Annex
- Health Careers Center

Scope Narrative

During the IGA phase of project development, Johnson Controls performed a detailed, room-by-room survey and documented existing fixture and lamp technology, and method of control. Johnson Controls found that lighting throughout the Mercer County Vocational School District is commonly provided by old T12 fluorescent lamp technology. A mixture of old, 40-watt lamps and newer 34-watt lamps were found throughout the facilities.
Many of the existing F96 high-output T12 pendant-hung industrial fixtures will be replaced with new industrial fixtures containing electronic T8 ballast, reflector, F32 T8 28-watt lamps and wire-guard protection.

Figure 4: Two-lamp 8 ft. T12 fixtures common in Shop Areas

The existing 4 ft. T12 fixtures throughout the remainder of the facilities will be re-lamped and re-ballasted with 28-watt T8 lamps and energy efficient electronic ballasts.
Additionally, incandescent exit signs were found throughout the facilities. New LED exit signs will be installed in place of existing inefficient exit signs. LED exit signs have been in production for several years and are a proven low cost solution for the older exit signs. Because exit signs are always on, the LEDs are a good replacement option because of their longer life and significantly lower power consumption than existing incandescent exit signs.

Figure 6: Incandescent exit sign at Assunpink Center

Scope of Work – Assunpink

- The majority of the lighting is recessed & surface F34T12 & F96HOT12 fixtures.
- The existing F34T12 recessed & surface fixtures will be retrofitted with electronic T8 ballast and F32/T8 28-watt lamps. In some cases, reflectors will also be installed.
- The existing 2-lamp F96HOT12 fixtures, present in the shops & classrooms will be replaced with new industrial fixtures containing electronic T8 ballast, F32/T8 28-watt lamps & wire-guard protection.
- The existing old 2-lamp F34T12 surface-wraparound fixtures, present in some of the classrooms will be replaced with new wide-body wraparound fixtures containing electronic T8 ballast, F32/T8 28-watt lamps & reflectors.

Scope of Work – Sypek

- The majority of the lighting is recessed & surface F34T12 & F96HOT12 fixtures.
- The existing F34T12 recessed & surface fixtures will be retrofitted with electronic T8 ballast and F32/T8 28-watt lamps. In some cases, reflectors will also be installed.
- The existing 2-lamp F96HOT12 fixtures, present in the shops & classrooms will be replaced with new industrial fixtures containing electronic T8 ballast, F32/T8 28-watt lamps & wire-guard protection.
- The existing old 2-lamp F34T12 surface-wraparound fixtures, present in some of the classrooms will be replaced with new wide-body wraparound fixtures containing electronic T8 ballast, F32/T8 28-watt lamps & reflectors.

Scope of Work – Health Careers Center

- The majority of the lighting is recessed & surface F32T8 fixtures in the "new" building & F34T12 fixtures in the "old" building.
- The existing F32T8 & F34T12 recessed & surface fixtures will be retrofitted with electronic T8 ballast and F32/
- T8 28-watt lamps. In some cases, reflectors will also be installed.

Savings Methodology

The savings for the lighting upgrades were calculated based on decreased lighting system power draw. The kW of the existing fixtures was determined by Johnson Controls by actual power measurements taken on a number of the most common light fixture types throughout the district. This data was then grouped fixture type to determine average power draw of the existing light fixtures, which was used in the calculation of savings for this measure.
Savings for this measure were calculated from the room-by-room lighting survey which can be found in Section 7 of this report.

Maintenance Requirements

Johnson Controls recommends that group re-lamping be performed when lamps begin to fail toward the end of their rated life. Performing a group re-lamping of the fluorescent fixtures throughout the facilities is not required, but would provide additional operational savings above that which has been calculated and included in this proposal.

Benefits

- Electrical energy savings
- Operational savings based on warrantee of new lamps and ballasts
- Capital improvements of lighting systems
- Improved interior light quality
- Standardize on one lamp type throughout the facility
- Silent, flicker-free operation
- Environmental responsibility through implementing new lighting technology with reduced mercury content
- Up to a three-year lamp warranty
- Up to a five-year ballast warranty

FIM 6.3: LIGHTING CONTROLS

FIM Summary

Occupancy-based lighting control reduces overall hours of operation of the lighting systems and results in significant electrical energy savings. In addition to the energy savings derived from the reduced operating hours, we assume that these occupancy sensors will reduce the fluorescent lighting kW demand by approximately 20% of the total kW controlled. This presumes that there is a coincident factor of 20% of the controlled lights off at any time during on-peak hours, and is based on extensive practical experience in similar lighting control installations. This is a benefit over and above the savings calculated for this measure.

Facilities Recommended for this Measure

- Assunpink Center
- Sypek Center
- Health Careers Center

Scope Narrative

The existing lighting systems throughout the Mercer County Vocational School district are commonly controlled by manual on/off light switches. In several areas, rooms were found to have two switches – one controlling the front portion of the room and the other controlling the back portion. In these areas, which are typically larger classrooms with 2-lamp 4ft. T12 fixtures, multiple occupancy sensors will be implemented, ensuring the sensors can "see" the entire space.

In some areas, the school district had previously installed a small number of motion sensors for lighting control. Because these sensors were older, single-technology sensors, there were some instances in which the sensors were bothersome to the occupants. In some cases, these sensors have malfunctioned and are in need of replacement. Johnson Controls recommends replacement of the existing sensors in these areas with new, dual-technology occupancy sensors for improved lighting control and savings.

In areas throughout the district which currently utilize manual switch control, Johnson Controls proposes installation of dual-technology occupancy sensors for energy savings and convenience. Occupancy-based lighting control is not recommended for the shop areas throughout the school district, as these areas typically contain large pieces of equipment which could block the sensor's "view" of the occupant.

A complete list of areas recommended for occupancy-based lighting controls is part of the lighting survey which can be found in Section 7 of this report. The proposed design will accomplish occupancy-based lighting control of approximately 45% of the total kW of the lighting systems throughout these three sites.

Scope of Work

Johnson Controls, Inc. proposes to use Passive Dual Technology (PDT) sensors from Sensor Switch for all sensors proposed to be installed in this project. Following are some of the typical room and area types that are part of this proposal and the products that are commonly used:

- Classrooms / Labs – Ceiling mounted sensors and/or corner mounted wide view sensors both with power packs. Sensors will be either Passive Infrared (PIR) or dual technology combination PIR with MicrophonicsTM
- Private Offices – In most cases sensors will be wall switch type. Sensors will be PIR or dual technology.
- Open Offices – Ceiling mounted sensors and/or corner mounted wide view sensors both with power packs. Sensors will be either Passive Infrared (PIR) or dual technology.
- Copy Rooms / Storage Closets / Kitchenettes / Break Rooms - In most cases sensors will be wall switch type. Can be PIR or dual technology. Sensors also come with vandal resistant option for added durability.
- Conference Rooms – Depending on size of the room and current switching, sensors will be either wall switch or remote mounted.
- Restrooms – Restrooms with stalls will have ceiling or other remote mounted sensors with the dual technology option. Smaller private restrooms will usually have wall switch sensors.

Savings Methodology

The savings for lighting controls were calculated based on decreased lighting operating hours ("burn hours"). Existing burn hours were determined by Johnson Controls during the IGA development phase by installation of loggers to record lighting system operation and space occupancy. This data was then grouped by space type and extrapolated to determine average annual burn hours of the light fixtures, and average annual hours when lights are on and the space is vacant.
Savings for this measure were calculated from the room-by-room lighting survey which can be found in Section 7 of this report.

Maintenance Requirements

No annual maintenance requirements are anticipated as a result of this measure.

Benefits

- Electrical energy savings
- Improved reliability over older single-technology sensors
- Decrease heat load on cooling equipment due to decreased lighting system operating hours

FIM 8.2: VENDING MISER

FIM Summary

The buildings throughout the school district contain refrigerated vending machines. Vending machines operate 24 hours/day 365 days/year and each consumes several hundreds of dollars per year in electrical energy cost. The installation of the VendingMiser product will reduce the run time of the vending machine during periods when no occupancy is sensed in the area surrounding the Vending machine. The smart electronics in the device will ensure product is kept cold through a cycling process while reducing total energy consumption.

Facilities Recommended for this Measure

- Assunpink Center
- Health Careers Center

Scope Narrative

The Vending Miser is an occupancy-based energy control product. It typically results in a 46% reduction in energy consumption, while maintaining the temperature of the vended product. Using a Passive Infrared (PIR) Sensor, VendingMiser powers down a vending machine when the area surrounding it is vacant. VendingMiser monitors the room's temperature, and automatically re-powers the vending machine at one to three hour intervals, independent of occupancy, to ensure that the vended product stays cold. Energy savings results from reduced machine run time when space is not occupied, while maintaining cold temperatures as needed by cycling the compressor.

Scope of Work

- Furnish and install Vending Miser product on all vending machines.
- Coordinate with facility staff to implement successful installation.

Savings Methodology

Because sensors are not currently in use, current annual hours of machine operation are assumed to be 8,760. Hours of occupancy of the surrounding space are taken from data gathered by loggers placed in the field. Annual occupied hours of the cafeteria were found to be 1,615 hours, and occupied hours of the faculty room were conservatively assumed to be the same as the offices in this building, which were found to have annual occupancy hours of 1,403 hours.

Maintenance Requirements

No maintenance is required for this product.

Benefits

- Electrical energy savings
- Extended useful equipment life cycle due to reduced run time

FIM 12.5: ROOF REPLACEMENT

FIM Summary

The roof a building can cause a significant amount of energy waste throughout the year. A lack of insulation between the roof structure and the conditioned space can results in excess heat gain as a result of the sun beating on the roof throughout the year and conduction during the summer as well as heat loss during the winter months. Another issue that may arise with roofs is leaking through cracks and weather damage. Replacement of the roof with a new high efficiency roofing system will reduce the energy consumption through increased insulation values as well as repair any leaks or holes in the structure. Occupant comfort will be improved due to a reduction in heating load from the roof and maintenance will be easier because many existing problems with the structure will be repaired.

Facilities Recommended for this Measure

- Assunpink – Building B
- Assunpink – Building C
- Sypek – Building A
- Sypek – Building B
- Sypek – Building C

Scope Narrative

Roof replacement is needed at several buildings throughout the Mercer County Vocational School District. The existing roofs are in failing condition. On-site personnel reported that ponding occurs, and leaks are common occurrence. Because of this, ceiling tiles are missing in several areas. The condition of the roofs has lead to a significant annual cost due to roof patching and ceiling tile replacement. The roof leaks also cause degradation of HVAC units and ductwork located above the ceiling. The photo below shows an area where a gutter has been installed above the ceiling to catch the water that leaks through the roof.

Not only is the condition of the roofs a maintenance issue – it is a safety issue as well. On-site personnel reports that the concrete roof-edge slabs periodically fall due to degradation. The slabs have reportedly fallen "in" towards the roof and not yet caused any harm or injury.

Figure 1: Roof damage causes further damage to ceiling and HVAC equipment

Figure 2: Concrete roof-edge slabs which are not secure due to degradation

Figure 3: In some areas concrete slabs have fallen and have been replaced

Roof leaks also cause damage to the underlying insulation. Johnson Controls recommends roof replacement to decrease maintenance costs, improve energy performance, and improve safety throughout the district.

The roof portions outlined with blue in the figure below will be replaced as part of the scope of work for this FIM. The roof of Building A, the roof of the Maintenance building, and the portion of the Building C roof that is indicated by the red "X" were will not be included in the scope of work for this project.

Figure 1: Assunpink Center Roof Replacement Scope

At Sypek Center, the roofs of Building A, Building B and Building C, which are outlined with blue in the figure below, are included for replacement under the scope of work for this FIM.
The roof of C Annex, which is indicated by the red "X," is not included in this scope of work.

Figure 2: Sypek Center Roof Replacement Scope

Scope of Work – Assunpink Buildings B & C, Sypek Buildings A, B & C

- Demolish and remove existing roof
- Provide and install a new high efficiency roofing system

Savings Methodology

The savings for the roof replacement were calculated by reducing the amount of infiltration and increasing the R-value in the eQuest model. The details of the eQuest models are included later in this report. The buildings will also benefit from additional insulation being installed on the roof surface and in wall which will provide additional savings which have not been calculated.

Maintenance Requirements

There will be no additional maintenance responsibilities that the district staff is not already performing in order to keep the buildings in working order. The condition of the new roof will need to be monitored.

Benefits

- Electrical energy savings
- Fuel energy savings
- Capital improvement to building structure and roof system
- Occupant comfort improvement due to reduced thermal loading from roof and sealing gaps in building structure
- Operational savings based on repairing any roof leaks or issues

FIM 12.6: WINDOW FILM

Facilities Recommended for this Measure

For buildings with a large number of windows or exterior walls that are glass, a high percentage of heating and cooling energy is wasted due to conduction and convection through the windows. The installation of window film will reduce the solar gain added to the buildings during all months of the year and will also slightly increase the R-value of the windows which will decrease the heat lost and gained through the glass. Typically, window film has the greatest affect on windows facing, south, east, and west because the solar gains are much greater on these windows than the north facing windows. Window film comes in a variety of colors which can be selected based on customer preference, an added benefit to the district is the installation of window will film will reduce the likelihood of shattered glass if a window is broken. The window will film will act to keep the broken window intact until it can properly be removed and replaced.

Facilities Recommended for this Measure

- Sypek – Building C
- Sypek – Building C Annex

Scope Narrative

Johnson Controls identified two areas which would particularly benefit from application of window film. The central Court area at Building C at the Sypek Center has a large skylight. Occupants report that a great amount of heat gain occurs through this skylight. This area is served by packaged roof-top units which provide heating and cooling to this area. Excessive heat gain through the skylight will cause this equipment to run longer and consume a great deal of energy.

The C Annex at Sypek Center has a perimeter hallway with a large amount of window area. This hallway is on the south side of the building, and thus experiences direct sunlight throughout the day. Occupants report that this area commonly reaches very high temperatures. The surrounding rooms contain air-conditioning and refrigeration systems which will also run longer due to the heat gain in this building.

Figure 6: Central Court at Sypek Building C where excessive heat gain occurs

Johnson Controls recommends installation of window film in these areas for increased occupant comfort and energy savings.

Figure 7: Area at the C Annex at Sypek Center where Window Film will increase occupant comfort

Scope of Work – Sypek Building C Central Court

- Inspect and clean windows prior to installation
- Coordinate with the customer as to color of window film to be installed
- Provide and install window film
- Clean area after installation of film
- Train staff on care and maintenance of window film

Scope of Work – Sypek Building C Annex – South Side Perimeter Hallway

- Inspect and clean windows prior to installation
- Coordinate with the customer as to color of window film to be installed
- Provide and install window film
- Clean area after installation of film
- Train staff on care and maintenance of window film

Savings Methodology

The savings for the window film improvements were calculated by reducing the solar gain added to the buildings during all months of the year and will also slightly increasing the R-value of the windows in the eQuest model. The details of the eQuest models are included later in this report.

Maintenance Requirements

Maintenance procedures should be followed as recommended by the window film manufacturer.

Benefits

- Electrical energy savings
- Fuel energy savings
- Occupant comfort improvement due to reduced heat loss and gain through glass openings
- Extended life of interior equipment including furniture, carpeting, and books due to reduced UV radiation entering the space
- Increased safety due to reduction in shattered glass if a window is broken

FIM 12.9: INSULATING GARAGE DOORS

FIM Summary

Conductive heat gain is caused by temperature differences in adjacent materials, and occurs when heat from the outside air is transferred to the building envelope, and then to the inside air, without any air permeation occurring. In areas with little insulation, conductive heat transfer causes heat loss from the conditioned inside areas of the building to the exterior. Heat loss and gain through poorly insulated areas causes HVAC equipment to run longer.

Facilities Recommended for this Measure

- Assunpink Building B
- Assunpink Building C
- Sypek Building B
- Sypek Building C
- Sypek Building C Annex

Scope Narrative

The Assunpink and Sypek are home to many shops with exterior garage doors. While the district has replaced several of the doors and installed new insulating garage doors, a majority of the doors throughout the facility remain uninsulated. These shops are served by heating and ventilating (H&V) units with hot water coils. Installation of new insulating garage doors will decrease heat loss from the conditioned space to the outside, thus decreasing the amount of heat that must be provided by the HVAC equipment.

Figure 1: Garage doors at Assunpink

Scope of Work – Assunpink

- Demolition and removal of the following:
  - Twelve (12) existing uninsulated garage doors
- Furnish and install the following:
  - Twelve (12) insulated garage doors with R-6.6 or higher
  - Test for proper closure

Scope of Work – Sypek

- Demolition and removal of the following:
  - Eleven (11) existing uninsulated garage doors
- Furnish and install the following:
  - Eleven (11) insulated garage doors with R-6.6 or higher
  - Test for proper closure

Savings Methodology

The savings for the insulating garage doors were calculated based on increased resistance to heat transfer. The details of the eQuest models are included later in this report.

Maintenance Requirements

Garage door weatherstrip seal should be checked annually and replaced as needed.

Benefits

- Natural gas savings
- Improved comfort

FIM 14.2: SOLAR PHOTOVOLTAIC PANELS

FIM Summary

Photovoltaic's, or PV, refers to devices that convert sunlight directly into electricity. This transformation of light into electricity is performed inside PV modules, which are the "solar collectors" in the system. A typical module used for a residential or commercial installation might measure about 3' by 5', and have a rated maximum DC output of about 200 watts. A collection of PV modules grouped together in an installation is called a "PV array". PV modules produce direct current (DC) electricity when exposed to sunlight. This DC power must be passed through an electronic device called an inverter if the end goal is to produce alternating current (AC) electricity. The inverter takes DC electricity as its input, and produces grid-quality AC power as its output.

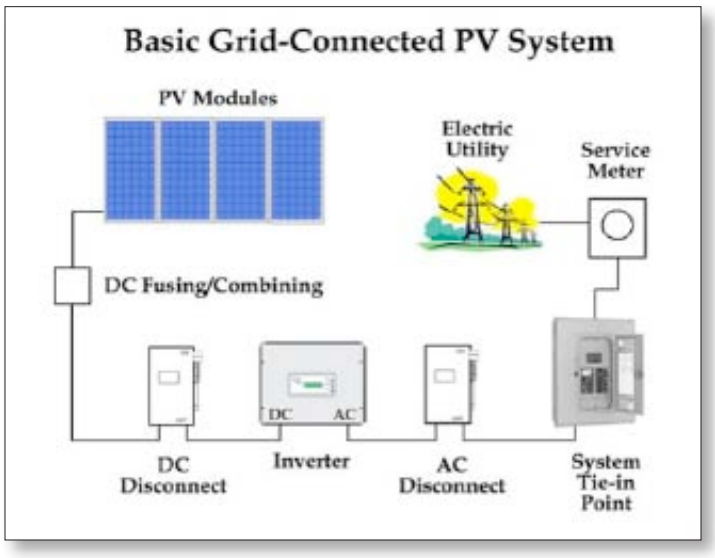
The AC power from the inverter is sometimes fed into a circuit breaker in a building electrical panel, where it can be used directly by building loads, with the excess production traveling out through the electric meter to the electrical grid. In some cases the AC power is fed directly to the utility grid, through a meter that is installed specifically for the PV system. This arrangement is often used in areas where the local utility has program to purchase all of the electricity produced by a PV system at a special solar buyback rate. Utilities may do this to increase their portfolio of "green" electricity generation, by entering into an arrangement with customers where they pay a premium rate for PV-produced electricity and at the same time purchase the "green attributes" associated with this electricity.

In addition to PV modules, one or more inverters, and the necessary equipment to connect to the building or utility electrical system, a complete and NEC code-compliant PV system will require a racking system for mounting the modules, fusing and disconnects on both the DC and AC side of the system, and various code-mandated system labeling. In grid-connected systems the local utility will often require a visible, lockable AC disconnect on the exterior of the building. Many PV systems also include lightning/surge arrestors on both the DC and AC side to protect the inverter, and many also include data collection and data display features.

Thus far, it has not proved cost-effective to include battery storage in a PV system simply to store and release power to take advantage of different electrical rates at different times of day, or for peak demand shaving. This may change as battery technology improves and electrical rates rise in the future. Because the peak output of a PV system occurs during the middle of the day, the technology has a natural tendency to provide power during peak usage hours when it is needed most, even without any energy storage in the system.

The most common type of PV installation today is a grid-connected battery-less system. This type of system cannot supply electrical power to a site when the utility grid goes down - the inverter needs the utility grid to produce power. This is partly a result of technical issues, but mainly it is a requirement established by electrical codes, power utilities, and the UL and other listing agencies. This "anti-islanding" feature is required so that utility workers cannot be exposed to unexpectedly energized electric lines during a grid outage.

The PV market worldwide has expanded rapidly over the past decade, with much of the growth being in Europe. Today PV is still used for remote power and space applications, but it is now also widely used in residential, commercial, and increasingly for large-scale power generation applications.



Facilities Recommended for this Measure

- Sypek Campus
- Assunpink Campus
- Health Careers Center

Scope Narrative

The roofs at Sypek, Assunpink, and Health Careers Center present a good candidate location for the PV systems after roof replacement is performed in the areas where it is needed.

The proposed solar PV systems will avoid purchase of electricity from the utility to the extent produced by the panels. It will also provide opportunity for augmentation of the District's curriculum to include this area of study.
Johnson Controls has identified the following candidate locations for PV system application at the Mercer County Vocational Schools. Please note that the roof-top application will only be viable after replacement of the roofs.

Site	Location	Proposed System kW
Assunpink	Roof - Building A	148.76
Assunpink	Roof - Building B	88.61
Assunpink	Roof - Building C	109.99
Sypek	Roof - Building B	177.19
Sypek	Roof - Building C Annex	33.61
Health Careers Center	Roof – Original Building	18.75
Health Careers Center	Roof – New Building	24.84

Scope of Work

- Furnish and install the following:
  - Solarworld SW 235 Mono modules or equivalent
  - Inverter with integral AC/DC disconnects
  - Roof or ground mount rack/support hardware
  - Component specification sheets and Warranties
  - Module and mounting hardware installation guides
  - Solar array layout drawings
  - Electrical line drawings
  - Roof or ground mounting hardware drawings

Savings Methodology

One of the most comprehensive references available for energy solution development is the RETScreen International website. The website was established for the promotion of sharing technical and practical information as it relates to energy saving applications. The site was created by the Canadian government with support from industry experts. Among other resources the website offers free software for evaluating potential renewable energy projects. The RETscreen tool was used to size the proposed Solar DHW heating system and predict the savings achievable from the installed system. http://www.RETScreen.net

Maintenance Requirements

Minimal annual maintenance is required for a solar system. Procedures should be followed as recommended by the system manufacturers.

Benefits

- Electric savings
- Educational Opportunity
- Decreased reliance on utility electric

FIM 14.5: RENEWABLE KIOSK DISPLAY

Scope Narrative

This measure promotes energy awareness and provides information specific to the renewable technologies implemented at the Mercer County Vocational Schools.

Facilities Recommended for this Measure

- Sypek Campus

Scope Narrative

As part of the renewable measures that have been included in this response, Johnson Controls, Inc. will include a web-based information service and Kiosk that will track energy production and/or saving in real time and provide a window into the renewable installation at Mercer County Vocational School District for access by student as a learning tool, or public to promote the school district's environmental stewardship.

Johnson Controls, Inc. has an alliance with Fat Spaniel Corporation to provide the services listed above. Please visit the follow website to navigate the system live and see how other school system are performing.
http://view2.fatspaniel.net/SSH/MainView.jsp

Scope of Work

- Furnish and install sub-metering equipment required for the system
- Furnish and install Kiosk to be installed in publicly-accessible location
- Set up the school districts web site
- Provide access to website
- Set up Kiosk display with customer input

Savings Methodology

Savings calculations are not applicable. This FIM is included for educational benefits.

Maintenance Requirements

Johnson Controls ongoing technical support and product revisions.

Benefits

- Educational Tool
- Public Awareness

FIM 15: GRANTS AND REBATES

FIM 15 – Grants and Rebates

Grants Office Research Report

Contents:

Mobilizing to Access Grant Funding

Each year, the federal government makes over $400 billion available for a wide range of projects. Much of that is available to a group of entities referred to as "State, Local, nonprofit, and other." As distinguished from research funding recipients, these government agencies, schools, and hospitals receive the largest share (in terms of dollars) of federal funding annually.

Grant Pathways

Funding at the federal level comes from 26 grantmaking agencies, and grants are either:

- **Direct** – funds go directly from the federal funding agency to local recipients; or
- **Pass-through** – funds go through the state, and possibly even a regional entity, before they are made available to the local entity. States may still have to apply for these funds and often keep a portion to cover administrative costs, but then each state will maintain its own re-granting process, timelines, and priorities.

It's important to be aware of whether the grant you are eligible to apply to a particular grant opportunity (and receive funds from it), or whether the opportunity is a pass-through grant for the state, and you will need to follow up with the state to determine what you need to do to apply for funds for your project.

Grant Types

Another distinction to be aware of is the type of grant a particular program offers. A grant may be:

- **Formula** – Funding allocations are based on a formula – such as student poverty (No Child Left Behind Grants), risk assessments (State Homeland Security Grants) or number of acute care hospital beds (Hospital Emergency Preparedness Grants). As long as an eligible applicant completes an application in the timeline and format required by the funder, they're virtually assured of receiving the money their formula has determined they're eligible for;
- **Competitive** – applications are competitively scored based on a set of objective and/or subjective criteria, and the score the proposal receives factors in to the award allocation; or
- **Earmark** – grant awards are decided at the legislative level during the budgeting process. You will need to apply to your local Congressman or State Representative to obtain these funds.

This Research Report may contain direct and pass-through grants as well as formula, competitive, and earmark programs. Each of these distinctions will have implications as the value of the program to your organization and the potential for raising new funding for your project.

Grant Sources

Grants typically come from one of three sources, including:

- **Federal** – issuing from one of the 26 Federal grantmaking agencies. These grants tend to be large (often $250,000 to $500,000 in size) and restricted to broad, national priorities;
- **State** – issuing from a state agency, either using funds derived from within the state or passing through funds received from elsewhere (most often a federal agency). These grants tend to be more accessible, smaller than federal grants, and more in line with state priorities; and
- **Private** – Foundations and Corporations provide approximately $35 billion each year in funding, and they tend to be the most responsive to locally developed projects and local needs.

All three of these sources may figure in to your funding strategy. A common approach is to fund the bulk of a project with federal and state funds, then apply to foundations to support the local elements that fall outside the parameters of the government funders, or to cover the required matching costs.

Determining the Desirability of a Grant

You may not have the resources or even the desire or need to write all the grants identified in this document. So, it may be necessary to qualify which grants to which you'd like to apply for the project, and which you'll leave for another time or another project. The following criteria may be helpful in determining which grants to pursue:

- **Total funding available** – gives you an idea how broad the program will be and how competitive;
- **Application burden –** some programs require 100 page narrative, while others may look for 10 or less;
- **Matching requirements** – similarly, some programs require a dollar for dollar match, while others may require a 5% match or no cost sharing at all;
- **Scale** – you don't want to write 1,000 $5,000 requests to get your $500,000 project funded or lock yourself into a lot of extra activities that you didn't intend just to get what you needed;
- **Collaboration/partnering requirements** – beyond what you have in place are a factor to consider;
- **Lead time** – more lead time generally equals more time to develop the project and articulate that in the grant application – six weeks is good, and three weeks is almost essential;
- **Track record with the funder** – generally more important or local funders than federal sources, but a consideration nonetheless.

Anatomy of a Grant Summary

The grant summaries contained in this report contain several common data elements, intended to provide you with an overview of each program and enough information to determine whether a given program warrants serious investigation – i.e., downloading and reading the guidance document and other informational materials on the program.

Each grant summary contains:

Grant Title - the title of the grant as defined by the funder, with any common abbreviations in parentheses. If the grant is focused on a particular state, the state name will also be in parentheses.

CFDA# - the Catalog of Federal Domestic Assistance number assigned by the funder, including the two numbers representing the primary funding agency (followed by a decimal point), and the remaining numbers (and letters) representing the agency's program. If no CFDA number exists, the entry will read: None

Authority - the definition of the funding source, including the federal or state agency and sub-agency or name of the foundation making the grant.

Summary - relevant information about the grant program, funding priorities, and application process, including highlights of the grant program and information on the priorities and application process.

Eligibility - the types of applicants that are eligible to apply for the grant including standard categories of eligible applicants, as well as any special eligibility criteria that the program requires.

Award Information -the total funding available, matching requirements, allocation formula, and any other relevant items that impact the award amount.

History of Funding - any available information on past years' funding. If no information is available, the entry will read: Not Available

Deadline - additional information on the deadline, including Letter of intent/full application deadlines or submission timeframes for different media, reflecting any nuances in the application deadline, as indicated in the guidance or other sources. In addition, the deadline description will identify a forecasted (unofficial or not yet published) deadline date with the following phrase: Identified deadlines are forecasted based on available information. **The official deadline date is subject to change at any time.**

Additional Information - relevant information not suited for other fields

Contact Information - information on program contact(s), including phone, e-mail, and a URL which points as directly as possible to the program Web page or guidance document (often a PDF).

Key Contacts

- Congressional Representative:

Congressman Frank LoBiondo, 2nd District of New Jersey
http://www.house.gov/lobiondo/

Washington, DC Office
2427 Rayburn House Office Building
Washington, DC 20515-3002
Phone: (202) 225-6572
Fax: (202) 225-3318

Mays Landing, NJ Office
5914 Main Street Suite 103
Mays Landing, NJ 08330-1746
Phone: (800) 471-4450 or (609) 625-5008
Fax: (609) 625-507

- State Administrative Agencies:

New Jersey Department of Education
Judge Robert L. Carter Building
100 River View Plaza
PO Box 500
Trenton, NJ 08625-0500
Phone: (609)292-4469
http://www.state.nj.us/education/

New Jersey Department of Environmental Protection
P. O. Box 402
Trenton, NJ 08625-0402
Phone: 1-866-DEP-KNOW (866-337-5669)
http://www.state.nj.us/dep/

Report of Funding Opportunities

Grants Office has identified 5 funding opportunities for this client and they are listed below with their administering agencies included, as well as any deadlines that are currently available.

Some funding opportunities may require collaboration with other agencies. *Please note: Congressional earmarks may be a viable opportunity for project funding. The client should contact their congressional representative for further details (see pg. 6).

Funding Opportunities included:

1. Energy Efficiency and Conservation Block Grant (New Jersey) (Recovery Act)
2. Renewable Energy Incentive Program (REIP) (New Jersey)
3. New Jersey SmartStart Buildings
4. New Jersey Solar Renewable Energy Credits (SRECs)- Details in FIM 14 write-up
5. New Jersey Pay for Performance Program

Foundations:

6. Community Foundation of New Jersey - Education
7. Geraldine R. Dodge Foundation - Education (New Jersey)

Title: Energy Efficiency and Conservation Block Grant (New Jersey) (Recovery Act)

Authority: New Jersey Board of Public Utilities

Summary: The EECBG Rebate Program provides supplemental funding up to $20,000 for eligible New Jersey local government entities to lower the cost of installing energy conservation measures. This program is administered by the New Jersey Board of Public Utilities (NJ BPU) and managed by TRC, the New Jersey's Clean Energy Program's (NJCEP's) Commercial and Industrial (C&I) Market Manager. Funding for the EECBG Rebate Program is provided through the American Recovery and Reinvestment Act (ARRA). Due to the Federal source of these funds, the following measures are eligible. Applications to New Jersey's Clean Energy Program must be limited to these measures: (1) Direct Install (where qualified through the Energy Assessment Tool): Lighting, Occupancy sensors, Variable speed drives, Programmable thermostats and certain other HVAC controls, Refrigeration measures, Low flow water devices, Pipe insulation, Packaged HVAC measures up to 15 tons, and Boilers and furnaces up to 300,000 Btu/h; (2) Pay for Performance: Efficient lighting, HVAC measures, Occupancy sensors, Variable speed drives, Programmable thermostats, Refrigeration measures, Domestic hot water reduction measures, Pipe insulation, ENERGY STAR® boilers and furnaces, Barometric dampers, High efficiency cooling systems, High efficiency water heating equipment, Energy efficient appliances, Geothermal heat pumps (10 tons of capacity or smaller), Windows, doors, insulation, and other building shell improvements, Clean and tune (furnaces), Solar thermal hot water (appropriately sized for the existing building), Low flow aerators/showerheads/toilets, Combined heat and power systems (sized to boilers appropriate to the buildings in which they are located), Chillers, Motors and pumps, Controls, Building management systems, Exhaust air heat recovery, Exhaust fans/air handlers/ventilation fans, (3) NJ SmartStart Buildings for measures recommended by a LGEA or an equivalent audit: Efficient lighting, High efficiency HVAC measures, Lighting controls, Variable speed drives, High efficiency boilers and furnaces, High efficiency cooling systems, High efficiency water heating equipment, Geothermal heat pumps (10 tons of capacity or smaller), High efficiency chillers, Motors, Pumps; and (4) Independently installed building shell measures recommended by a LGEA or an equivalent audit: Energy efficient windows; Energy efficient doors; Insulation; or Other energy efficient building shell measures.

Eligibility: EECBG funding is available for New Jersey local governments that did not receive a Direct Block Grant from the US Department of Energy. A complete list of the 512 eligible municipalities and counties is available at the NJCEP website: http://www.njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities.

Award Information: Funding of up to $20,000 has been reserved for eligible entities provided they apply by December 31, 2010.

History of Funding: None is available.

Deadline Description: The application deadline is December 31, 2010. After the December 31st deadline, a second round of remaining funds may be available. Projects must be completed and all supporting documentation for final payment received by December 31, 2011.

Additional Information: Official guidelines are available at http://www.njcleanenergy.com/files/file/ARRA/EECBG%20Complete%20Package%20Document%20-%20final%209-7-10.pdf.

Contact:
New Jersey's Clean Energy Program
c/o TRC Energy Services
900 Route 9 North, Suite 404
Woodbridge, NJ 07095
http://www.njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants

Title: Renewable Energy Incentive Program (REIP) (New Jersey)

Authority: New Jersey Board of Public Utilities

Summary: The renewable energy incentive program (REIP) provides rebates that reduce the upfront cost of installing renewable energy systems like solar, wind, and sustainable biomass projects in New Jersey. The Renewable Energy Incentive Program offers upfront incentives to customers of utilities regulated by the BPU who invest in eligible electricity-producing equipment for use in offsetting onsite electric consumption. REIP incentives improve the financial returns of renewable energy investments by offsetting the cost of system installation and/or providing ongoing benefits in the form of renewable energy credits from the generation of renewable energy. The REIP is considered one market development tool in New Jersey's Clean Energy Program, which offers upfront financial incentives, educational resources, and information on renewable energy systems, energy efficiency measures, and combined heat and power technologies. These programs are available to all New Jersey ratepayers, including residential customers, businesses, schools, and municipalities served by regulated electric and gas utilities. There are four types of renewable energy systems currently eligible to participate in the REIP: (1) Solar Electric (Photovoltaic, or PV): Systems that produce electricity directly from sunlight; (2) Sustainable Biomass: System organic material to produce electricity; (3) Fuel Cell – A fuel cell is an electrochemical energy conversion device. It produces electricity from external supplies of fuel and an oxidant. These react in the presence of an electrolyte. To be eligible for participation in the REIP Program the Fuel Cell must use a renewable source to produce thhydrogen fuel; and (4) Wind Generation: Generators that convert the kinetic energy of wind, captured by turbines, into electricity.

Eligibility: To be eligible to participate in the REIP, an applicant must bJersey Board of Public Utilities-regulated electric and/or natural gas utility. An applicant must demonstrate payment into the Societal Benefits Charge through submission of a utility bill from the site of the proposed installation.

Award Information: Rebate amounts vary based on capacity of system and type of applicant. Please refer to the following chart for rebate amounts: http://www.njcleanenergy.com/re.

History of Funding: None is available.

Deadline Description: The 2010 REIP budget for solar projects is only separated into three funding cycles to ensure that financing is available through the end of the year. The three funding cycles begin January 1, May 1, and September 1. ustomers interested in applying for renewable energy projects please call: 1-866-NJSMART (1-866-657-6278).

Additional Information: Official guidelines are available at http://www.njcleanenergy.com/files/file/Renewable_Programs/CORE/REIPGuidebookfinal0202mq.pdf.

Contact:
Renewable Energy Incentive Program
New Jersey's Clean Energy Program
New Jersey Board of Public Utilities

c/o Conservation Services Group
75 Lincoln Highway
Iselin, New Jersey 08830
Phone: 866-NJSMART (866-657-6278)
Email: joananne.bachmann@csgrp.com
http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program

Title: New Jersey SmartStart Buildings

Authority: New Jersey Board of Public Utilities

Summary: New Jersey SmartStart Buildings® is a statewide energy efficiency program administered by the New Jersey Board of Public Utilities' Office of Clean Energy and delivered by the Commercial & Industrial Market Manager, TRC Energy Services. The incentives, technical assistance, and other services described in this Program Guide are available to qualified commercial, industrial, institutional, government or agricultural customers in the state who are planning to construct, expand, renovate, or remodel a facility, or to replace electric or gas equipment. It also provides incentives to local governmental entities to conduct investment grade audits of their facilities as well as professional services to help guide customers through designing and planning phases. Customers can participate in the Program via three distinct avenues: (1) Prescriptive Measures: allows customers to choose equipment from a prequalified list of measures and receive an incentive; (2) Custom Measures: allows customers to request technical assistance to qualify unique measures of their choosing that are not on the prescriptive list, and may receive an incentive; and (3) Comprehensive Building Design Measures – in which the customer, the design team, and program-supported experts work together from the conceptual design stage of a new construction or substantial renovation project to consider holistic design and equipment options to improve the overall efficiency of a building. Under this approach, customers will be eligible for both program sponsored technical assistance in defining and costing efficiency options, as well as reimbursement to the customer's own design team for additional design work or analysis necessary to accommodate program recommendations. The customer's financial incentive will be calculated and awarded based on an analysis of the entire project design and the interrelationship between the various energy consuming systems in the building.

Eligibility: Projects must be located within the service territory of at least one of the following New Jersey Utilities: Atlantic City Electric, Jersey Central Power & Light, New Jersey Natural Gas, Elizabethtown Gas, Public Service Electric and Gas, Rockland Electric Company, or South Jersey Gas. Incentives for new construction are available only for projects in areas designated for growth in the NJ State Development and Redevelopment Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for incentives throughout the State.

Award Information: The Program provides incentives for commissioning mechanical systems for K-12 public schools over 50,000 square feet on a 50/50 cost-share basis for up to $30,000.

History of Funding: None is available.

Deadline Description: Applications may be submitted throughout the year. Applications are available at http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/application-forms/application-forms.

Additional Information: Pre-approval is required for almost all energy efficiency incentives. This means you must submit an application form (and applicable worksheets) before any equipment is installed. Official guidelines are available at http://www.njcleanenergy.com/files/file/NJSSB%20Program%20Guide/NJSSB%20Program%20Guide%20-%20September%202010%20-%20final.pdf.

Contact:
New Jersey's Clean Energy Program
New Jersey Board of Public Utilities
c/o Conservation Services Group
75 Lincoln Highway
Iselin, New Jersey 08830
Phone: 866-NJSMART (866-657-6278)
Email: joananne.bachmann@csgrp.com
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

Title: Community Foundation of New Jersey - Education

Authority: Community Foundation of New Jersey

Summary: The Community Foundation of New Jersey maintains over 650 charitable funds, which have been established by individuals, families, businesses, and nonprofit agencies residing in or affiliated with New Jersey. Over 300 of the funds have active donors who advise their own charitable fund at the Foundation. These donors make recommendations or set guidelines for gifts from their funds that the Foundation's Board honors. The Foundation assists donor advisors in making gifts to charities across New Jersey and the United States. It strives for excellent and effective giving by allowing donors to make recommendations for gifts to charities that are important to them, and serves as a community of donors and charities that makes giving simple, effective, and rewarding. The Community Foundation is built for consistent, responsive, and timely giving. The Foundation has many causes that touch their hearts and inspire action. From promoting the arts to curing disease, certain causes resonate in uniquely personal ways based on their own experience and values. Their donor families drive change by supporting a wide and deep range of needs. While their visions may differ, they share a desire to give back and make an ongoing difference. Key initiatives include: education, health, social welfare, and the environment.

Eligibility: Nonprofit agencies in New Jersey are eligible to apply for funding. Please refer to the official program guidance for additional information and restrictions.

Award Information: Award amounts vary by proposal and fund to which your organization applies. Please refer to the official guidance for more detail. The guidance is available at the URL contained in the contact section of this posting.

History of Funding: The foundation granted over $26,000,000 in 2007.

Deadline Description: There are no specific deadlines. If your organization would like to apply for funding, please submit a letter of inquiry to the Foundation detailing the nature and purpose of project, history of organization, amount requested and explanation, and name and coverage of any possible competitive nonprofits, is possible. Current funding opportunities can be view at http://www.cfnj.org/nonprofits/applications/index.php.

Additional Information: If you have questions, contact Nancy Hamilton at (973) 267-5533 ext. 240, or by email at nhamilton@cfnj.org

Contact:
Community Foundation of New Jersey
35 Knox Hill Road
P.O. Box 338
Morristown NJ 07963
Phone: (973) 267-5533
Fax: (973) 267-2903
Email: info@cfnj.org

Title: Geraldine R. Dodge Foundation - Education (New Jersey)

Authority: Geraldine R. Dodge Foundation

Summary: The Geraldine R. Dodge Foundation was established in 1974. The mission of the Foundation is to support endeavors that improve the quality of life in New Jersey. The Foundation donates funds in the areas of Arts, Education, and the Environment. In order to maximize the effectiveness of each grant, the Foundation seeks proposals that address one of the following goals: (1) Strengthen and build cultural institutions throughout the state of New Jersey, including support for efforts to promote creativity, public awareness, and opportunities for local artists; (2) Create innovative educational opportunities within and out of traditional classroom settings, including promotion of ecological education, arts education, and real world applied learning experiences; (3) Support efforts that seek to protect ecosystems and promote sustainable living within New Jersey; and (4) Increase public awareness about Arts, Education, and Environment through creative use of new and traditional media. The Foundation highly values innovative thinking, collaborative programs, "place-based" grantmaking, and an awareness of public policy.

Eligibility: Nonprofit entities with a 501(c)(3) status may apply for funding.

Award Information: Award amounts vary by proposal.

History of Funding: Annual Reports published by the Foundation are available at http://www.grdodge.org/aboutus/annualreports.htm.

Deadline Description: FY2010 deadlines are December 1, 2009, March 1, 2010, and September 1, 2010 with decisions in March 2010, June 2010, and December 2010, respectively. Deadlines are anticipated to be similar annually. Instructions for new applicants available at http://www.grdodge.org/howtoapply/invitedapplicants10.htm.

Additional Information: The Foundation does not provide grants for capital campaigns, individuals, or institutions of higher education. Complete application guidelines are available at http://www.grdodge.org/howtoapply/applicationguidelines.htm. Please consult the official guidance for full detail on the funding restrictions.

Contact:
RoseAnn DeBois, Grants Manager
Geraldine R. Dodge Foundation
14 Maple Avenue
PO Box 1239
Morristown, NJ 07962-1239
Phone: (973) 540-8442, ext. 109
Fax: (973) 540-1211
Email: rdebois@grdodge.org
www.grdodge.org

15.6 Pay for Performance Program – NJ

New Jersey Specific Rebate Program

Johnson Controls Inc. is a partner in the New Jersey pay for performance program. This programs allow schools district to obtain rebate for energy savings project above and beyond the standard NJ Smart program when energy savings exceeds 15% of the baseline usage for each school. We expect that many of the Mercer County Vocational schools will be eligible for this rebate program

Pay for Performance - Existing Buildings

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 200 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 200kW demand in order to participate in the program: hospitals, public colleges and universities, 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.

Combined Heat & Power (CHP) projects are eligible for incentives up to $1,000,000 as part of Pay for Performance. Download the CHP Application Package that includes instructions, forms and technical worksheets.

FIM 15.3: SOLAR RENEWABLE ENERGY CERTIFICATES (SRECS):

FIM Summary:

A SREC is a Solar Renewable Energy Credit issued in the form of a tradable certificate by the New Jersey Board of Public Utilities (BPU). SRECs start accumulating on the day your solar electric system is connected to electric service. The utility will track your SRECs through your system output meter, which will be read by utility company meter readers. Every time your solar power system generates 1,000 kilowatt hour (kWh) (or one megawatt hour [MWh]) of power, one SREC is earned.

In New Jersey, power suppliers (utilities) are required to include a significant percentage of renewably generated power in their generation portfolio in addition to natural gas, nuclear and coal. The most efficient way for power suppliers to accomplish this is to purchase Renewable Energy Certificates from owners of renewable energy systems.

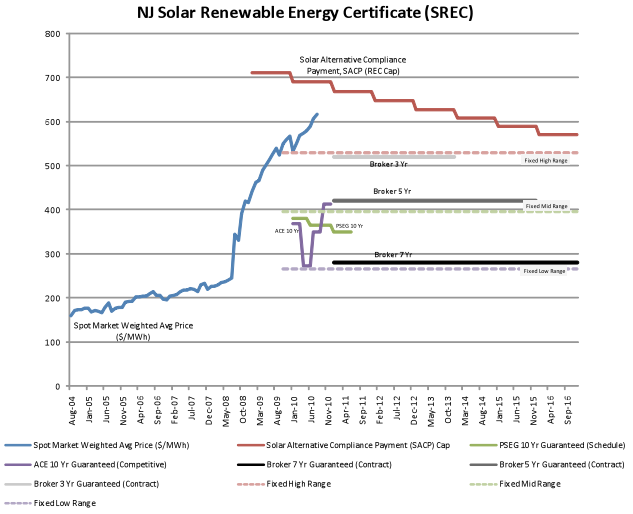
There are two ways to sell SRECs:

- SREC Brokers: There are several established Environmental/SREC brokerages registered to operate in New Jersey. The SREC values offered by brokers are typically higher than the values offered by Utility SREC Programs although their terms are shorter. A typical brokered 5 year agreement would have a value of $420/SREC

- Direct sale to SREC market: This approach will provide the highest SREC values in the short term ($625 - $650) but there is no term guarantee. This approach may or may not provide the highest return. Generally, this is not an appealing approach to a public school.

Johnson Controls will identify an approach for the sale of SRECs that will lock-in a value of **$425**/SREC for the first five years and a value of **$350**/SREC for ten yeard thereafter.

Historical NJ SREC values are shown in the chart to the right.



FIM 16.1: PC POWER MANAGEMENT

FIM Summary

Personal computers' (PCs) energy consumption waste within a facility is very often ignored. PCs are typically left on by the users even if they are not being used. Johnson Controls proposes to reduce this wasted energy through implementing a program that automatically and centrally manages power settings through a network based program. Currently, MAC computers utilize a much more advanced power management protocol directly out of the box which is why they are not included in this solution.

Facilities Recommended for this Measure

- Assunpink – all buildings that are part of the district network
- Sypek – all buildings that are part of the district network
- Health Careers Center – all buildings that are part of the district network

Scope Narrative:

Johnson Controls proposes to install an easy-to-deploy software utility that addresses network energy waste and reduces operating costs without impacting PC users. The product measures, manages, and minimizes the energy consumed by the network's PC clients through one centralized interface. It provides IT departments with a powerful approach to automate energy-efficient "best practices" throughout their networks, while it adds new control and flexibility to traditional PC power management.

This PC energy management tool is a client-server software solution that would allow the School District to measure, manage and minimize the amount of energy consumed by personal work computers and monitors. This software sets the power management options of the networked, Windows-based PCs on a schedule customized by IT Department staff to meet the user's needs. Installation of the server software is very straightforward. Existing system conditions would be verified such as connectivity to a remote database and presence of certain system requirements for the software.

Johnson Controls will work with the School District to install and rapidly deploy the software on the district's PC network. The two day installation plan will address server and client installation, basic administrative configurations, logical power management profile groupings, and energy consumption reporting. Johnson Controls will also provide ongoing technical support and product revisions, with an annual energy audit to ensure maximized energy savings.

Scope of Work:

- JCI will quickly and efficiently install the server and its clients for the personal computer power management.
- JCI will initiate a pre-installation planning meeting to confirm any relevant network characteristics and define the project's timeline and responsibilities. The client software will be deployed, implemented and configured on the District's network either remotely or manually.
- Once installed, the JCI team will train the customer's system administrators and reporting tool users.
- The JCI team will help assure the District's success through our annual maintenance program. This provides our customers with ongoing technical support, software updates and upgrades, and an annual Network Energy Analysis to confirm the most effective use of the system and allow for any incremental changes.
- An annual maintenance plan and support is also included for every year of the contract term.

Savings Methodology

The savings for PC power management were calculated based on reduction of energy consumed by personal computers, and also results of the building simulation models. The details of the eQuest models are included later in this report.

Maintenance Requirements

Johnson Controls ongoing technical support and product revisions.

Benefits:

- Simple to use.
- Energy Savings.

FIMs 18.5, 18.6, 18.8 & 18.9: ACADEMY OF ENERGY PROGRAMS

FIM Summary

Johnson Controls has a corporate-wide commitment to creating environments for achievement through programs that focus on energy, the environment, and classroom education. We have partnered with the National Energy Foundation to form The Academy of Energy, our award-winning energy-education program. Through hands-on curriculum, activities, and posters, The Academy promotes energy efficiency and conservation in grades K-12+ and encourages students to apply what they learn in the classroom to their personal and future professional lives.

Facilities Recommended for this Measure

All schools in the district will be able to participate in this program.

Scope Narrative:

FIM 18.5 - Energy Action Technology, grades 9-12, teaches advanced energy concepts. Over 72 learning activities and 7 Sources of Energy posters and corresponding Energists teach young adults about energy technologies and society as they begin to make the transition from school to work. The sources are: Coal, Oil, Natural Gas, Nuclear, Water, Renewable Energy, and Electrical Generation. Five full color technical posters teach about the Science of Flames, Petroleum Technology, Natural Gas Technology, Recycling Used Oil and Electrotechnology. The Energy Action Challenge gives students the opportunity to put into action at home what they have learned at school.

FIM 18.6 - Academy Solar, grades K-12, is an interdisciplinary program that can be used in science, technology, math, vocational studies, environmental education, social science, and futures studies curricula. Students are encouraged to investigate a wide range of energy concepts, technologies, and social issues through the focus of solar energy. Each program includes learning activities for the elementary and secondary levels plus a supply kit that students may use to investigate solar energy and its uses. Teachers will receive suggestions for various extension and enrichment activities that encourage students to do extra projects. Additional supplemental instructional materials include the Renewable Energy Sources poster and accompanying Energist, the Electrical Generation poster and Energist, the Energy Basics CD, and the Eye Chart poster. This program can stand alone or serve as an excellent compliment to Energy Fun, Energy Fundamentals, Energy Action Technology, or Energy Action Patrol0.

FIM 18.8 - Career Exploration, grades 11-12, provides students with career related work experience while obtaining up to 40 hours of academic credit. The program allows students a superb opportunity to integrate classroom theory into the world of work, as well as providing career option exploration, practical experiences, new skill development, realistic perceptions of the work environment, and professional contacts. The externship experience is a vital component of any major technical level of instruction.

FIM18.9 - Externship, for college undergraduates, provides students with up to 100 hours of career-related work experience at a Johnson Controls office while obtaining three semester hours of college credit. This experience will offer students an on-site, hands-on opportunity to think about a career in the energy field. Whether a student has interest in technology, engineering, sales, administration, etc. this course will assist with workforce development decisions for the student and Johnson Controls.

Each program contains activity books, posters, canvas tote bag, teacher letter, registration packet, action plan, levels of achievement, public relations packet, and action reports, as well as a Polaroid camera, film, and guidelines to integrate visual learning. Some programs also contain t-shirts, armbands, checklists, thermometers, CDs, or videos.

To provide teachers with an in-depth Academy understanding and assistance regarding program implementation, formal Teacher Training is included in this project. Further, facility staff training is also included in this project to ensure your teachers, students and custodial/facility staff are working together to maximize energy awareness and conservation.

Complete packages of materials are targeted to specific grade levels and can easily be integrated into existing math and science curriculums, giving teachers and students a fresh set of materials. Additionally, The Academy can be correlated to any state's core curriculum or education standards.

Scope of Work:

- Provide unlimited access to the Academy website via a user name and password.
- Access is valid for 3 years from execution date of contract. After 3 years, access may be renewed annually as part of a Planned Service Agreement.
- Academy of Energy Education Program website includes:
    - o Classroom ready materials, plans and activities that align with K-12 curriculums
    - o Activities for students, teachers and communities to encourage natural resource conservation
    - o Teachers blog
    - o Miscellaneous: laboratory materials, posters, training resources, competitions, educational libraries
- Provide a virtual orientation meeting to the Academy website

Savings Methodology

No savings are claimed for these FIMs.

Maintenance Requirements

Not Applicable

Benefits:

- Curriculum Enhancement
- Energy Education
- Behavior Modification

SECTION 4

SAVINGS CALCULATIONS

SECTION 5

MEASUREMENT AND VERIFICATION

Measurement & Verification (M&V) Methodologies

This section contains a description of the types of Measurement and Verification (M&V) methodologies that Johnson Controls will use to guarantee the performance of this project.

They have been developed and defined by three independent authorities:

- International Performance Measurement and Verification Protocol (IPMVP)
- Federal Energy Management Program (FEMP)
- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Guide 14P

There are four guarantee options that may be used to measure and verify the performance of a particular energy conservation measure. Each one is described below.

Option A – Partially Measured Retrofit Isolation

Savings are determined by partial field measurement of the energy use of the systems to which an ECM was applied, separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous.

Partial measurement means that some but not all parameters may be non-measured. Careful review of ECM design and installation will ensure that non-measured values fairly represent the probable actual use. Non-measured values will be shown in the M&V plan along with analysis of the significance of the error they may produce.

Savings are determined through engineering calculations using short term or continuous pre and post-retrofit measured or non-measured data points.

Option B – Retrofit Isolation with Ongoing Measurements

Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements can be taken throughout the post-retrofit period.

Savings are determined through engineering calculations using short-term or continuous pre and post-retrofit measurements.

Option C – Whole Building Metering/Utility Bill Comparisons

Option C involves the use of utility meters or whole building sub-meters to assess the energy performance of a total building. Option C assesses the impact of any type of improvement measure, but not individually if more than one is applied to an energy meter. This option determines the collective savings of all improvement measures applied to the part of the facility monitored by the energy meter. Also, since whole building meters are used, savings reported under Option C include the impact of any other change made in facility energy use (positive or negative).

Option C may be used in cases where there is a high degree of interaction between installed improvement measures or between improvement measures and the rest of the building or the isolation and measurement of individual improvement measures is difficult or too costly.

This Option is intended for projects where savings are expected to be large enough to be discernable from the random or unexplained energy variations that are normally found at the level of the whole facility meter. The larger the savings, or the smaller the unexplained variations in the baseline, the easier it will be to identify savings. Also, the longer the period of savings analysis after installing the improvement measure, the less significant is the impact of short-term unexplained variations. Typically, savings should be more than 20% of the baseline energy use if they are to be separated from the noise in the baseline data.

Periodic inspections should be made of all equipment and operations in the facility after the improvement measure installation. These inspections will identify changes from baseline conditions or intended operations. Accounting for changes (other than those caused by the improvement measures) is the major challenge associated with Option C-particularly when savings are to be monitored for long periods.

Savings are calculated through analysis of whole facility utility meter or sub-meter data using techniques from simple comparison to regression analysis.

Option D – Calibrated Simulation

Option D involves the use of computer simulation software to predict energy use. Such simulation models must be "calibrated" so that it predicts an energy use and demand pattern that reasonably matches actual utility consumption and demand data from either the base-year or a post-retrofit year.

Option D may be used to assess the performance of all improvement measures in a facility, akin to Option C. However, different from Option C, multiple runs of the simulation in Option D allow estimates of the savings attributable to each improvement measure within a multiple improvement measure project.

Option D may also be used to assess just the performance of individual systems within a facility, akin to Option A and B. In this case, the system's energy use must be isolated from that of the rest of the facility by appropriate meters.

Savings are calculated using energy use simulation models, calibrated with hourly or monthly utility billing data and/or end-use metering.

Selecting M&V Options for a Specific Project

The tailoring of your specific M&V option is based on the level of M&V precision required to obtain the desired accuracy level in the savings determination and is dependent on:

- The complexity of the Energy Conservation Measure
- The potential for changes in performance
- The measured savings value.

The challenge of the M&V plan is to balance three related elements:

- The cost of the M&V Plan
- Savings certainty
- The benefit of the particular conservation measure.

Savings can also be non-measured. If savings are non-measured, these savings are mutually agreed upon as achieved at substantial completion of the respective energy conservation measure and shall not be measured or monitored during the term of the performance contract.

The Performance Verification Methods Recommended for Mercer County Votech School

JCI's performance verification methods are designed to provide the facility's administration with the level of M&V necessary to protect them from an under-performing energy conservation measure (ECM), yet have a minimal impact on the project's financial success.

The selection of the M&V methods to be used is based on the criteria as detailed by IPMVP and FEMP, and JCI's experience with hundreds of successful performance contracts in the federal, state, and private sectors. Following is a table illustrating how the savings of the major energy conservation measures proposed for this project will be verified.

ECM Description	Measurement and Verification Method - Summary	Detail of M&V Methodology
Boiler Controllers	**Non-Measured:** Savings are from the optimized on and off cycles of the burner ignition.	***Pre M&V***: Manufacturer's data and existing operating parameters will be collected on the boilers. ***Post M&V***: The boiler controllers will be inspected following installation to verify proper operation. ***Energy Savings***: Savings are from the optimized on and off cycles of the burner ignition.
Boiler Plant Upgrades	**Option A:** Savings are from replacing the existing boiler with high efficiency boilers.	***Pre M&V***: The combustion test will be performed to determine the efficiency of the existing boilers. The operation schedule will be verified during the field audit. ***Post M&V***: The manufacturer data/combustion test will be used to verify the efficiency of the new boilers. ***Energy Savings***: Savings are from replacing the existing boiler with high efficiency boilers .
Building Automation Controls Upgrades	**Option B:** Savings are from building automation control upgrades.	***Pre M&V***: Accepted engineering practices / building simulations will be used to calculate energy consumption baselines. Pre-installation measurements will be taken. Short-term trending of equipment operating hours, if applicable, will be performed. All results will be calibrated. ***Post M&V***: Various control points within the building management system will be trended and/or totalized. This data will be used to verify that all control strategies are in place and functioning as intended. ***Energy Savings***: The savings generated by the building model will be used for calculations.
Chiller Replacement	**Non-Measured:** Savings are from the reduced electric consumption of the new chiller.	***Pre M&V***: Manufacturer's data and operating parameters will be collected on the existing chiller. ***Post M&V***: The new chiller will be inspected following installation to verify proper operation. ***Energy Savings***: Savings are from the reduced electric consumption of the new chiller.

ECM Description	Measurement and Verification Method - Summary	Detail of M&V Methodology
Demand Control Ventilation	**Option B:** Savings are from the reduced energy consumption of the heating and cooling system based on the CO_2 level.	***Pre M&V***: Accepted engineering practices / building simulations will be used to calculate energy consumption baselines. Pre-installation measurements will be taken. Short-term trending of equipment operating hours, if applicable, will be performed. All results will be calibrated. ***Post M&V***: Various control points within the building management system will be trended and/or totalized. This data will be used to verify that the demand control ventilation strategy is in place and functioning as intended. ***Energy Savings***: The savings generated by the building model will be used for calculations.
Lighting Occupancy Controls	**Option A:** Savings are from the reduced operating hours of the lighting fixtures.	***Pre M&V:*** Lighting power readings will be taken on a sample of lighting fixtures. Lighting burn hours will be measured through the use of light loggers. The lighting burn hours will be the same for baseline and post-installation conditions. ***Post M&V:*** Once the installation is completed, the sensor will be inspected to ensure proper operation. ***Energy Savings:*** Savings are from the reduced operating hours of the lighting fixtures.
Lighting Retrofit	**Option A:** Savings are from the reduced power consumption of new lighting fixtures.	***Pre M&V:*** Lighting power readings will be taken on a sample of lighting fixtures. Lighting burn hours will be measured through the use of light loggers. The lighting burn hours will be the same for baseline and post-installation conditions. ***Post M&V:*** Lighting power readings will be taken on a sample of lighting fixtures. Measurements will occur once at the outset of the agreement. ***Energy Savings:*** Energy savings will be calculated using the actual measured wattage reduction and measured burn-hours.
Package Unit Replacement RTU's	**Option A**: Savings are from replacing the existing RTUs with new RTUs.	***Pre M&V***: Manufacturer's data and existing operating parameters will be collected on the RTUs requiring replacement. ***Post M&V***: The new RTUs will be inspected following installation to verify proper operation. The nameplate data will be used to verify the efficiency of the new RTUs. ***Energy Savings***: Savings are from gaining efficiency by replacing the existing RTUs with high efficiency ones.

ECM Description	Measurement and Verification Method - Summary	Detail of M&V Methodology
PC Power Management	**ption B:** Savings are from power consumption drop of computers in different operating modes.	***Pre M&V:*** The occupancy, computer operating hours and computer power readings in different mode will be determined through field surveys. ***Post M&V:*** The post retrofit computer power consumption in different operating modes will be determined with the software. ***Energy Savings:*** Based on the difference in actual computer operating hours, power draw and operational profile energy savings will be calculated.
Roof Replacement	**Non-Measured:** Savings are from the reduced heating and cooling consumption.	***Pre M&V:*** The size of the roof will be verified during the field audit. ***Post M&V:*** The size of the new roof will be verified to be completed through JCI's commissioning process. ***Energy Savings:*** Savings are from the reduced heating and cooling consumption.
Solar PV	**Option B:** Energy savings are from the electricity generated from the PV system.	***Pre M&V:*** The baseline incident radiation at the location will be studied. The potential electric load to be offset will be verified through site audit and utility bills. ***Post M&V:*** Ongoing totalizations of electricity produced from PV system, ongoing trend of incident radiation and Force Majeure event will be used to verify the target energy. ***Energy Savings:*** Savings are from the electricity generated from the PV system.
Variable Flow HW Pumping & Motor Replacement	**Non-Measured:** Savings are from the reduced electric consumption of the VFD installation and high efficiency motor.	***Pre M&V***: Manufacturer's data and operating parameters will be collected on the existing HW pump. ***Post M&V***: The new VFD and motor will be inspected following installation to verify proper operation. The nameplate data will be used to verify the efficiency. ***Energy Savings***: Savings are from the reduced electric consumption of the VFD installation and high efficiency motor.
Vending Miser	**Non-Measured:** Post retrofit consumption determined through reduced operating hours of vending machines.	***Pre M&V:*** The total number of vending machines will be verified during the audit and the power consumption of the machines will be estimated based on vending machines operating 24 hours per day. ***Post M&V:*** A sample of Vending Misers will be inspected to ensure the devices are in place and operational. ***Energy Savings:*** Savings for the Vending Misers will be determined through a reduction of machine run hours.

Mercer County Votech School

Discussion of ESPE scope of work

From the onset of construction of a performance-contracting project, an Energy Solutions Performance Engineer (ESPE) will be assigned to the JCI Service team responsible for the project's ongoing success. The ESPE is responsible to ensure that the program delivers the savings as promised and guaranteed by JCI for the duration of the Performance Contracting agreement.

During the construction period, the role of the ESPE assigned to this project will be as follows:

- Monitoring of the installation and initiation of savings tracking and reporting. The ESPE will assist with system commissioning to insure that the desired levels of equipment performance are achieved.

For ECMs utilizing an Option "A" M&V protocol, the ESPE is responsible for:

1. Any pre and post measurements required under the contract.
2. Making sure the Building Management System employs the appropriate control strategies and setpoints as specified in the contract.
3. Performing a careful analysis of actual as-built information and adjusting the savings to be reported for a particular ECM if necessary to reflect the actual installation conditions. For example: The final lighting savings to be reported will be determined from the as-built information reflecting the actual mix of retrofits encountered during installation.

For ECMs utilizing an option "B" M&V protocol, the ESPE is responsible for:

1. Making sure that the appropriate data points required to track the variables defined for the ECM's savings calculation formulas in the contract are provided.
2. Working with the technicians to set up the on-going data capture (i.e., Trend and Totalization data on the Building Management System) necessary to track and report the savings being generated by a particular ECM.

- The ESPE will capture the savings being delivered by each ECM as it comes on line.
- At the completion of construction, documentation will be provided to the customer advising that construction is substantially complete, and that the savings guarantee period has started. The ESPE will then prepare, deliver, and review a construction period savings report with the customer's management team.

For the duration of the term of the Assured Performance Guarantee, the role of the ESPE assigned to this project will be as follows:

- Monitoring on-going performance of energy conservation measures to make sure the anticipated savings are being generated. The ESPE will spend time on-site once a quarter to:

    1. Review information from the building management system to ensure that control strategies as originally outlined are in place and functioning.
    2. Advise JCI and the customer's service personnel of any abnormalities/deficiencies observed. Consult with the customer's service personnel to discuss and resolve any questions/issues they may have.

- Coordinate with JCI service and customer's service personnel to address and correct any performance deficiencies that affect the generation of the anticipated savings.

- Calculate and document the savings being generated by the project. Track savings on an ongoing basis and report status of actual savings generated to date versus guaranteed savings to date to JCI's management team. Investigate and work with JCI service and customer's staff to resolve any issue that could generate a savings shortfall, or, deficiency in performance.

- Apprise customer of opportunities to further enhance project performance and of any additional opportunities for further energy conservation measures discovered.

- Consult with customer on other matters that may affect project's performance. For example, if the customer's current utilization of the facility drastically changes, or, additional floor space is added to an existing building, the performance of certain ECMs may be affected.

- The ESPE will provide an annual report illustrating the progression of savings.

- At the completion of each "guarantee" years, the ESPE will generate an Annual Savings Report containing:

    1. A Performance Value Report which gives an executive overview of the project's performance to date.
    2. A summary section containing the details of the projects savings accounting. This section also will contain a project highlights page and more detailed versions of any performance graphs appearing in the Performance Value Report.
    3. Sections as required containing spreadsheets detailing the savings calculations and formulas used for each ECM that was implemented under the project.

The ESPE will deliver and review this report in detail with the appropriate members of the customer's management team.

SECTION 6

FINANCIALS

SECTION 7

Detailed Engineering Data

LIGHTING SURVEY

Assunpink Center Lighting Survey

					PRE-INSTALLATION						POST-INSTALLATION									
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
1		BUILDING A	BUILDING A																		
2	Assunpink Center	BUILDING A	Office - Open (Board of Ed.) A176	Office	10	4LA' EE/EEMAG	145.0	1.5		Switch	5	4LT-RLRB/ NORMAL/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	97	0.5	Overhead Sensor	1613	0	0	988	5/2, (5) Cellular Lenses
3	Assunpink Center	BUILDING A	Office - Open (Board of Ed.) A176	Office	4	4LA' EE/EEMAG	145.0	0.6		Switch	4	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	49	0.2	Overhead Sensor Savings	1613	0	0	988	
4	Assunpink Center	BUILDING A	Exits	Exits	1	20W 2L EXIT	40.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
5	Assunpink Center	BUILDING A	Storage Closet A182	Storage	1	60W INCANDESCENT	60.0	0.1		Switch	1	13W CF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF= 1.05	15	0.0	Switch	1527	0	0	684	
6	Assunpink Center	BUILDING A	Office A181	Office	4	4LA' EE/EEMAG	145.0	0.6	94/99/84	Switch	2	4LT-RLRB/ NORMAL/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	97	0.2	Wall Sensor	1613	0	0	988	2r2
7	Assunpink Center	BUILDING A	Office A180	Office	4	3LA' EE/EEMAG	115.0	0.5		Switch	4	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.2	Wall Sensor	1613	0	0	988	2r2
8	Assunpink Center	BUILDING A	Office A179	Office	2	4LA' EE/EEMAG	145.0	0.3	31/35/33	Switch	2	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	1613	0	0	988	
9	Assunpink Center	BUILDING A	Office - Computer A177	Office	4	4LA' EE/EEMAG	145.0	0.6	43/43/44	Switch	2	4LT-RLRB/ NORMAL/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	0.2	Overhead Sensor	1613	0	0	988	2r2
10	Assunpink Center	BUILDING A	Office - Computer A177	Office	1	4LA' EE/EEMAG	145.0	0.1		Switch	1	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Overhead Sensor Savings	1613	0	0	988	
11	Assunpink Center	BUILDING A	Storage - Vault A178	Storage	4	4LA' EE/EEMAG	145.0	0.6	42/46/43	Switch	2	4LT-RLRB/ NORMAL/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	0.2	Wall Sensor	1527	0	0	684	2r2
12	Assunpink Center	BUILDING A	Storage A183	Storage	2	4LA' EE/EEMAG	145.0	0.3		Switch	2	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	
13	Assunpink Center	BUILDING A	Hallway A 168	Hallway	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	3120	4912	728	5790	
14	Assunpink Center	BUILDING A	Foyer	Hallway	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1627	
15	Assunpink Center	BUILDING A	Lavatory - Womens A174	Lavatory	3	40W INCANDESCENT	40.0	0.1	9.0	Switch	3	9W CF/SI (Litetronics #NL-10427)	Compact Fluorescent, twin, (1) 9W lamp	11	0.0	Switch	2080	0	0	1456	
16	Assunpink Center	BUILDING A	Lavatory - Mens A173	Lavatory	1	60W INCANDESCENT	60.0	0.1	2.0	Switch	1	13W CF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF= 1.05	15	0.0	Switch	2080	0	0	1456	
17	Assunpink Center	BUILDING A	Kitchen A175	Kitchen	4	3LA' EE/EEMAG	115.0	0.5	32/33/28	Switch	4	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.2	Switch	3120	80	0	2240	2r2
18	Assunpink Center	BUILDING A	Kitchen A175	Kitchen	1	2LA2'' U TUBE STD/EEMAG or ELEC	72.0	0.1		Switch	1	2LT-RLRB F17T8/ NORMAL/ REFL	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) w/Reflector	33	0.0	Switch	3120	80	0	2240	
19	Assunpink Center	BUILDING A	Kitchen A175	Kitchen	1	(1) FO23T8/ELEC	26.0	0.0		Switch	1	NO UPGRADE	Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	26	0.0	Switch	3120	80	0	2240	
20	Assunpink Center	BUILDING A	Conference - Board Room A169	Conference	11	2LA' EE/EEMAG & 2LA' EE/EEMAG	144.0	1.6		Switch	11	4L RLRB/ SS LOW/ INBOARD-OUTBOARD (w/ 2-2L ballasts)	Fluorescent, (4) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	82	0.9	Overhead Sensor	3120	415	0	1951	IBOB
21	Assunpink Center	BUILDING A	Exits	Exits	1	20W 2L EXIT	40.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
22	Assunpink Center	BUILDING A	Office A171	Office	6	2LA' EE/EEMAG & 2LA' EE/EEMAG	144.0	0.9	68/56/57	Switch	6	4L RLRB/ SS LOW/ INBOARD-OUTBOARD (w/ 2-2L ballasts)	Fluorescent, (4) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	82	0.5	Overhead Sensor	1613	0	0	988	IBOB
23	Assunpink Center	BUILDING A	Office A170	Office	6	2LA' EE/EEMAG & 2LA' EE/EEMAG	144.0	0.9	47/55/56	Switch	6	4L RLRB/ SS LOW/ INBOARD-OUTBOARD (w/ 2-2L ballasts)	Fluorescent, (4) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	82	0.5	Overhead Sensor	1613	0	0	988	IBOB
24	Assunpink Center	BUILDING A	Foyer	Hallway	1	60W INCANDESCENT	60.0	0.1		Switch	1	13W CF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF= 1.05	15	0.0	Switch	2324	0	0	1627	
25	Assunpink Center	BUILDING A	Lavatory A172	Lavatory	3	40W INCANDESCENT	40.0	0.1	14.3	Switch	3	9W CF/SI (Litetronics #NL-10427)	Compact Fluorescent, twin, (1) 9W lamp	11	0.0	Switch	2080	0	0	1456	
26	Assunpink Center	BUILDING A	Classroom 166A	Classroom	16	4LA' EE/EEMAG	145.0	2.3		Switch	16	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.8	Overhead Sensor	1763	0	0	1161	4r4, Every Other Fixture
27	Assunpink Center	BUILDING A	Classroom 166	Classroom	11	3LA' T8/ELEC	80.0	0.9	65/62/60	Switch	11	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.7	Overhead Sensor	1763	0	0	1161	
28	Assunpink Center	BUILDING A	Storage - IT 165	Storage	2	4LA' EE/EEMAG	145.0	0.3		Switch	2	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	
29	Assunpink Center	BUILDING A	Storage - IT 167	Storage	1	2LA' EE/EEMAG	71.6	0.1	24.1	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
30	Assunpink Center	BUILDING A	Hallway A 115A	Hallway	2	2LA' EE/EEMAG	71.6	0.1	13.9/16	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
31	Assunpink Center	BUILDING A	Hallway A 115A	Hallway	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	3120	4912	728	5790	
32	Assunpink Center	BUILDING A	Exits	Exits	2	20W 2L EXIT	40.0	0.1		Breaker	2	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
33	Assunpink Center	BUILDING A	Classroom 123	Classroom	18	2LA' EE/EEMAG	71.6	1.3	66/66/58	Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Overhead Sensor	1763	0	0	1161	3r8, 2r11
34	Assunpink Center	BUILDING A	Classroom 123	Classroom	16	2LA' EE/EEMAG	71.6	1.1		Switch	8	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1763	0	0	1161	
35	Assunpink Center	BUILDING A	Classroom 123	Classroom	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Overhead Sensor	1763	0	0	1161	
36	Assunpink Center	BUILDING A	Office 122	Office	4	2LA' EE/EEMAG	71.6	0.3	69/75/67	Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	2r2
37	Assunpink Center	BUILDING A	Storage 121	Storage	2	2LA' EE/EEMAG	71.6	0.1	26/7/16	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
38	Assunpink Center	BUILDING A	Classroom 116	Classroom	20	2LA' EE/EEMAG	71.6	1.4	61/64/65	Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1763	0	0	1161	5r12
39	Assunpink Center	BUILDING A	Classroom 116	Classroom	20	2LA' EE/EEMAG	71.6	1.4		Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1763	0	0	1161	
40	Assunpink Center	BUILDING A	Classroom 116	Classroom	20	2LA' EE/EEMAG	71.6	1.4		Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1763	0	0	1161	
41	Assunpink Center	BUILDING A	Office 117	Office	4	2LA' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1613	0	0	988	2r2
42	Assunpink Center	BUILDING A	Storage 118	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	lr2
43	Assunpink Center	BUILDING A	Shop - Modeling	Shop	2	4LA' EE/EEMAG	145.0	0.3	54/59/50	Switch	2	2LT-RLRB/ HIGH/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	65	0.1	Switch	1763	0	0	1234	
44	Assunpink Center	BUILDING A	Restroom - Girls 124	Restroom	2	2LA' EE/EEMAG	71.6	0.1		Switch	1	NEW 1X8 2L WIDE-FOOT WRAP/ LOW/ REFL (OTL_WF)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2056	0	0	1033	lr2
45	Assunpink Center	BUILDING A	Custodian Closet 125	Storage	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	1069	
46	Assunpink Center	BUILDING A	Restroom - Boys 126	Restroom	2	2LA' EE/EEMAG	71.6	0.1	21/28/20	Switch	1	NEW 1X8 2L WIDE-FOOT WRAP/ LOW/ REFL (OTL_WF)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2056	0	0	1033	lr2
47	Assunpink Center	BUILDING A	Lavatory	Lavatory	3	60W INCANDESCENT	60.0	0.2	5.8	Switch	3	13W CF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF= 1.05	15	0.0	Switch	2080	0	0	1456	
48	Assunpink Center	BUILDING A	Lavatory	Lavatory	3	60W INCANDESCENT	60.0	0.2		Switch	3	13W CF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF= 1.05	15	0.0	Switch	2080	0	0	1456	
49	Assunpink Center	BUILDING A	Lounge - Teachers 130	Lounge	4	2LA' EE/EEMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	3120	80	0	2240	
50	Assunpink Center	BUILDING A	Kitchen 131	Kitchen	2	2LA' EE/EEMAG	71.6	0.1	39.5	Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Wall Sensor	3120	80	0	2240	lr2
51	Assunpink Center	BUILDING A	Storage - Vending	Storage	1	2LA' EE/EEMAG	71.6	0.1	18.0	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
52	Assunpink Center	BUILDING A	Classroom 113	Classroom	32	2LA' EE/EEMAG	71.6	2.3	56/50/55	Switch	16	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	1.3	Overhead Sensor	1763	0	0	1161	2r7, 2r10
53	Assunpink Center	BUILDING A	Classroom 113	Classroom	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Overhead Sensor	1763	0	0	1161	
54	Assunpink Center	BUILDING A	Laundry	Laundry	2	2LA' EE/EEMAG	71.6	0.1	33.2	Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	2250	0	0	1575	lr2
55	Assunpink Center	BUILDING A	Office 114	Office	4	4LA' EE/EEMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Switch	1613	0	0	988	2r2
56	Assunpink Center	BUILDING A	Storage - Dispensary	Storage	2	2LA' EE/EEMAG	71.6	0.1	42/53/39	Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	lr3
57	Assunpink Center	BUILDING A	Storage - Dispensary	Storage	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
58	Assunpink Center	BUILDING A	Classroom - Theory 107	Classroom	15	2LA' EE/EEMAG	71.6	1.1		Switch	15	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.6	Overhead Sensor	1763	0	0	1161	
59	Assunpink Center	BUILDING A	Lockers 110	Lockers	4	2LA' EE/EEMAG	71.6	0.3	42/38/44	Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1858	0	0	1096	2r2
60	Assunpink Center	BUILDING A	Lavatory	Lavatory	1	2LA' EE/EEMAG	71.6	0.1	15.9	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
61	Assunpink Center	BUILDING A	Lockers 104	Lockers	4	2LA' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1858	0	0	1096	2r2
62	Assunpink Center	BUILDING A	Storage - Dispensary 105	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	lr3

					PRE-INSTALLATION						POST-INSTALLATION								
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
63	Assunpink Center	BUILDING A	Storage - Dispensary 105	Storage	1	2L4' EE/E/EMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
64	Assunpink Center	BUILDING A	Classroom 102	Classroom	30	2L4' EE/E/EMAG	71.6	2.1		Switch	15	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	1.2	Overhead Sensor	1763	0	0	1161	4r7, 1r4, lr2
65	Assunpink Center	BUILDING A	Classroom 102	Classroom	4	2L4' EE/E/EMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	1763	0	0	1161	
66	Assunpink Center	BUILDING A	Classroom - Shampoo/ Evening 102	Classroom	7	2L4' EE/E/EMAG	71.6	0.5		Switch	7	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Wall Sensor	1763	0	0	1161	
67	Assunpink Center	BUILDING A	Office 103	Office	4	4L4' EE/E/EMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	
68	Assunpink Center	BUILDING A	Foyer (to 133)	Hallway	1	(4) F20T12/HPFMAG	112.0	0.1		Switch	1	2LT-RLRB F17T8/ NORMAL/ REFL	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95) w/Reflector	33	0.0	Switch	2324	0	0	1627	
69	Assunpink Center	BUILDING A	Dorm - Nurse 138	Dorms	4	4L4' EE/E/EMAG	145.0	0.6	80/89/82	Switch	4	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.2	Wall Sensor	1750	0	0	1225	
70	Assunpink Center	BUILDING A	Lavatory	Lavatory	3	40W INCANDESCENT	40.0	0.1	11.5	Switch	3	9WCF/SI (Litetronics #NL-10427)	Compact Fluorescent, twin, (1) 9W lamp	11	0.0	Switch	2080	0	0	1456	
71	Assunpink Center	BUILDING A	Office 134	Office	4	2L4' EE/E/EMAG	71.6	0.3	19/26/28	Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	1r2, 1r3
72	Assunpink Center	BUILDING A	Office 134	Office	1	2L4' EE/E/EMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Wall Sensor Savings	1613	0	0	988	
73	Assunpink Center	BUILDING A	Office - Open 133	Office	12	2L4' EE/E/EMAG	71.6	0.9		Switch	12	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.5	Switch	1613	0	0	988	(4) 6LT12
74	Assunpink Center	BUILDING A	Office 136	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	1613	0	0	988	
75	Assunpink Center	BUILDING A	Office 132	Office	4	4L4' EE/E/EMAG	145.0	0.6		Switch	4	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.2	Wall Sensor	1613	0	0	988	
76	Assunpink Center	BUILDING A	Office 167	Office	6	2L4' EE/E/EMAG	71.6	0.4		Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	1613	0	0	988	
77	Assunpink Center	BUILDING A	Office 167	Office	2	(2) F20T12/HPFMAG	54.0	0.1		Switch	2	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.1	Wall Sensor Savings	1613	0	0	988	
78	Assunpink Center	BUILDING A	Office - Main Open	Office	16	2L4' EE/E/EMAG	71.6	1.1		Switch	8	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Switch	1613	0	0	988	4r5
79	Assunpink Center	BUILDING A	Office - Main Open	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1613	0	0	988	
80	Assunpink Center	BUILDING A	Office - Main Open	Office	5	45W INCANDESCENT HALOGEN	45.0	0.2		Switch	5	13WCF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.1	Switch	1613	0	0	988	
81	Assunpink Center	BUILDING A	Office 145	Office	4	4L4' EE/E/EMAG	145.0	0.6		Switch	4	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.2	Wall Sensor	1613	0	0	988	
82	Assunpink Center	BUILDING A	Conference 144	Conference	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	3120	415	0	1951	2r2
83	Assunpink Center	BUILDING A	Office 143	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	2r2
84	Assunpink Center	BUILDING A	Storage 104	Storage	2	2L4' EE/E/EMAG	71.6	0.1		Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	1r2
85	Assunpink Center	BUILDING A	Copy Room 141	Office	3	4L4' EE/E/EMAG	145.0	0.4	62/60/53	Switch	3	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1613	0	0	1129	
86	Assunpink Center	BUILDING A	Storage 154	Storage	2	2L4' EE/E/EMAG	71.6	0.1	28.0	Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	1r2
87	Assunpink Center	BUILDING A	Custodian Closet	Storage	1	2-60W INCANDESCENT	120.0	0.1	8.7	Switch	2	13WCF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	1527	0	0	1069	
88	Assunpink Center	BUILDING A	Lavatory - Womens	Lavatory	1	2-60W INCANDESCENT	120.0	0.1	9.1	Switch	2	13WCF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	2080	0	0	1456	
89	Assunpink Center	BUILDING A	Lavatory - Mens	Lavatory	1	2-60W INCANDESCENT	120.0	0.1		Switch	2	13WCF/SI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	2080	0	0	1456	
90	Assunpink Center	BUILDING A	Office 153	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	2r2
91	Assunpink Center	BUILDING A	Office 142	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	2r2
92	Assunpink Center	BUILDING A	Office 152	Office	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1613	0	0	988	2r2
93	Assunpink Center	BUILDING A	Classroom 164	Classroom	12	3L4' T8/ELIC	80.0	1.0	87/82/69	Switch	12	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.7	Overhead Sensor	1763	0	0	1161	
94	Assunpink Center	BUILDING A	Classroom 164	Classroom	12	3L4' T8/ELIC	80.0	1.0		Switch	12	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.7	Overhead Sensor	1763	0	0	1161	
95	Assunpink Center	BUILDING A	Classroom 164	Classroom	2	(1) FO17T8/ELIC	20.0	0.0		Switch	2	NO UPGRADE	Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	20	0.0	Switch	1763	0	0	1161	
96	Assunpink Center	BUILDING A	Storage 163	Storage	1	4L4' EE/E/EMAG	145.0	0.1		Switch	1	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.0	Switch	1527	0	0	684	
97	Assunpink Center	BUILDING A	Office 162	Office	2	2L4' EE/E/EMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1613	0	0	988	
98	Assunpink Center	BUILDING A	Lockers 161	Lockers	2	2L4' EE/E/EMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1858	0	0	1096	
99	Assunpink Center	BUILDING A	Classroom 159 - Computer Lab	Classroom	12	2L4' EE/E/EMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1763	0	0	1161	3r5
100	Assunpink Center	BUILDING A	Classroom 159 - Computer Lab	Classroom	3	2L4' EE/E/EMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Overhead Sensor Savings	1763	0	0	1161	
101	Assunpink Center	BUILDING A	Classroom 156	Classroom	36	2L4' EE/E/EMAG	71.6	2.6		Switch	18	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	1.4	Overhead Sensor	1763	0	0	1161	3r9, 2r6
102	Assunpink Center	BUILDING A	Classroom 156	Classroom	3	2L4' EE/E/EMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Overhead Sensor	1763	0	0	1161	
103	Assunpink Center	BUILDING A	Office 157	Office	2	2L4' EE/E/EMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1613	0	0	988	
104	Assunpink Center	BUILDING A	Storage 158	Storage	1	2L4' EE/E/EMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
105	Assunpink Center	BUILDING A	Lockers 160	Lockers	2	2L4' EE/E/EMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1858	0	0	1096	
106	Assunpink Center	BUILDING A	Hallway - Lobby	Hallway	12	2L4' EE/E/EMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Day-light Control	2324	0	0	1536	(6) 6 Lamp Fixtures
107	Assunpink Center	BUILDING A	Hallway - Lobby	Hallway	6	2L4' EE/E/EMAG	71.6	0.4		Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	2324	0	0	1536	
108	Assunpink Center	BUILDING A	Foyer	Hallway	1	21.22" U TUBE STD/EEMAG or ELIC	72.0	0.1		Switch	1	2LT-RLRB F17T8/ NORMAL/ REFL	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95) w/Reflector	33	0.0	Switch	2324	0	0	1627	
109	Assunpink Center	BUILDING A	Foyer	Hallway	1	21.22" U TUBE STD/EEMAG or ELIC	72.0	0.1		Switch	1	2LT-RLRB F17T8/ NORMAL/ REFL	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95) w/Reflector	33	0.0	Switch	2324	0	0	1627	
110		**BUILDING B**	**BUILDING B**																		
111	Assunpink Center	BUILDING B	Classroom 100 (Electrical)	Classroom	16	2L8' EE HO/STD	188.6	3.0		Switch	16	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.6	Switch	1763	0	0	1161	
112	Assunpink Center	BUILDING B	Classroom 100 (Electrical)	Classroom	2	2L8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.2	Switch	1763	0	0	1161	
113	Assunpink Center	BUILDING B	Lockers	Lockers	1	2L8' EE HO/STD	188.6	0.2		Switch	1	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.1	Switch	1858	0	0	1096	
114	Assunpink Center	BUILDING B	Lavatory	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
115	Assunpink Center	BUILDING B	Office	Office	4	4L4' EE/E/EMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	2r2
116	Assunpink Center	BUILDING B	Lavatory	Lavatory	1	2L4' EE/E/EMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
117	Assunpink Center	BUILDING B	Storage 106	Storage	4	2L4' EE/E/EMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1527	0	0	684	2r3
118	Assunpink Center	BUILDING B	Storage 106	Storage	2	2L4' EE/E/EMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Wall Sensor Savings	1527	0	0	684	
119	Assunpink Center	BUILDING B	Storage - Mezzanine 119	Storage	4	2L8' EE/STD	182.2	0.7		Switch	4	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.2	Switch	1527	0	0	684	
120	Assunpink Center	BUILDING B	Storage - Mezzanine 119	Storage	3	2L4' EE/E/EMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
121	Assunpink Center	BUILDING B	Storage - Mezzanine 118 (Below)	Storage	16	2L4' EE/E/EMAG	71.6	1.1	45/43/45	Switch	8	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Switch	1527	0	0	684	7r3 , 1r2
122	Assunpink Center	BUILDING B	Storage - Mezzanine 118 (Below)	Storage	7	2L4' EE/E/EMAG	71.6	0.5		Switch	7	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Switch	1527	0	0	684	
123	Assunpink Center	BUILDING B	Classroom - Mezzanine 118 (Above)	Classroom	16	2L4' EE/E/EMAG	71.6	1.1		Switch	8	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Switch	1763	0	0	1161	8r3
124	Assunpink Center	BUILDING B	Classroom - Mezzanine 118 (Above)	Classroom	8	2L4' EE/E/EMAG	71.6	0.6		Switch	8	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Switch	1763	0	0	1161	
125	Assunpink Center	BUILDING B	Hallway	Hallway	3	2L4' EE/E/EMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
126	Assunpink Center	BUILDING B	Classroom 108	Classroom	18	2L4' T8/ELIC	49.5	0.9		Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Overhead Sensor	1763	0	0	1161	

					PRE-INSTALLATION						POST-INSTALLATION									
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
127	Assumpink Center	BUILDING B	Classroom 108	Classroom	1	2L4' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
128	Assumpink Center	BUILDING B	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
129	Assumpink Center	BUILDING B	Classroom 109	Classroom	18	2L4' T8/ELEC	49.5	0.9		Existing Overhead Sensor	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Existing Overhead Sensor	1234	0	0	813	
130	Assumpink Center	BUILDING B	Classroom 109	Classroom	1	2L4' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
131	Assumpink Center	BUILDING B	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
132	Assumpink Center	BUILDING B	Hallway	Hallway	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
133	Assumpink Center	BUILDING B	Classroom 111 (Carpentry)	Classroom	14	2L8' EE HO/STD	188.6	2.6		Switch	14	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.4	Switch	1363	0	0	1161	
134	Assumpink Center	BUILDING B	Classroom 111 (Carpentry)	Classroom	13	2L8' EE HO/STD	188.6	2.5		Switch	13	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.3	Switch	1363	0	0	1161	
135	Assumpink Center	BUILDING B	Exits	Exits	1	LED	4.0	0.0		Breaker	1	NO UPGRADE	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
136	Assumpink Center	BUILDING B	Lockers 114	Lockers	1	2L8' EE HO/STD	188.6	0.2		Switch	1	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.0	Switch	1858	0	0	1096	
137	Assumpink Center	BUILDING B	Lavatory 113	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1	13.1	Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
138	Assumpink Center	BUILDING B	Office 115	Office	4	4L4' EE/EEMAG	145.0	0.6	105.0	Switch	4	4L-RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	2/2
139	Assumpink Center	BUILDING B	Lavatory 114	Lavatory	1	2L4' EE/EEMAG	71.6	0.1	14.4	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
140	Assumpink Center	BUILDING B	Storage 116	Storage	2	2L4' EE/EEMAG	71.6	0.1	34.8	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
141	Assumpink Center	BUILDING B	Storage 117	Storage	2	2L4' EE/EEMAG	71.6	0.1	e	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	2/3
142	Assumpink Center	BUILDING B	Storage - Mezzanine	Storage	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
143	Assumpink Center	BUILDING B	Storage - (Rear Double-Doors)	Storage	5	2L4' EE/EEMAG	71.6	0.4		Switch	5	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1527	0	0	684	
144	Assumpink Center	BUILDING B	Mechanical Room 121	Mechanical	9	2L4' EE/EEMAG	71.6	0.6	10/10/10	Switch	9	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.4	Switch	1835	0	0	1074	
145	Assumpink Center	BUILDING B	Mechanical Room 121	Mechanical	4	2L4' EE/EEMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1835	0	0	1074	Emergency Generator
146	Assumpink Center	BUILDING B	Storage 120	Storage	10	2L4' EE/EEMAG	71.6	0.7		Switch	10	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.4	Switch	1527	0	0	684	
147	Assumpink Center	BUILDING B	Storage 120	Storage	1	2L8' EE/STD	182.2	0.2		Switch	1	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.0	Switch	1527	0	0	684	
148	Assumpink Center	BUILDING B	Classroom 122 (HVAC)	Classroom	8	2L8' EE HO/STD	188.6	1.5		Switch	8	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.8	Overhead Sensor	1363	0	0	1161	
149	Assumpink Center	BUILDING B	Classroom 122 (HVAC)	Classroom	8	2L8' EE HO/STD	188.6	1.5		Switch	8	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.8	Overhead Sensor	1363	0	0	1161	
150	Assumpink Center	BUILDING B	Classroom 122 (HVAC)	Classroom	8	2L8' EE HO/STD	188.6	1.5		Switch	8	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.8	Overhead Sensor	1363	0	0	1161	
151	Assumpink Center	BUILDING B	Exits	Exits	2	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	2	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
152	Assumpink Center	BUILDING B	Lockers 127	Lockers	2	2L8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.1	Switch	1858	0	0	1096	
153	Assumpink Center	BUILDING B	Lavatory 125	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
154	Assumpink Center	BUILDING B	Office 124	Office	4	4L4' EE/EEMAG	145.0	0.6		Switch	4	4L-RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	
155	Assumpink Center	BUILDING B	Lavatory 120	Lavatory	1	2L4' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
156	Assumpink Center	BUILDING B	Storage - Tools 123	Storage	6	2L4' EE/EEMAG	71.6	0.4		Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1527	0	0	684	
157	Assumpink Center	BUILDING B	Mechanical Hood	Mechanical	2	60W INCANDESCENT	60.0	0.1		Switch	2	13W CFSI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	1835	0	0	1074	
158	Assumpink Center	BUILDING B	Storage - Mezzanine	Storage	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
159	Assumpink Center	BUILDING B	Storage - Mezzanine	Storage	1	2L8' EE/STD	182.2	0.2		Switch	1	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.0	Switch	1527	0	0	684	
160	Assumpink Center	BUILDING B	Hallway	Hallway	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
161	Assumpink Center	BUILDING B	Classroom 130	Classroom	18	2L4' EE/EEMAG	71.6	1.3		Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL_WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
162	Assumpink Center	BUILDING B	Classroom 130	Classroom	1	2L4' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
163	Assumpink Center	BUILDING B	Exits	Exits	1	LED	4.0	0.0		Breaker	1	NO UPGRADE	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
164	Assumpink Center	BUILDING B	Classroom 131	Classroom	18	2L4' EE/EEMAG	71.6	1.3		Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL_WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
165	Assumpink Center	BUILDING B	Classroom 131	Classroom	1	2L4' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
166	Assumpink Center	BUILDING B	Exits	Exits	1	20W 2L EXIT	40.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
167	Assumpink Center	BUILDING B	Hallway	Hallway	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
168	Assumpink Center	BUILDING B	Classroom 133	Classroom	18	2L8' EE HO/STD	188.6	3.4	13/14/13	Switch	18	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.7	Overhead Sensor	1363	0	0	1161	Dirty/Rusty Fixtures
169	Assumpink Center	BUILDING B	Exits	Exits	2	LED	4.0	0.0		Breaker	2	NO UPGRADE	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
170	Assumpink Center	BUILDING B	Lockers 135	Lockers	2	2L8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.1	Switch	1858	0	0	1096	
171	Assumpink Center	BUILDING B	Lavatory 136	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
172	Assumpink Center	BUILDING B	Storage - Mezzanine 138	Storage	3	2L4' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
173	Assumpink Center	BUILDING B	Office 137	Office	1	4L4' EE/EEMAG	145.0	0.1	34/31/33	Switch	1	4L-RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1613	0	0	988	2/2
174	Assumpink Center	BUILDING B	Lavatory 135	Lavatory	1	2L4' EE/EEMAG	71.6	0.1	9.8	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
175	Assumpink Center	BUILDING B	Storage - Tools 138	Storage	4	2L4' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	2r3
176	Assumpink Center	BUILDING B	Storage - Tools 138	Storage	2	2L4' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
177	Assumpink Center	BUILDING B	Storage(s) - Outdoor Project Area	Storage	2	100W INCANDESCENT	100.0	0.2		Switch	2	18W CFSI (Litetronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	1527	0	0	684	
178	Assumpink Center	BUILDING B	Storage(s) - Outdoor Project Area	Storage	1	100W INCANDESCENT	100.0	0.1		Switch	1	18W CFSI (Litetronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	1527	0	0	684	
179	Assumpink Center	BUILDING B	Storage(s) - Outdoor Project Area	Storage	2	4L4' EE/EEMAG	145.0	0.3		Switch	2	4L-RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	
180		**BUILDING C**	**BUILDING C**																		
181	Assumpink Center	BUILDING C	Classroom 119	Classroom	8	2L8' EE HO/STD	188.6	1.5		Switch	8	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.8	Overhead Sensor	1363	0	0	1161	
182	Assumpink Center	BUILDING C	Classroom 119	Classroom	8	2L8' EE HO/STD	188.6	1.5		Switch	8	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.8	Overhead Sensor	1363	0	0	1161	
183	Assumpink Center	BUILDING C	Classroom 119	Classroom	9	2L8' EE HO/STD	188.6	1.7		Switch	9	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	0.9	Overhead Sensor	1363	0	0	1161	
184	Assumpink Center	BUILDING C	Exits	Exits	2	LED	4.0	0.0		Breaker	2	NO UPGRADE	EXIT Light Emmitting Diode_4W LED	4	0.0	Breaker	3120	4912	728		
185	Assumpink Center	BUILDING C	Lockers	Lockers	2	2L8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL_ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	49	0.1	Switch	1858	0	0	1096	
186	Assumpink Center	BUILDING C	Lavatory	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
187	Assumpink Center	BUILDING C	Office	Office	4	4L4' EE/EEMAG	145.0	0.6		Switch	4	4L-RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	
188	Assumpink Center	BUILDING C	Lavatory	Lavatory	1	2L4' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
189	Assumpink Center	BUILDING C	Storage - Tools 123	Storage	6	2L4' EE/EEMAG	71.6	0.4		Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	1527	0	0	684	
190	Assumpink Center	BUILDING C	Storage - Mezzanine	Storage	4	2L4' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	2r2

					PRE-INSTALLATION						POST-INSTALLATION									
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
191	Assumpsink Center	BUILDING C	Classroom Lab - Testing 138	Classroom	4	2LA' EE/EEMAG	71.6	0.3	17/19/15	Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1763	0	0	1161	lr4
192	Assumpsink Center	BUILDING C	Storage 118	Storage	14	2LA' EE/EEMAG	71.6	1.0		Switch	7	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Switch	1527	0	0	684	2r6, 1r2
193	Assumpsink Center	BUILDING C	Storage - Chairs	Storage	3	2LA' EE/EEMAG	71.6	0.2	8.3	Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
194	Assumpsink Center	BUILDING C	Storage - Chairs	Storage	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
195	Assumpsink Center	BUILDING C	Hallway	Hallway	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
196	Assumpsink Center	BUILDING C	Classroom 127	Classroom	18	2LA' EE/EEMAG	71.6	1.3	61/58/51	Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL, WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
197	Assumpsink Center	BUILDING C	Classroom 127	Classroom	1	2LA' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1763	0	0	1161	Emergency Generator
198	Assumpsink Center	BUILDING C	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
199	Assumpsink Center	BUILDING C	Classroom 128	Classroom	18	2LA' EE/EEMAG	71.6	1.3	61/58/51	Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL, WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
200	Assumpsink Center	BUILDING C	Classroom 128	Classroom	1	2LA' EE/STD	80.0	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1763	0	0	1161	Emergency Generator
201	Assumpsink Center	BUILDING C	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
202	Assumpsink Center	BUILDING C	Hallway	Hallway	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
203	Assumpsink Center	BUILDING C	Classroom 130 (automotive)	Classroom	12	2L 8' EE HO/STD	188.6	2.3		Switch	12	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	1.2	Switch	1763	0	0	1161	
204	Assumpsink Center	BUILDING C	Classroom 130 (automotive)	Classroom	12	2L 8' EE HO/STD	188.6	2.3		Switch	12	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	1.2	Switch	1763	0	0	1161	
205	Assumpsink Center	BUILDING C	Exits	Exits	2	20W 2L EXIT	40.0	0.1		Breaker	2	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
206	Assumpsink Center	BUILDING C	Lockers 131	Lockers	2	2L 8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL, ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	1858	0	0	1096	
207	Assumpsink Center	BUILDING C	Lavatory 133	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
208	Assumpsink Center	BUILDING C	Lavatory 132	Lavatory	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
209	Assumpsink Center	BUILDING C	Office 134	Office	4	4LA' EE/EEMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	2r2
210	Assumpsink Center	BUILDING C	Storage - Mezzanine	Storage	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
211	Assumpsink Center	BUILDING C	Storage - Tools 135	Storage	4	2LA' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	2r3
212	Assumpsink Center	BUILDING C	Storage - Tools 135	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
213	Assumpsink Center	BUILDING C	Storage - Tools 135	Storage	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1527	0	0	684	
214	Assumpsink Center	BUILDING C	Office - Service Station 137	Office	5	2LA' EE/EEMAG	71.6	0.4		Switch	5	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	1613	0	0	988	
215	Assumpsink Center	BUILDING C	Exits	Exits	1	20W 2L EXIT	40.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		W/ Emergency Lights
216	Assumpsink Center	BUILDING C	Office (Opposite Service Station)	Office	8	4LA' EE/EEMAG	145.0	1.2		Switch	8	2LT-RLRB/ NORMAL/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.4	Wall Sensor	1613	0	0	988	
217	Assumpsink Center	BUILDING C	Classroom 100 (Machines)	Classroom	12	2L 8' EE HO/STD	188.6	2.3	20/21/23	Switch	12	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	1.2	Overhead Sensor	1763	0	0	1161	
218	Assumpsink Center	BUILDING C	Exits	Exits	2	20W 2L EXIT	40.0	0.1		Breaker	2	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
219	Assumpsink Center	BUILDING C	Lockers 105	Lockers	4	2L 8' EE HO/STD	188.6	0.8		Switch	4	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL, ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.2	Switch	1858	0	0	1096	
220	Assumpsink Center	BUILDING C	Lavatory	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
221	Assumpsink Center	BUILDING C	Office 102	Office	4	4LA' EE/EEMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	
222	Assumpsink Center	BUILDING C	Lavatory	Lavatory	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
223	Assumpsink Center	BUILDING C	Storage - Mezzanine	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	1	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.1	Switch	1527	0	0	684	lr3 + 1
224	Assumpsink Center	BUILDING C	Storage - Mezzanine	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
225	Assumpsink Center	BUILDING C	Storage 101	Storage	4	2LA' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	2r3
226	Assumpsink Center	BUILDING C	Storage 101	Storage	2	2LA' EE/EEMAG	71.6	0.1		Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
227	Assumpsink Center	BUILDING C	Mechanical - Hood	Mechanical	2	75W INCANDESCENT	75.0	0.2		Switch	2	18W CFSI (Litetronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	1835	0	0	1074	
228	Assumpsink Center	BUILDING C	Hallway	Hallway	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Wall Sensor	2324	0	0	1536	lr2,1r1
229	Assumpsink Center	BUILDING C	Classroom 108	Classroom	18	2LA' EE/EEMAG	71.6	1.3	29/34/37	Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL, WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
230	Assumpsink Center	BUILDING C	Classroom 108	Classroom	1	2L 4 T8/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
231	Assumpsink Center	BUILDING C	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
232	Assumpsink Center	BUILDING C	Classroom 109	Classroom	18	2LA' EE/EEMAG	71.6	1.3	56/59/69	Existing Overhead Sensor	3	NEW 1X24 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL, WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1234	0	0	813	3r6
233	Assumpsink Center	BUILDING C	Classroom 109	Classroom	1	2L 4 T8/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	176	0	0	116	Emergency Generator
234	Assumpsink Center	BUILDING C	Exits	Exits	1	LED	4.0	0.0		Breaker	1	NO UPGRADE	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
235	Assumpsink Center	BUILDING C	Hallway	Hallway	3	2LA' EE/EEMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2324	0	0	1536	
236	Assumpsink Center	BUILDING C	Classroom - Auto Body/Telecom.	Classroom	18	2L 8' EE HO/STD	188.6	3.4		Switch	18	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	97	1.7	Switch	1763	0	0	1161	
237	Assumpsink Center	BUILDING C	Classroom - Auto Body/Telecom.	Classroom	3	4LA' EE/EEMAG	145.0	0.4		Switch	3	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1763	0	0	1161	
238	Assumpsink Center	BUILDING C	Classroom - Auto Body/Telecom.	Classroom	1	3LA' EE/EEMAG	115.0	0.1		Switch	1	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.1	Switch	1763	0	0	1161	
239	Assumpsink Center	BUILDING C	Exits	Exits	1	2L-8W CF EXIT SIGN	24.0	0.0		Breaker	1	NEW LED EXIT SIGN w/ BATTERY BACK-UP (Econolight_EXP2)	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
240	Assumpsink Center	BUILDING C	Exits	Exits	1	LED	4.0	0.0		Breaker	1	NO UPGRADE	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
241	Assumpsink Center	BUILDING C	Lockers 111	Lockers	2	2L 8' EE HO/STD	188.6	0.4		Switch	2	NEW 1X8 2L INDUSTRIAL/ NORMAL/ REFL (OTL, ICS)	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	1858	0	0	1096	
242	Assumpsink Center	BUILDING C	Lavatory 112	Lavatory	1	(2) F20T12/HPFMAG	54.0	0.1		Switch	1	2LT-RLRB F17T8/ LOW	Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	25	0.0	Switch	2080	0	0	1456	
243	Assumpsink Center	BUILDING C	Office 114	Office	4	4LA' EE/EEMAG	145.0	0.6		Switch	4	4L RLRB/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Wall Sensor	1613	0	0	988	
244	Assumpsink Center	BUILDING C	Lavatory 113	Lavatory	1	2LA' EE/EEMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
245	Assumpsink Center	BUILDING C	Storage - Mezzanine	Storage	4	2LA' EE/EEMAG	71.6	0.3		Switch	2	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1527	0	0	684	lr4
246	Assumpsink Center	BUILDING C	Storage 115	Storage	6	2LA' EE/EEMAG	71.6	0.4	e	Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1527	0	0	684	
247	Assumpsink Center	BUILDING C	Storage 139	Storage	2	2LA' EE/EEMAG	71.6	0.1	e	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1527	0	0	684	
248	Assumpsink Center	BUILDING C	Shop - Paint Booth	Shop	6	3LA' EE/EEMAG	115.0	0.7		Switch	6	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.4	Switch	1763	0	0	1234	
249		**GARAGE AREA**	**GARAGE AREA**																		
250	Assumpsink Center	GARAGE AREA	Garage	Garage	11	2LA' EE/EEMAG	71.6	0.8		Switch	11	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.5	Switch	3120	1990	0	3577	
251	Assumpsink Center	GARAGE AREA	Shop	Shop	2	2LA' EE/EEMAG	71.6	0.1	22.2/24.2	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1763	0	0	1234	
252	Assumpsink Center	GARAGE AREA	Lavatory	Lavatory	1	60W INCANDESCENT	60.0	0.1	2.2	Switch	1	13W CFSI (Litetronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	2080	0	0	1456	
253	Assumpsink Center	GARAGE AREA	Lounge (Under Mezzanine)	Lounge	4	2LA' EE/EEMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	3120	80	0	2240	
254	Assumpsink Center	GARAGE AREA	Storage (Mezzanine)	Storage	4	2LA' EE/EEMAG	71.6	0.3	5/4/5	Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1527	0	0	684	

					PRE-INSTALLATION						POST-INSTALLATION										
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
255		PERIMETER	PERIMETER																		
256	Assumpink Center	PERIMETER	Exterior - Parking Lot	Exterior	15	150W HPS/BALLAST	188.0	2.8		Breaker	15	NO UPGRADE	High Pressure Sodium, (1) 150W lamp	188	2.8	Breaker	0	4015	0		
257	Assumpink Center	PERIMETER	Exterior - Perimeter 'A'	Exterior	2	175W MV/BALLAST	205.0	0.4		Breaker	2	NEW 100 QL/ WALLPACK/ PHOTOCELL	100W Induction Lighting	118	0.2	Breaker	0	4015	0		
258	Assumpink Center	PERIMETER	Exterior - Perimeter 'A'	Exterior	4	175W MV/BALLAST	205.0	0.8		Breaker	4	NEW 100 QL/ CANOPY/ PHOTOCELL	100W Induction Lighting	118	0.5	Breaker	0	4015	0		
259	Assumpink Center	PERIMETER	Exterior - Perimeter 'A'	Exterior	2	120V INCANDESCENT	120.0	0.2		Breaker	2	18W CF/SI (Lightronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Breaker	0	4015	0		
260	Assumpink Center	PERIMETER	Exterior - Perimeter 'B'	Exterior	6	175W MV/BALLAST	205.0	1.2		Breaker	6	NEW 100 QL/ WALLPACK/ PHOTOCELL	100W Induction Lighting	118	0.7	Breaker	0	4015	0		
261	Assumpink Center	PERIMETER	Exterior - Perimeter 'B'	Exterior	3	400W HPS/BALLAST	465.0	1.4		Breaker	3	NO UPGRADE	High Pressure Sodium, (1) 400W lamp	465	1.4	Breaker	0	4015	0		
262	Assumpink Center	PERIMETER	Exterior - Perimeter 'B'	Exterior	1	150W QUARTZ	150.0	0.2		Breaker	1	NEW 100 QL/ FLOOD/ PHOTOCELL	100W Induction Lighting	118	0.1	Breaker	0	4015	0		
263	Assumpink Center	PERIMETER	Exterior - Perimeter 'B'	Exterior	2	120V INCANDESCENT	120.0	0.2		Breaker	2	18W CF/SI/ PAR38 (TCP #IP3819)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Breaker	0	4015	0		
264	Assumpink Center	PERIMETER	Exterior - Perimeter 'C'	Exterior	7	175W MV/BALLAST	205.0	1.4		Breaker	7	NEW 100 QL/ WALLPACK/ PHOTOCELL	100W Induction Lighting	118	0.8	Breaker	0	4015	0		
265	Assumpink Center	PERIMETER	Exterior - Perimeter 'C'	Exterior	3	150W QUARTZ	150.0	0.5		Breaker	3	NEW 100 QL/ FLOOD/ PHOTOCELL	100W Induction Lighting	118	0.4	Breaker	0	4015	0		
266	Assumpink Center	PERIMETER	Exterior - Perimeter 'C'	Exterior	3	400W HPS/BALLAST	465.0	1.4		Breaker	3	NO UPGRADE	High Pressure Sodium, (1) 400W lamp	465	1.4	Breaker	0	4015	0		
267	Assumpink Center	PERIMETER	Exterior - Garage	Exterior	3	175W MV/BALLAST	205.0	0.6		Breaker	3	NEW 100 QL/ WALLPACK/ PHOTOCELL	100W Induction Lighting	118	0.4	Breaker	0	4015	0		
				TOTAL	1,277.0			129.5			978.0				69.6							

Sypek Center Lighting Survey

					PRE-INSTALLATION						POST-INSTALLATION									
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
2	Sypek Center	BUILDING A	Classroom 103	Classroom	20	2LA' E/E/EIMAG	71.6	1.4	48.7/48.6/50.1	Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1680	0	0	1463	1x4, 5r9, 2ew
3	Sypek Center	BUILDING A	Classroom 103	Classroom	20	2LA' E/E/EIMAG	71.6	1.4		Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1680	0	0	1463	
4	Sypek Center	BUILDING A	Classroom 103	Classroom	5	2LA' E/E/EIMAG	71.6	0.4		Switch	5	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	1680	0	0	1463	
12	Sypek Center	BUILDING A	Classroom 104 (# 107 on outside door)	Classroom	14	2LA' E/E/EIMAG	71.6	1.0		Switch	7	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1680	0	0	1463	1x4, 1r7, 2r5
17	Sypek Center	BUILDING A	Classroom 114	Classroom	10	2LA' E/E/EIMAG	71.6	0.7	48.6/47.4/53.5	Switch	5	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.4	Overhead Sensor	1680	0	0	1463	1x4, 5r13, 3ew
18	Sypek Center	BUILDING A	Classroom 114	Classroom	10	2LA' E/E/EIMAG	71.6	0.7		Switch	5	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.4	Overhead Sensor	1680	0	0	1463	
19	Sypek Center	BUILDING A	Classroom 114	Classroom	10	2LA' E/E/EIMAG	71.6	0.7		Switch	5	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.4	Overhead Sensor	1680	0	0	1463	
20	Sypek Center	BUILDING A	Classroom 114	Classroom	5	2LA' E/E/EIMAG	71.6	0.4		Switch	5	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	1680	0	0	1463	
23	Sypek Center	BUILDING A	Classroom 111	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	1x4, 3r5, 1ew
48	Sypek Center	BUILDING A	Classroom 142	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	63.1/71.5/73.7	Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Overhead Sensor	1680	0	0	1463	1x4, 3r6, 2ew
49	Sypek Center	BUILDING A	Classroom 142	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Overhead Sensor Savings	1680	0	0	1463	1x4
50	Sypek Center	BUILDING A	Classroom 142	Classroom	24	2LA' E/E/EIMAG	71.6	1.7		Switch	12	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	1.0	Overhead Sensor	1680	0	0	1463	1x4, 3r9
51	Sypek Center	BUILDING A	Classroom 142	Classroom	3	2LA' E/E/EIMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Overhead Sensor	1680	0	0	1463	1x4, 3r9
52	Sypek Center	BUILDING A	Classroom 142	Classroom	8	2LA' E/E/EIMAG	71.6	0.6		Switch	8	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Overhead Sensor	1680	0	0	1463	1x4, 4r2
56	Sypek Center	BUILDING A	Classroom 147 - Computer Lab	Classroom	15	2LA' E/E/EIMAG	71.6	1.1	44.9/43.3/47.7	Switch	15	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.6	Overhead Sensor	1680	0	0	1463	1x4, 3r5, 1ew
57	Sypek Center	BUILDING A	Classroom 147 - Computer Lab	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	Emergency Fixture
58	Sypek Center	BUILDING A	Classroom 151	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	41.9/42.4/50.3	Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Switch	1680	0	0	1463	room was divided to 3 ; 1x4, 3r6, 2ew
59	Sypek Center	BUILDING A	Classroom 151	Classroom	8	2LA' E/E/EIMAG	71.6	0.6		Switch	4	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.3	Switch	1680	0	0	1463	1x4, 1r8
60	Sypek Center	BUILDING A	Classroom 151	Classroom	6	2LA' E/E/EIMAG	71.6	0.4		Switch	3	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Switch	1680	0	0	1463	1x4, 3r3
61	Sypek Center	BUILDING A	Classroom 151	Classroom	3	2LA' E/E/EIMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1680	0	0	1463	
62	Sypek Center	BUILDING A	Classroom 151	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	1x4, 1r1
86	Sypek Center	BUILDING B	Classroom 100	Classroom	11	2LB' E/E HO/STD	188.6	2.1		Switch	11	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.1	Switch	1680	0	0	1463	
98	Sypek Center	BUILDING B	Classroom 109	Classroom	18	2LA' E/E/EIMAG	71.6	1.3		Existing Overhead Sensor	3	NEW 1X2 4 6L WIDE FOOT WRAP/ HIGH/ REFL (OTL_WF)	Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, VHLO (BF=1.1)	195	0.6	Existing Overhead Sensor	1176	0	0	1024	3r16
119	Sypek Center	BUILDING B	Classroom 118	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	38/43/44	Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Overhead Sensor	1680	0	0	1463	3r6
120	Sypek Center	BUILDING B	Classroom 118	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	168	0	0	146	Emergency Fixture
122	Sypek Center	BUILDING B	Classroom 119	Classroom	18	2LA' E/E/EIMAG	71.6	1.3		Switch	9	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.7	Overhead Sensor	1680	0	0	1463	3r6
123	Sypek Center	BUILDING B	Classroom 119	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	Emergency Fixture
125	Sypek Center	BUILDING B	Classroom 120 - Auto Body	Classroom	25	2LB' E/E HO/STD	188.6	4.7		Switch	25	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	2.4	Switch	1680	0	0	1463	
126	Sypek Center	BUILDING B	Classroom 120 - Auto Body	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	
138	Sypek Center	BUILDING B	Classroom 132 - Auto. Tech.	Classroom	29	2LB' E/E HO/STD	188.6	5.5		Switch	29	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	2.8	Switch	1680	0	0	1463	
147	Sypek Center	BUILDING B	Classroom - ATF Office	Classroom	10	2LA' E/E/EIMAG	71.6	0.7		Switch	5	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.4	Overhead Sensor	1680	0	0	1463	1r5, 1r6
157	Sypek Center	BUILDING B	Classroom 141	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	49/49/49	Existing Overhead Sensor	18	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.7	Existing Overhead Sensor	1176	0	0	1024	
158	Sypek Center	BUILDING B	Classroom 141	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	168	0	0	146	Emergency Fixture
160	Sypek Center	BUILDING B	Classroom 142	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	56/54/57	Existing Overhead Sensor	18	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.7	Existing Overhead Sensor	1176	0	0	1024	
161	Sypek Center	BUILDING B	Classroom 142	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	Emergency Fixture
163	Sypek Center	BUILDING B	Classroom 144 - Carpentry	Classroom	18	2LB' E/E HO/STD	188.6	3.4	21/20/19	Switch	18	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.7	Switch	1680	0	0	1463	
172	Sypek Center	BUILDING B	Classroom 153	Classroom	18	2LA' E/E/EIMAG	71.6	1.3	56/54/57	Existing Overhead Sensor	18	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.7	Existing Overhead Sensor	1176	0	0	1024	
173	Sypek Center	BUILDING B	Classroom 153	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	1680	0	0	1463	Emergency Fixture
175	Sypek Center	BUILDING B	Classroom 154 - Graphic Arts	Classroom	12	2LB' E/E HO/STD	188.6	2.3	34/21/29	Switch	12	NEW 1X8 4L INDUSTRIAL/ NORMAL/ WIRE GUARD (OTL_ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF=.85-.95)	97	1.2	Overhead Sensor	1680	0	0	1463	
191	Sypek Center	BUILDING C	Classroom 102	Classroom	6	4LA' E/E/EIMAG	145.0	0.9		Switch	3	4LT-RLRB/ HIGH/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, HLO (BF=.85-.95)	130	0.4	Overhead Sensor	1680	0	0	1463	3r2
195	Sypek Center	BUILDING C	Classroom 104 - Computer Lab	Classroom	4	4LA' E/E/EIMAG	145.0	0.6	54/53/50	Switch	2	4LT-RLRB/ HIGH/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, HLO (BF=.85-.95)	130	0.3	Wall Sensor	1680	0	0	1463	2r2
199	Sypek Center	BUILDING C	Classroom 110	Classroom	20	2LA' E/E/EIMAG	71.6	1.4	54/50/53	Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1680	0	0	1463	5r8
200	Sypek Center	BUILDING C	Classroom 110	Classroom	20	2LA' E/E/EIMAG	71.6	1.4		Switch	10	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.8	Overhead Sensor	1680	0	0	1463	
201	Sypek Center	BUILDING C	Classroom 111	Classroom	6	2LA' E/E/EIMAG	71.6	0.4	27/30/33	Switch	3	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.2	Wall Sensor	1680	0	0	1463	3r3
202	Sypek Center	BUILDING C	Classroom 111	Classroom	3	2LA' E/E/EIMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Wall Sensor Savings	1680	0	0	1463	
207	Sypek Center	BUILDING C	Classroom 121	Classroom	9	2LA' E/E/EIMAG	71.6	0.6	53/53/55	Switch	9	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.4	Wall Sensor	1680	0	0	1463	3r3
208	Sypek Center	BUILDING C	Classroom 122	Classroom	14	2LA' E/E/EIMAG	71.6	1.0	49/44/46	Switch	7	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1680	0	0	1463	5r10
209	Sypek Center	BUILDING C	Classroom 122	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
210	Sypek Center	BUILDING C	Classroom 122	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
211	Sypek Center	BUILDING C	Classroom 122	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
224	Sypek Center	BUILDING C	Classroom 126	Classroom	16	2LA' E/E/EIMAG	71.6	1.1	53/51/54	Switch	8	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1680	0	0	1463	
225	Sypek Center	BUILDING C	Classroom 126	Classroom	14	2LA' E/E/EIMAG	71.6	1.0		Switch	7	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1680	0	0	1463	
226	Sypek Center	BUILDING C	Classroom 126	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
227	Sypek Center	BUILDING C	Classroom 126	Classroom	3	2LA' E/E/EIMAG	71.6	0.2		Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	1680	0	0	1463	Emergency Fixture
235	Sypek Center	BUILDING C	Classroom 131	Classroom	12	2LA' E/E/EIMAG	71.6	0.9	61/61/56	Switch	12	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.5	Overhead Sensor	1680	0	0	1463	
236	Sypek Center	BUILDING C	Classroom 131	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	168	0	0	146	Emergency Fixture
237	Sypek Center	BUILDING C	Classroom 134	Classroom	14	2LA' E/E/EIMAG	71.6	1.0	35/34/39	Switch	7	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.6	Overhead Sensor	1680	0	0	1463	2r9, 2r3, 1r7, 1r6, 1r2, 1r4
238	Sypek Center	BUILDING C	Classroom 134	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
239	Sypek Center	BUILDING C	Classroom 134	Classroom	12	2LA' E/E/EIMAG	71.6	0.9		Switch	6	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	0.5	Overhead Sensor	1680	0	0	1463	
240	Sypek Center	BUILDING C	Classroom 134	Classroom	5	2LA' E/E/EIMAG	71.6	0.4		Switch	5	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor Savings	1680	0	0	1463	
250	Sypek Center	BUILDING C	Classroom 139	Classroom	9	2LA' E/E/EIMAG	71.6	0.6		Switch	9	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.4	Overhead Sensor	1680	0	0	1463	
251	Sypek Center	BUILDING C	Classroom 139	Classroom	1	2LA' E/E/EIMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	168	0	0	146	Emergency Fixture

					PRE-INSTALLATION						POST-INSTALLATION										
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
252	Sypek Center	BUILDING C	Classroom 144	Classroom	36	2L4' EE/EEMAG	71.6	2.6	53/49/48	Switch	18	4L-RLRB TANDEM/ LOW	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	80	1.4	Overhead Sensor	1680	0	0	1463	4e9, 2e2
253	Sypek Center	BUILDING C	Classroom 144	Classroom	4	2L4' EE/EEMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	1680	0	0	1463	
254	Sypek Center	BUILDING C	Classroom 144	Classroom	8	2L4' EE/EEMAG	71.6	0.6		Switch	8	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Switch	1680	0	0	1463	
255	Sypek Center	BUILDING C	Classroom 144	Classroom	4	26WCF/SI	27.0	0.1		Switch	4	NO UPGRADE	Compact Fluorescent, quad, (1) 26W lamp, BF=0.95	27	0.1	Switch	1680	0	0	1463	
271	Sypek Center	BUILDING C "Annex"	Classroom - Child Care D113	Classroom	13	2L4' EE/EEMAG	71.6	0.9	33/27/35	Switch	13	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.5	Overhead Sensor	1680	0	0	1463	1e4, 3e2 + 3
277	Sypek Center	BUILDING C "Annex"	Classroom - Child Care D114	Classroom	16	2L8' EE/STD	182.2	2.9		Switch	16	NEW 1X8 4L INDUSTRIAL/ HIGH/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, HLO (BF: .85-.95)	130	2.1	Overhead Sensor	1680	0	0	1463	4e4
282	Sypek Center	BUILDING C "Annex"	Classroom D119 - Supermarket	Classroom	20	2L8' EE/STD	182.2	3.6	51/45/51	Switch	20	NEW 1X8 4L INDUSTRIAL/ HIGH/ WIRE GUARD (OTL, ICS)	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, HLO (BF: .85-.95)	130	2.6	Overhead Sensor	1680	0	0	1463	2e7, 1e5 +1

Health Careers Center Lighting Survey

					PRE-INSTALLATION						POST-INSTALLATION									
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
1		NEW BUILDING	NEW BUILDING																		
2	Health Careers Center	NEW BUILDING	Classroom - Simulation Lab 107	Classroom	9	3L4' TB/ELEC (Inboard/Outboard)	91.0	0.8	57/65/71	Switch	9	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.6	Overhead Sensor	1839	0	0	1211	BOB
3	Health Careers Center	NEW BUILDING	Classroom - Simulation Lab 107	Classroom	8	3L4' TB/ELEC (Inboard/Outboard)	91.0	0.7		Switch	8	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.5	Overhead Sensor	1839	0	0	1211	
3	Health Careers Center	NEW BUILDING	Classroom - Beds	Classroom	8	23W CF/SI	24.0	0.2		Switch	8	NO UPGRADE	Compact Fluorescent, quad, (1) 23W lamp	24	0.2	Switch	1839	0	0	1211	
4	Health Careers Center	NEW BUILDING	Storage 108	Storage	4	25W INCANDESCENT	25.0	0.1		Switch	4	9W CF/SI (Lietronics #NL-10427)	Compact Fluorescent, twin, (1) 9W lamp	11	0.0	Switch	3010	0	0	1348	
5	Health Careers Center	NEW BUILDING	Storage 108	Storage	1	23W CF/SI	24.0	0.0		Switch	1	NO UPGRADE	Compact Fluorescent, quad, (1) 23W lamp	24	0.0	Switch	3010	0	0	1348	
6	Health Careers Center	NEW BUILDING	Classroom - Nursing Lab 109	Classroom	6	2L4' EE/EMAG	71.6	0.4		Switch	6	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Overhead Sensor	1839	0	0	1211	Remove Exist. Dimmer Switch
7	Health Careers Center	NEW BUILDING	Classroom - Nursing Lab 109	Classroom	1	2L4' TB/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Overhead Sensor Savings	1839	0	0	1211	
8	Health Careers Center	NEW BUILDING	Classroom - Nursing Lab 109	Classroom	8	4L4' TB/ELEC (Inboard/Outboard)	118.0	0.9		Switch	8	4L RLRB/ SS LOW/ INBOARD-OUTBOARD (w/ 2-2L ballasts)	Fluorescent, (4) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	82	0.7	Overhead Sensor	1839	0	0	1211	BOB
9	Health Careers Center	NEW BUILDING	Lavatory	Lavatory	1	2L4' TB/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2080	0	0	1456	
10	Health Careers Center	NEW BUILDING	Classroom - Beds	Classroom	22	1L4' EE/STD	50.0	1.1		Switch	22	1LT-RLRB/ LOW	Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	21	0.5	Switch	1839	0	0	1211	2 lamps per bed, R140-1-TP
11	Health Careers Center	NEW BUILDING	Storage/Mechanical 106	Storage	3	2L4' TB/ELEC	49.5	0.1	39/25/37	Switch	3	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	3010	0	0	1348	
12	Health Careers Center	NEW BUILDING	Office 105	Office	2	3L4' TB/ELEC	80.0	0.2		Switch	2	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.1	Wall Sensor	1542	0	0	944	
13	Health Careers Center	NEW BUILDING	Classroom 104 'E'	Classroom	12	3L4' TB/ELEC (Inboard/Outboard)	91.0	1.1		Switch	12	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.7	Overhead Sensor	1839	0	0	1211	BOB
14	Health Careers Center	NEW BUILDING	Lockers	Lockers	4	2L4' TB/ELEC	49.5	0.2	41/40/40	Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	1127	0	0	665	
15	Health Careers Center	NEW BUILDING	Cafeteria 102	Cafeteria	12	2L4' TB/ELEC	49.5	0.6	41/40/41	Switch	12	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.5	Overhead Sensor	3120	80	0	2240	
16	Health Careers Center	NEW BUILDING	Restroom - Mens	Restroom	1	2L4' TB/ELEC	49.5	0.0	36.0	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2218	0	0	1114	
17	Health Careers Center	NEW BUILDING	Restroom - Womens	Restroom	2	2L4' TB/ELEC	49.5	0.1	36/42/45	Switch	2	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.1	Switch	2218	0	0	1114	
18	Health Careers Center	NEW BUILDING	Office - Teachers 101	Office	8	3L4' TB/ELEC (Inboard/Outboard)	91.0	0.7		Switch	8	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.5	Overhead Sensor	1542	0	0	944	
19	Health Careers Center	NEW BUILDING	Hallway 100/110	Hallway	11	2L4' TB/ELEC	49.5	0.5		Switch	11	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.3	Switch	2448	0	0	1618	
20	Health Careers Center	NEW BUILDING	Exits w/ Emergency Lights	Exits	5	LED	4.0	0.0		Breaker	5	NO UPGRADE	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
21	Health Careers Center	NEW BUILDING	Foyer - Exit	Hallway	1	2L4' TB/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2448	0	0	1714	
22	Health Careers Center	NEW BUILDING	Exits w/ Emergency Lights	Exits	1	LED	4.0	0.0		Breaker	1	NO UPGRADE	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
23		OLD BUILDING	OLD BUILDING																		
24	Health Careers Center	OLD BUILDING	Classroom 112 'B'	Classroom	16	4L4' EE/EMAG	145.0	2.3	66/67/70	Switch	16	2LT-RLRB/ HIGH/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant StartBallast, VHLO (BF>1.1)	65	1.0	Overhead Sensor	1839	0	0	1211	
25	Health Careers Center	OLD BUILDING	Office 110	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Wall Sensor	1542	0	0	944	
26	Health Careers Center	OLD BUILDING	Office 109	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Wall Sensor	1542	0	0	944	
27	Health Careers Center	OLD BUILDING	Office 108	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Wall Sensor	1542	0	0	944	
28	Health Careers Center	OLD BUILDING	Office 107	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Wall Sensor	1542	0	0	944	
29	Health Careers Center	OLD BUILDING	Office 113	Office	4	4L4' EE/EMAG	145.0	0.6		Switch	4	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.2	Wall Sensor	1542	0	0	944	
30	Health Careers Center	OLD BUILDING	Office 113	Office	1	1L4' TB/ELEC	32.1	0.0		Switch	1	1LT-RLRB/ LOW	Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	21	0.0	Wall Sensor Savings	1542	0	0	944	
31	Health Careers Center	OLD BUILDING	Restroom - Womens 114	Restroom	2	4L4' EE/EMAG	145.0	0.3	43/45/40	Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Wall Sensor	2218	0	0	1114	
32	Health Careers Center	OLD BUILDING	Storage - Linen 106	Storage	1	60W INCANDESCENT	60.0	0.1		Switch	1	13W CF/SI (Lietronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	3010	0	0	1348	
33	Health Careers Center	OLD BUILDING	Storage 106	Storage	1	2L4' EE/EMAG	71.6	0.1	13.4	Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	3010	0	0	1348	
34	Health Careers Center	OLD BUILDING	Stairway to Attic	Stairway	1	100W INCANDESCENT	100.0	0.1		Switch	1	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	3120	4912	728	6132	
35	Health Careers Center	OLD BUILDING	Storage - Attic	Storage	4	60W INCANDESCENT	60.0	0.2		Switch	4	13W CF/SI (Lietronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.1	Switch	3010	0	0	1348	
36	Health Careers Center	OLD BUILDING	Storage - Attic (Side Room)	Storage	1	60W INCANDESCENT	60.0	0.1		Switch	1	13W CF/SI (Lietronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	3010	0	0	1348	
37	Health Careers Center	OLD BUILDING	Storage - Basement	Storage	4	2L4' EE/EMAG	71.6	0.3		Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Switch	3010	0	0	1348	
38	Health Careers Center	OLD BUILDING	Storage - Basement	Storage	4	100W INCANDESCENT	100.0	0.4		Switch	4	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.1	Switch	3010	0	0	1348	
39	Health Careers Center	OLD BUILDING	Storage - Crawl Space - West	Storage	3	100W INCANDESCENT	100.0	0.3		Switch	3	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.1	Switch	3010	0	0	1348	
40	Health Careers Center	OLD BUILDING	Storage - Crawl Space - North	Storage	1	100W INCANDESCENT	100.0	0.1		Switch	1	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	3010	0	0	1348	
41	Health Careers Center	OLD BUILDING	Storage - Crawl Space - East	Storage	3	100W INCANDESCENT	100.0	0.3		Switch	3	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.1	Switch	3010	0	0	1348	
42	Health Careers Center	OLD BUILDING	Boiler Room	Boiler Rm	1	100W INCANDESCENT	100.0	0.1		Switch	1	18W CF/SI (Lietronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Switch	2800	0	0	1960	
43	Health Careers Center	OLD BUILDING	Lobby 124	Hallway	1	4L4' EE/EMAG	145.0	0.1		Switch	1	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.0	Switch	2448	0	0	#VALUE!	
44	Health Careers Center	OLD BUILDING	Lobby 124	Hallway	1	2L4' EE/EMAG	71.6	0.1		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	2448	0	0	#VALUE!	
44	Health Careers Center	OLD BUILDING	Mail Room 105	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	1542	0	0	1079	
45	Health Careers Center	OLD BUILDING	Lavatory	Lavatory	1	3-60W INCANDESCENT	180.0	0.2	7.4	Switch	3	13W CF/SI (Lietronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	2080	0	0	1456	
46	Health Careers Center	OLD BUILDING	Office - Main 104	Office	2	4L4' EE/EMAG	145.0	0.3		Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	1542	0	0	944	
47	Health Careers Center	OLD BUILDING	Office 103	Office	4	4L4' EE/EMAG	145.0	0.6	61/55/64	Switch	4	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.2	Wall Sensor	1542	0	0	944	
48	Health Careers Center	OLD BUILDING	Office - Principal 102	Office	4	4L4' EE/EMAG	145.0	0.6		Switch	4	4LT-RLRB/ HIGH/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	130	0.5	Overhead Sensor	1542	0	0	944	2x2
49	Health Careers Center	OLD BUILDING	Office - Custodian 101	Office	1	2L4' EE/EMAG	71.6	0.1		Switch	1	NEW 1X4 1L WRAP/ NORMAL/ REFL (OTL, WA438)	Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	25	0.0	Switch	1542	0	0	944	
50	Health Careers Center	OLD BUILDING	Lounge - Teachers 110	Lounge	5	4L4' EE/EMAG	145.0	0.7		Switch	5	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.2	Overhead Sensor	3120	80	0	2240	
51	Health Careers Center	OLD BUILDING	Classroom 117 'A'	Classroom	16	4L4' EE/EMAG	145.0	2.3	43/48/62	Switch	16	2LT-RLRB/ HIGH/ 2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant StartBallast, VHLO (BF>1.1)	65	1.0	Overhead Sensor	1839	0	0	1211	
52	Health Careers Center	OLD BUILDING	Copy Room 116	Office	4	2L4' EE/EMAG	71.6	0.3	26/27/32	Switch	4	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.2	Wall Sensor	1542	0	0	1079	
53	Health Careers Center	OLD BUILDING	Storage 115	Storage	2	4L4' EE/EMAG	145.0	0.3	33/34/39	Switch	2	2LT-RLRB/ NORMAL/2X4 REFL	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	49	0.1	Switch	3010	0	0	1348	
54	Health Careers Center	OLD BUILDING	Storage Closet	Storage	1	60W INCANDESCENT	60.0	0.1		Switch	1	13W CF/SI (Lietronics #NL-13427)	Compact Fluorescent, quad, (1) 13W lamp, BF=1.05	15	0.0	Switch	3010	0	0	1348	
55	Health Careers Center	OLD BUILDING	Library 120	Library	4	4L4' EE/EMAG	145.0	0.6	69/80/72	Switch	2	4LT-RLRB/ HIGH/ TANDEM/ (2) 2X4 REFLS	Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85- .95)	130	0.3	Switch	3120	80	0	2240	2x2
56	Health Careers Center	OLD BUILDING	Classroom 119 'D'	Classroom	7	3L4' TB/ELEC (Inboard/Outboard)	91.0	0.6	80/75/65	Switch	7	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.4	Overhead Sensor	1839	0	0	1211	BOB
57	Health Careers Center	OLD BUILDING	Classroom 121 'C'	Classroom	8	3L4' TB/ELEC (Inboard/Outboard)	91.0	0.7	64/63/65	Switch	8	3L RLRB/ LOW/ INBOARD/OUTBOARD (w/ IL & 2L ballasts)	Fluorescent, (3) 48", T-8 lamp, (2) Instant Start Ballasts, RLO (BF: <.85)	62	0.5	Overhead Sensor	1839	0	0	1211	BOB
58	Health Careers Center	OLD BUILDING	Storage - Server Closet 121A	Storage	1	2L4' TB/ELEC	49.5	0.0		Switch	1	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.0	Switch	3010	0	0	1348	
59	Health Careers Center	OLD BUILDING	Storage - Server Closet 122	Storage	1	3L4' TB/ELEC	80.0	0.1		Switch	1	3L RLRB/ LOW	Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	62	0.1	Switch	3010	0	0	1348	
60	Health Careers Center	OLD BUILDING	Storage 123	Storage	1	150W INCANDESCENT	150.0	0.2	17.6	Switch	1	23W CF/SI (Lietronics #NL-23427)	Compact Fluorescent, quad, (1) 23W lamp	24	0.0	Switch	3010	0	0	1348	

					PRE-INSTALLATION						POST-INSTALLATION										
Line Item	Facility	Building	Area Description- Building/Room	Usage Group ID	Pre Fixt. Quantity	Pre Fixt Description	Pre Watts/Fixt	Pre kW/Space	Measured Foot-Candles	Exist Controls	Post Fixt. Quantity	Post Fixt Description	Post Technology Description	Post Watts/ Fixture	Post kW/Space	Prop Controls	On Peak Hours	Off-Pk Hours	Interm Peak Hours	Occupied Hours	Comments
61	Health Careers Center	OLD BUILDING	Hallways 125 'Old Building'	Hallway	20	2LA' EE/EEMAG	71.6	1.4	23/14/26	Switch	20	2LT-RLRB/ LOW	Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, RLO (BF=0.85)	41	0.8	Switch	2448	0	0	1618	
62	Health Careers Center	OLD BUILDING	Hallways 125 'Old Building'	Storage	1	150W INCANDESCENT	150.0	0.2		Switch	1	23WCF/SI (Lutronics #NL-23427)	Compact Fluorescent, quad, (1) 23W lamp	24	0.0	Switch	3010	0	0	1348	
63	Health Careers Center	OLD BUILDING	Exits w/ Emergency Lights	Exits	4	LED	4.0	0.0		Breaker	4	NO UPGRADE	EXIT Light Emmitting Diode, 4W LED	4	0.0	Breaker	3120	4912	728		
64		**PERIMETER**	**PERIMETER**																		
65	Health Careers Center	PERIMETER	Exterior	Exterior	9	175W MV/BALLAST	205.0	1.8		Breaker	9	NEW 100 Q L/ WALLPACK/ PHOTOCELL	100W Induction Lighting	118	1.1	Breaker	0	4015	0		
66	Health Careers Center	PERIMETER	Exterior	Exterior	7	100W INCANDESCENT	100.0	0.7		Breaker	7	18WCF/SI (Lutronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.1	Breaker	0	4015	0		
67	Health Careers Center	PERIMETER	Exterior	Exterior	2	11W CF/SI	13.0	0.0		Breaker	2	NO UPGRADE	Compact Fluorescent, (1) 11W lamp	13	0.0	Breaker	0	4015	0		
68	Health Careers Center	PERIMETER	Exterior	Exterior	1	100W QUARTZ	100.0	0.1		Breaker	1	NO UPGRADE	Halogen Incandescent, (1) 100W lamp	100	0.1	Breaker	0	4015	0		
69	Health Careers Center	PERIMETER	Exterior	Exterior	1	100W INCANDESCENT	100.0	0.1		Breaker	1	18WCF/SI (Lutronics #NL-20427)	Compact Fluorescent, quad, (1) 18W lamp, BF=1.0	20	0.0	Breaker	0	4015	0		
70		**PARKING LOT**	**PARKING LOT**																		
71	Health Careers Center	PARKING LOT	Exterior	Exterior	20	250W MH/BALLAST	295.0	5.9		Breaker	20	NO UPGRADE	Metal Halide, (1) 250W lamp	295	5.9	Breaker	0	4015	0		
				TOTAL	**316.0**			**32.9**			**316.0**				**19.9**						

Bldg	Building Name	LINEAR FLUORESCENTS							
		T12 Ballasts	T12 Lamps	T8 Ballasts	T8 Lamps	T8 Ballasts	T8 Lamps	Ballasts	Lamps
		pre-retrofit (qty)		pre-retrofit (qty)		post-retrofit (qty)		reduction (qty)	
		A	B	A	B	J	K		
1	Assunpink Center	1,385	2,831	73	181	879	2,744	579	268
2	Sypek Center	1,695	3,389	1	2	1,087	3,151	609	240
3	Health Careers Center	199	376	161	272	228	515	132	133
	TOTALS	3,279	6,596	235	455	2,194	6,410	1,320	641
	FAILURE RATES	5% C	20% D	5% C	10% D	3% L	10% M		
	MATERIAL REPLACEMENT COST	$27.46 E	$2.41 F	$20.73 E	$2.25 F	$21.15 N	$2.59 O		
	LABOR REPLACEMENT COST	$0 G	$0 H	$0 G	$0 H	$0 P	$0 Q		

Item	Building	Location	Machine (enter Cold Drink or Snack only)	Brand (i.e. Coke/Pepsi etc.)
1	Assunpink - Building 'A'	Lobby 100	Cold Drink	Dasani
2			Snack	Snack
3	Assunpink - Building 'B'	Classroom 108 Hallway	Cold Drink	Dasani
4			Cold Drink	Snack
5		Classroom 133	Cold Drink	Pepsi
6	Assunpink - Building 'C'	Classroom 130	Cold Drink	Pepsi
7			Snack	Snack
8		Classroom 110 Auto Body Shop	Cold Drink	Coke
9			Snack	Snack
10	Health Careers Center	Cafeteria 102	Cold Drink	Aquafina
11			Snack	Snack
	Total			
	Average Amps			

Total COLD DRINK machines = 7
Total SNACK machines = 4

SECTION 7

Detailed Engineering Data

LIGHTING

POWER MEASUREMENTS

LIGHTING FIXTURE WATTAGE MEASUREMENTS

Row Labels	Values Sum of QTY FIXTURES	Average of WATTS/FIXTURE
2' T12		
2 Lamp	1	54.0
4' T12		
2 Lamp	256	71.6
4 Lamp	6	145.0
8' T12		
2 Lamp	24	182.2
8' T12 HO		
2 Lamp	32	188.6
T8 ES		
1 Lamp (inboard)	23	32.1
2 Lamp	55	49.5
3 Lamp	5	80.0
Grand Total	402	101.6

LIGHTING FIXTURE WATTAGE MEASUREMENTS

READING #	WORKSHEET #	BUILDING	ROOM	LAMP TYPE	# LAMPS	QTY FIXTURES	LAMPS OUT	KW	WATTS/FIXTURE
1	1	Assunpink A	Lobby	4' T12	2	18	0	1.21	67.2
2	2	Assunpink B	Electric Shop - lower mezz	4' T12	2	23	0	1.69	73.5
3	3	Assunpink B	Electric Shop - upper mezz	4' T12	2	24	2	1.66	69.2
4	4	Assunpink B	Electric Shop - high bay	8' T12	2	4	0	0.74	185.0
5	4	Assunpink B	Electric Shop - high bay	8' T12	2	4	0	0.76	190.0
6	4	Assunpink B	Electric Shop - high bay	8' T12	2	4	0	0.71	177.5
7	5	Assunpink B	Electric Shop - bathroom	2' T12	2	1	0	0.054	54.0
8	6	Assunpink A	Cosmo 102	4' T12	2	14	0	1.02	72.9
9	6	Assunpink A	Cosmo 102	4' T12	2	20	0	1.47	73.5
10	7	Assunpink A	Room 164 (outboard)	T8 ES	2	6	0	0.33	55.0
11	8	Assunpink A	Room 164 (inboard)	T8 ES	1	6	0	0.182	30.3
12	9	Assunpink A	Room 166	T8 ES	3	5	0	0.4	80.0
13	10	Assunpink B	Gen Construction Classroom	T8 ES	2	18	0	0.88	48.9
14	11	Assunpink B	Gen Construction Shop	8' T12	2	6	0	1.06	176.7
15	11	Assunpink B	Gen Construction Shop	8' T12	2	6	0	1.09	181.7
16	12	Assunpink B	Boiler Room	4' T12	2	9	0	0.69	76.7
17	13	Sypek A	Lobby	4' T12	2	15	0	0.92	61.3
18	15	Sypek A	Hallway to right of Lobby	4' T12	2	4	0	0.31	77.5
19	15	Sypek A	Hallway to right of Lobby	4' T12	2	4	0	0.31	77.5
20	16	Sypek A	Evening School Office	4' T12	4	2	0	0.28	140.0
21	17	Sypek A	Media Room	4' T12	2	8	0	0.54	67.5
22	17	Sypek A	Media Room	4' T12	2	16	0	1.21	75.6
23	17	Sypek A	Media Room	4' T12	2	16	0	1.22	76.3
24	18	Sypek A	Room A114	4' T12	2	13	0	0.94	72.3
25	18	Sypek A	Room A114	4' T12	2	26	4	1.82	70.0
26	18	Sypek A	Room A114	4' T12	2	26	4	1.86	71.5
27	19	Sypek B	Construction Trades B100	8' T12 HO	2	5	0	0.96	192.0
28	19	Sypek B	Construction Trades B100	8' T12 HO	2	4	0	0.77	192.5
29	19	Sypek B	Construction Trades B100	8' T12 HO	2	4	0	0.76	190.0
30	20	Sypek B	Gen Building Cons B144	8' T12 HO	2	6	0	1.14	190.0
31	20	Sypek B	Gen Building Cons B145	8' T12 HO	2	4	0	0.74	185.0
32	20	Sypek B	Gen Building Cons B146	8' T12 HO	2	5	0	0.94	188.0
33	20	Sypek B	Gen Building Cons B147	8' T12 HO	2	4	0	0.73	182.5
34	21	Health Careers	Room D (outboard)	T8 ES	2	7	0	0.35	50.0
35	22	Health Careers	Room D (outboard)	T8 ES	2	7	0	0.203	29.0
36	23	Health Careers	Library	4' T12	4	4	0	0.6	150.0
37	24	Health Careers	Sim Lab (outboard)	T8 ES	2	9	0	0.52	57.8
38	24	Health Careers	Sim Lab (outboard)	T8 ES	2	8	0	0.45	56.3
39	25	Health Careers	Sim Lab (inboard)	T8 ES	1	9	0	0.3	33.3
40	25	Health Careers	Sim Lab (inboard)	T8 ES	1	8	0	0.261	32.6
41	26	Health Careers	Hallway	4' T12	2	10	0	0.7	70.0
42	26	Health Careers	Hallway	4' T12	2	10	0	0.65	65.0

SECTION 7

Detailed Engineering Data

LIGHTING

LOGGER DATA

Campus	Logger ID	Location	Space Type	Total Annualized Hours	Total Annualized Hours - Unoccupied	% Hr Savings	Average % Hr Savings	Area Description
Health Careers	19E1	Classroom A	Classroom	1,009.82	142.35	14.1%		
Health Careers	1A5D	Classroom - Nursing Lab	Classroom	2,261.20	672.64	29.7%		
Health Careers	1AB9	Classroom - Nursing Lab	Classroom	2,245.21	489.10	21.8%	23.6%	Classroom
Health Careers	1EDB	Conference Room (Across Class D)	Conference Room	630.38	351.97	55.8%		
Health Careers	1D36	Student Lounge/Conference Room	Conference Room	1,219.95	424.97	34.8%	42.0%	Conference Room
Health Careers	1A6C	Hallway (Outside Class D)	Hallway	3,114.94	1,000.10	32.1%		
Health Careers	1654	Hallway (Outside Evening School Office)	Hallway	3,009.60	675.25	22.4%	27.4%	Hallway
Health Careers	1AB5	Locker Room	Locker Room	1,126.74	680.47	60.4%	60.4%	Locker Room
Health Careers	1A4F	Mechanical Room	Mechanical Room	2,261.75	1,289.50	57.0%	57.0%	Mechanical Room
Health Careers	1A31	Office - Principal	Office	1,513.90	319.12	21.1%		
Health Careers	1642	Office - Evening School	Office	1,569.60	241.42	15.4%	15.4%	Office
Health Careers	1A2E	Restroom - Women (By Teacher's Room)	Restroom	2,217.63	1,584.10	71.4%	71.4%	Restroom
Health Careers	1A55	Storage Room (Acroos Main Office)	Storage	3,009.60	675.25	22.4%	22.4%	Storage

Campus	Logger ID	Location	Space Type	Total Annualized Hours	Total Annualized Hours - Unoccupied	% Hr Savings	Average % Hr Savings	Area Description
Sypek	1D67	Classroom A107	Classroom	1,588.36	491.71	31.0%		
Sypek	1ACA	Classroom A103 - Cosmetology	Classroom	1,769.80	678.90	38.4%		
Sypek	1EE0	Classroom A103 - Cosmetology	Classroom	1,770.36	391.07	22.1%		
Sypek	1A34	Classroom A151	Classroom	1,385.95	306.60	22.1%		
Sypek	1EE4	Classroom A151	Classroom	485.33	458.86	94.5%		
Sypek	1A1B	Classroom A114	Classroom	2,022.95	265.93	13.1%		
Sypek	1A56	Classroom A114	Classroom	2,066.52	595.47	28.8%		
Sypek	165F	Classroom B153	Classroom	2,754.80	1,146.10	41.6%		
Sypek	1D26	Classroom B109	Classroom	1,349.00	147.56	10.9%		
Sypek	1A2A	Classroom B142	Classroom	1,500.67	194.49	13.0%		
Sypek	1A42	Classroom B132 - Automotive Technology	Classroom	1,866.87	893.21	47.8%		
Sypek	1640	Classroom B132 - Automotive Technology	Classroom	2,102.92	1,310.35	62.3%		
Sypek	1E62	Classroom B120 - Auto Body	Classroom	1,859.70	719.57	38.7%		
Sypek	1648	Classroom B120 - Auto Body	Classroom	1,850.32	637.71	34.5%		
Sypek	19D1	Classroom B144 - Carpentry/Masonry	Classroom	1,511.14	855.15	56.6%		
Sypek	19AC	Classroom B144 - Carpentry/Masonry	Classroom	671.19	256.54	38.2%		
Sypek	1D48	Classroom 154 - Print Shop	Classroom	1,690.94	744.60	44.0%		
Sypek	1ADD	Classroom 154 - Print Shop	Classroom	1,084.83	246.11	22.7%		
Sypek	164F	Classroom C131	Classroom	1,787.45	421.32	23.6%		
Sypek	1AE2	Classroom C139	Classroom	1,930.85	217.96	11.3%		
Sypek	1B68	Classroom C122 - Child Care	Classroom	1,912.65	178.85	9.4%		
Sypek	1AC6	Classroom C122 - Child Care	Classroom	1,480.26	431.22	29.1%		
Sypek	1657	Classroom C134 - Culinary Arts	Classroom	1,893.89	318.07	16.8%		
Sypek	1A68	Classroom C134 - Culinary Arts	Classroom	1,985.45	257.06	12.9%	12.9%	Classroom
Sypek	1A50	Conference Room	Conference Room	495.81	308.69	62.3%	62.3%	Conference Room
Sypek	1A54	Corridor A150 (Near Class A137)	Hallway	2,683.11	1,034.00	38.5%		
Sypek	1AF5	Corridor A115 (Near Principal Office)	Hallway	422.46	194.49	46.0%		
Sypek	1D2A	Corridor C123B	Hallway	2,357.72	383.25	16.3%		
Sypek	1B24	Corridor C101B	Hallway	889.59	126.71	14.2%	14.2%	Hallway
Sypek	1A41	Locker Room A146	Locker Room	1,340.18	1,252.47	93.5%		
Sypek	1ADE	Locker Room A145	Locker Room	614.94	269.58	43.8%		
Sypek	1AC0	Locker Room B145	Locker Room	1,654.54	392.64	23.7%		
Sypek	1EED	Locker Room B155	Locker Room	1,654.54	237.25	14.3%		
Sypek	19FC	Locker Room B101	Locker Room	1,620.34	384.82	23.7%	36.8%	Locker Room
Sypek	1D34	Office A136 - Assistant Principal	Office	1,886.17	703.93	37.3%		
Sypek	19DA	Office A130 - Principal	Office	2,339.52	1,136.72	48.6%		
Sypek	1DB6	Copy Room A127	Office	2,154.76	973.51	45.2%		
Sypek	1A46	Office 148	Office	1,872.38	904.68	48.3%		
Sypek	1624	Office 136	Office	1,813.37	646.57	35.7%		
Sypek	1A67	Office C143	Office	1,933.05	535.51	27.7%		
Sypek	1D39	Office C137	Office	1,799.59	405.67	22.5%		
Sypek	19A3	Office C106	Office	297.82	208.57	70.0%	39.1%	Office
Sypek	161F	Restroom A108 - Men	Restroom	22.61	4.17	18.4%		
Sypek	1EE9	Restroom A123 - Women	Restroom	2,398.53	1,036.08	43.2%		
Sypek	1653	Restroom B135	Restroom	1,800.69	1,522.58	84.6%		
Sypek	1D8F	Restroom B123	Restroom	1,506.73	1,239.44	82.3%		
Sypek	1641	Restroom B103	Restroom	482.57	179.89	37.3%		
Sypek	1A64	Restroom C109 - Women	Restroom	1,949.60	610.07	31.3%	337.6%	Restroom
Sypek	164B	Storage Room A139	Storage	108.65	89.69	82.5%		
Sypek	1A47	Storage B110 - Large	Storage	989.96	684.64	69.2%		
Sypek	1622	Storage Room B161	Storage	412.53	351.97	85.3%	74.5%	Storage

Campus	Logger ID	Location	Space Type	Total Annualized Hours	Total Annualized Hours - Unoccupied	% Hr Savings	Average % Hr Savings	Area Description
Assupink Campus	1ADA	Classroom C109	Classroom	1,214.98	96.46	7.9%		
Assupink Campus	19F8	Classroom C108	Classroom	707.04	32.33	4.6%		
Assupink Campus	1A23	Classroom A113 - Cosmetology	Classroom	1,302.67	513.61	39.4%		
Assupink Campus	1621	Classroom A113 - Cosmetology	Classroom	846.57	397.85	47.0%		
Assupink Campus	1E82	Classroom C130 - Automotive Maintenance	Classroom	2,137.11	1,019.40	47.7%		
Assupink Campus	1ABF	Classroom C130 - Automotive Maintenance	Classroom	2,046.11	1,067.37	52.2%		
Assupink Campus	19D8	Classroom C100 - Machine Tool + Dye	Classroom	911.65	338.93	37.2%		
Assupink Campus	1A5A	Classroom B130	Classroom	2,124.98	370.22	17.4%		
Assupink Campus	164D	Classroom B108	Classroom	2,219.84	645.53	29.1%		
Assupink Campus	1619	Classroom B128 - HVAC Technology	Classroom	1,219.95	359.79	29.5%		
Assupink Campus	1A3B	Classroom B128 - HVAC Technology	Classroom	2,261.20	804.57	35.6%		
Assupink Campus	1B85	Classroom B111 - Building Construction	Classroom	1,503.42	619.46	41.2%		
Assupink Campus	198A	Mezzanine B118	Classroom	676.15	554.28	82.0%		
Assupink Campus	1B1C	Classroom A170 A - Welfare Work First	Classroom	1,731.20	551.15	31.8%		
Assupink Campus	1EE1	Classroom A102 - Theory	Classroom	2,731.09	563.14	20.6%		
Assupink Campus	1652	Classroom A113 - Cosmetology	Classroom	2,733.30	856.71	31.3%		
Assupink Campus	1AD6	Classroom A113 - Cosmetology	Classroom	2,731.64	1,410.47	51.6%		
Assupink Campus	1A3A	Classroom A116 - CADD/CAM	Classroom	1,911.54	856.71	44.8%		
Assupink Campus	1D2C	Classroom A116 - CADD/CAM	Classroom	2,491.18	380.64	15.3%	34.1%	Classroom
Assupink Campus	1EE7	Work Room A141	Conference Room	3,535.20	1,584.10	44.8%	44.8%	Conference Room
Assupink Campus	1D5F	Corridor A115 (By Class A123)	Hallway	1,110.75	441.65	39.8%		
Assupink Campus	1620	Corrider A108 (By Custodian Closet)	Hallway	3,536.85	1,134.11	32.1%	33.9%	Hallway
Assupink Campus	1E69	Locker Room C131	Locker Room	1,791.31	830.64	46.4%		
Assupink Campus	1D2F	Locker Room C105	Locker Room	900.62	537.07	59.6%		
Assupink Campus	1A36	Locker Room B114	Locker Room	985.55	214.83	21.8%		
Assupink Campus	1D28	Locker Room B127	Locker Room	2,263.96	434.35	19.2%		
Assupink Campus	1A08	Locker Room A110 B	Locker Room	2,542.47	1,199.29	47.2%		
Assupink Campus	1A24	Locker Room A104 A	Locker Room	2,663.81	1,356.76	50.9%	41.0%	Locker Room
Assupink Campus	1626	Shop (On Mezzanine Railing)	Mechanical Room	261.97	6.26	2.4%		
Assupink Campus	1EF1	Shop (On Fixture Near Locker Cabinet)	Mechanical Room	3,408.35	1,515.80	44.5%	41.5%	Mechanical Room
Assupink Campus	1ACF	Office B124	Office	1,641.85	750.86	45.7%		
Assupink Campus	1A59	Office B115	Office	1,534.86	555.32	36.2%		
Assupink Campus	1A6D	Office A103	Office	1,362.24	499.53	36.7%		
Assupink Campus	1EE3	Office A114	Office	1,684.87	471.89	28.0%		
Assupink Campus	1EEF	Office A143	Office	2,315.25	1,285.32	55.5%		
Assupink Campus	1D47	Office A142	Office	1,136.12	185.11	16.3%	38.7%	Office
Assupink Campus	1A4B	Restroom B113	Restroom	258.11	77.17	29.9%		
Assupink Campus	1AB0	Restroom B104	Restroom	184.76	86.04	46.6%		
Assupink Campus	1A28	Restroom A124 - Women	Restroom	3,516.44	2,092.50	59.5%		
Assupink Campus	1658	Restroom A126 - Men	Restroom	3,514.24	1,609.65	45.8%		
Assupink Campus	1AA2	Restroom (Between A110 and A104)	Restroom	2,808.30	1,249.87	44.5%	49.8%	Restroom
Assupink Campus	1A22	Storage Room B123	Storage	1,149.90	417.14	36.3%		
Assupink Campus	1A53	Storage Room B117 - Tools	Storage	727.44	165.29	22.7%		
Assupink Campus	1EDE	Storage Room A154	Storage	2,471.88	2,209.30	89.4%		
Assupink Campus	163D	Storage Room A102	Storage	1,759.32	580.35	33.0%	55.2%	Storage

SECTION 7

Detailed Engineering Data

TEMPERATURE LOGGER DATA

SECTION 7

Detailed Engineering Data

PHOTOVOLTAIC LIGHTING

1 / S1.0 PLAN VIEW: SOLAR ARRAY LAYOUT

SCALE: 1" = 40'

SCALE IN FEET

50 25 0 20 40 80 120 160 200

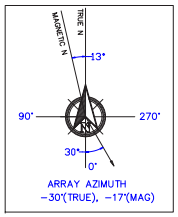
General Notes:

1. Perimeter of 6' from roof edges shall be maintained.
2. Solar modules shown are on a 55" pitch from N-S based on a Sunlink Ballasted Roof Mount System.

System Properties:

Solar Module:	Sunworld SW 235 or similar
# of Modules:	1478
# of Modules per String:	13
Mounting System MFG:	Sunlink or similar
Mouting System Type:	Ballasted
Azimuth:	-30° (True)
Tilt Angle:	10°
Inverter Mfg:	SatCon or similar
# of Inverters:	(1) PVS-250 (1) PVS-75
Total DC Power:	347.33 kW

Array	# of Modules	# of Strings	System Size (kW)
A	91	7	21.39
B	260	20	60.16
C	286	22	67.21
D	91	7	21.39
E	91	7	21.39
F	195	15	45.85
G	273	21	64.18
H	143	11	33.61
I	52	4	12.20
Total	1,478	114	347.33



HOST CUSTOMER

PV DESIGN CONSULTANT

Entech Solar, Inc.
423 Riverview Plaza
Trenton, NJ 0861
Ph. (609) 394-0011
Fx. (609) 394-0044

GENERAL CONTRACTOR

PROJECT NAME: Mercer County Technical Schools
SIZE: 347.33 kWDC
DESCRIPTION: Assunpink Center Site
STREET: 1085 Old Trenton Rd.
CITY, STATE, ZIP: Trenton, NJ
SCALE: 1"=40' | DATUM/ACE: +/- 10%
ENGINEERED BY: M. LAVARNWAY | DATE: 12/6/2010
DRAWN BY: M. LAVARNWAY | DATE: 12/6/2010
CHECKED BY: D. WILLIAMS | DATE: 12/6/2010
APPROVED BY: L. LAURENDEAU | DATE: 12/6/2010

REVISION HISTORY

REV	DESCRIPTION	DATE
X1	DRAFT - REVIEW	12/6
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-

JOB NUMBER: 2010-JCI0121 | PAGE SIZE: D

DRAWING TITLE: SITE PLAN

DISCIPLINE	SHEET	SEQUENCE	REVISION
S	1	0	X0

Engineer/Architect

PROJECT STATUS
SEAL/LICENSE #

Preliminary: Not For Construction

1 / S1.0 PLAN VIEW: SOLAR ARRAY LAYOUT
SCALE: 1" = 30'

SCALE IN FEET
25 12.5 0 10 20 40 60 80 100

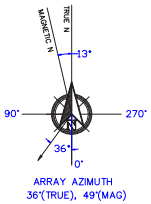
General Notes:

1. Perimeter of 6' from roof edges shall be maintained.
2. Solar modules shown are on a 55" pitch from N-S based on a Sunlink Ballasted Roof Mount System.

System Properties:

Solar Module:	SunWorld SW235 Mono or similar
# of Modules:	897
# of Modules per String:	13
Mounting System MFG:	Sunlink or similar
Mouting System Type:	Ballasted
Azimuth:	36° (True)
Tilt Angle:	10°
Inverter Mfg:	SatCon or similar
# of Inverters:	(2) PVS-100
Total DC Power:	210.80kW

Array	# of Modules	# of Strings	System Size (kW)
Array A	169	13	39.72
Array B	130	10	30.55
Array C	104	8	24.44
Array D	143	11	33.61
Array E	104	8	24.44
Array F	143	11	33.61
Array G	104	8	24.44
Total	897	68	210.80



ARRAY AZIMUTH
36°(TRUE), 49°(MAG)

HOST CUSTOMER

PV DESIGN CONSULTANT
Entech Solar, Inc.
423 Riverview Plaza
Trenton, NJ 0861
Ph. (609) 394-0011
Fx. (609) 394-0044

GENERAL CONTRACTOR

PROJECT NAME: Mercer County Tech Schools
SIZE: 210.80kWDC
DESCRIPTION: Sypek Center Site
STREET: 129 Bull Run Rd.
CITY, STATE, ZIP: Pennington, NJ
SCALE: 1"=30' | TOLERANCE: +/- 10%
ENGINEERED BY: M. LAVARNWAY | DATE: 12/6/2010
DRAWN BY: M. LAVARNWAY | DATE: 12/6/2010
CHECKED BY: D. WILLIAMS | DATE: 12/6/2010
APPROVED BY: L. LAURENDEAU | DATE: 12/6/2010

REVISION HISTORY

REV	DESCRIPTION	DATE
X0	DRAFT - REVIEW	12/6
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-

JOB NUMBER: 2010-JCI0122 | PAGE SIZE: D
DRAWING TITLE: SITE PLAN

DISCIPLINE	SHEET	SEQUENCE	REVISION
S	1	0	X0

Engineer/Architect

Preliminary: Not For Construction

1 / S1.0 PLAN VIEW: SOLAR ARRAY LAYOUT

SCALE: 1" = 15'

SCALE IN FEET

25 0 20 40 80 120

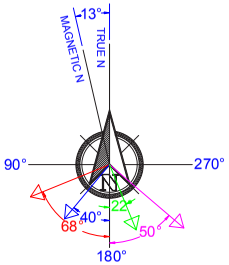
General Notes:

1. Seamed roof mounted modules shall be mounted flush to to the roof.

System Properties:

Solar Module:	Solarworld SW 235 Mono or similar
# of Modules:	189
# of Modules per String:	11 or 12
Mounting System MFG:	UniRack or similar
Mouting System Type:	Flush roof-mounted
Azimuth:	'table below'
Tilt Angle:	30 Degrees
Inverter Mfg:	SMA America or similar
# of Inverters:	(2) SB-5000-US (4) SB-7000-US
# of combiner boxes:	4
Total DC Power:	43.59 kW

Array	# of Modules	# of Strings	System Size (kW)
A	24	2	5.64
B	57	5	13.11
C	36	3	8.28
D	72	6	16.56
Total	189	16	43.59



ARRAYS	ARRAY AZIMUTH TRUE	ARRAY AZIMUTH MAG	COLOR MARK
A	68°	81°	Red
B	-22°	-9°	Green
C	40°	53°	Blue
D	-50°	-37°	Magenta

PROJECT DEVELOPER

PV DESIGN CONSULTANT

Entech Solar, Inc.
423 Riverview Plaza
Trenton, NJ 0861
Ph. (609) 394-0011
Fx. (609) 394-0044

GENERAL CONTRACTOR

PROJECT NAME: Mercer County Tech Schools
SIZE: 43.59 kW
DESCRIPTION: Health Career Center Site
STREET: 1070 Klockner Road
CITY, STATE, ZIP: Trenton, NJ
SCALE: 1"=15' | TOLERANCE: +/- 10%
ENGINEER DRY: M. LAVARNWAY | DATE: 12/6/2010
DRAWN BY: M. LAVARNWAY | DATE: 12/6/2010
CHECKED BY: D. WILLIAMS | DATE: 12/6/2010
APPROVED BY: L. LAURENDEAU | DATE: 12/6/2010

REVISION HISTORY

REV	DESCRIPTION	DATE
0	DRAFT - REVIEW	12/6

JOB NUMBER: 2010-JCI0123 | PAGE SIZE: D

DRAWING TITLE: SITE PLAN

DISCIPLINE	SHEET	SEQUENCE	REVISION
S	1	0	

Engineer/Architect

STATE OF NEW JERSEY
SEAL / LICENSE #

Preliminary: Not For Construction

SECTION 7

Detailed Engineering Data

O & M INVOICES