ENERGY SAVINGS IMPROVEMENT PROGRAM

TABERNACLE SCHOOL DISTRICT

ENERGY SAVINGS PLAN

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TABLE OF CONTENTS

Appendix:

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I. Executive Summary

Concord Engineering has been tasked with providing the Tabernacle School District with an Energy Savings Plan (ESP) that will be utilized to implement an Energy Savings Improvement Program (ESIP) in accordance with NJ Public Law 2009, Chapter 4. The Energy Savings Plan is a multi-faceted report that contains a multitude of information in order to aid the District in making implementation decisions. The basics of the ESP consist of the calculated energy conservation measures, their respective construction costs and the cash flow analysis over the fifteen year term as allowed by the ESIP legislation. Additionally, items such as design and compliance issues, maintenance requirements, greenhouse gas reduction, etc., are also included in the plan.

Prior to implementing an ESP, the Tabernacle School District needed to have an initial energy audit conducted. This audit was conducted by Dome-Tech Incorporated in May 2012 and encompassed the District's two school facilities. The energy audit report is on file with the District and includes the facility specific building descriptions, major equipment lists, etc., to be used for reference to this document. The results of the initial energy audit are utilized as the framework for the ESP. Tabernacle School District's initial energy goals were to implement all of the measures as outlined in the Energy Audit Report. In addition to the audit measures the district was interested in replacing its hot water boilers located in the Middle School.

In order to complete the ultimate goal of the ESP, to provide a project that can show energy cost savings that will pay for the costs to implement the project in a 15 year term, a baseline energy usage profile needs to be created for each facility in the District. Concord Engineering analyzed the utility usage and cost for the District utilizing the baseline period of November 2011 to October 2012. The summarized District-wide baseline energy consumption and cost data are as follows:

- Total District Electric Usage: 1,700,620 kWh
- Total District Natural Gas Usage: 86,501 therms
- Total District Utility Cost: $308,910

The baseline energy data for the District was then utilized to prepare the energy conservation measure calculations noted above and included in **Section V** and to help prepare recommended scenarios for implementation as outlined in **Section IX** and **Appendix A**.

The resultant projected cash flows will enable the District to fund all of the projects within the Energy Savings Plan scope of work for a Gross Project Cost of $689,000 with a net annual year 1 savings of $60,370 or 21% annual cost reduction.

Overall, Concord Engineering is pleased to provide the District with the ESP results and believes the District is in a great position to implement a program that provides much needed upgrades to their facilities' equipment.

II. Introduction

The New Jersey State Legislature approved Assembly Bill Number A1185 and A2313 & 2564 that allows certain local public entities to enter into contracts for up to 15 years for energy conservation or provisions of renewable energy production at buildings owned by such entities. Furthermore, this allows government agencies to make these energy related improvements to their facilities and pay for the costs using the energy savings value that result. The enacted Chapter 4 of the Laws of 2009, the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. Guidelines for implementation of this program have been provided through the Department of Community Affairs Local Finance Notice 2009-11, and subsequent protocols provided by the Board of Public Utilities Docket No. EO09020128 dated 2/24/2009 for computing energy costs savings.

The first step, (after having completed an Energy Audit) to implementing an Energy Savings Improvement Program is creation of the Energy Savings Plan (ESP). The plan is created to bridge the gap between what is outlined in the energy audit report to a more detailed scope of work with more refined cost estimates and energy savings to provide the owner with a cash flow analysis over the life of the contract. The ESP identifies and describes each energy conservation measure that will comprise the ESIP, an estimate of greenhouse gas reductions from the resultant savings, identification of all design and compliance issues, maintenance requirements necessary to ensure continued savings, identification of eligibility for PJM demand response and curtailable service programs, and an assessment of any risks associated with implementation of the plan. The plan is used as a reference document to provide information to the local entity for the purposes of soliciting proposals from qualified Energy Services Companies (ESCO) to implement the project or they can choose to self-implement and use the plan to secure funding and move into construction services.

III. Energy Audit Results

The Tabernacle School District had an energy audit performed by Dome-Tech that encompassed the District's two schools. The audits were performed in May 2012.

The report was consistent with the Board of Public Utilities Local Government Energy Audit Program guidelines. The audit provided a basic list of energy conservations measures for each facility that ranged from small low/no cost measures to more capital intensive measures. Each of the measures was evaluated and assigned an estimated construction cost and a projected energy savings using industry standard practices and engineering judgment.

The energy audit provided a list of recommended energy efficiency upgrades that were used as a base for developing the Energy Savings Plan. These recommendations were further analyzed, along with new recommendations developed through further analysis of the facilities and District's operating characteristics. In addition, the energy audit report provided valuable information regarding building occupancy, operating hours, and utility data which was utilized for creating the baseline building profile. The energy audit reports were used in developing the Energy Savings Plan, but not directly referenced and as such not included as an attachment to this report.

The energy audit reports are on file with the School District and include the facility specific building descriptions, major equipment lists, etc., to be used for reference to this document.

IV. Historic Energy Consumption and Costs

The District facilities are currently delivered electricity from Atlantic City Electric under Annual General Service Secondary rate tariff. Natural Gas is provided by South Jersey Gas. The District also utilizes a third party supplier, South Jersey Energy, for electricity commodity purchasing, and Hess, for natural gas commodity purchasing. The utility data provided by the District represents the calendar year from November 2011 to October 2012. The table below summarizes the annual usage and average cost per unit for each facility.

Table 1: Baseline Utility Summary

	BASELINE ENERGY USAGE PERIOD NOV-2011 to OCT-2012					
	ELECTRIC				NATURAL GAS	
FACILITY	USAGE (KWH)	DEMAND (KW)	DEMAND COST	SUPPLY COST	USAGE (THERMS)	ANNUAL COST
Kenneth R Olson Middle School	1,009,500	348.00	$21,656	$108,976	44,734	$41,227
Tabernacle Elementary School	691,120	342.40	$21,032	$74,115	41,767	$41,904
School District Totals:	1,700,620	690.40	$42,688	$183,091	86,501	$83,131

BASELINE ENERGY COST			
	ELECTRIC		NATURAL GAS
FACILITY	DEMAND RATE ($/kW/Mth)	SUPPLY RATE ($/KWH)	SUPPLY RATE ($/THERM)
Kenneth R Olson Middle School	$6.74	$0.108	$0.92
Tabernacle Elementary School	$6.74	$0.107	$1.00

The Distribution Demand Charge for Atlantic City Electric's AGS Service is based on the October 26, 2012 BPU issued tariff information.

The baseline utility usage period was used as the basis for each building in order to calculate energy savings. The usage information along with collected building information such as lighting, mechanical equipment, and occupancy profiles; and industry standard practices and assumptions were used in creating the energy profile.

V. Energy Conservation Measures (ECM)

Energy Conservation Measures (ECM) were developed specifically for the District's facilities based on the preliminary framework set by the initial energy audit conducted by Dome-Tech and expanded upon based on Concord Engineering's follow-up field surveys, measurements and further investigation. Tables 2 & 3 below provide a summary of the associated utility cost savings and energy savings for each energy conservation measure calculated for the District. Immediately following the summary tables are the actual description and calculations per ECM.

Table 2: Energy Cost Savings Summary

TABLE 2: ENERGY COST SAVINGS					
ECM NO.	BUILDING	DESCRIPTION	ANNUAL UTILITY COST SAVINGS		
			ELECTRIC SAVINGS	NATURAL GAS SAVINGS	TOTAL SAVINGS
ECM #1	MS & ES	Vending Machine Controls	$807	$0	$807
ECM #2	Middle School	Lighting General	$10,851	$0	$10,851
ECM #3	Middle School	Lighting Gym & All Purpose	$831	$0	$831
ECM #4	Middle School	Lighting Media Center	$1,289	$0	$1,289
ECM #5	Middle School	Lighting Controls	$1,272	$0	$1,272
ECM #6	Elementary School	Lighting General	$8,422	$0	$8,422
ECM #7	Elementary School	Lighting Controls	$785	$0	$785
ECM #8	Middle School	VFD Chilled Water Pumps	$1,765	$0	$1,765
ECM #9	Middle School	Boiler Replacement	$0	$4,935	$4,935
ECM #10	Middle School	Walk-In Controls	$453	$0	$453
ECM #11	Middle School	CHWP Freeze Protection Sequence	$1,378	$0	$1,378
ECM #12	Middle School	Controls Optimization	$2,563	$2,727	$5,290
ECM #13	Middle School	Premium Efficiency Motors	$322	$0	$322
ECM #14	Elementary School	Controls Optimization	$8,816	$5,581	$14,397
ECM #15	Elementary School	Premium Efficiency Motors	$138	$0	$138
ECM #16	Elementary School	AC-3 VFD Fan	$3,481	$3,954	$7,435
TOTAL		**ALL MEASURES SAVINGS**	**$43,173**	**$17,197**	**$60,370**

Table 3: Energy Usage Savings Summary

TABLE 3: ENERGY CONSUMPTION SAVINGS					
ECM NO.	BUILDING	DESCRIPTION	ANNUAL UTILITY REDUCTION		
			ELECTRIC DEMAND (KW)	ELECTRIC CONS. (KWH)	NATURAL GAS (THERMS)
ECM #1	MS & ES	Vending Machine Controls	0.0	7,488	0
ECM #2	Middle School	Lighting General	46.7	100,476	0
ECM #3	Middle School	Lighting Gym & All Purpose	3.3	7,696	0
ECM #4	Middle School	Lighting Media Center	4.8	11,938	0
ECM #5	Middle School	Lighting Controls	0.0	11,775	0
ECM #6	Elementary School	Lighting General	30.7	78,708	0
ECM #7	Elementary School	Lighting Controls	0.0	7,335	0
ECM #8	Middle School	VFD Chilled Water Pumps	1.6	9,437	0
ECM #9	Middle School	Boiler Replacement	0.0	0	5,364
ECM #10	Middle School	Walk-In Controls	0.0	4,192	0
ECM #11	Middle School	CHWP Freeze Protection Sequence	0.0	12,758	0
ECM #12	Middle School	Controls Optimization	15.0	23,729	2,964
ECM #13	Middle School	Premium Efficiency Motors	0.9	2,982	0
ECM #14	Elementary School	Controls Optimization	0.0	82,394	5,581
ECM #15	Elementary School	Premium Efficiency Motors	0.6	1,294	0
ECM #16	Elementary School	AC-3 VFD Fan	0.0	32,534	3,954
TOTAL		**ALL MEASURES SAVINGS**	**103.7**	**394,736**	**17,863**

ECM #1: Vending Miser Controls

Description:

The school district has vending machines located in the Middle and Elementary. Currently these machines operate on a continual basis with lights on and compressors operating required to maintain product temperature. These machines are in general used sporadically throughout the day, which presents the opportunity to add controls that would shut down nonessential parts of the machine as well as increase compressor cycle time.

The VendingMiser® system incorporates innovative energy-saving technology into a small plug-and-play device that in conjunction with a passive infrared sensor regulate the operation of the cold beverage and snack machines based on occupancy and room temperature.

Description of Scope:

Construction Scope

- Order four (4) Vending Miser Model VM170.
- This measure assumes qualified district maintenance staff will install these devices on the vending machines throughout the district.

Additional Maintenance & Implementation Risk:

Installation of the new units will require no additional maintenance over the existing units.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

The energy savings calculations are based on manufacturer provided spreadsheet. The calculation uses industry standard energy consumption values for the machines and user inputted quantity of each machine type, occupied hours per week for the facility, and electric rate.

VENDING MACHINES		
ECM INPUTS	QUANTITY	
SCHOOL	SNACK	BEVERAGE
Middle School	-	3
Elementary School	-	1
TOTAL	**0**	**3**

Cold Drink and Snack Vending Machine Energy Conservation Project

Energy Analysis Prepared For:	Input Variables	
	Energy Costs ($0.000 per kwh)	$0.108
	Facility Occupied Hours per Week	60
Middle & Elementary School	Number of Cold Drink Vending Machines	4
	Number of Uncooled Snack Machines	0
	Power Requirements of Cold Drink Machine (avg watts	400
	Power Requirements of Snack Machine (avg watts)	90
	VendingMiser Sale Price (for cold drink machines)	$230.00
	OfficeMiser Sale Price (for snack machines)	$210.00

Savings Analysis

	Before	After	
Cold Drink Machines	$1,507.75	$702.79	Cost of Operation
	14,026	6,538	kWh
		53%	% Energy Savings
Snack Machines	$0.00	$0.00	Cost of Operation
	0	0	kWh
		0%	% Energy Savings

ENERGY SAVINGS SUMMARY		
DESCRIPTION	SAVINGS (KWH)	COST SAVINGS
Vending Misers - Middle	5,616	$607
Vending Misers - Elementary	1,872	$200
TOTAL	7,488	$807

Power Requirements of Cold Drink Machine (with lights) = 400 average watts
Facility Occupied Hours
Schools = 12 hrs per day x 5 days per week = 60 hours per week
Average Electric Rate = $0.108 per kWh

Project Cost Estimate:

PROJECT COST ESTIMATE	
DESCRIPTION	VALUE ($)
Est. Cost - Middle	$700
Est. Cost - Elementary	$300
Less NJOCE Incentives	$0
Net Construction Cost	$1,000

ECM #2 & 6: Middle and Elementary School – Lighting Upgrade

Description:

Lighting throughout both educational facilities in the Tabernacle School District is comprised of a variety of fixture types. Facilities are made up of a mixture of older linear fixtures with 32 Watt T-8 lamps, incandescent/CFL down lights and some HID lamp sources in interior and exterior locations.

This ECM includes the following:

- Re-Ballasting, and/or Re-lamping of the existing fixtures containing 32w T8 lamps and electronic ballasts with reduced wattage 28w T8 lamps and high efficiency electronic ballasts. The new energy efficient, T8 fixtures will provide adequate lighting and will save the owner on electrical costs due to the better performance of the lamp and ballasts.
- Replacement of all incandescent lamps to compact fluorescent lamps. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours.
- Replacement of exterior fixtures located at both schools. In general exterior HID wall Packs will be replaced with low wattage LED equivalent wall packs.

The existing and proposed lighting retrofits are shown per space in the **Investment Grade Lighting Audit Appendix** of this analysis.

Description of Scope:

Preliminary Scope

- Engineering specifications / documentation of proposed lighting system modifications
- Thorough site survey by Electrical Contractor to review existing conditions
- Bid proposals requested from contractors
- Fixture, Lamp and Ballast submittals

Construction Scope

Construction scope includes:

- Remove existing fixtures where replacement fixtures are proposed.
- Install new fixture and electrical connections as required
- Install new fixture retrofit kit where applicable
- Remove and dispose of existing lamps and install new lamps where re-lamping fixtures are proposed.

- Recycling of all disposed lamps and ballasts.
- Test operation of all new light fixtures.

Energy Savings Calculations / Results:

The energy savings have been tabulated based on occupancy profiles recorded through data loggers. The information includes total burn hours for each space measured as well as total occupied burn hours for each space measured. The total measured burn hours were used to calculate the existing lighting energy. The total measured occupied burn hours were used to calculate the proposed lighting energy. The proposed lighting energy was calculated based on the installation of all proposed fixture retrofits, as well as installation of occupancy sensors for all proposed areas. All areas proposed for a retrofit or sensor installation are shown in the **Investment Grade Lighting Audit Appendix**.

Energy savings calculations are based on the difference between the existing and proposed facility energy use. The following summary is broken down by building:

LIGHTING GENERAL UPGRADE CALCULATIONS				
ECM INPUTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Building	**Parameter**	Existing Lighting System	Lighting Upgrade	
Olson Middle School	Electric Demand (kW)	100.4	53.7	46.7
	Electric Consumption (kWh)	216,346	115,870	100,476
	Electric Cost ($)	$31,487	$16,856	$14,631
Tabernacle Elementary School	Electric Demand (kW)	81.1	50.4	30.7
	Electric Consumption (kWh)	191,045	112,337	78,708
	Electric Cost ($)	$27,002	$16,095	$10,907
ENERGY SAVINGS CALCULATIONS				
ECM RESULTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Total Demand (kW)		181.5	104.1	77.5
Total Energy (kWh)		407,391	228,207	179,184
Energy Cost ($)		$58,489	$32,951	$25,538
COMMENTS:	Hours of operation are based on logged hours.			

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$215,000
Anticipated NJ OCE Incentive	$26,895
Net Project Cost	$188,105

ECM #3: Middle School – Gymnasium/Cafeteria Lighting Upgrade

Description:

Lighting throughout the Tabernacle Middle School Gymnasium / Cafeteria is comprised of HID high bay light fixtures switched via existing breakers.

This ECM includes the following:

- Replacement of all existing HID light fixtures. New linear fluorescent 2x4 pendant mounted (6) lamp, 54w T5HO light fixtures with lens, wire guard and 4 point suspension system will be provided as a one for one replacement of existing fixtures.
- Provision of additional conduit and wiring as necessary to mount new fixture and avoid interferences with existing steel structure roof support system.

The existing and proposed lighting retrofits are shown per space in the **Investment Grade Lighting Audit Appendix** of this analysis.

Description of Scope:

Preliminary Scope

- Engineering specifications / documentation of proposed lighting system modifications
- Thorough site survey by Electrical Contractor to review existing conditions
- Bid proposals requested from contractors
- Fixture submittals

Construction Scope

Construction scope includes:

- Remove existing fixtures where replacement fixtures are proposed.
- Install new fixture and electrical connections as required
- Install new fixture retrofit kit where applicable
- Remove and dispose of existing lamps and install new lamps where re-lamping fixtures are proposed.
- Recycling of all disposed lamps and ballasts.
- Test operation of all new light fixtures.

Energy Savings Calculations / Results:

The energy savings have been tabulated based on occupancy profiles recorded through data loggers. The information includes total burn hours for each space measured as well as total occupied burn hours for each space measured. The total measured burn hours were used to calculate the existing lighting energy. The total measured occupied burn hours were used to calculate the proposed lighting energy. The proposed lighting energy was calculated based on the

installation of all proposed fixture retrofits, as well as installation of occupancy sensors for all proposed areas. All areas proposed for a retrofit or sensor installation are shown in the **Investment Grade Lighting Audit Appendix**.

Energy savings calculations are based on the difference between the existing and proposed facility energy use. The following summary is broken down by building:

LIGHTING GYMNASIUM & ALL PURPOSE ROOM UPGRADE CALCULATIONS				
ECM INPUTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Building	**Parameter**	Existing Lighting System	Lighting Upgrade	
MS - Gymnasium & APR	Electric Demand (kW)	14.6	11.2	3.3
	Electric Consumption (kWh)	33,670	25,974	7,696
	Electric Cost ($)	$4,814	$3,714	$1,100
ENERGY SAVINGS CALCULATIONS				
ECM RESULTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Total Demand (kW)		14.6	11.2	3.3
Total Energy (kWh)		33,670	25,974	7,696
Energy Cost ($)		$4,814	$3,714	$1,100
COMMENTS:	Hours of operation are based on logged hours.			

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$12,000
Anticipated NJ OCE Incentive	$3,200
Net Project Cost	$8,800

ECM #4: Middle School – Media Center Lighting Upgrade

Description:

Lighting throughout the Tabernacle Middle School Media Center is comprised of a combination of 2x2 recessed parabolic fixtures and 8" dual lamp CFL down lights on dimming switches.

This ECM includes the following:

- Replacement of all existing light fixtures. New 2x4 recessed LED light fixtures will be provided in a new pattern to achieve the state mandated 50 foot candle minimum level.
- Provision of new ceiling tiles to match existing condition where fixtures have been eliminated.
- Modification to existing suspended ceiling system to accommodate the placement of new 2x4 fixtures.

The existing and proposed lighting retrofits are shown per space in the **Investment Grade Lighting Audit Appendix** of this analysis.

Description of Scope:

Preliminary Scope

- Engineering specifications / documentation of proposed lighting system modifications
- Thorough site survey by Electrical Contractor to review existing conditions
- Bid proposals requested from contractors
- Fixture submittals

Construction Scope

Construction scope includes:

- Remove existing fixtures where replacement fixtures are proposed.
- Install new fixture and electrical connections as required
- Install new fixture retrofit kit where applicable
- Remove and dispose of existing lamps and install new lamps where re-lamping fixtures are proposed.
- Recycling of all disposed lamps and ballasts.
- Test operation of all new light fixtures.

Energy Savings Calculations / Results:

The energy savings have been tabulated based on occupancy profiles recorded through data loggers. The information includes total burn hours for each space measured as well as total occupied burn hours for each space measured. The total measured burn hours were used to calculate the existing lighting energy. The total measured occupied burn hours were used to calculate the proposed lighting energy. The proposed lighting energy was calculated based on the installation of all proposed fixture retrofits, as well as installation of occupancy sensors for all proposed areas. All areas proposed for a retrofit or sensor installation are shown in the **Investment Grade Lighting Audit Appendix**.

Energy savings calculations are based on the difference between the existing and proposed facility energy use. The following summary is broken down by building:

LIGHTING MEDIA CENTER UPGRADE CALCULATIONS				
ECM INPUTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Building	**Parameter**	Existing Lighting System	Lighting Upgrade	
MS - Media Center	Electric Demand (kW)	8.4	3.6	4.8
	Electric Consumption (kWh)	21,003	9,065	11,938
	Electric Cost ($)	$2,948	$1,272	$1,675
ENERGY SAVINGS CALCULATIONS				
ECM RESULTS		**EXISTING**	**PROPOSED**	**SAVINGS**
Total Demand (kW)		8.4	3.6	4.8
Total Energy (kWh)		21,003	9,065	11,938
Energy Cost ($)		$2,948	$1,272	$1,675
COMMENTS:	Hours of operation are based on logged hours.			

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$25,000
Anticipated NJ OCE Incentive	$2,870
Net Project Cost	$22,130

ECM #5 & 7: Middle and Elementary School - Lighting Controls

Description:

The lighting controls required within these facilities extend to classrooms, restrooms, offices and work rooms. The lighting is primarily controlled by manual wall switches. This ECM includes the installation of dual technology occupancy/vacancy sensors for all applicable spaces in schools

This ECM includes replacement of existing wall mounted switches with dual technology wall and remote mounted occupancy/vacancy sensors. The existing and proposed lighting retrofits and lighting controls are shown per space in the **Investment Grade Lighting Audit Appendix** of this analysis.

Description of Scope:

Preliminary Scope

- Engineering specifications / documentation of proposed lighting system & controls
- Thorough site survey by Electrical Contractor to review existing conditions
- Bid proposals requested from contractors
- Lighting Controls submittals

Construction Scope

Construction scope includes:

- Remove existing wall switch for wall mount occupancy/vacancy sensor locations.
- Install new dual technology occupancy/vacancy sensor in wall switch electrical box.
- Install ceiling mounted occupancy/vacancy sensors where indicated on the lighting appendix or where wall mounted occupancy sensor coverage is not adequate.
- Install additional occupancy/vacancy sensors for additional coverage as needed per the manufacturer's installation instructions.
- Install remote power packs as needed to accommodate existing switching scheme and quantity.
- Test operation of all new occupancy controls.

Energy Savings Calculations / Results:

The energy savings have been tabulated based on occupancy profiles recorded through data loggers. The information includes total burn hours for each space measured as well as total occupied burn hours for each space measured. The total measured burn hours were used to calculate the existing lighting energy. The total measured occupied burn hours were used to calculate the proposed lighting energy. The proposed lighting energy was calculated based on the installation of all proposed fixture retrofits, as well as installation of occupancy sensors for all

proposed areas. All areas proposed for a retrofit or sensor installation are shown in the **Investment Grade Lighting Audit Appendix**.

Energy savings calculations are based on the difference between the existing and proposed facility energy use. The following summary is broken down by building:

LIGHTING CONTROLS CALCULATIONS				
ECM INPUTS		**PROPOSED**	**PROPOSED**	**SAVINGS**
Building	**Parameter**	Lighting Upgrade	Lighting Controls	
Olson Middle School	Electric Demand (kW)	53.7	53.7	0.0
	Electric Consumption (kWh)	115,870	104,095	11,775
	Electric Cost ($)	$16,856	$15,584	$1,272
Tabernacle Elementary School	Electric Demand (kW)	50.4	50.4	0.0
	Electric Consumption (kWh)	112,337	105,002	7,335
	Electric Cost ($)	$16,095	$15,311	$785
ENERGY SAVINGS CALCULATIONS				
ECM RESULTS		**PROPOSED**	**PROPOSED**	**SAVINGS**
Total Demand (kW)		104.1	104.1	0.0
Total Energy (kWh)		228,207	209,097	19,110
Energy Cost ($)		$32,951	$30,895	$2,057
COMMENTS:	Lighting Controls Savings based on lighting upgrade reduction			

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$53,000
Anticipated NJ OCE Incentive	$3,625
Net Project Cost	$49,375

ECM #8: Olson Chilled Water Pump VSD / Premium Motor

Description:

The Olson Middle School has two constant volume chilled water pumps that circulate to the valance units. The valance units are all fitted with 2-way control valves, and single system by-pass.

This ECM would install a variable frequency drive controller and inverter duty rated motor (if required). The controller will be required to operate based on differential pressure sensor to modulate. The new controls should be integrated into the existing BMS system.

EXISTING EQUIPMENT SUMMARY					
EQUIPMENT IDENTIFICATION	**FUNCTION**	**MOTOR HP**	**RPM**	**VOLTAGE/ PHASE**	**EXISTING EFFICIENCY**
CHWP-1	Chilled Water	10	1,760	208-230/460V 3P	91.7%
CHWP-2	Chilled Water	10	1,760	208-230/460V 3P	91.7%

Description of Scope:

Preliminary Scope

- Engineering design documentation
- Thorough site survey by HVAC / Electrical Engineer to review existing conditions.
- Bid proposals requested from contractors
- Equipment submittals

Construction Scope

- Demo and dispose of existing motor.
- Reuse existing pump and mounting brackets; order motor frame adapter as necessary.
- Install new inverter duty rated motors that meet or exceed the existing motor efficiency.
- Install new Variable Frequency Drive.
- Install mounting brackets as required to install drive in vicinity of motor.
- Provide all electric wiring and disconnects as required to install drives.
- Install all necessary control wiring, pressure sensors, and control sequences to operate variable speed drive.

The equipment list below is the basis of the replacement motors and represents the minimum efficiency requirements for this ECM implementation:

PROPOSED EQUIPMENT SUMMARY					
EQUIPMENT IDENTIFICATION	**FUNCTION**	**MOTOR HP**	**MANUF.**	**MODEL**	**PROPOSED EFFICIENCY**
CHWP-1	Chilled Water	10	-	-	91.7%
CHWP-2	Chilled Water	10	-	-	91.7%

Additional Maintenance & Implementation Risk:

Installation of the new variable speed drive will require no additional maintenance over the existing system.

Energy Savings Calculations:

Energy Savings were calculated utilizing the New Jersey Board of Public Utilities Protocols to Measure Resource Savings dated July 2011. Cost savings for Demand are expected to be realized for only 5 months during the year while the chilled water pumps operate.

$$\text{Energy Savings (kWh)} = 0.746 \times \text{HP} \times \text{HRS} \times (\text{ESF}/\eta_{\text{motor}})$$

$$\text{Demand Savings (kW)} = 0.746 \times \text{HP} \times (\text{DSF}/\eta_{\text{motor}})$$

CHILLED WATER PUMPS VFD	
ECM INPUTS	**ANALYSIS**
Motor Nameplate HP	10.0
Flow (GPM)	130
Head (Ft)	110
Motor Efficiency (%)	91.7%
Operating Hours	2000
KW per HP (KW/HP)	0.746
Energy Savings Factor	0.58
Demand Savings Factor	0.201
Elec Cost ($/kWh)	$0.187
Demand Charge ($ / kW / Month)	$6.740
ENERGY SAVINGS CALCULATIONS	
Electric Demand (kW)	1.6
Electric Energy (kWh)	9,437
Electric Demand Savings ($)	$55
Electric Energy Cost ($)	$1,765

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$32,000
Anticipated NJ OCE Incentive	$0
Net Project Cost	$32,000

ECM #9: Olson MS – Boiler Replacement

Description:

The Olson Middle School has two Weil McLain Model 94 gas fired boilers which are at the end of their useful life expectancy. These boilers are 1981 vintage and rated at 4,330 MBH input, with an expected thermal efficiency rating of 70%. In addition to the Weil McLain boilers there is a single Fulton Pulse condensing boiler rated at 2,000 MBH. The Fulton operates during the summer time from approximately May to September for heating and reheating purposes, with the Weil McLain's operating during the winter months.

This ECM includes replacement of the two Weil McLain Boilers with two 2,000 MBH condensing natural gas fired boilers. The existing Fulton will remain in place and be a backup boiler.

Description of Scope:

Preliminary Scope

- Thorough site survey by HVAC / Electrical Engineer to review existing conditions.
- Engineering design documentation
- Bid proposals from Asbestos Abatement Contractors.
- Bid proposals requested from contractors
- Equipment submittals

Construction Scope

- Demolish, remove and dispose of existing two Weil McLain Boilers.
- Reuse existing boiler pads.
- Install two new 2,000 MBH Condensing Boilers with controls.
- Pipe boilers into existing heating system.
- Remove existing boiler flue stack and install new flue and combustion air vent per manufacturer's specifications. If up through roof perform all required stack sealing to prevent roof leakage.
- Provide equipment start-up, testing, adjusting and balancing.

The equipment list below is the basis of design and represents the efficiency and capacity minimum requirements for this ECM implementation:

ECM IMPLEMENTATION SUMMARY		
ECM INPUTS	**EXISTING**	**PROPOSED**
Quantity	2	2
Boiler Manufacturer	Weil McLain	Hydrotherm
Model	94 - 1394	KN-20
Boiler Fuel	Natural Gas	Natural Gas
Input Rating (MBH)	4330.0	2000
Output Rating (MBH)	3031.0	1756
Efficiency	70%	88%
Total Input Capacity (MBH)	8660	4000
Total Output Capacity (MBH)	6062	3512

Energy Savings Calculations / Results:

Energy Savings were calculated utilizing the New Jersey Board of Public Utilities Protocols to Measure Resource Savings dated July 2011. In order to evaluate the gas usage associated with the heating boilers only a regression analysis was performed with Heating Degree Days during the same period. Based on the analysis the resultant breakdown of natural gas usage was determined for the facility.

NATURAL GAS USAGE BREAKDOWN	
Description	**therm**
Utility Bill Usage	41,729.9
Weather Adjusted Usage	39,084.6
Domestic/Cooking Usage	8,968.2
Heating Usage	30,116.4
Fulton Boiler Usage	3,890.7
Weil McLain Usage	26,225.7

$$\text{Fuel Savings} = \text{Natural Gas Usage} \times \left(1 - \frac{\text{Existing Efficiency}}{\text{Proposed Efficiency}}\right)$$

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	26,226		
Boiler Efficiency (%)	70%	88%	18%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	1,836	1,836	
Gas Cost ($/Therm)	$0.92	$0.92	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	26,226	20,861	5,364
Energy Cost ($)	$24,128	$19,192	$4,935
COMMENTS:	Boiler Efficiency Based on age of boiler		

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$240,000
Anticipated NJ OCE Incentive	$4,000
Net Project Cost	$236,000

ECM #10: Walk-In Controls

The Middle School has three walk-in coolers/freezers that store food for the kitchen which services both the Middle and Elementary School. Each box has an evaporator with one or two fans to circulate cold air. These fans operate continuously whether the compressor is on or off resulting in unnecessary heat buildup in the box due to the fan motors.

This measure would install an evaporator fan controller that features two-speed operation of the evaporator fans – high speed during cooling, and low speed or off when not cooling manufactured by Frigitek or equivalent.

Description of Scope:

Preliminary Scope

- Contact Manufacturer representatives for Frigitek or equivalent.
- Perform field survey to verify conditions with manufacturer's representative.

Construction Scope

- Utilize in-house electrician or hire electric contractor to install walk-in controller unit.

Additional Maintenance & Implementation Risk:

Installation of the new units will require no additional maintenance over the existing units.

There is no risk involved with implementation of this measure.

Energy Savings Calculations / Results:

Energy savings calculations are based on New Jersey Board of Public Utilities Protocols to Measure Resource Savings. The energy savings are calculated using existing equipment characteristics.

$$\text{kWh Savings Evap Fans} = \frac{\left(\text{Amps} \times \text{Volts} \times \text{Phase}^{\frac{1}{2}}\right)}{1000} \times 0.55 \times 8760 \times 35.52\%$$

$$\text{kWh Savings Evap Reduced Heat} = \text{kWh Savings Evap Fans} \times 0.28 \times 1.6$$

kWh Savings Controls

$$= \frac{\text{Amps}_{CP} \times \text{Volts}_{CP} \times \text{Phase}_{CP}^{\frac{1}{2}}}{1000} \times 0.85$$
$$\times (35\% \times 2{,}195 \text{ Hrs} + 55\% \times 6{,}565 \text{ Hrs})$$
$$+ \frac{\text{Amps}_{EF} \times \text{Volts}_{EF} \times \text{Phase}_{EF}^{\frac{1}{2}}}{1000} \times 0.55 \times 8760 \times 35.52\% \times 5\%$$

CALCULATION CONSTANTS	
Evaporator Fan Motor Power Factor	0.55
ConversIon kW to ton (Refrigeration)	0.28
Efficiency of Typical System (kW/ton)	1.6
Compressor Power Factor	0.85
Compressor Winter Runtime	2195
Compressor Winter Duty Cycle	35%
Compressor Non-Winter Runtime	6565
Compressor Non-Winter Duty Cycle	55%
Reduced Runtime due to Controls	5%
Percent Time Evaporator is Turned Off	35.52%

ENERGY SAVINGS SUMMARY		
DESCRIPTION	**ELECTRIC SAVINGS KWH**	**COST SAVINGS**
Walk-In #1 (Bally)	942	$102
Walk-In #2 (Bohn)	1,787	$193
Walk-In #3 (Bohn)	1,463	$158
Total	4,192	$453

WALK-IN COOLER/FREEZER EVAPORATOR FAN CONTROL			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	No Controller	Frigitek Controller	
Qty of Evaporator Fans	1	1	
Nameplate Amps of Evap Fan	0.9	0.9	
Nameplate Volts of Evap Fan	208	208	
Phase of Evap Fan	1	1	
Nameplate Amps of Compressor	6.8	6.8	
Nameplate Volts of Compressor	230	230	
Phase of Compressor	3	3	
Elec Cost ($/kWh)	$0.108	$0.108	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Evaporator Fan Usage (KWH)	852	549	303
Evap Fan Heat Usage (KWH)	382	246	136
Compressor Usage (KWH)	10,083	9,579	504
Total Electric Usage (KWH)	11,316	10,374	942
Electric Cost ($)	$1,222	$1,120	$102
COMMENTS:	Walk-In Cooler #1 (Bally)		

WALK-IN COOLER/FREEZER EVAPORATOR FAN CONTROL			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	No Controller	Frigitek Controller	
Qty of Evaporator Fans	2	2	
Nameplate Amps of Evap Fan	0.9	0.9	
Nameplate Volts of Evap Fan	208	208	
Phase of Evap Fan	3	3	
Nameplate Amps of Compressor	6.8	6.8	
Nameplate Volts of Compressor	230	230	
Phase of Compressor	3	3	
Elec Cost ($/kWh)	$0.108	$0.108	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Evaporator Fan Usage (KWH)	2,951	1,903	1,048
Evap Fan Heat Usage (KWH)	661	426	235
Compressor Usage (KWH)	10,083	9,579	504
Total Electric Usage (KWH)	13,695	11,908	1,787
Electric Cost ($)	$1,479	$1,286	$193
COMMENTS:	Walk-In #2 (Bohn)		

WALK-IN COOLER/FREEZER EVAPORATOR FAN CONTROL			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	No Controller	Frigitek Controller	
Qty of Evaporator Fans	2	2	
Nameplate Amps of Evap Fan	1.1	1.1	
Nameplate Volts of Evap Fan	208	208	
Phase of Evap Fan	1	1	
Nameplate Amps of Compressor	6.8	6.8	
Nameplate Volts of Compressor	230	230	
Phase of Compressor	3	3	
Elec Cost ($/kWh)	$0.108	$0.108	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Evaporator Fan Usage (KWH)	2,205	1,422	783
Evap Fan Heat Usage (KWH)	494	318	175
Compressor Usage (KWH)	10,083	9,579	504
Total Electric Usage (KWH)	12,782	11,319	1,463
Electric Cost ($)	$1,380	$1,222	$158
COMMENTS:	Walk-In #3 (Bohn)		

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$3,000
Anticipated NJ OCE Incentive	$225
Net Project Cost	$2,775

ECM #11: CHWP Freeze Protection Sequence

Description:

The Middle School Trane Air-Cooled Chiller and pump set have a 30% glycol mixture working fluid. The existing Johnson Metasys system calls for the chilled water pumps to activate for freeze protection when the outside air temperature is below 44 degrees Fahrenheit. The freezing point for the glycol mixture is 10 degrees Fahrenheit, resulting in the chilled water pump operating when not required.

This measure will modify the existing programming in Metasys that will call for the chilled water pumps to turn on in Freeze Protection mode at 35 degrees Fahrenheit.

Description of Scope:

Construction Scope

- Contact current Controls Contractor that maintains system.
- Discuss control sequence changes with Controls Contractor.
- Controls Contractor makes appropriate programming changes to the system.

Additional Maintenance & Implementation Risk:

Modification of controls will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using average daily temperature data for 2012 to determine the number of hours the pumps operated at below 44 degrees Fahrenheit and below 35 degrees Fahrenheit. There are no demand savings for this measure.

$$\text{Electric kWh} = 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Load Factor} \times \text{HP} \times \text{Op. Hours} \times \frac{1}{\text{Efficiency}}$$

FREEZE PROTECTION SEQUENCE IMPROVEMENT			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Motor Nameplate HP	10.0	10.0	
Flow (GPM)	130	130	
Head (Ft)	110	110	
Motor Efficiency (%)	91.7%	91.7%	
Freeze Protection OAT Setpoint	44	35	
Hours Below OAT Setpoint	2328	696	1632
KW per HP (KW/HP)	0.746	0.746	
Load Factor	75%	75%	
Elec Cost ($/kWh)	$0.108	$0.108	
Demand Charge ($ / kW / Month)	$6.740	$6.740	
ENERGY SAVINGS CALCULATIONS			
Electric Demand (kW)	0.0	0.0	0.0
Electric Energy (kWh)	14,204	4,247	9,958
Electric Demand Savings ($)	$0	$0	$0
Electric Energy Cost ($)	$1,534	$459	$1,075

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$1,000
Anticipated NJ OCE Incentive	$0
Net Project Cost	$1,000

ECM #12: Controls Optimization Middle School

Description:

The Middle School has a Johnson Metasys system which controls the heating and air conditioning systems. The system currently utilizes many of the scheduling and optimization capabilities to control the building and reduce energy. Upon review of the system it was believed further optimization of schedules could be performed to further reduce the energy usage of the building associated with heating, cooling, and ventilation.

This ECM would further optimize existing schedules and add schedules to further reduce energy and increase building performance.

Description of Scope:

Construction Scope

- Contact current Controls Contractor that maintains system.
- Discuss control sequence changes with Controls Contractor.
- Controls Contractor makes appropriate programming changes to the system.

Additional Maintenance & Implementation Risk:

Installation of controls will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using a calibrated energy simulation model. This model was created in Trane Trace 700 version 6.2.8.3.

Schedule changes were based on optimization of existing schedules to increase shutdown and setback periods. In addition an optimum stop schedule for the Rooftop units and VAV schedule was created to further reduce fan run time. See **Middle School BMS Schedules Appendix** for details of existing and proposed schedules.

ENERGY SAVINGS SUMMARY	
Electric Demand (kW)	15.0
Electric Usage (kWh)	23,729
Natural Gas Usage (Therm)	2,964
Electric Demand Savings ($)	$112
Electric Energy Savings ($)	$2,563
Natural Gas Savings ($)	$2,727
Total Cost Savings ($)	$5,402

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$2,500
Anticipated NJ OCE Incentive	$0
Net Project Cost	$2,500

ECM #13: Premium Efficiency Motors

Description:

The Middle School has older hot water pumps with standard efficiency motors. These pumps operate throughout the year. The heating and ventilating units HV-A-1 &2 are also fitted with older fan motors with low efficiency ratings.

This measure will remove the existing inefficient motors with new Baldor Premium Efficiency Motors.

EXISTING EQUIPMENT					
TAG	MOTOR HP	RPM	FRAME	V/P/H	EFFICIENCY
HWP-1	7.5	1750	213T	230/460/3/60	85.5%
HWP-2	7.5	1750	213T	230/460/3/60	85.5%
HWP-3	5	1740	184TC	208-230/460/3/60	87.5%
HV-A-1	2	1745	N145T	200-230/460/3/60	78.0%
HV-A-2	2	1745	N145T	200-230/460/3/60	78.0%

Description of Scope:

Construction Scope

- Demo and Dispose of existing motors.
- Install new premium efficiency motors manufactured by Baldor or equivalent.

Additional Maintenance & Implementation Risk:

Installation of motors will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using the New Jersey Board of Public Utilities Protocols to Measure Resource Savings.

$$\text{Electric Savings kWh} = 0.746\frac{\text{kW}}{\text{HP}} \times \text{Load Factor} \times \text{HP} \times \text{Op. Hours} \times \left(\frac{1}{\text{Efficiency}_{\text{Base}}} - \frac{1}{\text{Efficiency}_{\text{New}}}\right)$$

Demand Savings kW

$$= 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Coincidence Factor} \times \text{HP} \times \left(\frac{1}{\text{Efficiency}_{\text{Base}}} - \frac{1}{\text{Efficiency}_{\text{New}}} \right)$$

PROPOSED EQUIPMENT			
TAG	MANUF.	MODEL NO.	EFFICIENCY
HWP-1	Baldor	EM3311T-G	91.0%
HWP-2	Baldor	EM3311T-G	91.0%
HWP-3	Baldor	VEM3665T	89.5%
HV-A-1	Baldor	EFM3157T	86.5%
HV-A-2	Baldor	EFM3157T	86.5%

ENERGY SAVINGS CALCULATION					
TAG	COINCIDENCE FACTOR	LOAD FACTOR	OPER. HOURS	KW SAVINGS	KWH SAVINGS
HWP-1	74%	75%	3,391	0.29	1,006
HWP-2	74%	75%	3,391	0.29	1,006
HWP-3	74%	75%	2,745	0.07	196
HV-A-1	74%	75%	2,745	0.14	387
HV-A-2	74%	75%	2,745	0.14	387
TOTAL				0.93	2,982

COST SAVINGS			
TAG	DEMAND SAVINGS	USAGE SAVINGS	TOTAL SAVINGS
HWP-1	$10	$109	$118
HWP-2	$10	$109	$118
HWP-3	$1	$21	$23
HV-A-1	$9	$42	$51
HV-A-2	$9	$42	$51
TOTAL	$40	$322	$362

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$8,000
Anticipated NJ OCE Incentive	$0
Net Project Cost	$8,000

ECM #14: Controls Optimization Elementary School

Description:

The Elementary School has a Johnson Metasys system which controls the heating and air conditioning systems. The system currently utilizes many of the scheduling and optimization capabilities to control the building and reduce energy. Upon review of the system it was believed further optimization of schedules could be performed to further reduce the energy usage of the building associated with heating, cooling, and ventilation.

This ECM would further optimize existing schedules and add schedules to further reduce energy and increase building performance.

Description of Scope:

Construction Scope

- Contact current Controls Contractor that maintains system.
- Discuss control sequence changes with Controls Contractor.
- Controls Contractor makes appropriate programming changes to the system.

Additional Maintenance & Implementation Risk:

Installation of controls will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using a calibrated energy simulation model. This model was created in Trane Trace 700 version 6.2.8.3.

Schedule changes were based on optimization of existing schedules to increase shutdown and setback periods. See **Elementary School BMS Schedules Appendix** for details of existing and proposed schedules.

ENERGY SAVINGS SUMMARY	
Electric Demand (kW)	0.0
Electric Usage (kWh)	82,394
Natural Gas Usage (Therm)	5,581
Electric Demand Savings ($)	$0
Electric Energy Savings ($)	$8,816
Natural Gas Savings ($)	$5,581
Total Cost Savings ($)	$14,397

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$2,500
Anticipated NJ OCE Incentive	$0
Net Project Cost	$2,500

ECM #15: Premium Efficiency Motors – Elementary School

Description:

The Elementary School has five older hot water pumps with standard efficiency motors located in the boiler room. These pumps operate throughout the year.

This measure will remove the existing inefficient motors with new Baldor Premium Efficiency Motors.

EXISTING EQUIPMENT					
TAG	MOTOR HP	RPM	FRAME	V/P/H	EFFICIENCY
HWP-1	1.5	1750	-	230/460/3/60	84.0%
HWP-2	5	1735	184T	230/460/3/60	82.5%
HWP-3	5	1735	184T	208-230/460/3/60	82.5%
HWP-4	2	1750	-	200-230/460/3/60	84.0%
HWP-5	2	1750	-	200-230/460/3/60	84.0%
*Note: Estimated Efficiencies for HWP-1,4,&5 based on EPAct 1992 Baseline					

Description of Scope:

Construction Scope

- Demo and Dispose of existing motors.
- Install new premium efficiency motors manufactured by Baldor or equivalent.
- Installer to provide motor frame modification kit as required.

Additional Maintenance & Implementation Risk:

Installation of motors will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using the New Jersey Board of Public Utilities Protocols to Measure Resource Savings.

$$\text{Electric Savings kWh} = 0.746\frac{\text{kW}}{\text{HP}} \times \text{Load Factor} \times \text{HP} \times \text{Op. Hours} \times \left(\frac{1}{\text{Efficiency}_{\text{Base}}} - \frac{1}{\text{Efficiency}_{\text{New}}}\right)$$

Demand Savings kW

$$= 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Coincidence Factor} \times \text{HP} \times \left(\frac{1}{\text{Efficiency}_{\text{Base}}} - \frac{1}{\text{Efficiency}_{\text{New}}} \right)$$

PROPOSED EQUIPMENT			
TAG	MANUF.	MODEL NO.	EFFICIENCY
HWP-1	Baldor	EFM3154T	86.5%
HWP-2	Baldor	VEM3665T	89.5%
HWP-3	Baldor	VEM3665T	89.5%
HWP-4	Baldor	EFM3157T	86.5%
HWP-5	Baldor	EFM3157T	86.5%

ENERGY SAVINGS CALCULATION					
TAG	COINCIDENCE FACTOR	LOAD FACTOR	OPER. HOURS	KW SAVINGS	KWH SAVINGS
HWP-1	74%	75%	2,745	0.03	79
HWP-2	74%	75%	2,000	0.26	530
HWP-3	74%	75%	2,000	0.26	530
HWP-4	74%	75%	2,000	0.04	77
HWP-5	74%	75%	2,000	0.04	77
TOTAL				0.63	1,294

COST SAVINGS			
TAG	DEMAND SAVINGS	USAGE SAVINGS	TOTAL SAVINGS
HWP-1	$1	$8	$9
HWP-2	$9	$57	$66
HWP-3	$9	$57	$66
HWP-4	$1	$8	$10
HWP-5	$1	$8	$10
TOTAL	$21	$138	$160

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$7,000
Anticipated NJ OCE Incentive	$0
Net Project Cost	$7,000

ECM #16: AC-3 VFD Fan - Elementary School

Description:

The Elementary School Media Center has a single constant volume air handler with direct expansion cooling and hot water reheat coils located downstream of the unit.

This ECM would install a variable speed drive on the supply and return fans for the unit and modulate them based on the load in the space, creating a single zone variable air volume system.

Description of Scope:

Preliminary Scope

- Thorough site survey by HVAC / Electrical Contractor to review existing conditions.
- Engineering design documentation
- Bid proposals requested from contractors
- Equipment submittals

Construction Scope

- Install Variable Frequency Drive and Inverter Duty Motor on AC-3 supply and return fans.
- Install additional control points and wiring as required to operate the VFD based on the variable air volume control sequence through the existing Metasys System.
- Controls contractor to program additional controls sequences to operate the unit as a single zone variable air volume system.

Additional Maintenance & Implementation Risk:

Installation of controls will require no additional maintenance.

There is no risk involved with implementation of this measure.

Energy Savings Calculations/Results:

Savings were calculated using a calibrated energy simulation model. This model was created in Trane Trace 700 version 6.2.8.3.

ENERGY SAVINGS SUMMARY	
Electric Demand (kW)	0.0
Electric Usage (kWh)	32,534
Natural Gas Usage (Therm)	3,954
Electric Demand Savings ($)	$0
Electric Energy Savings ($)	$3,481
Natural Gas Savings ($)	$3,954
Total Cost Savings ($)	$7,435

Project Cost Estimate:

PROJECT COST ESTIMATE	
Description	**$**
Gross Project Cost	$37,000
Anticipated NJ OCE Incentive	$1,200
Net Project Cost	$35,800

VI. Energy Conservation Measures Not Recommended

The following measures were investigated by Concord, but were removed from the overall project due cost constraints, technical feasibility, and/or owner's recommendation not to proceed.

ECM – Kitchen Equipment Replacement

Facilities Affected: Elementary School, Middle School

Conclusion: The LGEA audit report recommended replacement of the kitchen equipment at both schools. Based on discussion with facility staff all of the cooking is done at the Middle School with warming occurring at the Elementary School. The existing equipment at the Middle School is relatively new and much of it is Energy Star rated. Based on the condition of the current equipment and operating hours we do not recommend replacement at this time.

VII. Design and Compliance, Maintenance Impacts, and Risks

Design and Compliance Issues:

As part of the ESP development Concord Engineering has licensed professional engineers on staff to ensure that all design and compliance issues are encompassed in the Plan and that recommended measures will meet all applicable State of New Jersey Codes.

Maintenance Impacts:

The installation of the recommended measures will provide the District with a reduction in the amount of emergency maintenance required through the installation of new equipment, of which the cost savings were not accounted for due to the difficulty in calculating a specific annual cost benefit. The District will be required to perform preventative maintenance on all equipment to ensure correction operation and to reach expected equipment life. Based on the recommendations it is foreseen that no additional maintenance will be required beyond their current practices.

Risks:

The installation of the recommended measures will provide the District with new equipment to replace existing equipment nearing and at the end of its useful life, therefore reducing the risk for a near term capital replacement project cost. The measures also present a minimal to no risk in affecting current facility comfort conditions, and will likely improve these conditions through better equipment performance.

VIII. PJM Demand Response & Curtailable Service Programs

The regional transmission organization PJM oversees the electricity grid in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. PJM currently offers various demand response programs to end users on the grid an opportunity to generate revenue through curtailing electric load in their facility from the grid. There are various levels of commitment that can be accepted by the end user to participate in the program. Three of the most common programs offered by PJM currently are the Emergency Load Response Program, Economic Load Response Program, and Synchronized Reserves Market. The Emergency Response Program allows end-users to receive financial incentives through agreeing to reduce a set amount of electricity consumption during system emergencies on the grid. The Economic Load Response Program allows end users to receive financial incentives for voluntarily reducing electricity consumption during times of high wholesale prices. The Synchronized Reserves Market allows end users to receive financial incentives for reducing electricity consumption on short notice in case of an unexpected emergency event. Each of these programs has stipulations in order participate such as number of events one must participate, amount of load to be curtailed, and response time.

IX. ESIP Cash Flow Summary

Financing an Energy Savings Improvement Program is based on the principle that the cost of the improvements will be paid through the value of the reduced energy costs. Entities are able to finance these ESIP projects for a period not to exceed fifteen (15) years. The Board of Public Utilities has provided protocols in order to ensure with which to ensure these projects will cash flow within the project term. These protocols provide fixed values for energy cost escalation and discount rate, as well as methods for calculating the Participant Net Benefit, and Cost Benefit ratio. These guidelines are published in Board of Public Utilities Docket No. EO09020128 dated 2/24/2009. The proceeding Table 4 shows the Cash Flow Summary for the District's Energy Savings Projects pursuant to the protocol's guidelines.

For this project, a 3.0% interest rate was utilized with a 2.2% electric and 2.4% natural gas utility escalation rated. The interest rate will be subject to revision once financing is finalized. At that point, the project cash flow analysis can be further refined.

Table 4: ESIP Cash Flow Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM ECONOMIC ANALYSIS

Gross Construction Cost	$609,000	Electric Cost Savings	$43,173	Electric Escalation Rate	2.4%
Engineering Costs	$80,000	Natural Gas Cost Savings	$17,197	Natural Gas Escaltion Rate	2.2%
Gross Project Cost	$689,000	Maintenance Cost Savings	$0	Maintenance Escalation	2.0%
NJOCE Incentives	$37,515	Other Cost Savings	$0	Discount Rate	8.0%
Net Project Cost	$651,485	Total Annual Savings	$60,370		
Financing Term (Years)	15				
Interest / Bond Rate	3.000%				

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Total
Energy Cost Savings																	
Electric Cost Savings	-	$43,173	$44,209	$45,270	$46,357	$47,469	$48,609	$49,775	$50,970	$52,193	$53,446	$54,728	$56,042	$57,387	$58,764	$60,175	
Natural Gas Cost Savings	-	$17,197	$17,575	$17,962	$18,357	$18,761	$19,174	$19,596	$20,027	$20,467	$20,918	$21,378	$21,848	$22,329	$22,820	$23,322	
Total Annual Energy Savings		$60,370	$61,785	$63,232	$64,714	$66,230	$67,782	$69,371	$70,997	$72,660	$74,363	$76,106	$77,890	$79,716	$81,584	$83,497	$1,070,297
Maintenance/Other Cost Savings																	
Maintenance Cost Savings	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Other Cost Savings	-	$0															
Total Annual Maint/Other Savings		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Net Annual Operating Savings		**$60,370**	$61,785	$63,232	$64,714	$66,230	$67,782	$69,371	$70,997	$72,660	$74,363	$76,106	$77,890	$79,716	$81,584	$83,497	$1,070,297
Project Costs																	
Received NJOCE Incentive		$37,515	$0	$0													$37,515
Additional Capital Outlay	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gross Financed Amount	$689,000																
Interest Expense		($20,670)	($19,559)	($18,414)	($17,235)	($16,021)	($14,770)	($13,481)	($12,154)	($10,787)	($9,380)	($7,930)	($6,436)	($4,898)	($3,313)	($1,681)	($176,728)
Principle Payment		($37,045)	($38,157)	($39,301)	($40,480)	($41,695)	($42,946)	($44,234)	($45,561)	($46,928)	($48,336)	($49,786)	($51,279)	($52,818)	($54,402)	($56,034)	($689,000)
Total Payment		($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($865,728)
Net Cashflow	$0	$40,170	$4,069	$5,517	$6,999	$8,515	$10,067	$11,656	$13,281	$14,945	$16,648	$18,391	$20,175	$22,000	$23,869	$25,781	$242,085
Cumulative Cashflow		$40,170	$44,239	$49,757	$56,755	$65,271	$75,338	$86,993	$100,275	$115,220	$131,868	$150,259	$170,434	$192,434	$216,303	$242,085	

Simple Payback, yrs*:	**10.79**
Net Present Value (15 Yr):	**$121,994**
Internal Rate of Return:	-

COMMENTS:

1. Simple payback is calculated based on Year 1 operating savings only.

X. Greenhouse Gas Reductions

An additional goal beyond merely saving energy is the reduction of greenhouse gas emissions. A reduction in these emissions is important as they have impact on the environment around us. The Carbon Emissions Reductions were calculated based on emissions factor data published by the New Jersey Department of Environmental Protection. These factors show equivalent pounds of Carbon Dioxide per unit of fuel usage based on system average air emissions for July 2003 to present. The following Tables show the emission factors and greenhouse gas emissions reductions for the conservation measures.

Table 7: NJDEP Emissions Factors

EMISSIONS FACTORS		
ENERGY TYPE	**CONVERSION FACTOR**	
Electricity	1.52	lbs CO_2 / kWh
Natural Gas	11.7	lbs CO_2 / therm

Figure 1
Pre & Post Measure Emissions

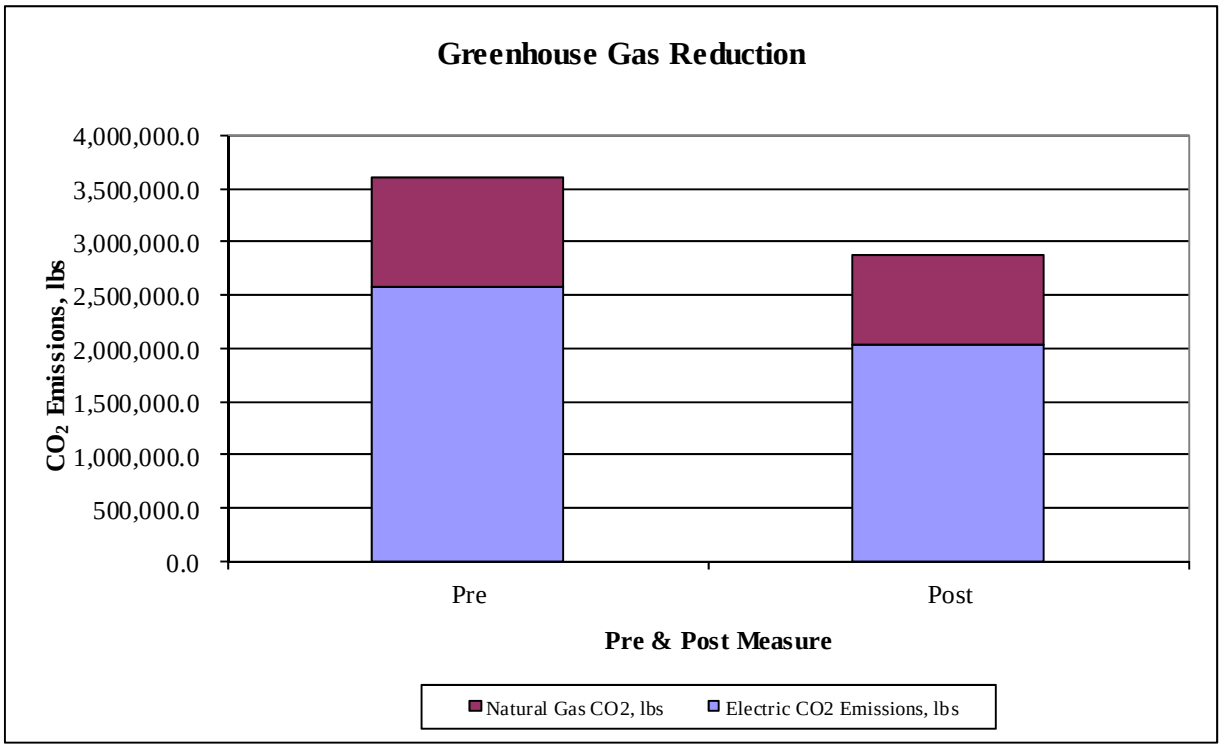

Table 8: Emission Reductions per Measure

CO_2/GREENHOUSE GAS REDUCTION					
ECM NO.	**BUILDING**	**DESCRIPTION**	**Electric CO2, lbs**	**Natural Gas CO2, lbs**	**Total CO2 Emissions, lbs**
ECM #1	MS & ES	Vending Machine Controls	11,381.8	0.0	11,381.8
ECM #2	Middle School	Lighting General	152,723.5	0.0	152,723.5
ECM #3	Middle School	Lighting Gym & All Purpose	11,697.9	0.0	11,697.9
ECM #4	Middle School	Lighting Media Center	18,145.8	0.0	18,145.8
ECM #5	Middle School	Lighting Controls	17,898.0	0.0	17,898.0
ECM #6	Elementary School	Lighting General	119,636.2	0.0	119,636.2
ECM #7	Elementary School	Lighting Controls	11,149.2	0.0	11,149.2
ECM #8	Middle School	VFD Chilled Water Pumps	14,344.2	0.0	14,344.2
ECM #9	Middle School	Boiler Replacement	0.0	62,758.8	62,758.8
ECM #10	Middle School	Walk-In Controls	6,371.8	0.0	6,371.8
ECM #11	Middle School	CHWP Freeze Protection Sequence	19,392.2	0.0	19,392.2
ECM #12	Middle School	Controls Optimization	36,068.1	34,678.8	70,746.9
ECM #13	Middle School	Premium Efficiency Motors	4,532.6	0.0	4,532.6
ECM #14	Elementary School	Controls Optimization	125,238.9	65,297.7	190,536.6
ECM #15	Elementary School	Premium Efficiency Motors	1,966.9	0.0	1,966.9
ECM #16	Elementary School	AC-3 VFD Fan	49,451.7	46,261.8	95,713.5
TOTAL		**ALL MEASURES SAVINGS**	**550,547**	**162,735**	**713,282**

XI. Measurement & Verification

The primary purpose of Measurement and Verification (M&V) is to validate performance of energy efficiency upgrades and payments made towards these upgrades. M&V should not be used to derive a precise energy savings for every project, but to assess whether or not the properly installed projects are reasonable close to the projected savings. Careful consideration should be taken in selecting an M&V plan based on risk and cost benefit to the District for the proposed projects. The U.S. Department of Energy has produced and published Measurement and Verification Guidelines for Federal Energy Projects. These guidelines have been used as a base reference for this report and a full copy of the U.S. DOE guidelines are available at www.eere.energy.gov/femp.

The following Table outlines the four most common approaches for Measurement and Verification.

Table 9: Measurement and Verification Approach

MEASUREMENT AND VERIFICATION APPROACH		
M&V OPTION	**PERFORMANCE & USAGE FACTORS MEASUREMENTS**	**SAVINGS CALCULATION METHODOLOGY**
Option A – Retrofit Isolation with Key Parameter Measurement	This option is based on a combination of measured and estimated factors when variations in factors are not expected. Measurements are spot or short-term and are taken at the component or system level, both in the baseline and post-installation cases. Measurements should include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer's data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.	Direct measurements and estimated values, engineering calculations and/or component or system models often developed through regression analysis Adjustments to models are not typically required.
Option B – Retrofit Isolation with All Parameter Measurement	This option is based on periodic or continuous measurements of energy use taken at the component or system level when variations in factors are expected. Energy or proxies of energy use are measured continuously. Periodic spot or short-term measurements may suffice when variations in factors are not expected. Savings are determined from analysis of baseline and reporting period energy use or proxies of energy use.	Direct measurements, engineering calculations, and/or component or system models often developed through regression analysis Adjustments to models may be required.

Option C – Utility Data Analysis	This option is based on long-term, continuous, whole-building utility meter, facility level, or sub-meter energy (or water) data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate with and adjust energy use to independent variables such as weather, but simple comparisons may also be used.	Based on regression analysis of utility meter data to account for factors that drive energy use Adjustments to models are typically required.
Option D – Calibrated Computer Simulation	Computer simulation software is used to model energy performance of a whole-facility (or sub-facility). Models must be calibrated with actual hourly or monthly billing data from the facility. Implementation of simulation modeling requires engineering expertise. Inputs to the model include facility characteristics; performance specifications of new and existing equipment or systems; engineering estimates, spot-, short-term, or long-term measurements of system components; and long-term whole-building utility meter data. After the model has been calibrated, savings are determined by comparing a simulation of the baseline with either a simulation of the performance period or actual utility data.	Based on computer simulation model (such as eQUEST or Trane Trace 700) calibrated with whole-building or end-use metered data or both. Adjustments to models are required.

Each of the above approaches can be used for a wide array of energy efficiency upgrades, and each has different costs and complexities associated with it. When selecting an M&V approach the following general rules of thumb can be applied.

- **Option A** - Retrofit Isolation with Key Parameter Measurement
    - When magnitude of savings is low for the entire project or a portion of the project.
    - The risk for not achieving savings is low.
- **Option B** - Retrofit Isolation with All Parameter Measurement
    - For simple equipment replacement projects.
    - When energy savings values per individual measure are desired.
    - When interactive effects are to be ignored or are estimated using estimating methods that do not involve long term measurements.
    - When independent variables that affect energy use are not complex and excessively difficult or expensive to monitor.
    - When sub meters already existing that record the energy use of subsystems under consideration.

- **Option C** - Utility Data Analysis

    - For complex equipment replacement and controls projects.
    - When predicted energy savings are in excess of 10 to 20 percent as compared with the record energy use.
    - When energy savings per individual measure are not desired.
    - When interactive effects are to be included.
    - When the independent variables that affect energy use are complex and excessively difficult or expensive to monitor.

- **Option D** - Calibrated Computer Simulation

    - When new construction projects are involved.
    - When energy savings values per measure are desired.
    - When Option C tools cannot cost effectively evaluate particular measures or their interactions with the building.
    - When complex baseline adjustments are anticipated.

Overall, Measurement and Verification is the key to realizing actual savings from the implementation of any energy conservation measure or renewable energy measure. Combined with a detailed construction management plan, the Owner will be able to benefit fully from the energy and cost savings associated with their commitment to saving energy and reducing greenhouse gases. The proceeding section provides recommended M&V option scopes of work that the commission should consider for each measure.

Measurement & Verification Recommended Scopes of Work:

Scope 1: (Option A)

Measurement and Verification of this ECM can be provided upon request. Pre and post watt measurements on a sample size of fixtures that will verify the reduction in energy consumption. Post implementation measurement and verification of occupancy sensor operation can be provided through the use of occupancy sensor data loggers to ensure lighting energy savings is achieved and proper operation of occupancy sensors is verified.

Scope 2: (Option C)

Measurement and verification of this ECM can be provided on a whole building energy conservation approach with respect to the heating and cooling systems in the building. The recommended M&V plan for this ECM is a comparison based on the annual facility energy use through monitoring of the utility bills. The baseline consists of the utilization of the historical energy usage.

Post implementation measurement and verification is recommended through comparison of utility usage data and the historical baseline normalized through outside factors, such as the changes in weather or occupancy. Additional, this can be achieved through the use of inputting

utility data into Energy Star Portfolio Manager for pre and post installation periods to track changes in energy performance.

MEASUREMENT AND VERIFICATION PLAN					
ECM NO.	**DESCRIPTION**	**OPTION A**	**OPTION B**	**OPTION C**	**OPTION D**
ECM #1	Vending Machine Controls	X			
ECM #2	Lighting General	X			
ECM #3	Lighting Gym & All Purpose	X			
ECM #4	Lighting Media Center	X			
ECM #5	Lighting Controls	X			
ECM #6	Lighting General	X			
ECM #7	Lighting Controls	X			
ECM #8	VFD Chilled Water Pumps	X			
ECM #9	Boiler Replacement			X	
ECM #10	Walk-In Controls	X			
ECM #11	CHWP Freeze Protection Sequence	X			
ECM #12	Controls Optimization			X	
ECM #13	Premium Efficiency Motors	X			
ECM #14	Controls Optimization			X	
ECM #15	Premium Efficiency Motors	X			
ECM #16	AC-3 VFD Fan	X			

XII. Energy Savings Plan Assumptions

The assumptions utilized in this energy savings plan include but are not limited to following:

A. Cost Estimates noted within this report are based on industry accepted costing data such as RS Means™ Cost Data, contractor pricing, and engineering estimates. Prevailing wage rates for the specified region has been utilized to calculate installation costs.
B. Energy savings noted within this audit are calculated utilizing New Jersey Board of Public Utilities Protocols to Measure Resource Savings, industry standard procedures, and accepted engineering assumptions.
C. The Energy Savings Plan does not constitute an Energy Savings Guarantee.
D. Information gathering for each facility is strongly based on the energy audit and interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
    a. operating hours
    b. equipment type
    c. control strategies
    d. scheduling
E. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
F. Equipment incentives and energy credits are based on current pricing and levels of the 2013 NJ Clean Energy Program Incentives. Incentive availability is dependent on the individual program funding and applicability. In the event project implementation occurs post 2013, incentive levels may change.
G. Energy Cost savings are calculated based on provided utility billing information from the owner and current posted Utility Company Tariff rates.

APPENDIX A

PROPOSED ENERGY CONSERVATION MEASURES (ECM's)																
			ANNUAL UTILITY REDUCTION			ANNUAL UTILITY COST SAVINGS										
ECM NO.	BUILDING	DESCRIPTION	ELECTRIC DEMAND (KW)	ELECTRIC CONS. (KWH)	NATURAL GAS (THERMS)	ELECTRIC DEMAND SAVINGS	ELECTRIC COST SAVINGS	NATURAL GAS COST SAVINGS	TOTAL COST SAVINGS	PJM REVENUE	MAINT. COST SAVINGS	PROJECT COST	REBATES, INCENTIVES	TOTAL PROJECT COST	SIMPLE PAYBACK (YRS)	INCLUDE (Y/N)
ECM #1	MS & ES	Vending Machine Controls	0.0	7,488	0	$0	$807	$0	$807	$0	$0	$1,000	$0	$1,000	1.2	Y
ECM #2	Middle School	Lighting General	46.7	100,476	0	$3,779	$10,851	$0	$14,631	$0	$0	$131,000	$11,675	$119,325	8.2	Y
ECM #3	Middle School	Lighting Gym & All Purpose	3.3	7,696	0	$269	$831	$0	$1,100	$0	$0	$12,000	$3,200	$8,800	8.0	Y
ECM #4	Middle School	Lighting Media Center	4.8	11,938	0	$386	$1,289	$0	$1,675	$0	$0	$25,000	$2,870	$22,130	13.2	Y
ECM #5	Middle School	Lighting Controls	0.0	11,775	0	$0	$1,272	$0	$1,272	$0	$0	$30,000	$2,080	$27,920	22.0	Y
ECM #6	Elementary School	Lighting General	30.7	78,708	0	$2,485	$8,422	$0	$10,907	$0	$0	$84,000	$10,720	$73,280	6.7	Y
ECM #7	Elementary School	Lighting Controls	0.0	7,335	0	$0	$785	$0	$785	$0	$0	$23,000	$1,545	$21,455	27.3	Y
ECM #8	Middle School	VFD Chilled Water Pumps	1.6	9,437	0	$55	$1,765	$0	$1,820	$0	$0	$32,000	$0	$32,000	17.6	Y
ECM #9	Middle School	Boiler Replacement	0.0	0	5,364	$0	$0	$4,935	$4,935	$0	$0	$210,000	$4,000	$206,000	41.7	Y
ECM #10	Middle School	Walk-In Controls	0.0	4,192	0	$0	$453	$0	$453	$0	$0	$3,000	$225	$2,775	6.1	Y
ECM #11	Middle School	CHWP Freeze Protection Sequence	0.0	12,758	0	$0	$1,378	$0	$1,378	$0	$0	$1,000	$0	$1,000	0.7	Y
ECM #12	Middle School	Controls Optimization	15.0	23,729	2,964	$112	$2,563	$2,727	$5,402	$0	$0	$2,500	$0	$2,500	0.5	Y
ECM #13	Middle School	Premium Efficiency Motors	0.9	2,982	0	$40	$322	$0	$362	$0	$0	$8,000	$0	$8,000	22.1	Y
ECM #14	Elementary School	Controls Optimization	0.0	82,394	5,581	$0	$8,816	$5,581	$14,397	$0	$0	$2,500	$0	$2,500	0.2	Y
ECM #15	Elementary School	Premium Efficiency Motors	0.6	1,294	0	$21	$138	$0	$159	$0	$0	$7,000	$0	$7,000	44.0	Y
ECM #16	Elementary School	AC-3 VFD Fan	0.0	32,534	3,954	$0	$3,481	$3,954	$7,435	$0	$0	$37,000	$1,200	$35,800	4.8	Y
TOTAL			**103.7**	**394,736**	**17,863**	**$7,148**	**$43,173**	**$17,197**	**$67,518**	**$0**	**$0**	**$609,000**	**$37,515**	**$571,485**	**8.5**	

ENERGY SAVINGS IMPROVEMENT PROGRAM ECONOMIC ANALYSIS

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Gross Project Cost	$689,000	Maintenance Cost Savings	$0	Maintenance Escalation	2.0%
NJOCE Incentives	$37,515	Other Cost Savings	$0	Discount Rate	8.0%
Net Project Cost	$651,485	Total Annual Savings	$60,370		
Financing Term (Years)	15				
Interest / Bond Rate	3.000%				

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Total
Energy Cost Savings																	
Electric Cost Savings	-	$43,173	$44,209	$45,270	$46,357	$47,469	$48,609	$49,775	$50,970	$52,193	$53,446	$54,728	$56,042	$57,387	$58,764	$60,175	
Natural Gas Cost Savings	-	$17,197	$17,575	$17,962	$18,357	$18,761	$19,174	$19,596	$20,027	$20,467	$20,918	$21,378	$21,848	$22,329	$22,820	$23,322	
Total Annual Energy Savings		$60,370	$61,785	$63,232	$64,714	$66,230	$67,782	$69,371	$70,997	$72,660	$74,363	$76,106	$77,890	$79,716	$81,584	$83,497	$1,070,297
Maintenance/Other Cost Savings																	
Maintenance Cost Savings	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Other Cost Savings	-	$0															
Total Annual Maint/Other Savings		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Net Annual Operating Savings		**$60,370**	$61,785	$63,232	$64,714	$66,230	$67,782	$69,371	$70,997	$72,660	$74,363	$76,106	$77,890	$79,716	$81,584	$83,497	$1,070,297
Project Costs																	
Received NJOCE Incentive		$37,515	$0	$0													$37,515
Additional Capital Outlay	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gross Financed Amount	$689,000																
Interest Expense		($20,670)	($19,559)	($18,414)	($17,235)	($16,021)	($14,770)	($13,481)	($12,154)	($10,787)	($9,380)	($7,930)	($6,436)	($4,898)	($3,313)	($1,681)	($176,728)
Principle Payment		($37,045)	($38,157)	($39,301)	($40,480)	($41,695)	($42,946)	($44,234)	($45,561)	($46,928)	($48,336)	($49,786)	($51,279)	($52,818)	($54,402)	($56,034)	($689,000)
Total Payment		($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($57,715)	($865,728)
Net Cashflow	$0	$40,170	$4,069	$5,517	$6,999	$8,515	$10,067	$11,656	$13,281	$14,945	$16,648	$18,391	$20,175	$22,000	$23,869	$25,781	$242,085
Cumulative Cashflow		$40,170	$44,239	$49,757	$56,755	$65,271	$75,338	$86,993	$100,275	$115,220	$131,868	$150,259	$170,434	$192,434	$216,303	$242,085	

Simple Payback, yrs*:	**10.79**
Net Present Value (15 Yr):	**$121,994**
Internal Rate of Return:	-

COMMENTS:

1. Simple payback is calculated based on Year 1 operating savings only.

APPENDIX B

CEG Project #: 1C12230
Facility Name: Tabernacle Elementary School
Address: 141 New Road
City, State, Zip Tabernacle, NJ 08088

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1.1	Main Lobby	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	2,253	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	8	0.34	1,075	0.37	1,178	$156	0	No New Controls	0	0.0%	0	$0
1.1	Main Office	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,267	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	605	0.28	662	$93	0	No New Controls	0	0.0%	0	$0
1.1	Conference Room	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	5	0.44	1,056	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	5	0.21	504	0.23	552	$78	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	101	$11
2	Corridor in Main Office	3200	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	3	0.16	518	Existing to Remain	0	3	54	0	0.16	518	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1.1	Kitchen in Main Office	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	134	0.09	147	$23	0	No New Controls	0	0.0%	0	$0
3	Kitchen in Main Office	1600	1 Lamp, 32w T8, (1) Elect. Ballast, Under-Cabinet Flourescent	1	32	2	0.06	102	Re-lamp & Reballast	1 Lamp, 28w T8, (1) 1/32 Elect. Ballast Low-Power High Efficiency	1	22	2	0.04	70	0.02	32	$5	0	No New Controls	0	0.0%	0	$0
4	Storage	1000	2x2, 2 6" U-Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	73	1	0.07	73	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	1	0.05	50	0.02	23	$4	0	No New Controls	0	0.0%	0	$0
5	RR in Main Office	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	21	$2
6	RR in Main Office	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	0	20.0%	21	$2
1.1	Principal's Office	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,267	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	605	0.28	662	$93	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	0.0%	0	$0
1.1	Corridor #1	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	2,534	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	9	0.38	1,210	0.41	1,325	$175	0	No New Controls	0	0.0%	0	$0
1	Class 108	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 108	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
8	RR in Class 108	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
8	Storage in Class 108	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0
1	Class 107	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
7	Class 107	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
8	RR in Class 107	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
8	Storage in Class 107	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0
1	Class 106	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 106	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
8	RR in Class 106	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
8	Storage in Class 106	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0
1	Class 105	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 105	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
8	RR in Class 105	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
8	Storage in Class 105	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0
1	Class 104	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 104	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 104	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	15	$2
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class 103	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 103	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 103	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	15	$2
8	Above Sink	2500	2 Lamp, 60w Incandescent	2	120	1	0.12	300	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	0.09	225	$31	0	No New Controls	0	0.0%	0	$0
9	Women's RR	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	15	$2
1.1	Women's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	220	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.05	115	$16	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	10.0%	11	$1
10	Custodian's Closet	1000	60w Incandescent	1	60	2	0.12	120	Replace	15w Screw-In CFL, Incandescent	1	15	2	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
9	Men's RR	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	15	$2
1.1	Men's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	220	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.05	115	$16	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	0.0%	0	$0
11	All Purpose Room	2500	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	20	2.24	5,600	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	20	1.68	4,200	0.56	1,400	$195	0	No New Controls	0	0.0%	0	$0
10	Stage	1000	60w Incandescent	1	60	3	0.18	180	Replace	15w Screw-In CFL, Incandescent	1	15	3	0.05	45	0.14	135	$25	0	No New Controls	0	0.0%	0	$0
12	Stage	1000	15w Screw-in CFL, Incandescent	1	15	3	0.05	45	Existing to Remain	0	1	15	0	0.05	45	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	Stage	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	116	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	84	0.03	32	$6	0	No New Controls	0	0.0%	0	$0
12	Stage	1000	15w Screw-in CFL, Incandescent	1	15	2	0.03	30	Existing to Remain	0	1	15	0	0.03	30	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
14	Stage	1000	150w Incandescent PAR38	1	150	4	0.60	600	Re-Lamp	42w CFL Spring Lamp Screw-In	1	42	4	0.17	168	0.43	432	$81	0	No New Controls	0	0.0%	0	$0
1.1	Storage	1000	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	176	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	84	0.09	92	$17	0	No New Controls	0	0.0%	0	$0
15	Kitchen	1600	23w CFL Spring Lamp Screw-In, 2 Piece, PAR38 Reflector	1	23	3	0.07	110	Existing to Remain	0	1	23	0	0.07	110	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
16	Kitchen	1600	100w Incandescent PAR38	1	100	3	0.30	480	Re-Lamp	23w CFL Spring Lamp Screw-In, 2 Piece, PAR38 Reflector	1	23	3	0.07	110	0.23	370	$58	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
17	Dishwash	1600	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	93	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	67	0.02	26	$4	0	No New Controls	0	0.0%	0	$0
15	Dishwash	1600	23w CFL Spring Lamp Screw-In, 2 Piece, PAR38 Reflector	1	23	1	0.02	37	Existing to Remain	0	1	23	0	0.02	37	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
15	Main Area	3200	23w CFL Spring Lamp Screw-In, 2 Piece, PAR38 Reflector	1	23	10	0.23	736	Existing to Remain	0	1	23	0	0.23	736	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
18	Main Area	3200	8', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
1.1	Corridor #2	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	24	2.11	6,758	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	24	1.01	3,226	1.10	3,533	$467	0	No New Controls	0	0.0%	0	$0
19	Class 207	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18
17	Class 207	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 207	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
19	Class 208	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18
17	Class 208	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 208	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
19	Class 205	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18
17	Class 205	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 205	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
19	Class 206	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18
17	Class 206	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 206	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
19	Class 230	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
17	Class 230	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 230	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
19	Class 204	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	11	1.23	2,218	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	11	0.92	1,663	0.31	554	$84	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	166	$18
17	Class 204	1800	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	418	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	302	0.06	115	$18	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	10.0%	30	$3
8	Storage in Class 204	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
12	Girl's RR	2500	15w Screw-in CFL, Incandescent	1	15	1	0.02	38	Existing to Remain	0	1	15	0	0.02	38	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
19	Girl's RR	2500	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	1	0.11	280	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	210	0.03	70	$10	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	42	$4
17	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	10.0%	11	$1
10	Custodian's Closet	1000	60w Incandescent	1	60	2	0.12	120	Replace	15w Screw-In CFL, Incandescent	1	15	2	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
12	Boy's RR	2500	15w Screw-in CFL, Incandescent	1	15	1	0.02	38	Existing to Remain	0	1	15	0	0.02	38	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
19	Boy's RR	2500	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Wrap Flourescent	4	112	1	0.11	280	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	210	0.03	70	$10	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	42	$4
17	Boy's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	10.0%	11	$1
18	Storage	1000	8', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	232	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	168	0.06	64	$12	0	No New Controls	0	0.0%	0	$0
1.1	Office 200 in Media Center	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,267	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	605	0.28	662	$93	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	121	$13
1.1	IT Office 202.1	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	634	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	302	0.14	331	$47	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	60	$6
1.1	Office 202.2	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	634	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	302	0.14	331	$47	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	60	$6
1.1	Office / Storage	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	634	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	302	0.14	331	$47	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	30	$3
1.1	Storage	1000	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	176	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	84	0.09	92	$17	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
20	Media Center - Main Area	3150	2 Lamp, 26w CFL, Elect. Ballast, Downlight	2	54	28	1.51	4,763	Existing to Remain	0	2	54	0	1.51	4,763	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
21	Media Center - Main Area	3150	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	44	4.93	15,523	Re-lamp & Reballast	2x4, 4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	44	3.70	11,642	1.23	3,881	$515	0	No New Controls	0	0.0%	0	$0
2	Media Center - Main Area	3150	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	7	0.38	1,191	Existing to Remain	0	3	54	0	0.38	1,191	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
22	Media Center - Main Area	3150	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Strip Flourescent	4	112	4	0.45	1,411	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	4	0.34	1,058	0.11	353	$47	0	No New Controls	0	0.0%	0	$0
2	Media Center - Main Area	3150	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	9	0.49	1,531	Existing to Remain	0	3	54	0	0.49	1,531	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1.1	Corridor #3	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	17	1.50	4,787	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	17	0.71	2,285	0.78	2,502	$331	0	No New Controls	0	0.0%	0	$0
1	Class 315	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 315	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 315	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
1	Class 310	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 310	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 310	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
1	Class 313	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 313	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 313	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
1	Class 308	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 308	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 308	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class 311	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 311	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 311	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
1	Class 306	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	9	0.79	1,426	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	9	0.57	1,021	0.23	405	$62	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	102	$11
7	Class 306	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	3	0.29	518	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	3	0.15	270	0.14	248	$38	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	54	$6
9	RR in Class 306	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	15	$2
13	Boy's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	290	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	210	0.03	80	$11	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	42	$4
12	Boy's RR	2500	15w Screw-in CFL, Incandescent	1	15	1	0.02	38	Existing to Remain	0	1	15	0	0.02	38	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	10.0%	4	$0
12	Custodian's Closet	1000	15w Screw-in CFL, Incandescent	1	15	1	0.02	15	Existing to Remain	0	1	15	0	0.02	15	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
12	Girl's RR	2500	15w Screw-in CFL, Incandescent	1	15	1	0.02	38	Existing to Remain	0	1	15	0	0.02	38	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	8	$1
13	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	290	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	210	0.03	80	$11	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	20.0%	42	$4
1.1	Faculty Room #307	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	7	0.62	1,478	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	7	0.29	706	0.32	773	$109	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	20.0%	141	$15
1.1	Faculty RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	220	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.05	115	$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	11	$1
13	Electrical Services 305	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	3	0.17	174	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	3	0.13	126	0.05	48	$9	0	No New Controls	0	0.0%	0	$0
1	Kindergarden 302	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	15	1.32	2,376	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	15	0.95	1,701	0.38	675	$103	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	10.0%	170	$18
7	Kindergarden 302	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	2	0.19	346	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	2	0.10	180	0.09	166	$25	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	36	$4
9	RR 302	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
9	Storage 302	1000	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	Existing to Remain	0	2	30	0	0.03	30	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
13	Boiler Room 303	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	7	0.41	406	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	7	0.29	294	0.11	112	$21	0	No New Controls	0	0.0%	0	$0
1	Kindergarden 300	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	15	1.32	2,376	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	15	0.95	1,701	0.38	675	$103	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	10.0%	170	$18
7	Kindergarden 300	1800	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	2	0.19	346	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	50	2	0.10	180	0.09	166	$25	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	36	$4
9	RR 303	2500	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	75	Existing to Remain	0	2	30	0	0.03	75	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
8	Storage 300	1000	2 Lamp, 60w Incandescent	2	120	1	0.12	120	Re-lamp	2 Lamp, 15w CFL Screw-In	2	30	1	0.03	30	0.09	90	$17	0	No New Controls	0	0.0%	0	$0
17	Corridor #4	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
1.1	Corridor #4	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	7	0.62	1,971	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	7	0.29	941	0.32	1,030	$136	0	No New Controls	0	0.0%	0	$0
1.1	Office 304	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	845	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	403	0.18	442	$62	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	0.0%	0	$0
1.1	Corridor #5	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	3,098	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	11	0.46	1,478	0.51	1,619	$214	0	No New Controls	0	0.0%	0	$0
1	Class 409	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 408	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 407	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 405	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 406	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 404	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
1	Class 402B	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,267	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	907	0.20	360	$55	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	91	$10
1	Class 402A	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,267	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	907	0.20	360	$55	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	91	$10
1	Class 403A	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,267	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	907	0.20	360	$55	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	91	$10

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class 403B	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,267	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	907	0.20	360	$55	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	91	$10
1	Class 400	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
2	Class 400	1800	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	2	0.11	194	Existing to Remain	0	3	54	0	0.11	194	0.00	0	$0	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	39	$4
6	RR Class 400	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	21	$2
5	RR Class 400	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	11	$1
5	Storage in Class 400	1000	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	58	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
1	Kindergarden 401	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	11	0.97	1,742	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	11	0.69	1,247	0.28	495	$75	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	125	$13
2	Kindergarden 401	1800	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	2	0.11	194	Existing to Remain	0	3	54	0	0.11	194	0.00	0	$0	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	39	$4
6	RR in Kindergarden 401	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	21	$2
5	RR in Kindergarden 401	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	11	$1
5	Storage in Kindergarden 401	1000	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	58	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
3	Kindergarden 401	1800	1 Lamp, 32w T8, (1) Elect. Ballast, Under-Cabinet Flourescent	1	32	1	0.03	58	Re-lamp & Reballast	1 Lamp, 28w T8, (1) 1/32 Elect. Ballast Low-Power High Efficiency	1	22	1	0.02	40	0.01	18	$3	0	No New Controls	0	0.0%	0	$0
1.1	Corridor #6	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	5	0.44	1,408	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	5	0.21	672	0.23	736	$97	0	No New Controls	0	0.0%	0	$0
11	Electrical Room 417	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	1	0.11	112	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	84	0.03	28	$5	0	No New Controls	0	0.0%	0	$0
17	Mechanical Room #413	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	6	0.35	348	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	6	0.25	252	0.10	96	$18	0	No New Controls	0	0.0%	0	$0
1	Class 411	1800	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,267	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	907	0.20	360	$55	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	91	$10
17	Storage in Class 411	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
22	Class 414	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Strip Flourescent	4	112	16	1.79	3,226	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	16	1.34	2,419	0.45	806	$123	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	20.0%	484	$52

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1.1	Copy Room 412	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	845	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	403	0.18	442	$62	0	No New Controls	0	0.0%	0	$0
22	Art Class 410	1800	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Strip Flourescent	4	112	16	1.79	3,226	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	16	1.34	2,419	0.45	806	$123	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	10.0%	242	$26
1.1	Storage in Class 410	1000	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	88	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	42	0.05	46	$9	0	No New Controls	0	0.0%	0	$0
2	Girl's RR	2500	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	1	0.05	135	Existing to Remain	0	3	54	0	0.05	135	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	27	$3
1.1	Girl's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	440	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	210	0.09	230	$32	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	20.0%	42	$4
6	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	2	0.12	290	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	210	0.03	80	$11	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	20.0%	42	$4
1.1	Faculty RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	220	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.05	115	$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	21	$2
6	Faculty RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	0	10.0%	11	$1
13	Custodian's Closet	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
2	Boy's RR	2500	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	1	0.05	135	Existing to Remain	0	3	54	0	0.05	135	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	27	$3
1.1	Boy's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	440	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	210	0.09	230	$32	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	20.0%	42	$4
6	Boy's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	2	0.12	290	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	210	0.03	80	$11	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	0.0%	0	$0
1.1	Corridor #7	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	12	1.06	3,379	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	12	0.50	1,613	0.55	1,766	$234	0	No New Controls	0	0.0%	0	$0
1	Nurse	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,690	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency	3	63	8	0.50	1,210	0.20	480	$68	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	20.0%	242	$26
2	Nurse	2400	2x2, 3 Lamp, 17w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	54	2	0.11	259	Existing to Remain	0	3	54	0	0.11	259	0.00	0	$0	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	0	20.0%	52	$6
5	Exam Room	2400	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	2	0.12	278	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	202	0.03	77	$11	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	40	$4
1.1	RR in Nurse	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	220	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.05	115	$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	21	$2
6	RR in Nurse	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	0	20.0%	21	$2

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1.1	Office	2400	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	634	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	302	0.14	331	$47	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	30	$3
17	PE Storage in Gym	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	6	0.35	348	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	6	0.25	252	0.10	96	$18	0	No New Controls	0	0.0%	0	$0
23	Display in Corridor #2	3200	4', 2 Lamp, 40w T12, (1) Mag. Ballast, Strip Flourescent	2	94	1	0.09	301	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.05	166	$22	0	No New Controls	0	0.0%	0	$0
24	Display in Corridor #3	3200	3', 1 Lamp, 30w T12, (1) Mag. Ballast, Strip Flourescent	1	46	2	0.09	294	Re-lamp & Reballast	1 Lamp, 25w T8, (1) 1/25 Elect. Ballast Low-Power High Efficiency	1	21	2	0.04	134	0.05	160	$21	0	No New Controls	0	0.0%	0	$0
13	Mechanical Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	4	0.23	232	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	168	0.06	64	$12	0	No New Controls	0	0.0%	0	$0
12	Door Lights	4368	15w Screw-in CFL, Incandescent	1	15	4	0.06	262	Existing to Remain	0	1	15	0	0.06	262	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
25	Canopy Lights	4368	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	9	0.26	1,140	Existing to Remain	0	1	29	0	0.26	1,140	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
26	Wall Mount Wall Packs	4368	250w HID Wallpack, High Pressure Sodium	1	295	24	7.08	30,925	Replace	HiLumz 60W LED Wall Pack #HLWP-C42	1	60	24	1.44	6,290	5.64	24,636	$3,092	0	No New Controls	0	0.0%	0	$0
	TOTAL					**896**	**81**	**191,045**					**791**	**50**	**112,337**	**31**	**78,708**	**$10,907**			**78**	**16**	**7,335**	**$785**

CEG Project #: 1C12230
Facility Name: Kenneth R. Olson Middle School
Address: 132 New Road
City, State, Zip Tabernacle, NJ 08088

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1.1	Office in Girl's Locker Room	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	0	No New Controls	0	0.0%	0	$0
2	RR in Office	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	0	No New Controls	0	0.0%	0	$0
3	Storage in Office	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
3	Shower in Office	2500	60w Incandescent	1	60	1	0.06	150	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	38	0.05	113	$16	0	No New Controls	0	0.0%	0	$0
4	Vestibule	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	563	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	269	0.09	294	$39	0	No New Controls	0	0.0%	0	$0
5	RR in Girl's Locker Room	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	0	No New Controls	0	0.0%	0	$0
2	RR in Girl's Locker Room	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	0	No New Controls	0	0.0%	0	$0
6	Main Area	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	6	0.67	2,150	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	6	0.50	1,613	0.17	538	$72	0	No New Controls	0	0.0%	0	$0
2	Main Area	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	2	0.12	371	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	269	0.03	102	$14	0	No New Controls	0	0.0%	0	$0
2	Main Area	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
4	Vestibule	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	845	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.14	442	$59	0	No New Controls	0	0.0%	0	$0
2	Vestibule	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
6	Main Area	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	6	0.67	2,150	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	6	0.50	1,613	0.17	538	$72	0	No New Controls	0	0.0%	0	$0
1.1	Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
2	RR in Office	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	0	No New Controls	0	0.0%	0	$0
3	Shower in Office	2500	60w Incandescent	1	60	1	0.06	150	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	38	0.05	113	$16	0	No New Controls	0	0.0%	0	$0
3	Storage #2	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
2	Main Shower	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	2	0.12	290	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	210	0.03	80	$11	0	No New Controls	0	0.0%	0	$0
7	Storage #1	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
2	Narrow Corridor	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	3	0.17	557	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
7	Storage #4	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
8	Generator Room	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	1	0.11	112	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	84	0.03	28	$5	0	No New Controls	0	0.0%	0	$0
8	Electrical Room	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	1	0.11	112	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	84	0.03	28	$5	0	No New Controls	0	0.0%	0	$0
7	Electrical Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
9	Electrical Room	1000	4', 2 Lamp, 40w T12, (1) Mag. Ballast, Industrial Hood	2	94	1	0.09	94	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.05	52	$10	0	No New Controls	0	0.0%	0	$0
9	Electrical Room	1000	4', 2 Lamp, 40w T12, (1) Mag. Ballast, Industrial Hood	2	94	1	0.09	94	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.05	52	$10	0	No New Controls	0	0.0%	0	$0
7	Storage	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
4	Girl's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	440	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	210	0.09	230	$32	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	74	$8
5	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
4	Boy's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	440	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	210	0.09	230	$32	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	74	$8
5	Boy's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
10	Gymnasium - Hall	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	9	0.52	1,670	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	9	0.38	1,210	0.14	461	$61	0	No New Controls	0	0.0%	0	$0
11	Gymnasium - Hall	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	14	0.41	1,299	Existing to Remain	0	1	29	0	0.41	1,299	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	Gymnasium - Hall	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	5	0.44	1,408	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	5	0.21	672	0.23	736	$98	0	No New Controls	0	0.0%	0	$0
3	Custodian's Closet	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
3	Storage by Above Custodian's Closet	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
4	Main Hall	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	22	1.94	6,195	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	22	0.92	2,957	1.01	3,238	$432	0	No New Controls	0	0.0%	0	$0
10	Hall by Cafeteria	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	7	0.41	1,299	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	7	0.29	941	0.11	358	$48	0	No New Controls	0	0.0%	0	$0
11	Hall by Cafeteria	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	14	0.41	1,299	Existing to Remain	0	1	29	0	0.41	1,299	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	Boy's RR in Caf. Hall	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Boy's RR in Caf. Hall	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
4	Girl's RR in Caf. Hall	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Girl's RR in Caf. Hall	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
3	Custodian's Closet	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
10	Small Group Instructions (C-34)	2100	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	7	0.41	853	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	7	0.29	617	0.11	235	$34	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	132	$14
10	Small Stairs to Stage	1000	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	174	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	126	0.05	48	$9	0	No New Controls	0	0.0%	0	$0
7	Stage	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	8	0.46	464	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	8	0.34	336	0.13	128	$24	0	No New Controls	0	0.0%	0	$0
8	Stage	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	4	0.45	448	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	4	0.34	336	0.11	112	$21	0	No New Controls	0	0.0%	0	$0
3	Stage	1000	60w Incandescent	1	60	30	1.80	1,800	Replace	15w Screw-In CFL, Incandescent	1	15	30	0.45	450	1.35	1,350	$255	0	No New Controls	0	0.0%	0	$0
8	Large Storage by Stage	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	4	0.45	448	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	4	0.34	336	0.11	112	$21	0	No New Controls	0	0.0%	0	$0
6	Main Hall	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	3	0.34	1,075	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	3	0.25	806	0.08	269	$36	0	No New Controls	0	0.0%	0	$0
2	Main Hall	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
10	Main Hall	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	186	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
6	Main Hall	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	6	0.67	2,150	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	6	0.50	1,613	0.17	538	$72	0	No New Controls	0	0.0%	0	$0
2	Main Hall	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	186	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	134	0.02	51	$7	0	No New Controls	0	0.0%	0	$0
6	Main Hall	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	2	0.22	717	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	2	0.17	538	0.06	179	$24	0	No New Controls	0	0.0%	0	$0
6	Main Hall	3200	8', 4 Lamp, 32w T8, (2) Elect. Ballast, Vapor-Tight Wrap	4	112	4	0.45	1,434	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	4	0.34	1,075	0.11	358	$48	0	No New Controls	0	0.0%	0	$0
7	Storage in Kitchen	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
3	Kitchen Hoods	2100	60w Incandescent	1	60	2	0.12	252	Replace	15w Screw-In CFL, Incandescent	1	15	2	0.03	63	0.09	189	$28	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
12	Kitchen Hoods	2100	15w Screw-in CFL, Incandescent	1	15	2	0.03	63	Existing to Remain	0	1	15	0	0.03	63	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1.1	Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	0	No New Controls	0	0.0%	0	$0
3	Freezer #1	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
3	Freezer #2	1000	60w Incandescent	1	60	1	0.06	60	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	15	0.05	45	$8	0	No New Controls	0	0.0%	0	$0
8	Storage by Office	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	1	0.11	112	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	84	0.03	28	$5	0	No New Controls	0	0.0%	0	$0
7	Storage by Office	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
7	Storage	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
7	Tiny Locker Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
3	RR in Locker Room	2500	60w Incandescent	1	60	1	0.06	150	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	38	0.05	113	$16	0	No New Controls	0	0.0%	0	$0
4	Cafeteria / APR - Vestibule	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	563	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	269	0.09	294	$39	0	No New Controls	0	0.0%	0	$0
4	Music / Vocal Class	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	18	1.58	2,534	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	18	0.76	1,210	0.83	1,325	$210	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	226	$24
1.1	Office in C112	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	19	$2
1.1	Practice Room	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	179	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	67	0.07	112	$18	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	18.7%	13	$1
4	Instrumental Music	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	18	1.58	2,534	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	18	0.76	1,210	0.83	1,325	$210	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	226	$24
1.1	Office in Class C113	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	19	$2

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
8	Equipment Room	1000	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	1	0.11	112	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	1	0.08	84	0.03	28	$5	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
7	Equipment Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	4	$0
1.1	Program Supervisor	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	941	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.28	588	$86	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	75	$8
1.1	Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	941	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.28	588	$86	0	No New Controls	0	0.0%	0	$0
1.1	CST Super	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	3	0.34	706	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	265	0.21	441	$65	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	56	$6
13	Class (B-66)	1600	8', 2 Lamp, 75w T12, (1) Mag. Ballast, Industrial Hood	2	173	14	2.42	3,875	Replace	8', 4 Lamp Tandem, 28w T8, 2/32 Elect. Ballast High-Power High Efficiency, Industrial, Tubeguard	4	84	14	1.18	1,882	1.25	1,994	$316	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	352	$38
7	Storage B66	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
13	Class (B-67)	1600	8', 2 Lamp, 75w T12, (1) Mag. Ballast, Industrial Hood	2	173	14	2.42	3,875	Replace	8', 4 Lamp Tandem, 28w T8, 2/32 Elect. Ballast High-Power High Efficiency, Industrial, Tubeguard	4	84	14	1.18	1,882	1.25	1,994	$316	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	352	$38
4	Corridor #1	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	806	0.28	883	$118	0	No New Controls	0	0.0%	0	$0
4	Corridor #1	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	845	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.14	442	$59	0	No New Controls	0	0.0%	0	$0
10	Corridor #1	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #1	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
7	Boiler Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	10	0.58	580	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	10	0.42	420	0.16	160	$30	0	No New Controls	0	0.0%	0	$0
8	Receiving Area	3200	8', 4 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	4	112	8	0.90	2,867	Re-lamp & Reballast	4 Lamp, 28w T8, (1) 4/32 Elect. Ballast Low-Power High Efficiency	4	84	8	0.67	2,150	0.22	717	$96	0	No New Controls	0	0.0%	0	$0
7	Receiving Area	3200	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	371	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	269	0.03	102	$14	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
3	RR in Receiving Area	2500	60w Incandescent	1	60	1	0.06	150	Replace	15w Screw-In CFL, Incandescent	1	15	1	0.02	38	0.05	113	$16	0	No New Controls	0	0.0%	0	$0
2	RR in Receiving Area	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vapor-Tight Wrap	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	0	No New Controls	0	0.0%	0	$0
1.1	Office in Receiving	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	19	$2
4	Boy's RR by Receiving	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	880	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	420	0.18	460	$65	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	147	$16
5	Boy's RR by Receiving	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
1	Class	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	8	0.90	1,434	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	8	0.50	806	0.39	627	$99	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	151	$16
4	Councilor	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,478	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	8	0.34	706	0.37	773	$113	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	150	$16
1	Class	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
4	Reception	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	370	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.09	193	$28	0	No New Controls	0	0.0%	0	$0
4	Conference Room	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	370	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.09	193	$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	38	$4
4	LD Office	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	739	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.18	386	$57	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	75	$8
4	Socio. Office	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	739	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.18	386	$57	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	75	$8
4	Copy Room	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	370	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.09	193	$28	0	No New Controls	0	0.0%	0	$0
4	Psych. Office	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	370	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.09	193	$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	38	$4

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class B48	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class B43	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class B44	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class B45	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class B46	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
4	Girl's RR by B46	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Girl's RR by B46	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
7	Custodian's Closet	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
13	Maintenance Shop	1600	8', 2 Lamp, 75w T12, (1) Mag. Ballast, Industrial Hood	2	173	24	4.15	6,643	Replace	8', 4 Lamp Tandem, 28w T8, 2/32 Elect. Ballast High-Power High Efficiency, Industrial, Tubeguard	4	84	24	2.02	3,226	2.14	3,418	$542	0	No New Controls	0	0.0%	0	$0
9	Maintenance Shop	1600	4', 2 Lamp, 40w T12, (1) Mag. Ballast, Industrial Hood	2	94	1	0.09	150	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	67	0.05	83	$13	0	No New Controls	0	0.0%	0	$0
1.1	Office in Maintenance Shop	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	235	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	88	0.07	147	$22	0	No New Controls	0	0.0%	0	$0
4	Corridor #2	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	7	0.62	1,971	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	7	0.29	941	0.32	1,030	$137	0	No New Controls	0	0.0%	0	$0
4	Corridor #2	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	845	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.14	442	$59	0	No New Controls	0	0.0%	0	$0
10	Corridor #2	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #2	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class (C-18)	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	15	1.68	2,688	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	15	0.95	1,512	0.74	1,176	$186	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	283	$31
1	Class (C-20)	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	15	1.68	2,688	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	15	0.95	1,512	0.74	1,176	$186	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	283	$31
1	Preparation Room P1	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	2	0.22	358	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	2	0.13	202	0.10	157	$25	0	No New Controls	0	0.0%	0	$0
4	Corridor #3	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	806	0.28	883	$118	0	No New Controls	0	0.0%	0	$0
4	Corridor #3	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	563	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	269	0.09	294	$39	0	No New Controls	0	0.0%	0	$0
4	Corridor #4	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	1,126	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	538	0.18	589	$78	0	No New Controls	0	0.0%	0	$0
4	Corridor #4	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
10	Corridor #4	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #4	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1	Class C10	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class C12	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
4	Class C14	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	12	1.06	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	12	0.50	806	0.55	883	$140	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	151	$16
4	Boy's RR by C14	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Boy's RR by C14	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
7	Custodian's Closet	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
4	Corridor #5	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	1,126	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	538	0.18	589	$78	0	No New Controls	0	0.0%	0	$0
4	Corridor #5	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
10	Corridor #5	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #5	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	Girl's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
4	Class C13	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	12	1.06	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	12	0.50	806	0.55	883	$140	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	151	$16
4	Class C11	1600	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	12	1.06	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	12	0.50	806	0.55	883	$140	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	151	$16
1	Class C9	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class C6	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class C7	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
4	Superintendent by C7	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	739	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.18	386	$57	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	21.3%	75	$8
4	Super's Office	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	554	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	265	0.14	290	$42	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	21.3%	56	$6
4	Copy Room	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	370	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.09	193	$28	0	No New Controls	0	0.0%	0	$0
7	Heater Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	1	0.06	58	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1.1	Main Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	8	0.90	1,882	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	8	0.34	706	0.56	1,176	$172	0	No New Controls	0	0.0%	0	$0
14	Principal's Office	2100	2x2, 2 6" U-Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	6	0.35	731	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	51	6	0.31	643	0.04	88	$13	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	137	$15
14	Conference Room	2100	2x2, 2 6" U-Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	9	0.52	1,096	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	51	9	0.46	964	0.06	132	$19	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	205	$22
10	Women's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
10	Men's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
14	Narrow Corridor by RR in Main Office	3200	2x2, 2 6" U-Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	2	0.12	371	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	51	2	0.10	326	0.01	45	$6	0	No New Controls	0	0.0%	0	$0
10	Storage	1000	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	58	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	42	0.02	16	$3	0	No New Controls	0	0.0%	0	$0
1.1	Work Room / Faculty Kitchen	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	941	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.28	588	$86	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.2%	75	$8
4	Main Office Hall	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	806	0.28	883	$118	0	No New Controls	0	0.0%	0	$0
4	Main Office Hall	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	563	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	269	0.09	294	$39	0	No New Controls	0	0.0%	0	$0
15	Main Office Hall	3200	8', 2 Lamp, 32w T8, (1) Elect. Ballast, Wrap Flourescent	2	58	4	0.23	742	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	4	0.17	538	0.06	205	$27	0	No New Controls	0	0.0%	0	$0
10	Main Office Hall	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	10	0.58	1,856	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	10	0.42	1,344	0.16	512	$68	0	No New Controls	0	0.0%	0	$0
11	Main Office Hall	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	15	0.44	1,392	Existing to Remain	0	1	29	0	0.44	1,392	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
16	Main Office Hall	3200	60w Incandescent, PAR 38 Lamp	1	60	3	0.18	576	Re-lamp	20w CFL Screw-in, PAR38 Reflector	1	18	3	0.05	173	0.13	403	$54	0	No New Controls	0	0.0%	0	$0
1	Nurse	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	8	0.90	1,882	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	8	0.50	1,058	0.39	823	$121	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	225	$24

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
10	RR in Nurse	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
10	Long Storage	1000	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	2	0.12	116	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	84	0.03	32	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	10.0%	8	$1
1.1	Business Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	11	1.23	2,587	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	11	0.46	970	0.77	1,617	$237	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	207	$22
1.1	Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	941	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.28	588	$86	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	75	$8
4	Girl's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Girl's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
4	Corridor #6	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	1,126	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	538	0.18	589	$78	0	No New Controls	0	0.0%	0	$0
4	Corridor #6	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
10	Corridor #6	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #6	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1	Class A8	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A13	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A7	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A6	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A11	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18

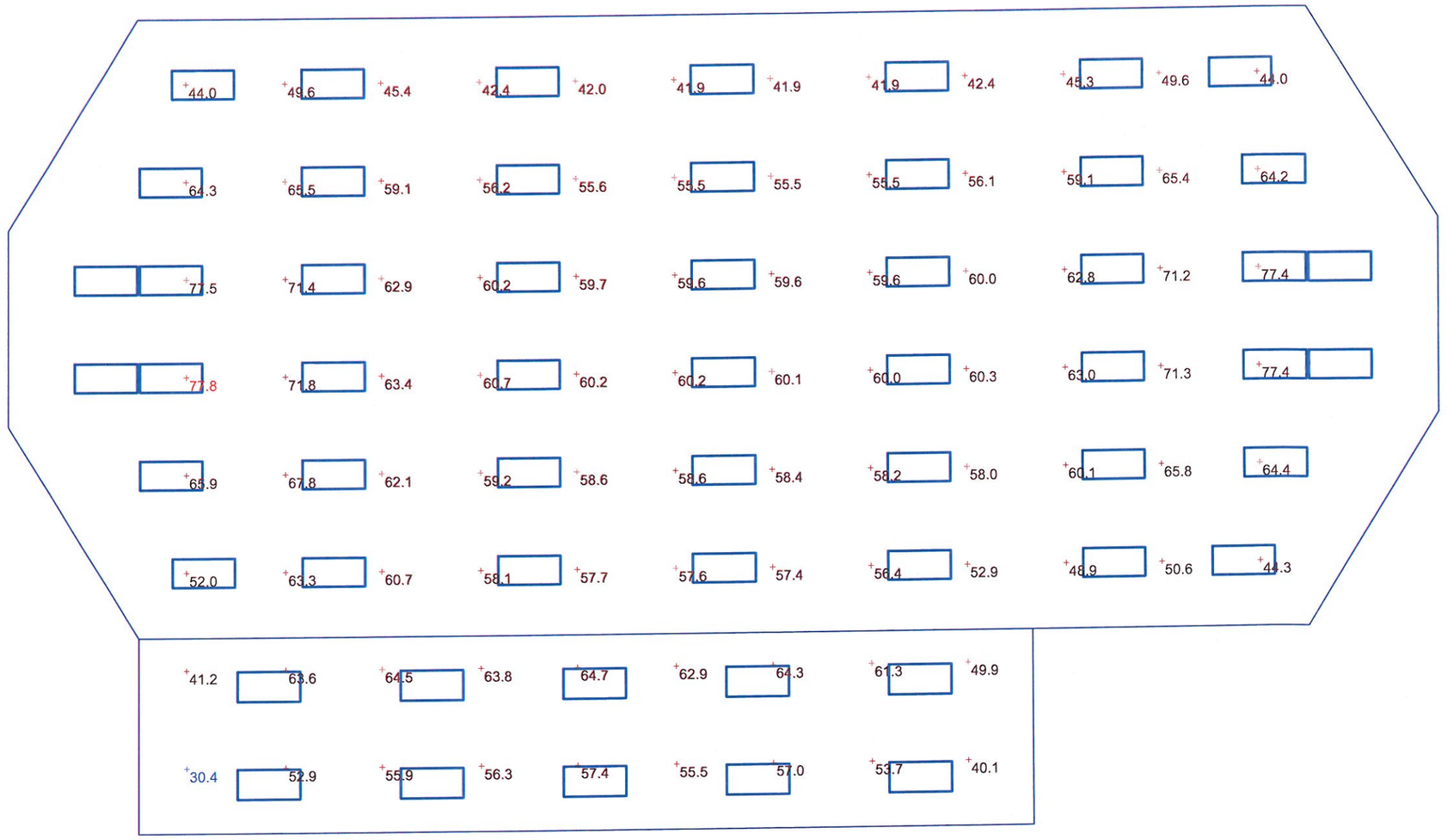
			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class A9	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A12	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A10	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
1	Class A14	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	9	1.01	1,613	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	9	0.57	907	0.44	706	$112	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	18.7%	170	$18
4	Corridor #7	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	1,126	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	538	0.18	589	$78	0	No New Controls	0	0.0%	0	$0
4	Corridor #7	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
10	Corridor #7	3200	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	3	0.17	557	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	403	0.05	154	$20	0	No New Controls	0	0.0%	0	$0
11	Corridor #7	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	8	0.23	742	Existing to Remain	0	1	29	0	0.23	742	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1	Class A20	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	15	1.68	2,688	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	15	0.95	1,512	0.74	1,176	$186	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	283	$31
1.1	Preparation Room P2	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	2	0.22	358	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	134	0.14	224	$36	0	No New Controls	0	0.0%	0	$0
1	Class A18	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	15	1.68	2,688	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	15	0.95	1,512	0.74	1,176	$186	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	283	$31
4	Boy's RR	2500	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	660	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	315	0.14	345	$48	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	35.0%	110	$12
5	Boy's RR	2500	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Vanity Luminaire	2	58	1	0.06	145	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	1	0.04	105	0.02	40	$6	5	Dual Technology Occupancy Sensor - Remote Mnt.	0	35.0%	37	$4
4	Corridor #8	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	6	0.53	1,690	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	6	0.25	806	0.28	883	$118	0	No New Controls	0	0.0%	0	$0
4	Corridor #8	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	563	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	269	0.09	294	$39	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
10	Men's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
10	Women's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
1.1	Tech. Department	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	8	0.90	1,882	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	8	0.34	706	0.56	1,176	$172	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	150	$16
1.1	Conference / Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	2	0.22	470	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.14	294	$43	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	38	$4
7	Storage	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	116	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	84	0.03	32	$6	0	No New Controls	0	0.0%	0	$0
1.1	Curriculum Office - Secretary	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	941	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	353	0.28	588	$86	0	No New Controls	0	0.0%	0	$0
1.1	Copy Room	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	2	0.22	470	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.14	294	$43	0	No New Controls	0	0.0%	0	$0
1.1	Curriculum Supervisor	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	2	0.22	470	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	176	0.14	294	$43	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	38	$4
1.1	Mike Aponte's Office	2100	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	5	0.56	1,176	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	5	0.21	441	0.35	735	$108	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	94	$10
17	Media Spec. Office	2100	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	7	0.67	1,411	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	51	7	0.36	750	0.32	662	$97	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	160	$17
10	Women's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
10	Men's RR	2500	2x4, 2 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	2	58	1	0.06	145	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	105	0.02	40	$6	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	35.0%	37	$4
4	District Construction	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	8	0.70	1,478	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	8	0.34	706	0.37	773	$113	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	1	21.3%	150	$16
4	Storage / Heater	1000	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	2	0.18	176	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	2	0.08	84	0.09	92	$17	0	No New Controls	0	0.0%	0	$0
7	Storage by Heater Room	1000	4', 2 Lamp, 32w T8, (1) Elect. Ballast, Industrial Hood	2	58	2	0.12	116	Re-lamp & Reballast	2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency	2	42	2	0.08	84	0.03	32	$6	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	Class (B-36)	1600	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	20	2.24	3,584	Re-lamp & Reballast	2x4, 3 Lamp, 28w T8, (1) 3/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	3	63	20	1.26	2,016	0.98	1,568	$249	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	18.7%	377	$41
1.1	Storage in Class	1000	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	4	0.45	448	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	168	0.28	280	$53	0	No New Controls	0	0.0%	0	$0
1.1	Faculty Room	2500	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	16	1.79	4,480	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	16	0.67	1,680	1.12	2,800	$393	4	Dual Tech. Occupancy Sensor w/2 Powerpacks - Remote Mnt.	2	46.7%	785	$85
1.1	Small Laundry Room in Faculty Room	1000	2x4, 4 Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt.	4	112	1	0.11	112	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	42	0.07	70	$13	0	No New Controls	0	0.0%	0	$0
17	Sound Studio	2100	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	6	0.58	1,210	Re-lamp & Reballast	2x2, 3 Lamp, 17w T8, (1) 3/17 Elect. Ballast Low-Power High Efficiency	3	51	6	0.31	643	0.27	567	$83	0	No New Controls	0	0.0%	0	$0
4	Computer Service	2100	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	3	0.26	554	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	3	0.13	265	0.14	290	$42	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	21.3%	56	$6
4	Computer Storage	1000	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	4	0.35	352	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	4	0.17	168	0.18	184	$35	0	No New Controls	0	0.0%	0	$0
11	Vestibule #1	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	4	0.12	371	Existing to Remain	0	1	29	0	0.12	371	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	Vestibule #1	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
11	Vestibule #2	3200	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	4	0.12	371	Existing to Remain	0	1	29	0	0.12	371	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	Vestibule #2	3200	2x4, 3 Lamp, 32w T8, (1) Elect. Ballast, Recessed Troffer Mnt.	3	88	1	0.09	282	Re-lamp & Reballast	2x4, 2 Lamp, 28w T8, (1) 2/32 Elect. Ballast Low-Power High Efficiency, Silver Reflector Kit	2	42	1	0.04	134	0.05	147	$20	0	No New Controls	0	0.0%	0	$0
18	Media Center - Book Stacks	2500	8', 6 Lamp, 32w T8, (2) Elect. Ballast, Uplight/Downlight Flourescent	6	166	7	1.16	2,905	Re-lamp & Reballast	6 Lamp, 28w T8, (2) 3/32 Elect. Ballast Low-Power High Efficiency	6	126	7	0.88	2,205	0.28	700	$98	0	No New Controls	0	0.0%	0	$0
17.1	Media Center - Main Entrance Area	2500	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	20	1.92	4,800	Remove Existing Fixtures	New Layout Lithonia Model 2TL4-46L-FW-A19-MVOLT-D50-LP840-NX	1	49	10	0.49	1,225	1.43	3,575	$502	0	No New Controls	0	0.0%	0	$0
17.1	Media Center - Main Area	2500	2x2, 3 1-5/8" U-Lamp, 32w T8, (2) Elect. Ballast, Recessed Troffer Mnt., Parabolic Diffuser	3	96	40	3.84	9,600	Remove Existing Fixtures	New Layout Lithonia Model 2TL4-46L-FW-A19-MVOLT-D50-LP840-NX	1	49	46	2.25	5,635	1.59	3,965	$556	0	No New Controls	0	0.0%	0	$0
11.1	Media Center - Main Area	2500	26w CF, Elect. Ballast, 6 Can, Flourescent Downlight	1	29	51	1.48	3,698	Remove Existing Fixtures	Demo and Dispose of Fixture, Replace Ceiling Tile	1	0	51	0.00	0	1.48	3,698	$519	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
19	External Lighting	4368	70w HID Wallpack, High Pressure Sodium Lamp & Ballast	1	92	42	3.86	16,878	Replace	Lumark 20W LED Wall Pack XTOR2A-PC2	1	20	42	0.84	3,669	3.02	13,209	$1,671	0	No New Controls	0	0.0%	0	$0
20	External Lighting	4368	250w HID Wallpack, Metal Halide Lamp & Ballast	1	295	2	0.59	2,577	Replace	HiLumz 60W LED Wall Pack #HLWP-C42	1	60	2	0.12	524	0.47	2,053	$260	0	No New Controls	0	0.0%	0	$0
21	External Lighting	4368	150w HID Flood, High-Pressure Sodium	1	190	1	0.19	830	Re-lamp & Reballast	100w HID Uniform Pulse Start Mehal Halide	1	125	1	0.13	546	0.07	284	$36	0	No New Controls	0	0.0%	0	$0
22	External Lighting	4368	50w HID Surface Mnt., High Pressure Sodium Lamp & Ballast	1	60	1	0.06	262	Replace	Lumark 20W LED Wall Pack XTOR2A-PC2	1	20	1	0.02	87	0.04	175	$22	0	No New Controls	0	0.0%	0	$0
23	External Lighting	4368	100w HID, Metal Halide Lamp & Ballast	1	120	6	0.72	3,145	Re-lamp & Reballast	70w HID Uniform Pulse Start Mehal Halide	1	95	6	0.57	2,490	0.15	655	$83	0	No New Controls	0	0.0%	0	$0
24	External Lighting	4368	42w CF, Elect. Ballast, 7.5 Can, Flourescent Downlight	1	45	5	0.23	983	Existing to Remain	0	1	45	0	0.23	983	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
24	External Lighting	4368	42w CF, Elect. Ballast, 7.5 Can, Flourescent Downlight	1	45	5	0.23	983	Existing to Remain	0	1	45	0	0.23	983	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
25	Gymnasium	2500	400w HID High Bay, Metal Halide Lamp & Ballast	1	455	17	7.74	19,338	Replace	2x4, 6 Lamp, 54w T5, (3) 2/54 Elect. Ballast, Singlepoint Mnt., High Bay, Wire Guard	6	351	17	5.97	14,918	1.77	4,420	$620	0	No New Controls	0	0.0%	0	$0
25	Cafeteria / APR	2100	400w HID High Bay, Metal Halide Lamp & Ballast	1	455	15	6.83	14,333	Replace	2x4, 6 Lamp, 54w T5, (3) 2/54 Elect. Ballast, Singlepoint Mnt., High Bay, Wire Guard	6	351	15	5.27	11,057	1.56	3,276	$480	0	No New Controls	0	0.0%	0	$0
	TOTAL					**1,252**	**123**	**271,019**					**1,137**	**69**	**150,909**	**55**	**120,110**	**$17,407**			**92**	**22**	**11,775**	**$1,272**

APPENDIX C



Plan View
Scale 1" = 8'

LUMINAIRE SCHEDULE

Symbol	Label	Qty	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
	C	56	2TL4 46L RW A19 D50 LP835 N100	2TLED 2X4 WITH A19 LENS	ONE 49-WATT LED, DOWNLIGHT POS.	2TL4_46L_RW_A19_D50_LP835_N100.ies	Absolute	1.00	49.6

Calculated values include direct and interreflected components.

VISUAL

Tabernacle Middle School Media Center

Designer
L.Hart

Date
Apr 10 2013

Scale
As Noted

Drawing No.
SK-1

APPENDIX D

MIDDLE SCHOOL BMS OPERATING SCHEDULES

EXISTING BMS SCHEDULES				
SCHEDULE Exhaust Fans				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	20:00	13	11
Tuesday	7:00	20:00	13	11
Wednesday	7:00	20:00	13	11
Thursday	7:00	20:00	13	11
Friday	7:00	20:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103

PROPOSED BMS SCHEDULES				
SCHEDULE Exhaust Fans				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	20:00	13	11
Tuesday	7:00	20:00	13	11
Wednesday	7:00	20:00	13	11
Thursday	7:00	20:00	13	11
Friday	7:00	20:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103
			HOURS ON REDUCTION	**0.0%**

EXISTING BMS SCHEDULES				
SCHEDULE Morning Warm Up				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	4:00	6:00	2	22
Tuesday	4:00	6:00	2	22
Wednesday	4:00	6:00	2	22
Thursday	4:00	6:00	2	22
Friday	4:00	6:00	2	22
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			10	158

PROPOSED BMS SCHEDULES				
SCHEDULE Morning Warm Up				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	4:00	6:00	2	22
Tuesday	4:00	6:00	2	22
Wednesday	4:00	6:00	2	22
Thursday	4:00	6:00	2	22
Friday	4:00	6:00	2	22
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			10	158
			HOURS ON REDUCTION	**0.0%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - All Purpose room				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	19:00	19	5
Tuesday	5:00	23:59	18	6
Wednesday	5:00	23:59	18	6
Thursday	5:00	23:59	18	6
Friday	5:00	23:59	18	6
Saturday	5:00	19:00	14	10
Sunday	5:00	23:59	18	6
Total			123	45

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - All Purpose room				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	19:00	13	11
Tuesday	6:00	19:00	13	11
Wednesday	6:00	19:00	13	11
Thursday	6:00	19:00	13	11
Friday	6:00	19:00	13	11
Saturday	9:00	16:00	7	17
Sunday	9:00	15:00	6	18
Total			78	90
			HOURS ON REDUCTION	**36.6%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - Gymnasium				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	5:00	20:00	15	9
Tuesday	5:00	20:00	15	9
Wednesday	5:00	20:00	15	9
Thursday	5:00	20:00	15	9
Friday	5:00	20:00	15	9
Saturday	7:00	17:00	10	14
Sunday	0:00	0:00	0	24
Total			85	83

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - Gymnasium				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	18:00	12	12
Tuesday	6:00	18:00	12	12
Wednesday	6:00	18:00	12	12
Thursday	6:00	18:00	12	12
Friday	6:00	18:00	12	12
Saturday	7:00	17:00	10	14
Sunday	0:00	0:00	0	24
Total			70	98
			HOURS ON REDUCTION	**17.6%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - Classrooms				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	23:59	24	0
Tuesday	0:00	23:59	24	0
Wednesday	0:00	23:59	24	0
Thursday	0:00	23:59	24	0
Friday	0:00	23:59	24	0
Saturday	0:00	23:59	24	0
Sunday	0:00	23:59	24	0
Total			168	0

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - Classrooms				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	16:00	10	14
Tuesday	6:00	16:00	10	14
Wednesday	6:00	16:00	10	14
Thursday	6:00	16:00	10	14
Friday	6:00	16:00	10	14
Saturday	6:00	16:00	10	14
Sunday	6:00	16:00	10	14
Total			70	98
			HOURS ON REDUCTION	**58.3%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - Main Office				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	20:00	20	4
Tuesday	5:00	21:00	16	8
Wednesday	5:00	21:00	16	8
Thursday	5:00	21:00	16	8
Friday	5:00	21:00	16	8
Saturday	5:00	21:00	16	8
Sunday	5:00	23:59	18	6
Total			118	50

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - Main Office				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	19:00	13	11
Tuesday	6:00	19:00	13	11
Wednesday	6:00	19:00	13	11
Thursday	6:00	19:00	13	11
Friday	6:00	19:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103
			HOURS ON REDUCTION	**44.9%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - Media				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	20:00	14	10
Tuesday	6:00	23:59	18	6
Wednesday	0:00	23:59	24	0
Thursday	0:00	23:59	24	0
Friday	0:00	23:59	24	0
Saturday	6:00	17:00	11	13
Sunday	6:00	17:00	11	13
Total			126	42

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - Media				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	22:00	16	8
Tuesday	6:00	22:00	16	8
Wednesday	6:00	22:00	16	8
Thursday	6:00	17:00	11	13
Friday	6:00	17:00	11	13
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			70	98
			HOURS ON REDUCTION	**44.4%**

EXISTING BMS SCHEDULES				
SCHEDULE RTU & VAV Schedule				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	5:00	18:00	13	11
Tuesday	5:00	18:00	13	11
Wednesday	5:00	18:00	13	11
Thursday	5:00	18:00	13	11
Friday	5:00	18:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103

PROPOSED BMS SCHEDULES				
SCHEDULE RTU & VAV Schedule				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	17:00	11	13
Tuesday	6:00	17:00	11	13
Wednesday	6:00	17:00	11	13
Thursday	6:00	17:00	11	13
Friday	6:00	17:00	11	13
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			55	113
			HOURS ON REDUCTION	**15.4%**

PROPOSED BMS SCHEDULES				
SCHEDULE Optimum Stop Schedule				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	15:00	17:00	2	22
Tuesday	15:00	17:00	2	22
Wednesday	15:00	17:00	2	22
Thursday	15:00	17:00	2	22
Friday	15:00	17:00	2	22
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			10	158
			HOURS ON REDUCTION	**-**

APPENDIX E

ELEMENTARY SCHOOL BMS OPERATING SCHEDULES

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc - All Purpose Room				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	21:00	21	3
Tuesday	5:00	23:59	19	5
Wednesday	5:00	23:59	19	5
Thursday	5:00	23:59	19	5
Friday	5:00	23:59	19	5
Saturday	5:00	21:00	16	8
Sunday	5:00	23:59	19	5
Total			132	36

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc - All Purpose Room				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	20:00	14	10
Tuesday	6:00	20:00	14	10
Wednesday	6:00	20:00	14	10
Thursday	6:00	20:00	14	10
Friday	6:00	20:00	14	10
Saturday	7:00	15:00	8	16
Sunday	7:00	15:00	8	16
Total			86	82
			HOURS ON REDUCTION	**34.8%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc Classrooms				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	23:59	24	0
Tuesday	0:00	23:59	24	0
Wednesday	0:00	23:59	24	0
Thursday	0:00	23:59	24	0
Friday	0:00	23:59	24	0
Saturday	0:00	23:59	24	0
Sunday	0:00	23:59	24	0
Total			168	0

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc Classrooms				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	17:00	11	13
Tuesday	6:00	17:00	11	13
Wednesday	6:00	17:00	11	13
Thursday	6:00	17:00	11	13
Friday	6:00	17:00	11	13
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			55	113
			HOURS ON REDUCTION	**67.3%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc Gymnasium				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	5:00	21:00	16	8
Tuesday	5:00	21:00	16	8
Wednesday	5:00	21:00	16	8
Thursday	5:00	21:00	16	8
Friday	5:00	21:00	16	8
Saturday	7:00	17:00	10	14
Sunday	0:00	0:00	0	24
Total			90	78

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc Gymnasium				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	20:00	14	10
Tuesday	6:00	20:00	14	10
Wednesday	6:00	20:00	14	10
Thursday	6:00	20:00	14	10
Friday	6:00	20:00	14	10
Saturday	7:00	15:00	8	16
Sunday	0:00	0:00	0	24
Total			78	90
			HOURS ON REDUCTION	**13.3%**

EXISTING BMS SCHEDULES				
SCHEDULE Locker Rooms Run/Stop				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	16:00	9	15
Tuesday	7:00	16:00	9	15
Wednesday	7:00	16:00	9	15
Thursday	7:00	16:00	9	15
Friday	7:00	16:00	9	15
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			45	123

PROPOSED BMS SCHEDULES				
SCHEDULE Locker Rooms Run/Stop				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	16:00	9	15
Tuesday	7:00	16:00	9	15
Wednesday	7:00	16:00	9	15
Thursday	7:00	16:00	9	15
Friday	7:00	16:00	9	15
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			45	123
			HOURS ON REDUCTION	**0.0%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc Main Office				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	0:00	21:00	21	3
Tuesday	5:00	21:00	16	8
Wednesday	5:00	21:00	16	8
Thursday	5:00	21:00	16	8
Friday	5:00	21:00	16	8
Saturday	5:00	21:00	16	8
Sunday	5:00	23:59	19	5
Total			120	48

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc Main Office				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	19:00	13	11
Tuesday	6:00	19:00	13	11
Wednesday	6:00	19:00	13	11
Thursday	6:00	19:00	13	11
Friday	6:00	19:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103
			HOURS ON REDUCTION	**45.8%**

EXISTING BMS SCHEDULES				
SCHEDULE Occ/Unocc Media Center				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	20:00	14	10
Tuesday	6:00	23:59	17	7
Wednesday	0:00	23:59	24	0
Thursday	0:00	23:59	24	0
Friday	0:00	23:59	24	0
Saturday	6:00	17:00	11	13
Sunday	6:00	17:00	11	13
Total			125	43

PROPOSED BMS SCHEDULES				
SCHEDULE Occ/Unocc Media Center				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	6:00	20:00	14	10
Tuesday	6:00	20:00	14	10
Wednesday	6:00	18:00	12	12
Thursday	6:00	18:00	12	12
Friday	6:00	18:00	12	12
Saturday	7:00	15:00	8	16
Sunday	0:00	0:00	0	24
Total			72	96
			HOURS ON REDUCTION	**42.4%**

EXISTING BMS SCHEDULES				
SCHEDULE Morning Warm Up				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	4:00	6:00	2	22
Tuesday	4:00	6:00	2	22
Wednesday	4:00	6:00	2	22
Thursday	4:00	6:00	2	22
Friday	4:00	6:00	2	22
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			10	158

PROPOSED BMS SCHEDULES				
SCHEDULE Morning Warm Up				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	4:00	6:00	2	22
Tuesday	4:00	6:00	2	22
Wednesday	4:00	6:00	2	22
Thursday	4:00	6:00	2	22
Friday	4:00	6:00	2	22
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			10	158
			HOURS ON REDUCTION	**0.0%**

EXISTING BMS SCHEDULES				
SCHEDULE Exhaust Fan Operation				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	20:00	13	11
Tuesday	7:00	20:00	13	11
Wednesday	7:00	20:00	13	11
Thursday	7:00	20:00	13	11
Friday	7:00	20:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103

PROPOSED BMS SCHEDULES				
SCHEDULE Exhaust Fan Operation				
DAY	**TIME ON**	**TIME OFF**	**HOURS ON**	**HOURS OFF**
Monday	7:00	20:00	13	11
Tuesday	7:00	20:00	13	11
Wednesday	7:00	20:00	13	11
Thursday	7:00	20:00	13	11
Friday	7:00	20:00	13	11
Saturday	0:00	0:00	0	24
Sunday	0:00	0:00	0	24
Total			65	103
			HOURS ON REDUCTION	**0.0%**

APPENDIX F

TABERNACLE SCHOOL DISTRICT

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

July 9, 2013

Revised July 24, 2013

Prepared by:
DLB Associates
(dlb # 11770)

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

Table of Contents

SECTION 1: EXECUTIVE SUMMARY

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

1.1 Executive Summary

1.1.1 Overview

DLB Associates has been commissioned by the Tabernacle School District to provide a third-party review of an Energy Savings Plan (ESP) for conformance with state requirements for two (2) of the district's facilities. State requirements are set forth in P.L. 2009, Chapter 4, "Energy Savings Improvement Program" and Local Finance Notice 2009-11.

DLB's review includes an analysis of the energy savings plan for conformance with the New Jersey Board of Public Utilities (BPU) standards and verification that all required sections are submitted in the ESP report. A review of the calculations methodology and plan savings as specified by the BPU protocol also was performed.

This report includes the summary and conclusions of DLB's third party review of the submitted Energy Savings Plan prepared by Concord Engineering and dated April 10, 2013.

1.1.2 Energy Savings Plan Review

The review of the energy savings calculations included within the ESP concluded that the calculations were performed in accordance with industry standard practice and utilizing the intent of the BPU protocol. DLB has indicated a few items for further review and expect that the comments can be incorporated without affecting the ESP results significantly.

1.1.3 Energy Savings Calculations Review

The ESP appears to be complete and contains the required components. The equations used to determine savings follow the protocol's calculation methods for commercial and industrial energy efficient construction. Trane TRACE, acceptable simulation software, is used to evaluate energy savings for ECMs involving mechanical equipment control.

1.1.4 Conclusion

Both the ESP and the associated calculations appear to be completed with satisfactory effort and in accordance with P.L. 2009, Chapter 4, "Energy Savings Improvement Program" and Local Finance Notice 2009-11. A few calculations and concepts should be verified, as indicated within the body of this report, and should be reviewed and addressed prior to adoption by the Tabernacle School District. Overall, DLB comments should have a low impact on the predicted savings.

DLB comments have been addressed in the attached memorandum composed by Concord Engineering dated July 24, 2013. The ESP did not need to be revised by Concord Engineering. The ESP is ready for review and adoption by the Tabernacle School District.

SECTION 2: ENERGY SAVINGS PLAN REVIEW

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

2.1 Executive Summary

2.1.1 Energy Savings Plan Overview

The final Energy Savings Plan reviewed by DLB Associates was prepared by Concord Engineering and is dated April 10, 2013. The ESP report includes an analysis for the following two facilities:

FACILITY INFORMATION	
Building Name	**Street Address**
Olson Middle School	132 New Road, Tabernacle, NJ 08088
Tabernacle Elementary School	141 New Road, Tabernacle, NJ 08088

SECTION 3: ENERGY SAVINGS PLAN REVIEW

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

3.1 Energy Savings Plan Review

3.1.1 Plan Components – Required By P.L. 2009, C.4

The Energy Savings Plan is the core of the Energy Savings Implementation Program (ESIP) process. Energy conservation measures (ECMs) that are planned are described and the cost calculations that support how the plan will pay for itself in reduced energy costs are provided. Under the law, the ESP must address the following elements:

- Energy audit results
- Energy conservation measure descriptions
- Greenhouse gas reduction calculations based on energy savings
- Design and compliance issue identification and identification of who will provide these services
- Risk assessment for the successful implementation of the plan
- Identification of eligibility, costs and revenues for demand response and curtailable service activities
- Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings
- Maintenance requirements necessary to ensure continued energy savings
- Description and cost estimates for ESCO savings guarantee

3.1.2 Plan Components – Submitted Plan Review

Concord Engineering's submitted ESP, dated April 10, 2013, was the basis for the third party review. The table below lists the required elements of the ESP as required by P.L. 2009, C.4, whether the items were addressed satisfactorily in the ESP, and any associated comments.

ENERGY SAVINGS PLAN COMPONENT REVIEW			
Plan Component	**Included In Plan**	**Location In ESP**	**Comments**
Energy Audit Results	Yes	Section 1, Page 4	Described in report, detailed results on file with school district under separate cover
ECM Descriptions	Yes	Section 5, Pages 8 - 42	None
Greenhouse Gas Calculations	Yes	Section 10, Pages 48 - 49	None
Design and Compliance Issues	Yes	Section 7, Page 44	None

TABERNACLE SCHOOL DISTRICT - THIRD PARTY ENERGY SAVINGS PLAN REVIEW

ENERGY SAVINGS PLAN COMPONENT REVIEW			
Plan Component	**Included In Plan**	**Location In ESP**	**Comments**
Implementation Risk Assessment	Yes	Section 7, Page 44	None
Demand Response Program	Yes	Section 8, Page 45	Generic overview
Curtailable Energy Services	Yes	Section 8, Page 45	Generic overview
Implementation Costs	Yes	Section 9, Pages 46 - 47	None
Projected Energy Savings	Yes	Section 5, Pages 8 - 42	None
Maintenance Requirements	Yes	Section 7, Page 44	See Sections 4.1.3 and 4.1.4
ESCO Savings Guarantee Information	No, Not Required	Not applicable	Not developed by an ESCO

SECTION 4: ENERGY SAVINGS CALCULATIONS REVIEW

4.1 Energy Savings Calculations Review

4.1.1 Methodology Of Submitted Calculations

The Energy Savings Improvement Plan included calculations which utilized the energy modeling software Trane TRACE 700 version 6.2.8.3 for ECMs involving controls optimization. This building simulation software is in compliance with ASHRAE 90.1 2004 Chapter 11 requirements. The models were calibrated to the baseline utility billing data.

Other ECM savings were calculated using BPU-acceptable equations and spreadsheet analyses. These include lighting and controls retrofits, vending machine controls, pump and motor upgrades, boiler replacement, and walk-in cooler / freezer controls. These calculations were spot-checked for accuracy.

4.1.2 General Calculation Quality

The quality of the energy savings calculations was satisfactory, however, input and output reports were not provided for computer simulations in the body of the report and have not been spot-checked by DLB. The approach was summarized in broad terms only. Overall results are well-organized and logical.

4.1.3 Mechanical And Electrical Energy Conservation Measures

Controls optimization ECMs were calculated using Trane TRACE energy modeling software and engineering spreadsheet calculations. The baseline models were calibrated using historical energy bills. Existing and proposed equipment schedule input was provided in Appendix D and is appropriate for the building usage.

The remaining ECMs were evaluated using engineering spreadsheet calculations. The ECMs submitted seem to agree with standard industry practice and BPU protocol requirements.

DLB notes the following potential issues with the ECM analysis:

1. ECM #8 – Olson Chilled Water Pump VSD / Premium Motor: An inverter duty rated motor is included in the construction scope and cost estimate, but not indicated as a requirement for this ECM, although a variable speed drive is being provided. The additional maintenance and implementation risk of not replacing the existing motor with an inverter duty rated model should be pointed out in the report. The existing motor may have to be replaced prematurely if a VSD alone is installed.
2. ECM #9 – Olson Middle School – Boiler Replacement: The efficiency for the existing boiler seems low. The source of the boiler efficiency value used in the calculation should be confirmed.
3. ECM #15 – Premium Efficiency Motors: The operating hours for HWP-2 through HWP-5 should be confirmed. Most motors in the ESP appear to match the Annual Operating Hours Table in the protocols, but the efficiencies of these motors differ from the table.

4.1.4 Lighting Energy Conservation Measures

Lighting improvement savings calculations were performed in a satisfactory manner using a spreadsheet analysis and were reviewed in a spot-check fashion. The measures were calculated using information obtained from

data loggers which recorded unoccupied and occupied burn hours for each space. These data points were used to calculate savings using standard engineering equations and percent savings.

DLB notes the following potential issues with the lighting ECM analysis:

4. ECM #2, 4, & 6 – Middle and Elementary Schools – Lighting Upgrades: Maintenance savings for fixtures replaced with LED units could be a side benefit to discuss in the "Additional Maintenance & Implementation Risk" section. These lamps offer a much longer useful life than HID lamps and could offer small, but notable, maintenance savings.
5. ECM #2 – 6 – Middle and Elementary Schools – Lighting Upgrades: The methodology behind the electric demand and consumption savings calculations is unclear. The quotient of electric consumption divided by electric demand is not equal for the existing and proposed lighting configurations. ECM #3, for example, yields 2,306 hours for the existing lighting system and 2,319 hours for the proposed lighting system. If coincidence or interactive factors are used in the calculation, they should be indicated to confirm consistency in the approach.

4.1.5 Financial Calculations

The financial calculations included within the ESP incorporate a 4.25% interest rate for the loan and include a 2.2% electric and 2.4% natural gas utility escalation. The utility escalations coincide with the BPUs "Guidelines for Calculating Energy Savings." Option 1 incorporates sixteen (16) ECMs and is analyzed over a 15 year financing term. The financial analysis is acceptable.

SECTION 5: REVIEW DISCLAIMER

5.1 Review Disclaimer

DLB Associates, as part of the third party review services, is providing our professional opinion in the evaluation of the energy savings calculations, ESP and any other supporting documentation provided.

This evaluation is not a guarantee that the savings and assumptions stated are valid. DLB Associates will not be responsible for any failure in achieving the predicted energy and cost savings detailed. Our intention is to complete our due diligence in verifying the energy savings calculations in accordance with the BPU protocols, however, it is impractical to review all inputs in detail utilized. As a result, bottom line numbers and a limited number of parameters have been verified to conclude validity of savings.

SECTION 6: ATTACHMENTS

TO:	Scot Gowers, DLB Associates; Carol Mascioli Tabernacle Schools
FROM:	Kevin Blankenbuehler, Concord Engineering
PROJECT:	Tabernacle School District Energy Savings Plan
JOB NO:	1C12230.00
DATE:	July 24, 2013

SUBJECT: Third Party Review by DLB Associates – Energy Engineer's Responses

ENGINEERING MEMORANDUM

DLB Associates provided third party review services of the Energy Savings Plan created by Concord Engineering. Below are Concord Engineering's responses to DLB Associates' comments contained within their draft review document, dated July 9, 2013.

- **Page 10, Comment 1 – ECM#8 Olson Middle Chilled Water Pump VSD / Premium Motor:** The "If required" statement was added in the ECM description in the event the existing motor is found to already be inverter duty rated (Which I believe is). You are correct an inverter duty motor is required for this ECM, and therefore it was noted as such in the Construction Scope.

  Required Action: No revision to energy savings plan required.

- **Page 10, Comment 2 – ECM#9 Olson Middle Boiler Replacement:** Given the age of the boiler it can be assumed at minimum of 0.5% thermal efficiency degradation per year. As the boiler is 20 years old that equates to 10% reduction from the original nameplate rating of 80%. We believe this is a conservative number given the condition of the boilers.

  Required Action: No revision to energy savings plan required.

- **Page 10, Comment 3 – ECM#15 Premium Efficiency Motors:** Existing Motor Efficiencies for HWP-2 - 5 are based on nameplate data observed during the field surveys. Proposed Motor Efficiencies are based on specified Baldor Replacements. The pump operating hours for pumps 2-5 are based on 4,000 hours of heating operation with each pump and its back up splitting operating hours.

  Required Action: No revision to energy savings plan required.

- **Page 11, Comment 4 – ECM#2, 4, &6 – Middle and Elementary Schools Lighting Upgrades:** We agree there are maintenance benefits associated with the LED conversion. Existing maintenance costs for these could not be determined from the District so future savings were considered $0

  Required Action: No revision to energy savings plan required.

- **Page 11, Comment 4 – ECM#2 - 6 – Middle and Elementary Schools Lighting Upgrades:** Demand Savings were calculated based on the difference between Existing Fixture Wattage minus Proposed Fixture Wattage for each space and then summed. The resultant kWh savings are based on the total of each space retrofit strategy wattage reduction multiplied by the space hours of operations. As not every space has a retrofit strategy and different operating hours were used based on the space type data logging the existing and proposed average hours (Total kWh / Total kW) would be expected not to coincide.

  Required Action: No revision to energy savings plan required.

The responses noted above are respectfully submitted by:

Kevin Blankenbuehler
Concord Engineering