TOWNSHIP OF NORTH BRUNSWICK
PUMP STATIONS
ENERGY ASSESSMENT

for

NEW JERSEY
BUREAU OF PUBLIC UTILITIES

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1.0 INTRODUCTION & BACKGROUND

This report summarizes the energy audit for the North Brunswick Township Waste Water Pumping Stations. The pumps are used for transfer of municipal wastewater and are housed in five buildings with a combined area of approximately 6,170 square feet. The pump station buildings are located on Edly Lane, How Lane, Princess Drive, Schmidt Lane, and West Lawrence Drive.

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

This report shall cover the energy audit for the North Brunswick Township Water Pumping Stations.

2.0 EXECUTIVE SUMMARY

This report details the results of the North Brunswick Township Waste Water Pumping Stations. The five small buildings are located in North Brunswick, New Jersey. The following areas were evaluated for energy conservation measures:

- Motor efficiency upgrades
- Temperature setback
- Window AC unit upgrade

Various potential Energy Conservation Measures (ECMs) were identified for the above categories. Measures which are recommended for implementation have a payback of 10 years or less. This threshold is considered a viable return on investment. Potential annual savings of $10,600 for the recommended ECMs may be realized with a payback of 4.5 years.

The ECMs identified in this report will allow for the building to reduce its energy usage and if pursued has the opportunity to qualify for the New Jersey SmartStart Buildings Program. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

ECM-1 Premium Efficiency Motors for Edly Lane Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
36,200	15	34,100	0	5,100	1.11	1,900	7.1	6.7

* Incentive shown is per the New Jersey Smart Start Program, 2009 Premium Motors Application for three 150 HP motors.

ECM-2 Premium Efficiency Motors for Princess Drive Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
8,800	3	2,100	0	600	0.02	N/A	14.7	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM. Motors must operate a minimum of 2,000 hours per year to qualify for an inventive.

ECM-3 Space Temperature Setback for Edly Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,400	0	11,200	0	1,600	16.1	N/A	0.9	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-4 Space Temperature Setback for How Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	4,060	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-5 Space Temperature Setback for Princess Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,500	0	8,790	0	1,300	12.0	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-6 Space Temperature Setback for Schmidt Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	3,830	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-7 Space Temperature Setback for West Lawrence Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	5,400	0	800	16.1	N/A	0.9	N/A

3.0 EXISTING CONDITIONS

3.1 Building General

3.1.1 Structure

The North Brunswick Waste Water Pumping Stations consist of five buildings with a combined area of approximately 6,170 square feet. The buildings are located at Edly Lane, How Lane, Princess Drive, Schmidt Lane and West Lawrence Drive.

The Edly Lane facility is a 3,150 square foot, CMU wall building on a concrete foundation with brick exterior. The building has a first floor and basement section. The roof is flat metal deck with a flat roof membrane. The building houses wastewater pumps, pumps' electric panels and an emergency backup electric generator.

The How Lane facility consists of a 300 square foot, pre-fabricated, metal building. The building is single story and located on a concrete beam foundation. The building has sheet metal wall and roof panels and a single entrance door. The building houses the pumps' electric panels and an emergency back up electric generator. The submersible wastewater pumps are located outside of the building in a concrete tank.

The Princess Lane facility, 1,100 square feet, is a CMU wall building with brick exterior. The building has a first floor and a basement section and was constructed on a concrete foundation. The roof is wood frame with asphalt shingles. The building houses wastewater pumps, the pumps' electric panels and an emergency backup electric generator.

The 200 square foot, single story Schmidt facility is a CMU wall building with brick exterior constructed on a concrete foundation. The roof is comprised of wood frame construction with asphalt shingles. The building houses the pumps' electric panels and an emergency back up electric generator. The submersible wastewater pumps are located outside of the building in a concrete tank.

West Lawrence is a 1,420 square foot single story facility with a basement, and CMU walls and brick exterior. The building's foundation is concrete. The wood frame roof has asphalt shingles. The building houses submersible wastewater pumps, the pumps' electric panels, and an emergency backup electric generator.

3.1.2 Operating Hours

The pumping stations operate continuously year round.

3.2 Utility Usage

The single utility connected to the buildings is electricity, which is purchased from, and delivered by, the Public Service Electric and Gas Company (PSE&G). For 2008, the pumping stations had a combined electricity usage of 810,060 kWh, at a cost of $120,500.

The average combined blended electricity rate for the five pump stations is $0.149 per kWh. Pricing information obtained from the Energy Information Administration (EIA) indicated that the average blended rate for commercial customers in New Jersey over the same period was $0.147 per kWh. Lower

electricity supply pricing may be available by switching to an alternate supplier. A list of electric suppliers licensed by the NJ Board of Public Utilities to sell electricity to customers served by PSE&G is provided in Appendix A.

The pump stations use electricity primarily to operate the wastewater pumps, building heat, and lighting. In 2008, the largest electricity user was Edly Lane which had a usage of 347,600 kWh and an average monthly demand of 82 kW; How Lane used 124,200 kWh with an average monthly demand of 32 kW. Princess Drive's usage was 90,780 kWh and an average monthly demand of 17 kW; Schmidt Lane had usage of 185,600 kWh and an 85 kW average monthly demand. West Lawrence was the lowest with a usage of 62,080 kWh and 17 kW average monthly demand.

Utility data is also provided in Appendix A.

3.3 HVAC Systems

3.3.1 Heating

The buildings are heated by electric unit heaters ranging in size from 3 kW to 20 kW. Each heater has an individual thermostat; winter space temperature setpoint for each station is 70°F.

3.3.2 Cooling

The pump station at Schmidt Lane utilizes one 12,000 Btuh window air conditioning unit.

3.4 Lighting/Electrical Systems

Interior lighting is a combination of T-12 and T-8 florescent light fixtures. The interior lights are manually turned on and off with switches.

The exterior lighting is a combination of metal halide and high pressure sodium wall mounted fixtures. The exterior lighting is controlled by photo cells.

The pump stations utilize the following backup diesel fired generators:

Edly Lane – 370 kW Caterpillar Model SR4
How Lane – 125 kW OnanGenset Model 125.0DYD
Princess Drive - 250 kW Cummins Model NT8555GS3
Schmidt Lane – 300 kW Cummins Model DFCB-5566848
West Lawrence – 80 kW Cummins Model DGA-5745155

3.5 Pumping Systems

The Township of North Brunswick owns and operates the municipal water sewer system. The pump stations are used to collect and pump wastewater from the lower elevations located throughout the township. The pumps at How Lane, Schmidt Lane, and West Lawrence are centrifugal submersible. The pumps at Edly Lane and Princess Drive are in-line centrifugal with separately coupled open dripproof motors. Pump controls are automated with level sensors that cycle the pumps on and off as needed.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Premium Efficiency Motors for Edly Lane Pumps

The existing electric motors on the wastewater pumps are not efficient. This ECM evaluates replacing the existing standard efficiency with premium efficiency motors. Savings were determined by comparing the energy usage of the existing pump motors to the energy usage with premium efficiency motors.

Replacing the motors will provide annual electrical savings of 34,070 kWh. Installation includes installing the new motors and reconnecting the output shaft and electrical wiring.

The pump motors at Edly Lane have run hours of 2,400 per year and will have an expected lifetime of 20 years, according to NEMA and the estimated total energy savings are 681,400 kWh over the life of the project or $102,000.

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

ECM-1 Premium Efficiency Motors for Edly Lane Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
36,200	15	34,100	0	5,100	1.11	1,900	7.1	6.7

* Incentive shown is per the New Jersey Smart Start Program, 2009 Premium Motors Application for three 150 HP motors.

This measure is recommended.

4.2 ECM-2 Premium Efficiency Motors for Princess Drive Pumps

As with Edly Lane, the motors on the wastewater pumps at Princess are not efficient, and the same measure as ECM-1 was evaluated for these pumps.

The pump motors at Princess Drive have run hours of 730 per year and will have an expected lifetime of 25 years, according to NEMA and the estimated total energy savings are 52,500 kWh over the life of the project or $15,000.

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

ECM-2 Premium Efficiency Motors for Princess Drive Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
8,800	3	2,100	0	600	0.02	N/A	14.7	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM. Motors must operate a minimum of 2,000 hours per year to qualify for an inventive.

This measure is not recommended.

4.3 ECM-3 Space Temperature Setback for Edly Lane

The existing heating system is controlled by individual thermostats and the setpoints are maintained at a constant 70°F. The pumps are fully automated and the station is only occupied for approximately three hours per week when town maintenance personnel inspect the equipment. This ECM evaluates temperature setback to reduce energy consumption during unoccupied periods.

A block load building model was developed to approximate the existing energy load for the building. The block loads, provided in Appendix H, model the maximum overall heating load for the space. Parameters including roof, wall, and window construction, total envelope surface area and infiltration loads, building occupancy, internal heat generation, and other sources of heat gain and loss were considered. By entering this calculated maximum load into a spreadsheet containing bin temperature data, the total accumulated year-round heating energy requirements were determined. Bin data for North Brunswick, NJ was not available; therefore, data from nearby Newark, NJ was used.

To determine the proposed energy usage during temperature setback, a second bin spreadsheet was used for the new accumulated heating load, which was identical to the existing usage spreadsheet except the heating unoccupied temperature was lowered to 60°F. The difference in heating energy between the two models is taken as the savings which are annual savings of 11,200 kWh and $1,600.

Space temperature setback would be accomplished by replacing the existing unit heater thermostats with a single wall mounted programmable thermostat programmed to set back the temperatures during unoccupied hours.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 168,000 kWh, and $24,000.

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

ECM-3 Space Temperature Setback for Edly Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,400	0	11,200	0	1,600	16.1	N/A	0.9	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

This measure is recommended.

4.4 ECM-4 Space Temperature Setback for How Lane

The same condition exists at the How Lane pumping station as in ECM-3 for Edly Lane. The savings for this measure were determined utilizing the same procedure as Edly Lane.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 60,900 kWh and $9,000.

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

ECM-4 Space Temperature Setback for How Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	4,060	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

This measure is recommended.

4.5 ECM-5 Space Temperature Setback for Princess Drive

Please refer to ECM-3 for the procedure for analyzing this ECM.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 131,900 kWh and $19,500.

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

ECM-5 Space Temperature Setback for Princess Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,500	0	8,790	0	1,300	12.0	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

This measure is recommended.

4.6 ECM-6 Space Temperature Setback for Schmidt Lane

For Schmidt Lane, the same process was used to assess the measure as in ECM-3.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 57,500 kWh and $9,000.

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

ECM-6 Space Temperature Setback for Schmidt Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	3,830	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

This measure is recommended.

4.7 ECM-7 Space Temperature Setback for West Lawrence Drive

The West Lawrence Drive space temperature setback ECM used the same procedure detailed in ECM-3.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 81,200 kWh and $12,000.

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

ECM-7 Space Temperature Setback for West Lawrence Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	5,410	0	800	16.1	N/A	0.9	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

This measure is recommended.

4.8 ECM-8 Replace Schmidt Lane Window AC Unit

The window air conditioning unit was installed to provide cooling for the electrical equipment located at the pump station. This is wasteful as the air conditioning unit is cooling the entire building. This ECM evaluates replacement of the 12,000 Btuh window unit with a smaller 2,600 Btuh unit mounted directly on the electrical equipment cabinet enclosure. A direct mounted cabinet AC unit uses less energy, would not obstruct the window, and is programmable to only operate when desired.

This measure was not evaluated at the other pump stations because different electrical control equipment is utilized which does not experience overheating issues.

The energy savings were determined by comparing the existing unit's usage to the proposed smaller unit. It is assumed that the air conditioner runs constantly when the outdoor air temperature is above 70°F, and weather bin data was used to determine the annual cooling operating hours. The existing energy usage was calculated to be 1,790 kWh and the proposed unit will reduce the usage to 330 kWh.

To implement this measure, a cabinet AC unit would be installed directly on the side of the electrical equipment cabinet.

Cabinet AC units have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 29,400 kWh and $4,000.

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

ECM-8 Replace Schmidt Lane Window AC Unit

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
3,400	0	1,460	0	200	0.18	N/A	17.0	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is not recommended.

4.9 Potential Incentives

The North Brunswick Pump Station energy conservation projects may be eligible for incentives by the New Jersey Office of Clean Energy. The largest incentives available would be for the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects in facilities that consume a minimum average electric demand of 200 kW per month (total of 12 months peak demand/12). Facilities that meet this criterion must also achieve a minimum performance target of 15% by using an approved simulation modeling tool before and after construction. To utilize this program, a P4P Partner would need to be engaged. The 200 kW/month average minimum has been dropped so any structure can apply. This new incentive structure will be in effect until December 31, 2009.

Incentives for this program include the following:

- Incentive #1: The P4P Program pays $0.05 per square foot to a maximum of $50,000 or 50% of facility annual energy cost for the P4P Partner to develop an Energy Reduction Plan (ERP). This incentive is paid after approval of the ERP and signed Installation Agreement. Applicant must agree to commit to implementation of the ERP within 6 months or the incentive must be returned to the state.

- Incentive #2: Paid after installation of recommended measures; base incentives deliver $0.11/kWh and $1.10/therm not to exceed 30% of total project cost.

- Incentive #3: Paid after acceptance of Post-Construction Benchmarking Report showing energy savings over one year utilizing the approved simulation modeling tool and EPA Portfolio Manager. Incentive #3 base incentives deliver $0.07/kWh and $0.70/therm not to exceed 20% of total project cost.

Combining Incentives #2 and #3 will deliver a total of $0.18/ kWh and $1.80/therm not to exceed 50% of total project cost. Incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above the minimum performance target calculated with the approved simulation modeling tool, not to exceed 50% of total project cost.

Incentives are also available for prescriptive measures for various types of equipment under the New Jersey SmartStart Buildings incentive program. Prescriptive measures are paid after installation and no energy savings verification will be required. There are incentives available under this program for the premium efficiency motors at Edly Lane (ECM-1) suggested in this study. This incentive was calculated utilizing the New Jersey SmartStart Building Equipment incentive program. This program provides incentives dependent upon the existing equipment type and proposed equipment retrofit measure. If the North Brunswick pump stations qualify and enter into the New Jersey Pay for Performance Program, then

the savings from the ECMs, which qualify for New Jersey SmartStart incentive program, will be included in total building energy usage and savings. Applicants cannot apply for both programs for the same project.

When calculating the total incentive for the New Jersey Pay For Performance program, all energy conservation measures are applicable as the amount received is based on building wide energy improvements. The overall energy reduction for the buildings was estimated to be 13.0% for Edly Lane, 3.3% for How Lane, 12.0% for Princess Drive, 2.9% for Schmidt Lane, and 8.7% for West Lawrence Drive. Since none of the buildings meet the 15% minimum they are not eligible to receive monies based on Incentives #2 and #3 as discussed above.

The P4P incentive calculations are presented in Appendix J.

5.0 ALTERNATIVE ENERGY SCREENING EVALUATION

5.1 Geothermal

Geothermal heat pumps (GHP) transfer heat between the constant temperature of the earth and the building to maintain the building's interior space conditions. Below the surface of the earth throughout New Jersey the temperature remains in the low 50°F range throughout the year. This stable temperature provides a source for heat in the winter and a means to reject excess heat in the summer. With GHP systems, water is circulated between the building and the piping buried in the ground. The ground heat exchanger in a GHP system is made up of a closed or open loop pipe system. Most common is the closed loop in which high density polyethylene pipe is buried horizontally at 4-6 feet deep or vertically at 100 to 400 feet deep. These pipes are filled with an environmentally friendly antifreeze/water solution that acts as a heat exchanger. In the summer, the water picks up heat from the building and moves it to the ground. In the winter the system reverses and fluid picks up heat from the ground and moves it to the building. Heat pumps make collection and transfer of this heat to and from the building possible.

The buildings utilize electric unit heaters for winter heating and do not have a need for summer air conditioning. To take advantage of a GHP system, the building would have to install a low temperature closed loop water source heat pump system to realize the benefit of the consistent temperature of the ground. The existing electric unit heaters would be removed and an entirely new heat pump system would need to be installed.

This measure is not recommended due to the lack of air conditioning needs and the high cost to install the new systems.

5.2 Solar

5.2.1 Photovoltaic Rooftop Solar Power Generation

The pump stations were evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Edly Lane is the largest user of electricity and was chosen as the sample station for the initial evaluation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The New Jersey Clean Power Estimator provided by the New Jersey Clean Energy Program is presently being updated; therefore, the site recommended use of the PVWAT solar grid analyzer version 1. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWAT solar power generation model is provided in Appendix K.

The State of New Jersey incentives for non-residential PV applications is $1.00/watt up to 50 kW of installed PV array. Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Municipalities do not pay federal taxes; therefore, would not be able to utilize the federal tax credit incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission

producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The cost of the ACP penalty for 2009 is $689; this is the amount that must be paid per SERC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2009 is expected to be $600/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. Renewable Energy Consultants estimated an average of $487/ SERC per year and this number was utilized in the cash flow for this report.

The Edly lane pump station had a maximum kW demand of 149 kW and a minimum of 60 kW during 2008. The monthly average over the observed 12 month period was 82 kW. The facility's existing load will justify the use of the maximum incentive cap of 50 kW of installed PV solar array; therefore, a 50 kW system size was selected for the calculations. The system costs for PV installations were derived from the most recent NYSERDA (New York State Energy Research and Development Agency) estimates of total cost of system installation. It should be noted that the cost of installation is currently $10 per watt or $10,000 per kW of installed system. This has increased in the past few years due to the rise in national demand for PV power generator systems. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

Photovoltaic (PV) Rooftop Solar Power Generation for Edly Lane – 50 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
$	kW	kWh	Therms	$	$	$	$	Years	Years
500,000	0	59,200	0	8,600	8,600	50,000	28,800	>25	12.0

*Incentive based on New Jersey Renewable Energy Program for non-residential applications of $1.00 per Watt of installed capacity
** Estimated Solar Renewable Energy Certificate Program (SREC) for 15 years at $487/1000 kWh

This measure is not recommended at this time due to the long payback period; however, it could be a potentially viable renewable measure for the town to consider in the future if electricity rates continue to increase and if PV installation costs decline below $10 per watt.

5.2.2 Solar Thermal Domestic Hot Water Plant

The pump station buildings do not use domestic hot water; therefore, a solar thermal plant was not evaluated.

5.3 Wind

Small wind turbines use a horizontal axis propeller, or rotor, to capture the kinetic energy of the wind and convert it into rotary motion to drive a generator which usually is designed specifically for the wind turbine. The rotor consists of two or three blades, usually made from wood or fiberglass. These materials give the turbine the needed strength and flexibility, and have the added advantage of not interfering with television signals. The structural backbone of the wind turbine is the mainframe, and includes the slip-

rings that connect the wind turbine, which rotates as it points into changing wind directions, and the fixed tower wiring. The tail aligns the rotor into the wind.

To avoid turbulence and capture greater wind energy, turbines are mounted on towers. Turbines should be mounted at least 30 feet above any structure or natural feature within 300 feet of the installation. Smaller turbines can utilize shorter towers. For example, a 250-watt turbine may be mounted on a 30-50 foot tower, while a 10 kW turbine will usually need a tower of 80-120 feet. Tower designs include tubular or latticed, guyed or self-supporting. Wind turbine manufacturers also provide towers.

The New Jersey Clean Energy Program for small wind installations has designated numerous pre-approved wind turbines for installation in the State of New Jersey. Incentives for wind turbine installations are based on kilowatt hours saved in the first year. Systems sized under 16,000 kWh per year of production will receive a $3.20 per kWh incentive. Systems producing over 16,000 kWh will receive $51,200 for the first 16,000 kWh of production with an additional $0.50 per kWh up to a maximum cap of 750,000 kWh per year. Federal tax credits are also available for renewable energy projects up to 30% of installation cost for systems less than 100 kW. However, as noted previously, municipalities do not pay federal taxes and is, therefore, not eligible for the tax credit incentive.

The most important part of any small wind generation project is the mean annual wind speed at the height of which the turbine will be installed. In the North Brunswick area, the map indicates a mean annual wind speed of 10 miles per hour. For the pump stations, there are site restrictions. Parking lots, trees, local residential housing and high voltage power lines would greatly affect a tower location.

An aerial satellite image of Edly Lane and wind speed map is included in Appendix L.

This measure is not recommended due to the low mean annual wind speed.

5.4 Combined Heat and Power Generation (CHP)

Combined heat and power, cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location.

The pump stations have a need for electrical generation and the ability to use some of the thermal byproduct during the winter. However thermal usage during the summer months is not needed and thermal energy produced by the CHP plant will be wasted.

The most viable option for a CHP plant would be a reciprocating engine natural gas-fired unit. However, since the pump stations are located in residential areas, noise would be an issue.

This measure is not recommended due to limited use of summertime heat and noise issues.

5.5 Biomass Power Generation

Biomass power generation is a process in which waste organic materials are used to produce electricity or thermal energy. These materials would otherwise be sent to the landfill or expelled to the atmosphere. To participate in NJCEP's Customer On-Site Renewable Energy program, participants must install an on-site sustainable biomass or fuel cell energy generation system. Incentives for bio-power installations are available to support up to 1MW-dc of rated capacity.

*Class I organic residues are eligible for funding through the NJCEP CORE program. Class I wastes include the following renewable supply of organic material:

- Wood wastes not adulterated with chemicals, glues or adhesives
- Agricultural residues (corn stover, rice hulls or nut shells, manures, poultry litter, horse manure, etc) and/or methane gases from landfills
- Food wastes
- Municipal tree trimming and grass clipping wastes
- Paper and cardboard wastes
- Non adulterated construction wood wastes, pallets

The NJDEP evaluates biomass resources not identified in the RPS.

Examples of eligible facilities for a CORE incentive include:

- Digestion of sewage sludge
- Landfill gas facilities
- Combustion of wood wastes to steam turbine
- Gasification of wood wastes to reciprocating engine
- Gasification or pyrolysis of bio-solid wastes to generation equipment

* from NJOCE Website

This measure is not recommended because the pump stations do not have a waste stream that can be utilized for the production of electricity or thermal energy.

5.5 Demand Response Curtailment

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

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

Each pump station has the ability to shed load by use of a back up generator. The Edly Lane pumping station utilizes one Caterpillar 370 kW back up generator and has the highest average monthly kW demand during the observed period of 82 kW. PSE&G utilizes curtailment providers to bundle and organize demand reduction load. A PSE&G pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program.

The pump stations are not able to satisfy the Curtailment Service Provider required 100kW minimum; therefore, this ECM is not recommended.

6.0 EPA PORTFOLIO MANAGER

The United States Energy Protection Agency (EPA) is a federal agency in charge of regulating environment waste and policy in the United States. The mission of the EPA is to protect human health and the environment. The EPA has released an interactive energy management tool known as the EPA Portfolio Manger that allows building owners to track and assess energy consumption across their facility. This program is designed to allow property owners and managers to share, compare and improve upon their facility's energy consumption. Inputting such parameters at electricity, heating fuel, building characteristics and location into the website based program generates a naturalized energy rating score out of 100. Once an account is registered, monthly utility data can be entered to track the savings progress and retrieve an updated energy rating score on a monthly basis.

The parameters for the pump stations were entered in the Portfolio Manager and a Site Energy Usage Index (EUI) for each site was obtained. The Portfolio Manager was not able to provide the naturalized energy rating score for the sites because wastewater pump stations are not yet listed under the categories needed to provide the score and generate a full report.

The pump station buildings are relatively small in size; however, have significant annual electric usage due to the year round operation of the large wastewater pumps. Therefore, the EUI for the sites is higher than the national average of 104 kBtu/ft^2/yr, and lower indexes are preferable.

Edly Lane

The EUI for Edly Lane is 377 kBtu/ft^2/yr, and factors attributable to this index include wasted energy from non-premium efficiency motors and no space temperature setback during unoccupied hours. If the measures recommended are implemented, it is projected the site EUI could be reduced to 328 kBtu/ft^2/yr.

How Lane

How Lane's EUI is 1,410 kBtu/ft^2/yr; the higher index is the result of space temperature setback not being utilized during unoccupied hours. Implementation of the recommended measure would reduce the EUI to 1,364 kBtu/ft^2/yr.

Princess Drive

The EUI for Princess Drive is 282 kBtu/ft^2/yr., due to motor inefficiency and space temperature not being set back for unoccupied hours. If the recommended measures were implemented, the site EUI would be reduced to 248 kBtu/ft^2/yr.

Schmidt Lane

Schmidt Lane's EUI is a significant 3,166 kBtu/ft^2/yr, mainly due to temperature setback not being utilized during hours when the building is not occupied. Reduction to 3,077 kBtu/ft^2/yr.is possible if the space temperature setback measure was implemented.

West Lawrence

The EPA Portfolio Manager Site EUI for West Lawrence is 149 kBtu/ft^2/yr. because temperature setback is not implemented. If this recommended measure is installed, an EUI of 136 kBtu/ft^2/yr. could be realized.

Information regarding the Energy Star Portfolio Manager is located in Appendix M. The user name and password for the Pump Station EPA Portfolio Manager Account was provided to Christopher Gianotto, Supervisor of Pump Station Services for the Township of North Brunswick.

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the five pump station facilities in North Brunswick, New Jersey identified potential ECMs for motor upgrade and temperature setback. Potential annual savings of $10,600 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 Premium Efficiency Motors for Edly Lane Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
36,200	15	34,100	0	5,100	1.11	$1,900	7.1	6.7

* Incentive shown is per the New Jersey Smart Start Program, 2009 Premium Motors Application for three 150 HP motors.

ECM-2 Premium Efficiency Motors for Princess Drive Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
8,800	3	2,100	0	600	0.02	N/A	14.7	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM. Motors must operate a minimum of 2,000 hours per year to qualify for an inventive.

ECM-3 Space Temperature Setback for Edly Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,400	0	11,200	0	1,600	16.1	N/A	0.9	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-4 Space Temperature Setback for How Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	4,060	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-5 Space Temperature Setback for Princess Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,500	0	8,790	0	1,300	12.0	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-6 Space Temperature Setback for Schmidt Lane

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	3,830	0	600	11.9	N/A	1.2	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM

ECM-7 Space Temperature Setback for West Lawrence Drive

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
700	0	5,400	0	800	16.1	N/A	0.9	N/A

APPENDIX A

Utility Usage Analysis

New Jersey BPU Energy Audit Program
CHA #20418
Building: North Brunswick Township Sewer Pump Station at Edly Lane

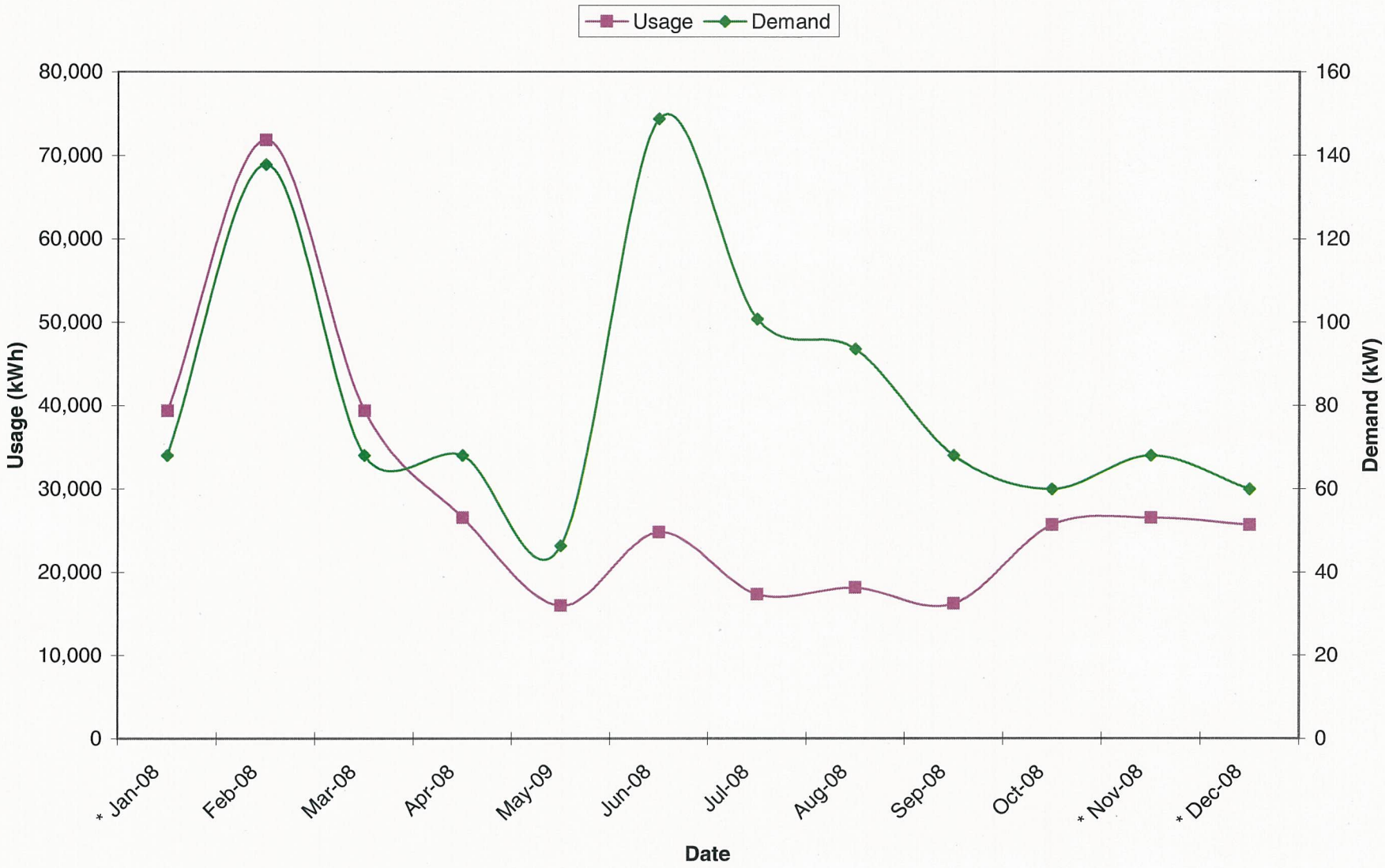
Account Number: 62 429 095 61 Meter Number: 778010347 Rate: LPLS
Public Service Electric & Gas Company (PSE&G)

Electricity						
Period	kWh	kW	Cost ($)	Demand Unit Cost ($/kW)	Supply Unit Cost ($/kWh)	Blended Rate ($/kWh)
* Jan-08	39,360	68.00	4,710.45	5.02	0.1015	0.1197
Feb-08	71,840	137.80	9,197.78	8.41	0.1015	0.1280
Mar-08	39,360	68.00	4,710.45	5.02	0.1015	0.1197
Apr-08	26,560	68.00	3,371.18	5.02	0.1001	0.1269
May-09	16,000	46.40	2,247.82	5.86	0.1002	0.1405
Jun-08	24,800	148.80	5,640.21	15.66	0.1145	0.2274
Jul-08	17,360	100.80	3,590.18	10.91	0.1263	0.2068
Aug-08	18,160	93.60	3,593.73	9.20	0.1300	0.1979
Sep-08	16,240	68.00	2,757.09	7.31	0.1163	0.1698
Oct-08	25,680	60.00	3,570.52	7.87	0.1062	0.1390
* Nov-08	26,560	68.00	3,371.18	5.02	0.1001	0.1269
* Dec-08	25,680	60.00	3,570.52	7.87	0.1062	0.1390
Total	347,600	148.80	50,331.11		0.1063	0.1448
Monthly Ave.	28,967	82.28	4,194.26	8.64		

Electricity													
Sevice Charge	Annual Demand kW	Summer Demand kW	0n-peak kWh	Off-peak kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply on-peak kWh	Supply off-peak kWh	Supply Total	Total
$372.11	$219.33	$0.00	$49.14	$79.44	$235.64	$393.13	$1,348.79	$57.46	$64.63	$1,534.75	$1,704.82	$3,361.66	$4,710.45
$744.22	$887.63	$0.00	$100.11	$134.60	$430.10	$715.05	$3,011.71	$115.00	$155.89	$3,084.18	$2,831.00	$6,186.07	$9,197.78
$372.11	$219.33	$0.00	$49.14	$79.44	$235.64	$393.13	$1,348.79	$57.46	$64.63	$1,534.75	$1,704.82	$3,361.66	$4,710.45
$372.11	$219.33	$0.00	$35.55	$51.24	$159.02	$265.28	$1,102.53	$57.46	$64.63	$1,084.50	$1,062.06	$2,268.65	$3,371.18
$372.11	$149.66	$0.00	$21.69	$30.57	$95.79	$159.81	$829.63	$57.46	$64.63	$661.97	$634.13	$1,418.19	$2,247.82
$471.34	$607.93	$1,446.30	$34.50	$46.52	$148.47	$247.70	$3,002.76	$193.90	$81.84	$1,304.04	$1,057.67	$2,637.45	$5,640.21
$297.69	$260.10	$618.79	$25.87	$30.84	$103.94	$173.40	$1,510.63	$169.62	$51.67	$1,106.23	$752.03	$2,079.55	$3,590.18
$372.11	$301.90	$282.38	$26.66	$32.67	$108.72	$181.38	$1,305.82	$212.02	$64.59	$1,173.41	$837.89	$2,287.91	$3,593.73
$372.11	$219.33	$0.00	$23.79	$29.27	$96.44	$162.20	$903.14	$211.57	$66.06	$897.24	$679.08	$1,853.95	$2,757.09
$372.11	$193.52	$0.00	$36.59	$47.31	$164.63	$256.49	$1,070.65	$211.15	$67.43	$1,194.54	$1,026.75	$2,499.87	$3,570.52
$372.11	$219.33	$0.00	$35.55	$51.24	$159.02	$265.28	$1,102.53	$57.46	$64.63	$1,084.50	$1,062.06	$2,268.65	$3,371.18
$372.11	$193.52	$0.00	$36.59	$47.31	$164.63	$256.49	$1,070.65	$211.15	$67.43	$1,194.54	$1,026.75	$2,499.87	$3,570.52
$4,862.24	$3,690.91	$2,347.47	$475.18	$660.45	$2,102.04	$3,469.34	$17,607.63	$1,611.71	$878.06	$15,854.65	$14,379.06	$32,723.48	

* Estimated - Copy of bill not available

North Brunswick, NJ - Sewer Pump Station at Edly Lane



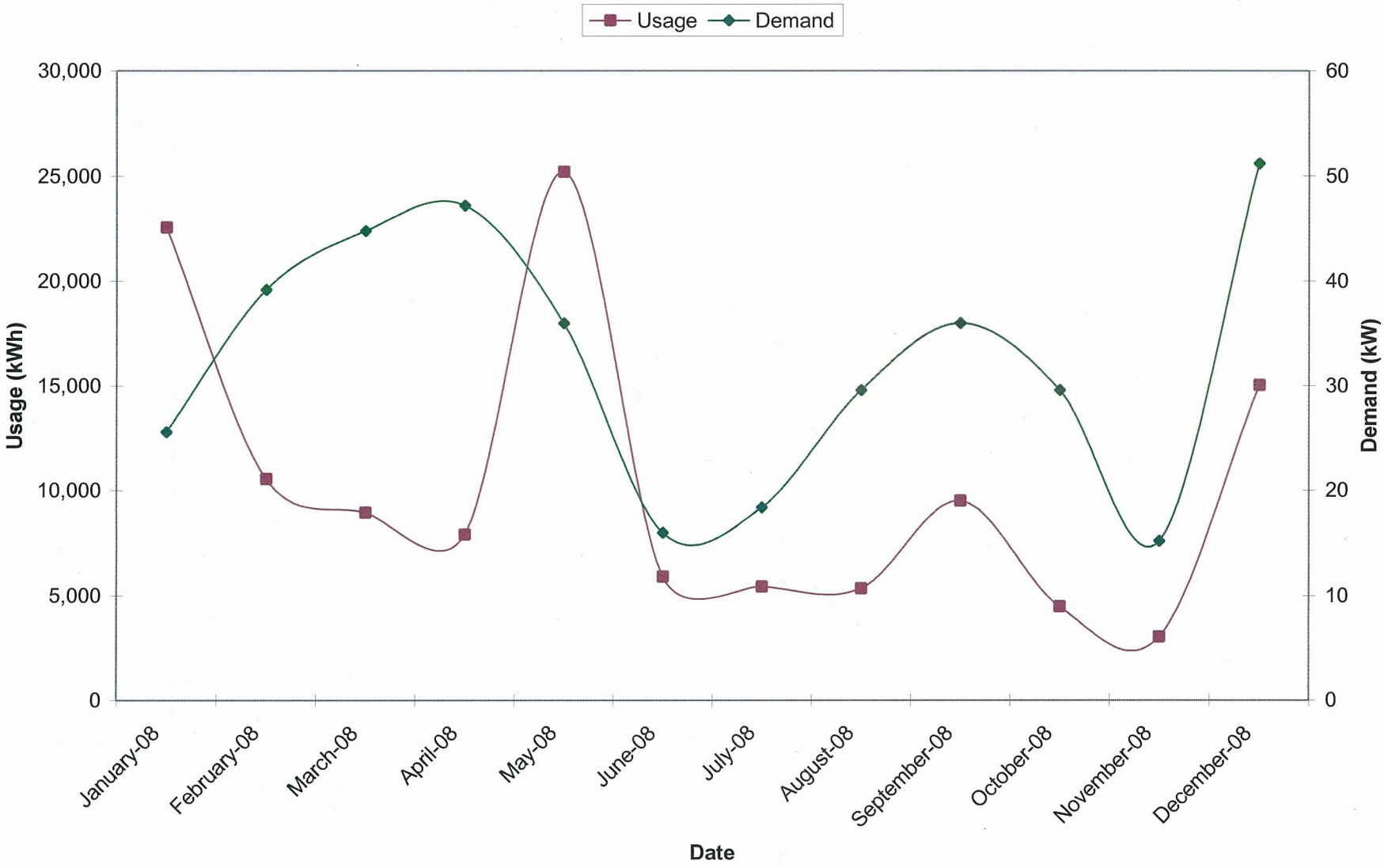
New Jersey BPU Energy Audit Program
CHA #20418
Building: North Brunswick Township Sewer Pump Station at How Lane

Account Number: 62 694 025 65 Meter Number: 728001931 Rate: GLP
Public Service Electric & Gas Company (PSE&G)

Electricity						
Period	kWh	kW	Cost ($)	Demand Unit Cost ($/kW)	Supply Unit Cost ($/kWh)	Blended Rate ($/kWh)
Jan-08	22,560	25.60	2,850.15	16.5762	0.1070	0.1263
Feb-08	10,560	39.20	1,370.62	4.9003	0.1112	0.1298
Mar-08	8,960	44.80	1,194.51	4.7748	0.1090	0.1333
Apr-08	7,920	47.20	1,075.49	4.7299	0.1071	0.1358
May-08	25,200	36.00	3,273.23	14.9694	0.1080	0.1299
Jun-08	5,920	16.00	1,067.03	16.7000	0.1344	0.1802
Jul-08	5,440	18.40	1,092.52	16.8750	0.1430	0.2008
Aug-08	5,360	29.60	1,234.25	14.6980	0.1483	0.2303
Sep-08	9,520	36.00	1,888.70	14.0619	0.1448	0.1984
Oct-08	4,480	29.60	763.73	7.4916	0.1200	0.1705
Nov-08	3,040	15.20	514.63	10.9118	0.1133	0.1693
Dec-08	15,040	51.20	1,986.53	5.9775	0.1115	0.1321
Total	124,000	51.20	18,311.39		0.1164	0.1477
Monthly Ave.	10,333	32.40	1,525.95	9.79		

Electricity											
Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
$12.73	$299.07	$0.00	$160.97	$135.13	$222.96	$830.86	$41.44	$83.84	$1,894.01	$2,019.29	$2,850.15
$4.24	$152.65	$0.00	$75.35	$63.22	$105.47	$400.93	$13.79	$25.65	$930.25	$969.69	$1,370.62
$4.24	$174.46	$0.00	$63.93	$53.64	$89.49	$385.76	$13.79	$25.66	$769.30	$808.75	$1,194.51
$4.24	$183.80	$0.00	$56.51	$47.42	$79.11	$371.08	$13.79	$25.66	$664.96	$704.41	$1,075.49
$12.72	$420.56	$0.00	$179.80	$150.87	$251.70	$1,015.65	$41.37	$76.97	$2,139.24	$2,257.58	$3,273.23
$4.24	$62.31	$115.63	$77.35	$35.44	$59.13	$354.10	$63.62	$25.64	$623.67	$712.93	$1,067.03
$4.24	$71.65	$132.98	$71.07	$32.57	$54.34	$366.85	$80.23	$25.64	$619.80	$725.67	$1,092.52
$4.24	$115.27	$213.92	$70.03	$32.09	$53.54	$489.09	$80.23	$25.64	$639.29	$745.16	$1,234.25
$4.24	$140.19	$260.17	$124.38	$57.00	$95.09	$681.07	$80.23	$25.64	$1,101.76	$1,207.63	$1,888.70
$4.24	$115.27	$0.00	$31.96	$26.48	$44.74	$222.69	$79.98	$26.50	$434.56	$541.04	$763.73
$4.24	$59.19	$0.00	$21.69	$20.03	$30.36	$135.51	$79.90	$26.77	$272.45	$379.12	$514.63
$4.24	$199.38	$0.00	$115.61	$105.36	$150.22	$574.81	$79.90	$26.77	$1,305.05	$1,411.72	$1,986.53
$67.85	$1,993.80	$722.70	$1,048.65	$759.25	$1,236.15	$5,828.40	$668.27	$420.38	$11,394.34	$12,482.99	

North Brunswick, NJ - Sewer Pump Station at How Lane



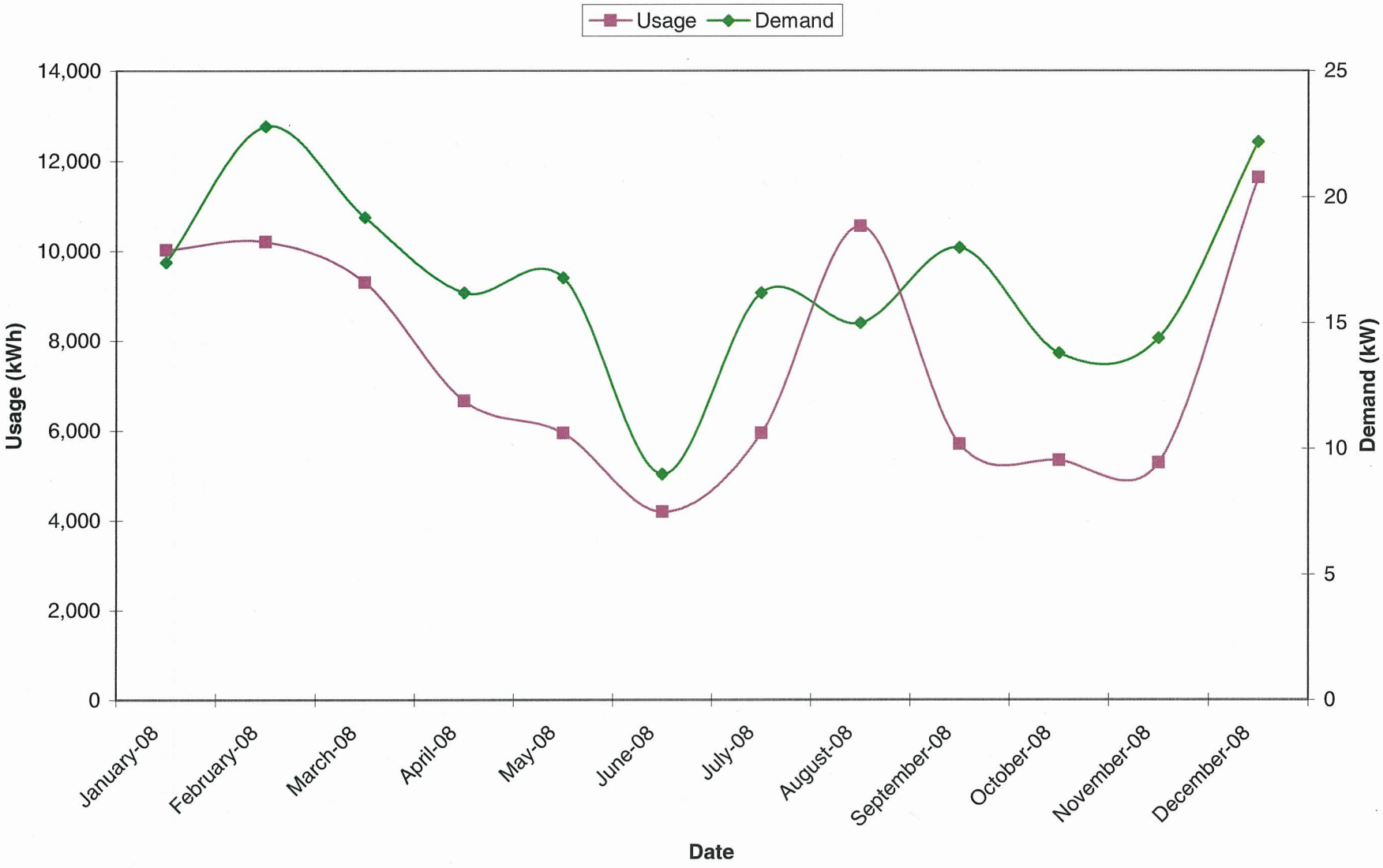
New Jersey BPU Energy Audit Program
CHA #20418
Building: North Brunswick Township Sewer Pump Station at Princess Drive

Account Number: 62 711 742 13 Meter Number: 298000260 Rate: GLP
Public Service Electric & Gas Company (PSE&G)

Electricity						
Period	kWh	kW	Cost	Demand Unit Cost	Supply Unit Cost	Blended Rate
			($)	($/kW)	($/kWh)	($/kWh)
Jan-08	10,020	17.40	1,181.67	5.6356	0.1077	0.1179
Feb-08	10,200	22.80	1,254.80	5.1947	0.1110	0.1230
Mar-08	9,300	19.20	1,121.82	5.4391	0.1089	0.1206
Apr-08	6,660	16.20	808.81	5.7247	0.1069	0.1214
May-08	5,940	16.80	741.08	5.6595	0.1080	0.1248
Jun-08	4,200	9.00	753.65	19.0333	0.1376	0.1794
Jul-08	5,940	16.20	1,112.32	15.8969	0.1432	0.1873
Aug-08	10,560	15.00	2,039.05	32.5573	0.1460	0.1931
Sep-08	5,700	18.00	1,103.45	15.4194	0.1442	0.1936
Oct-08	5,340	13.80	769.41	9.5355	0.1186	0.1441
Nov-08	5,280	14.40	736.27	9.3083	0.1133	0.1394
Dec-08	11,640	22.20	1,465.58	7.4059	0.1114	0.1259
Total	90,780	22.80	13,087.91		0.1201	0.1442
Monthly Ave.	7,565	16.75	1,090.66	10.61		

Electricity												
Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total		Total
$4.24	$67.76	$0.00	$71.49	$59.99	$99.84	$303.32	$10.93	$19.37	$848.05	$878.35		$1,181.67
$4.24	$88.79	$0.00	$72.77	$61.07	$101.88	$328.75	$10.92	$18.73	$896.40	$926.05		$1,254.80
$4.24	$74.77	$0.00	$66.35	$55.68	$92.89	$293.93	$10.92	$18.74	$798.23	$827.89		$1,121.82
$4.24	$63.08	$0.00	$47.52	$39.87	$66.52	$221.23	$10.92	$18.74	$557.92	$587.58		$808.81
$4.24	$65.42	$0.00	$42.38	$35.56	$59.33	$206.93	$10.92	$18.74	$504.49	$534.15		$741.08
$4.24	$35.05	$65.04	$54.88	$25.15	$41.95	$226.31	$52.48	$18.73	$456.13	$527.34		$753.65
$4.24	$63.08	$117.08	$77.60	$35.56	$59.33	$356.89	$58.64	$18.73	$678.06	$755.43		$1,112.32
$8.48	$116.82	$216.81	$137.97	$63.22	$105.47	$648.77	$117.27	$37.46	$1,235.55	$1,390.28		$2,039.05
$4.24	$70.09	$130.09	$74.47	$34.13	$56.93	$369.95	$58.64	$18.73	$656.13	$733.50		$1,103.45
$4.24	$53.74	$0.00	$38.10	$31.53	$53.34	$180.95	$58.44	$19.41	$510.61	$588.46		$769.41
$4.24	$56.08	$0.00	$37.68	$34.92	$52.74	$185.66	$58.40	$19.56	$472.65	$550.61		$736.27
$4.24	$86.45	$0.00	$89.68	$81.69	$116.26	$378.32	$58.40	$19.56	$1,009.30	$1,087.26		$1,465.58
$55.12	$841.13	$529.02	$810.89	$558.37	$906.48	$3,701.01	$516.88	$246.50	$8,623.52	$9,386.90		

North Brunswick, NJ - Sewer Pump Station at Princess Drive



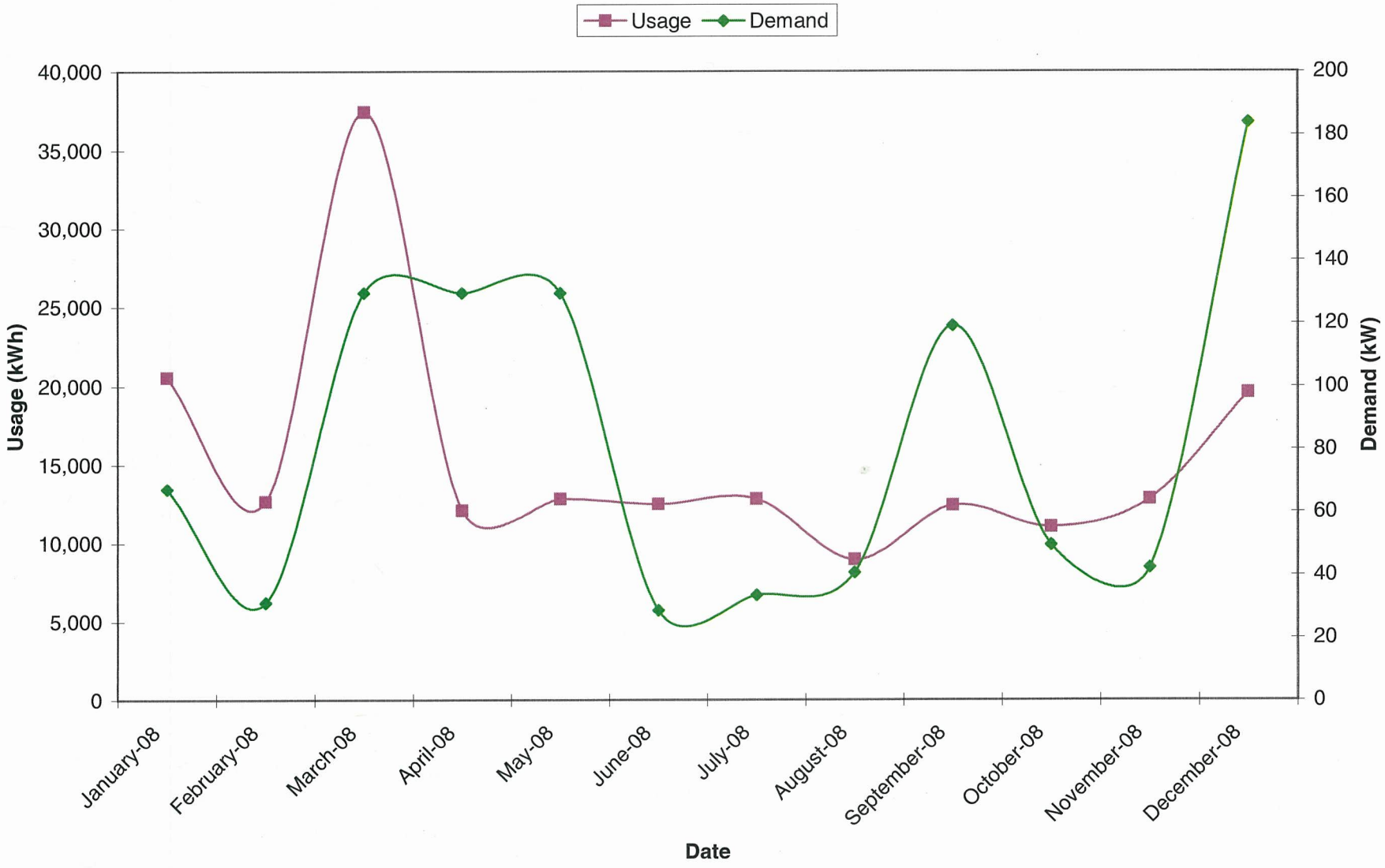
New Jersey BPU Energy Audit Program
CHA #20418
Building: North Brunswick Township Sewer Pump Station at Schmidt Lane

Account Number: 62 638 475 65 Meter Number: 728006506 Rate: GLP
Public Service Electric & Gas Company (PSE&G)

Electricity						
Period	kWh	kW	Cost	Demand Unit Cost	Supply Unit Cost	Blended Rate
			($)	($/kW)	($/kWh)	($/kWh)
Jan-08	20,560	67.20	2,558.35	5.1097	0.1075	0.1244
Feb-08	12,640	31.20	1,599.58	6.2837	0.1107	0.1265
Mar-08	37,440	129.60	5,284.22	8.9390	0.1100	0.1411
Apr-08	12,080	129.60	1,877.72	4.4697	0.1071	0.1554
May-08	12,800	129.60	1,964.74	4.4697	0.1079	0.1535
Jun-08	12,480	28.80	2,138.62	16.2396	0.1335	0.1714
Jul-08	12,800	33.60	2,383.89	16.3563	0.1430	0.1862
Aug-08	8,960	40.80	1,821.54	11.8316	0.1491	0.2033
Sep-08	12,400	119.20	3,303.70	12.5968	0.1450	0.2664
Oct-08	11,040	49.60	1,707.90	7.4599	0.1208	0.1547
Nov-08	12,800	42.40	1,798.21	8.0738	0.1134	0.1405
Dec-08	19,600	184.00	3,082.62	4.8572	0.1115	0.1573
Total	185,600	184.00	29,521.09		0.1186	0.1591
Monthly Ave.	15,467	82.13	2,460.09	7.57		

Electricity											
Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
$4.24	$261.68	$0.00	$146.70	$123.09	$204.45	$740.16	$31.97	$49.72	$1,736.50	$1,818.19	$2,558.35
$4.24	$121.50	$0.00	$90.18	$75.68	$126.25	$417.85	$31.95	$42.60	$1,107.18	$1,181.73	$1,599.58
$8.48	$1,009.35	$0.00	$267.14	$224.15	$373.95	$1,883.07	$63.90	$85.24	$3,252.01	$3,401.15	$5,284.22
$4.24	$504.68	$0.00	$86.19	$72.32	$120.65	$788.08	$31.95	$42.64	$1,015.05	$1,089.64	$1,877.72
$4.24	$504.68	$0.00	$91.32	$76.63	$127.85	$804.72	$31.95	$42.64	$1,085.43	$1,160.02	$1,964.74
$4.24	$112.15	$208.14	$163.06	$74.72	$124.65	$686.96	$104.79	$42.62	$1,304.25	$1,451.66	$2,138.62
$4.24	$130.84	$242.83	$167.23	$76.63	$127.85	$749.62	$133.29	$42.61	$1,458.37	$1,634.27	$2,383.89
$3.25	$121.81	$226.06	$117.06	$53.64	$89.49	$611.31	$102.19	$32.67	$1,075.37	$1,210.23	$1,821.54
$4.24	$464.18	$861.46	$162.01	$74.24	$123.85	$1,689.98	$133.29	$42.61	$1,437.82	$1,613.72	$3,303.70
$4.24	$193.15	$0.00	$78.77	$65.31	$110.27	$451.74	$132.89	$43.97	$1,079.30	$1,256.16	$1,707.90
$4.24	$165.11	$0.00	$91.32	$84.01	$127.85	$472.53	$132.74	$44.48	$1,148.46	$1,325.68	$1,798.21
$4.24	$716.51	$0.00	$149.41	$136.42	$195.77	$1,202.35	$132.74	$44.48	$1,703.05	$1,880.27	$3,082.62
$54.13	$4,305.64	$1,538.49	$1,610.39	$1,136.84	$1,852.88	$10,498.37	$1,063.65	$556.28	$17,402.79	$19,022.72	

North Brunswick, NJ - Sewer Pump Station at Schmidt Lane



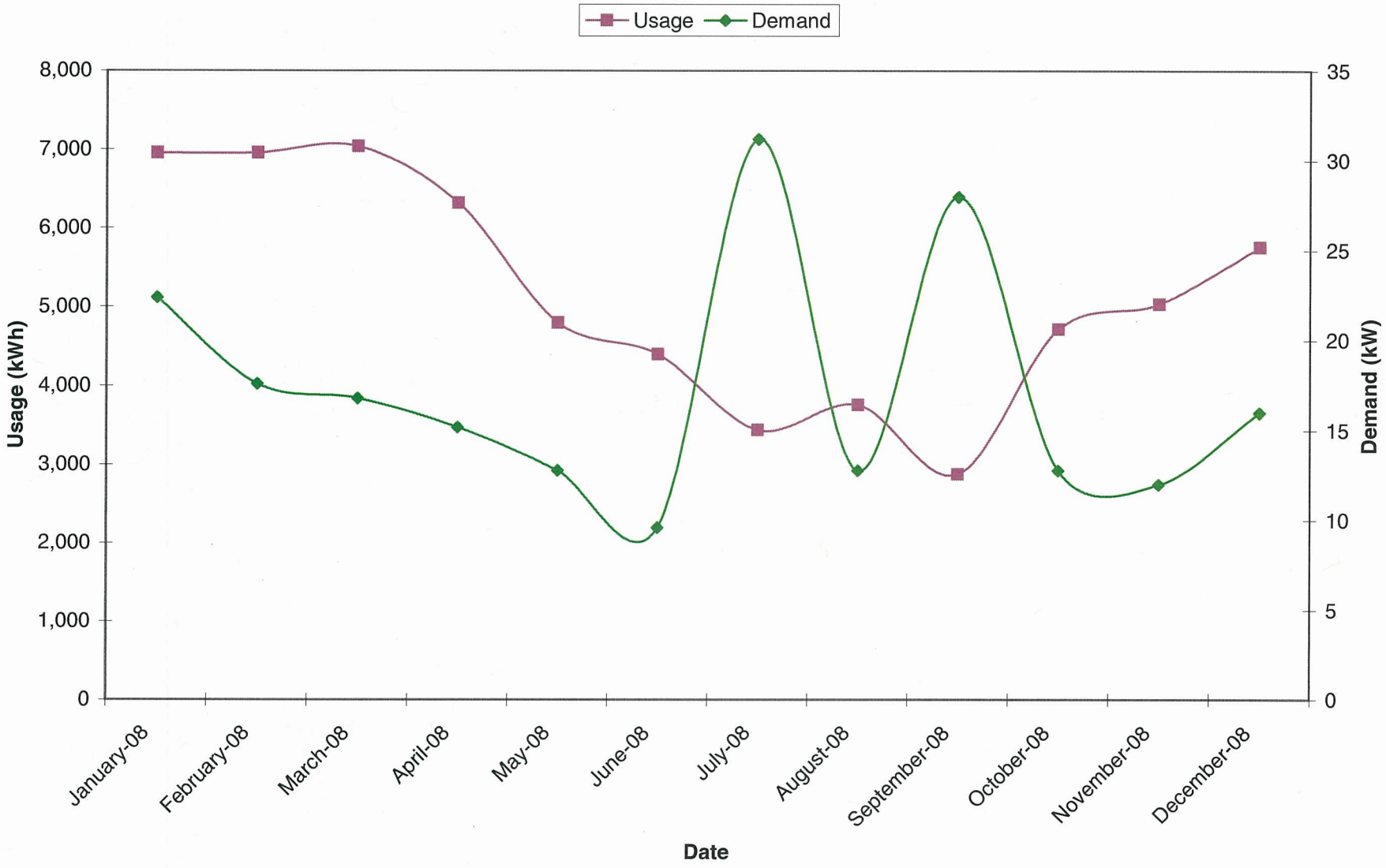
New Jersey BPU Energy Audit Program
CHA #20418
Building: North Brunswick Township Sewer Pump Station at West Lawrence

Account Number: 62 581 151 60 Meter Number: 728000778 Rate: GLP
Public Service Electric & Gas Company (PSE&G)

Electricity						
Period	kWh	kW	Cost ($)	Demand Unit Cost ($/kW)	Supply Unit Cost ($/kWh)	Blended Rate ($/kWh)
Jan-08	6,960	22.40	867.09	5.1188	0.1075	0.1246
Feb-08	6,960	17.60	866.36	5.2898	0.1105	0.1245
Mar-08	7,040	16.80	864.38	5.3565	0.1094	0.1228
Apr-08	6,320	15.20	765.53	5.5105	0.1072	0.1211
May-08	4,800	12.80	596.37	5.8133	0.1079	0.1242
Jun-08	4,400	9.60	742.79	15.9896	0.1330	0.1688
Jul-08	3,440	31.20	899.13	12.9276	0.1429	0.2614
Aug-08	3,760	12.80	760.58	15.5242	0.1483	0.2023
Sep-08	2,880	28.00	713.69	10.5071	0.1445	0.2478
Oct-08	4,720	12.80	689.15	8.3188	0.1225	0.1460
Nov-08	5,040	12.00	679.75	8.6267	0.1135	0.1349
Dec-08	5,760	16.00	765.53	7.4438	0.1115	0.1329
Total	62,080	31.20	9,210.35		0.1180	0.1484
Monthly Ave.	5,173	17.27	767.53	8.86		

Electricity											
Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
$4.24	$87.23	$0.00	$49.66	$41.67	$69.19	$251.99	$10.92	$16.51	$587.67	$615.10	$867.09
$4.24	$68.54	$0.00	$49.66	$41.67	$69.52	$233.63	$10.91	$13.65	$608.17	$632.73	$866.36
$4.24	$65.42	$0.00	$50.24	$42.15	$70.32	$232.37	$10.91	$13.66	$607.44	$632.01	$864.38
$4.24	$59.19	$0.00	$45.10	$37.84	$63.12	$209.49	$10.91	$13.66	$531.47	$556.04	$765.53
$4.24	$49.84	$0.00	$34.25	$28.74	$47.94	$165.01	$10.91	$13.66	$406.79	$431.36	$596.37
$4.24	$37.38	$69.38	$57.49	$26.34	$43.95	$238.78	$33.08	$13.66	$457.27	$504.01	$742.79
$4.24	$121.50	$225.48	$44.93	$20.60	$34.35	$451.10	$42.71	$13.65	$391.67	$448.03	$899.13
$4.24	$49.84	$92.51	$49.12	$22.51	$37.56	$255.78	$42.71	$13.65	$448.44	$504.80	$760.58
$3.39	$87.23	$161.88	$37.62	$17.24	$28.77	$336.13	$34.17	$10.92	$332.47	$377.56	$713.69
$4.24	$49.84	$0.00	$33.67	$27.96	$47.14	$162.85	$42.60	$14.04	$469.66	$526.30	$689.15
$4.24	$46.73	$0.00	$35.97	$32.95	$50.34	$170.23	$42.54	$14.25	$452.73	$509.52	$679.75
$4.24	$62.31	$0.00	$43.82	$40.03	$57.53	$207.93	$42.54	$14.25	$500.81	$557.60	$765.53
$50.03	$785.05	$549.25	$531.53	$379.70	$619.73	$2,915.29	$334.91	$165.56	$5,794.59	$6,295.06	

North Brunswick, NJ - Sewer Pump Station at West Lawrence



ELECTRIC MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell electricity to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

American Powernet Management
867 Berkshire Blvd, Suite 101
Wyomissing, PA 19610
www.americanpowernet.com

BOC Energy Services
575 Mountain Avenue
Murray Hill, NJ 07974
www.boc-gases.com

Commerce Energy Inc.
535 Route 38, Suite 138
Cherry Hill, NJ 08002
(888) 817-8572 or
(858) 910-8099
www.commerceenergy.com

ConEdison Solutions
701 Westchester Avenue
Suite 201 West
White Plains, NY 10604
(800) 316-8011
www.ConEdSolutions.com

Constellation NewEnergy, Inc.
1199 Route 22 East
Mountainside, NJ 07092
908 228-5100
www.newenergy.com

Credit Suisse (USA), Inc.
700 College Road East
Princeton, NJ 08450
www.creditsuisse.com

Direct Energy Services, LLC
One Gateway Center, Suite 2600
Newark, NJ 07102
(973) 799-8568
www.directenergy.com

FirstEnergy Solutions
395 Ghent Road Suite 407
Akron, OH 44333
(800) 977-0500
www.fes.com

Gerdau Ameristeel Energy Co.
North Crossman Road
Sayreville, NJ 08872

Gexa Energy LLC New Jersey
20 Greenway Plaza, Suite 600
Houston, TX 77046
(866) 304-GEXA
Beth.miller@gexaenergy.com

Glacial Energy of New Jersey
2602 McKinney Avenue, Suite 220
Dallas, TX 75204
www.glacialenergy.com

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
www.hess.com

Integrys Energy Services, Inc
99 Wood Avenue, Suite 802
Iselin, NJ 08830
www.integrysenergy.com

Liberty Power Delaware, LLC
1901 W Cypress Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Liberty Power Holdings, LLC
1901 W Cypress Creek Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Pepco Energy Services, Inc.
d/b/a Power Choice
23 S. Kinderkamack Rd Ste D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
http://www.pplenergyplus.com/

Sempra Energy Solutions
The Mac-Cali Building
581 Main Street, 8th Floor
Woodbridge, NJ 07095
(877) 273-6772
www.SempraSolutions.com

South Jersey Energy Company
1 South Jersey Plaza, Route 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com

Strategic Energy, LLC
6 East Main Street, Suite 6E
Ramsey, NJ 07446
(888) 925-9115
www.sel.com

Suez Energy Resources NA
333 Thornall Street FL6
Edison, NJ 08818
866.999.8374(toll free)
www.suezenergyresources.com

UGI Energy Services, Inc.
d/b/a POWERMARK
1 Meridian Blvd. Suite 2C01
Wyomissing, PA 19610
(800) 427-8545
www.ugienergyservices.com

Jan 14, 2009

APPENDIX B

ECM-1 Premium Efficiency Motors for Edly Lane

North Brunswick
CHA #20418
Edly Lane Pump Station

ECM-1 Install Premium Efficiency Motors

Demand Cost $/kW-month	Energy Cost $/kWh	
$ 8.64	$ 0.106	Supply

Multipliers		
Material	Labor	Equipment
0.98	1.21	1.09

Savings Analysis

Cost Estimates

	Motor		Existing	Load	Existing	Existing	New	New Load	New	New	Demand	Demand	Occ	kWh	$ kWh	Total $	Estimated	Payback	Unit Costs			Subtotal Costs				
#	ID	Location	HP	Factor	Efficiency[a]	kW	HP[b]	Factor	Efficiency[a]	kW	Savings kW	Savings $	Hours	Savings	Savings	Savings	Cost	Years	Materials	Labor	Equipment	Materials	Labor	Equipment	Total Cost	Remarks
1	Pump-1	Waste Water Pump	150	0.7	0.902	86.8	150	0.7	0.954	82.1	4.732	$ 491	2,400	11,356	$ 1,207	$ 1,698	$ 12,082	7.1	$ 10,353	$ 1,600	$ -	$ 10,146	$ 1,936	$ -	$ 12,082	
2	Pump-2	Waste Water Pump	150	0.7	0.902	86.8	150	0.7	0.954	82.1	4.732	$ 491	2,400	11,356	$ 1,207	$ 1,698	$ 12,082	7.1	$ 10,353	$ 1,600	$ -	$ 10,146	$ 1,936	$ -	$ 12,082	
3	Pump-3	Waste Water Pump	150	0.7	0.902	86.8	150	0.7	0.954	82.1	4.732	$ 491	2,400	11,356	$ 1,207	$ 1,698	$ 12,082	7.1	$ 10,353	$ 1,600	$ -	$ 10,146	$ 1,936	$ -	$ 12,082	
		Total	**450**			**260.4**	**450**			**246.2**	**14.19**	**$ 1,472**		**34,067**	**$ 3,621**	**$ 5,093**	**$ 36,246**	**7.1**								

Notes

a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

b Same as existing HP unless resized to better match load

APPENDIX C

ECM-2 Premium Efficiency Motors for Princess Drive

North Brunswick
CHA #20418
Princess Drive Pump Station

ECM-2 Install Premium Efficiency Motors

Demand Cost $/kW-month	Energy Cost $/kWh	
$ 10.61	$ 0.120	Supply

Multipliers		
Material	Labor	Equipment
0.98	1.21	1.09

Savings Analysis

Cost Estimates

																				Unit Costs			Subtotal Costs				
	Motor		Existing	Load	Existing	Existing	New	New Load	New	New	Demand	Demand	Occ	kWh	$ kWh	Total $	Estimated	Payback									
#	ID	Location	HP	Factor	Efficiency[a]	kW	HP[b]	Factor	Efficiency[a]	kW	Savings kW	Savings $	Hours	Savings	Savings	Savings	Cost	Years	Materials	Labor	Equipment	Materials	Labor	Equipment	Total Cost	Remarks
1	Pump-1	Waste Water Pump	40	0.7	0.902	23.1	40	0.7	0.941	22.2	0.959	$ 122	730	700	$ 84	$ 206	$ 2,934	14.2	$ 2,253	$ 600	$ -	$ 2,208	$ 726	$ -	$ 2,934	
2	Pump-2	Waste Water Pump	40	0.7	0.902	23.1	40	0.7	0.941	22.2	0.959	$ 122	730	700	$ 84	$ 206	$ 2,934	14.2	$ 2,253	$ 600	$ -	$ 2,208	$ 726	$ -	$ 2,934	
3	Pump-3	Waste Water Pump	40	0.7	0.902	23.1	40	0.7	0.941	22.2	0.959	$ 122	730	700	$ 84	$ 206	$ 2,934	14.2	$ 2,253	$ 600	$ -	$ 2,208	$ 726	$ -	$ 2,934	
		Total	**120**			**69.4**	**120**			**66.6**	**2.88**	**$ 366**		**2,101**	**$ 252**	**$ 619**	**$ 8,803**	**14.2**								

Notes

a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

b Same as existing HP unless resized to better match load

APPENDIX D

ECM-3 Edly Lane Space Temperature Setback

North Brunswick
CHA #20418
Edly Lane Pump Station

ECM-3 Space Temperature Setback

Building Footprint	1,575	SF	Ex Occupied Clng Temp.	72	°F	Ex Occupied Htg Temp.	70	°F	Blended Electric Cost	0.1448	$/kWh
Heat Content	3,413	Btuh/kW	Ex Unoccupied Clng Temp.	72	°F	Ex Unoccupied Htg Temp.	70	°F	**Heating Energy Savings**	11,204	kWh
Cooling Efficiency	1.3	kW/ton	Prop Occupied Clng Temp	73	°F	Prop Occupied Htg Temp.	70	°F	**Cooling Energy Savings**		kWh
Building Balance Temp.	60	°F	Prop Unoccupied Clng Temp.	80	°F	Prop Unoccupied Htg Temp.	60	°F	**Total Energy Savings**	11,204	kWh
Internal Gains	7,380	btu/h	Occupied Cooling UA	523	btu/hr/°F	Occupied Heating UA	453	btu/hr/°F	**Total Cost Savings**	$ 1,622	
Unoc Internal Gain factor	0.03		Unoccupied Cooling UA	506	btu/hr/°F	Unoccupied Heating UA	453	btu/hr/°F			
Ave Occ Internal Gain Factor	0.5		Cooling Occ Enthalpy Setpoint	27.5	Btu/lb						
			Cooling Unocc Enthalpy Setpoint	27.6	Btu/lb						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS						PROPOSED LOADS									
					Occupied			Unoccupied			Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	15,432	-20,441	-3,695	15,432	-20,441	-222	14,926	-20,441	-3,695	11,384	-20,441	-222	0	0	0	0
97.5	42.5	3	0	3	12,902	-14,195	-3,695	12,902	-14,195	-222	12,396	-14,195	-3,695	8,854	-14,195	-222	1	2	0	0
92.5	39.5	34	1	33	10,372	-11,356	-3,695	10,372	-11,356	-222	9,866	-11,356	-3,695	6,324	-11,356	-222	5	19	0	0
87.5	36.6	131	2	129	7,842	-8,612	-3,695	7,842	-8,612	-222	7,336	-8,612	-3,695	3,795	-8,612	-222	15	71	0	0
82.5	34	500	9	491	5,313	-6,151	-3,695	5,313	-6,151	-222	4,807	-6,151	-3,695	1,265	-6,151	-222	61	277	0	0
77.5	31.6	620	11	609	2,783	-3,880	-3,695	2,783	-3,880	-222	2,277	-3,880	-3,695	0	0	-222	93	21	0	0
72.5	29.2	664	12	652	253	-1,609	-3,695	253	-1,609	-222	0	0	-3,695	0	0	-222	118	20	0	0
67.5	27	854	15	839	1,133	568	-3,695	1,133	568	-222	1,133	568	-3,695	0	0	-222	3	23	0	0
62.5	24.5	927	17	910	3,400	1,703	-3,695	3,400	1,703	-222	3,400	1,703	-3,695	0	0	-222	0	0	1,309	-52
57.5	21.4	600	11	589	5,667	2,839	-3,695	5,667	2,839	-222	5,667	2,839	-3,695	1,133	568	-222	0	0	1,445	271
52.5	18.7	610	11	599	7,933	3,975	-3,695	7,933	3,975	-222	7,933	3,975	-3,695	3,400	1,703	-222	0	0	2,078	883
47.5	16.2	611	11	600	10,200	5,110	-3,695	10,200	5,110	-222	10,200	5,110	-3,695	5,667	2,839	-222	0	0	2,690	1,494
42.5	14.4	656	12	644	12,467	6,246	-3,695	12,467	6,246	-222	12,467	6,246	-3,695	7,933	3,975	-222	0	0	3,542	2,258
37.5	12.6	1,023	18	1,005	14,734	7,381	-3,695	14,734	7,381	-222	14,734	7,381	-3,695	10,200	5,110	-222	0	0	6,544	4,540
32.5	10.7	734	13	721	17,000	8,517	-3,695	17,000	8,517	-222	17,000	8,517	-3,695	12,467	6,246	-222	0	0	5,427	3,989
27.5	8.6	334	6	328	19,267	9,653	-3,695	19,267	9,653	-222	19,267	9,653	-3,695	14,734	7,381	-222	0	0	2,802	2,148
22.5	6.8	252	4	248	21,534	10,788	-3,695	21,534	10,788	-222	21,534	10,788	-3,695	17,000	8,517	-222	0	0	2,366	1,872
17.5	5.5	125	2	123	23,800	11,924	-3,695	23,800	11,924	-222	23,800	11,924	-3,695	19,267	9,653	-222	0	0	1,298	1,053
12.5	4.1	47	1	46	26,067	13,059	-3,695	26,067	13,059	-222	26,067	13,059	-3,695	21,534	10,788	-222	0	0	535	443
7.5	2.6	22	1	21	28,334	14,195	-3,695	28,334	14,195	-222	28,334	14,195	-3,695	23,800	11,924	-222	0	0	272	230
2.5	1	13	0	13	30,601	15,331	-3,695	30,601	15,331	-222	30,601	15,331	-3,695	26,067	13,059	-222	0	0	174	148
-2.5	0	0	0	0	32,867	16,466	-3,695	32,867	16,466	-222	32,867	16,466	-3,695	28,334	14,195	-222	0	0	0	0
-7.5	-1.5	0	0	0	35,134	17,602	-3,695	35,134	17,602	-222	35,134	17,602	-3,695	30,601	15,331	-222	0	0	0	0
TOTALS		8,760	157	8,603													295	434	30,481	19,277

Existing Building Ventilation & Infiltration (occ)	**210**	**cfm**
Overheat Ventilation Factor	**1.00**	
Additional ventilation to offset overheat	**0**	**cfm**
Existing Building Ventilation & Infiltration (unocc)	**210**	**cfm**

North Brunswick
CHA #20418
Edly Lane Pump Station

ECM-3 Cost Estimate

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Programmable thermostat	2	ea	$ 100	$ 150	$ -	$ 196	$ 363	$ -	$ 559	
Electric Wiring	2	ea	$ 100	$ 150		$ 196	$ 363	$ -	$ 559	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Edly Lane has one 20 kw electric heater with 24 volt control voltage

$ 1,118		Subtotal
$ 112	10%	Contingency
$ 123	10%	Contractor O&P
$ -	0%	Engineering
$ 1,353		**Total**

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	Edly Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

Outdoor Winter Design DB Temperature	1 *F	**Indoor Winter Design DB Temperature**	70 *F
Outdoor Summer Design DB Temperature	98 *F	**Indoor Summer Design DB Temperature**	72 *F
Outdoor Summer Design WB Temperature	74 *F	**Indoor Summer Design WB Temperature**	60 *F
Outdoor Summer Humidity Ratio	0.0121 #/#	**Indoor Air (70*F) Humidity Ratio**	0.0078 #/#

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)

		R Value	Wall Type
	Steel Siding, 4" Insulation, Steel Siding	15.2	1
	Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
	4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
	Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
	4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
	4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
	Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
	Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
	Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
	4" Block, 1" insulation, 8" Block	19.9	16
x	4" Face Brick, 8" CMU filled	5.2	

Roofs (Select One)

		R Value	Roof Type
	Tectum Deck, 3.3" Insul., BU Roof	13.0	1
x	Steel Deck, 5" Insul., BU Roof	18.2	1
	Attic Roof with 6" Insul.	25.0	4
	4" HW Concrete Deck, BU Roof	2.7	2
	Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
	Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
	Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
	Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
	Wood Deck, 6" insulation, Felt & Membrane	18.0	
	Wood Deck, 6" insulation, Felt & Membrane	40.20	

Windows (Select One)

		U Value
	Aluminum Frame, 1/8" SP Glazing	1.05
x	Aluminum Frame, 1/4" DP Glazing	0.60
	Aluminum Frame, 3/16" DP Glazing	0.62
	Aluminum Frame, 1/2" DP Glazing	0.50
	Skylights	0.90
	Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area	1,575 SF		
Occupied Area	1,575 SF	**Return Plenum?**	n

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	30 Ft	12.0 Ft	12.0 Ft	0 SF	0 SF	360 SF
East Exposure	40 Ft	12.0 Ft	12.0 Ft	0 SF	21 SF	459 SF
South Exposure	30 Ft	12.0 Ft	12.0 Ft	0 SF	85 SF	275 SF
West Exposure	40 Ft	12.0 Ft	12.0 Ft	9 SF	0 SF	471 SF

Forced Ventilation 0 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	Edly Lane Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor		Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	9	216 btu/h/sf	0.8	0.29	Glass Type C	438 Btu/hr
						438 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	360	0.19	26 *F	1.0	1,800 Btu/hr
East Exposure	459	0.19	26 *F	1.0	2,295 Btu/hr
South Exposure	275	0.19	35 *F	1.0	1,851 Btu/hr
West Exposure	471	0.19	26 *F	1.0	2,356 Btu/hr
Roof	1,575	0.06	50 *F	1.0	4,331 Btu/hr
Fenestration	9	0.60	26 *F		137 Btu/hr
Doors	106	0.14	26 *F		385 Btu/hr
Ceiling	1,575	0.14	0 *F		0 Btu/hr
Partition		0.05	0 *F		0 Btu/hr
Floor	1,575	0.04	0 *F		0 Btu/hr
					13,155 Btu/h

INTERNAL HEAT GAINS

							Room Heat Gain
Lights	0.00 w/sf x	1,575 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		0 Btu/h
Plug Load	0.10 w/sf x	1,575 Occ Area =	0.2 kW x 3.4x		1.0 RAF =		538 Btu/h
People	2 people x	255 btu/person x	5%	time in space =			26 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =			0 Btu/h
Equipment	2.0 kW x 3.413 =						6,826 Btu/h
Misc.							0 Btu/h
							7,389 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor		Perimeter Ratio		Coef	Temp. Diff.	Room Heat Gain
Walls	1,565 SF	0.12	CFM/SF			1.08	26 *F	5,708 Btu/h
Doors	106 SF	0.20	CFM/LF	0.95	LF/SF	1.08	26 *F	614 Btu/h
Windows	9 SF	0.20	CFM/LF	1.30	LF/SF	1.08	26 *F	69 Btu/h
Ventilation	0 cfm					1.08	26 *F	0 Btu/h
								6,391 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	0	0.19	26	1.0	0 Btu/hr
East Exposure	0	0.19	26	1.0	0 Btu/hr
South Exposure	0	0.19	35	1.0	0 Btu/hr
West Exposure	0	0.19	26	1.0	0 Btu/hr
Roof	1,575	0.06	50	0.0	0 Btu/hr
					0 Btu/h

INTERNAL HEAT GAINS

					Room Heat Gain
Lights	0.00 w/sf x	1,575 Occ Area =	0.0 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT		SENSIBLE HEAT GAINS - TEMP. INDEPENDENT	
Solar	438	Internal Gains to Room	7,389
Conduction to Room	13,155	Internal Gains to Plenum	0
Conduction to Plenum	0		
Ventilation and Infiltration	6,391		
Sub Total	19,984	Sub Total	7,389

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	Edly Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	1,575 SF	0.12 CFM/SF	4,800	0.0043 ##	3,940 Btu/h
Doors	106 SF	0.20 CFM/LF	4,800	0.0043 ##	421 Btu/h
Windows	9 SF	0.20 CFM/LF	4,800	0.0043 ##	47 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##	0 Btu/h
People	2 people	0.05 time in space		250 Btu/hr/person	25 Btu/h
					4,433 Btu/h

Cooling Load Summary

	Sensible	Latent	Total		
Temperature Dependent Gains	19,984	4,433	24,417		
Temperature Indep. Gains	7,389		7,389	SHR=	0.86
Total	27,373	4,433	31,806		

Building Cooling Load 2.7 Tons at 594 SF/Ton

Building Air Flow to Condition Space based on a 12*F Temp Rise is **2,108 CFM** / **1.34 CFM/sf**

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	360	0.19	69	4,777 Btu/h
East Exposure	459	0.19	69	6,091 Btu/h
South Exposure	275	0.19	69	3,649 Btu/h
West Exposure	471	0.19	69	6,253 Btu/h
Fenestration	9	0.60	69	362 Btu/h
Roof	1,575	0.06	69	5,977 Btu/h
Doors	106	0.14	69	1,022 Btu/h
Ceiling	1,575	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	1,575	0.04	50	3,150 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	1,565 SF	0.12 CFM/SF	1.08	69	188 cfm	14,026 Btu/h
Doors	106 SF	0.20 CFM/LF	1.08	69	20 cfm	1,508 Btu/h
Windows	9 SF	0.20 CFM/LF	1.08	69	2 cfm	170 Btu/h
Ventilation Load	0 cfm		1.08	69	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load					210 cfm	15,704 Btu/h

Building Heating Load **46,985** **btu/h**

29.8 btu/sf

APPENDIX E

ECM-4 How Lane Space Temperature Setback

North Brunswick
CHA #20418
How Lane Pump Station

ECM-4 Space Temperature Setback

Building Footprint	300 SF	Ex Occupied Clng Temp.	68 °F	Ex Occupied Htg Temp.	70 °F	Blended Electric Cost	0.1477 $/kWh		
Heat Content	3,413 Btuh/kW	Ex Unoccupied Clng Temp.	72 °F	Ex Unoccupied Htg Temp.	70 °F	**Heating Energy Savings**	4,062 kWh		
Cooling Efficiency	1.3 kW/ton	Prop Occupied Clng Temp	73 °F	Prop Occupied Htg Temp.	70 °F		kWh		
Building Balance Temp.	60 °F	Prop Unoccupied Clng Temp.	80 °F	Prop Unoccupied Htg Temp.	60 °F	**Total Energy Savings**	4,062 kWh		
Internal Gains	btu/h	Occupied Cooling UA	192 btu/hr/°F	Occupied Heating UA	136 btu/hr/°F	**Total Cost Savings**	$ 600		
Unoc Internal Gain factor	0.03	Unoccupied Cooling UA	167 btu/hr/°F	Unoccupied Heating UA	136 btu/hr/°F				
Ave Occ Internal Gain Factor	0.5	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb						
		Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS						PROPOSED LOADS									
					Occupied			Unoccupied			Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	6,625	-9,134	0	5,091	-9,134	0	5,665	-9,134	0	3,756	-9,134	0	0	0	0	0
97.5	42.5	3	0	3	5,665	-6,343	0	4,256	-6,343	0	4,705	-6,343	0	2,921	-6,343	0	1	1	0	0
92.5	39.5	34	1	33	4,705	-5,074	0	3,422	-5,074	0	3,744	-5,074	0	2,086	-5,074	0	6	11	0	0
87.5	36.6	131	2	129	3,744	-3,848	0	2,587	-3,848	0	2,784	-3,848	0	1,252	-3,848	0	18	36	0	0
82.5	34	500	9	491	2,784	-2,749	0	1,753	-2,749	0	1,824	-2,749	0	417	-2,749	0	0	125	0	0
77.5	31.6	620	11	609	1,824	-1,734	0	918	-1,734	0	864	-1,734	0	0	0	0	0	1	0	0
72.5	29.2	664	12	652	864	-719	0	83	-719	0	0	0	0	0	0	0	0	0	1	0
67.5	27	854	15	839	341	254	0	341	254	0	341	254	0	0	0	0	0	0	149	3
62.5	24.5	927	17	910	1,022	761	0	1,022	761	0	1,022	761	0	0	0	0	0	0	484	9
57.5	21.4	600	11	589	1,704	1,269	0	1,704	1,269	0	1,704	1,269	0	341	254	0	0	0	523	112
52.5	18.7	610	11	599	2,385	1,776	0	2,385	1,776	0	2,385	1,776	0	1,022	761	0	0	0	744	326
47.5	16.2	611	11	600	3,067	2,283	0	3,067	2,283	0	3,067	2,283	0	1,704	1,269	0	0	0	958	540
42.5	14.4	656	12	644	3,748	2,791	0	3,748	2,791	0	3,748	2,791	0	2,385	1,776	0	0	0	1,257	808
37.5	12.6	1,023	18	1,005	4,430	3,298	0	4,430	3,298	0	4,430	3,298	0	3,067	2,283	0	0	0	2,316	1,616
32.5	10.7	734	13	721	5,111	3,806	0	5,111	3,806	0	5,111	3,806	0	3,748	2,791	0	0	0	1,918	1,415
27.5	8.6	334	6	328	5,793	4,313	0	5,793	4,313	0	5,793	4,313	0	4,430	3,298	0	0	0	989	760
22.5	6.8	252	4	248	6,474	4,821	0	6,474	4,821	0	6,474	4,821	0	5,111	3,806	0	0	0	834	662
17.5	5.5	125	2	123	7,155	5,328	0	7,155	5,328	0	7,155	5,328	0	5,793	4,313	0	0	0	457	372
12.5	4.1	47	1	46	7,837	5,835	0	7,837	5,835	0	7,837	5,835	0	6,474	4,821	0	0	0	188	156
7.5	2.6	22	1	21	8,518	6,343	0	8,518	6,343	0	8,518	6,343	0	7,155	5,328	0	0	0	96	81
2.5	1	13	0	13	9,200	6,850	0	9,200	6,850	0	9,200	6,850	0	7,837	5,835	0	0	0	61	52
-2.5	0	0	0	0	9,881	7,358	0	9,881	7,358	0	9,881	7,358	0	8,518	6,343	0	0	0	0	0
-7.5	-1.5	0	0	0	10,563	7,865	0	10,563	7,865	0	10,563	7,865	0	9,200	6,850	0	0	0	0	0
TOTALS		8,760	157	8,603													24	174	10,974	6,912

Existing Building Ventilation & Infiltration (occ) 94 cfm
Overheat Ventilation Factor 1.00
Additional ventilation to offset overheat 0 cfm
Existing Building Ventilation & Infiltration (unocc) 94 cfm

North Brunswick
CHA #20418
How Lane

ECM-4 Cost Estimate

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Programmable thermostat	1	ea	$ 100	$ 150	$ -	$ 98	$ 182	$ -	$ 280	
Electric Wiring	1	ea	$ 150	$ 150		$ 147	$ 182	$ -	$ 329	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

How Lane has one 5 kw electric heater with 24 volt control voltage

$ 608	Subtotal
$ 61	10% Contingency
$ 67	10% Contractor O&P
$ -	0% Engineering
$ 736	**Total**

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	How Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

Outdoor Winter Design DB Temperature	1 *F	**Indoor Winter Design DB Temperature**	70 *F
Outdoor Summer Design DB Temperature	98 *F	**Indoor Summer Design DB Temperature**	72 *F
Outdoor Summer Design WB Temperature	74 *F	**Indoor Summer Design WB Temperature**	60 *F
Outdoor Summer Humidity Ratio	0.0121 ##	**Indoor Air (70*F) Humidity Ratio**	0.0078 ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)		R Value	Wall Type
	Steel Siding, 4" Insulation, Steel Siding	15.2	1
	Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
	4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
	Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
	4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
	4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
	Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
	Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
	Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
	4" Block, 1" insulation, 8" Block	19.9	16
x	Exterior Metal siding, 2" insulation board, interior metal siding	8.1	

Roofs (Select One)		R Value	Roof Type
	Tectum Deck, 3.3" Insul., BU Roof	13.0	1
	Steel Deck, 5" Insul., BU Roof	18.2	1
	Attic Roof with 6" Insul.	25.0	4
	4" HW Concrete Deck, BU Roof	2.7	2
	Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
	Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
	Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
	Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
	Wood Deck, 6" insulation, Felt & Membrane	18.0	
x	Exterior Metal roofing, 2" insulation board, interior metal siding	8.10	

Windows (Select One)		U Value
	Aluminum Frame, 1/8" SP Glazing	1.05
	Aluminum Frame, 1/4" DP Glazing	0.60
	Aluminum Frame, 3/16" DP Glazing	0.62
	Aluminum Frame, 1/2" DP Glazing	0.50
	Skylights	0.90
	Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area	300 SF				
Occupied Area	300 SF			**Return Plenum?**	n

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	12 Ft	10.0 Ft	10.0 Ft	0 SF	48 SF	72 SF
East Exposure	25 Ft	10.0 Ft	10.0 Ft	4 SF	0 SF	246 SF
South Exposure	12 Ft	10.0 Ft	10.0 Ft	0 SF	0 SF	120 SF
West Exposure	25 Ft	10.0 Ft	10.0 Ft	9 SF	0 SF	241 SF

Forced Ventilation 0 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	How Lane Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor		Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	4	216 btu/h/sf	0.8	0.31	Glass Type C	214 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	9	216 btu/h/sf	0.8	0.29	Glass Type C	438 Btu/hr
						653 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	72	0.12	26 *F	1.0	231 Btu/hr
East Exposure	246	0.12	26 *F	1.0	790 Btu/hr
South Exposure	120	0.12	35 *F	1.0	519 Btu/hr
West Exposure	241	0.12	26 *F	1.0	774 Btu/hr
Roof	300	0.12	50 *F	1.0	1,852 Btu/hr
Fenestration	13	0.00	26 *F		0 Btu/hr
Doors	48	0.14	26 *F		174 Btu/hr
Ceiling	300	0.14	0 *F		0 Btu/hr
Partition		0.05	0 *F		0 Btu/hr
Floor	300	0.04	0 *F		0 Btu/hr
					4,340 Btu/h

INTERNAL HEAT GAINS

							Room Heat Gain
Lights	0.00 w/sf x	300 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		0 Btu/h
Plug Load	0.10 w/sf x	300 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		102 Btu/h
People	2 people x	255 btu/person x	5% time in space =				26 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =			0 Btu/h
Equipment	1.0 kW x 3.413 =						3,413 Btu/h
Misc.							0 Btu/h
							3,541 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	679 SF	0.12 CFM/SF		1.08	26 *F	2,477 Btu/h
Doors	48 SF	0.20 CFM/LF	0.95 LF/SF	1.08	26 *F	278 Btu/h
Windows	13 SF	0.20 CFM/LF	1.30 LF/SF	1.08	26 *F	101 Btu/h
Ventilation	0 cfm			1.08	26 *F	0 Btu/h
						2,856 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE 4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	0	0.12	26	1.0	0 Btu/hr
East Exposure	0	0.12	26	1.0	0 Btu/hr
South Exposure	0	0.12	35	1.0	0 Btu/hr
West Exposure	0	0.12	26	1.0	0 Btu/hr
Roof	300	0.12	50	0.0	0 Btu/hr
					0 Btu/h

INTERNAL HEAT GAINS

					Room Heat Gain
Lights	0.00 w/sf x	300 Occ Area =	0.0 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT	
Solar	653
Conduction to Room	4,340
Conduction to Plenum	0
Ventilation and Infiltration	2,856
Sub Total	7,848

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT	
Internal Gains to Room	3,541
Internal Gains to Plenum	0
Sub Total	3,541

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	How Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	300 SF	0.12 CFM/SF	4,800	0.0043 ##/##	750 Btu/h
Doors	48 SF	0.20 CFM/LF	4,800	0.0043 ##/##	191 Btu/h
Windows	13 SF	0.20 CFM/LF	4,800	0.0043 ##/##	69 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##/##	0 Btu/h
People	2 people	0.05 time in space		250 Btu/hr/person	25 Btu/h
					1,035 Btu/h

Cooling Load Summary

	Sensible	Latent	Total		
Temperature Dependent Gains	7,848	1,035	8,883		
Temperature Indep. Gains	3,541		3,541	SHR=	0.92
Total	11,389	1,035	12,424		

Building Cooling Load 1.0 Tons at 290 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is **877 CFM** / **2.92 CFM/sf**

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	72	0.12	69	613 Btu/h
East Exposure	246	0.12	69	2,096 Btu/h
South Exposure	120	0.12	69	1,022 Btu/h
West Exposure	241	0.12	69	2,055 Btu/h
Fenestration	13	0.00	69	0 Btu/h
Roof	300	0.12	69	2,556 Btu/h
Doors	48	0.14	69	463 Btu/h
Ceiling	300	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	300	0.04	50	600 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	679 SF	0.12 CFM/SF	1.08	69	82 cfm	6,087 Btu/h
Doors	48 SF	0.20 CFM/LF	1.08	69	9 cfm	683 Btu/h
Windows	13 SF	0.20 CFM/LF	1.08	69	3 cfm	248 Btu/h
Ventilation Load	0 cfm		1.08	69	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load					94 cfm	7,017 Btu/h

Building Heating Load **16,422** **btu/h**

54.7 btu/sf

APPENDIX F

ECM-5 Princess Drive Space Temperature Setback

North Brunswick
CHA #20418
Princess Drive Pump Station

ECM-5 Space Temperature Setback

Building Footprint	1,092	SF	Ex Occupied Clng Temp.	72	°F	Ex Occupied Htg Temp.	70	°F	Blended Electric Cost	0.1442	$/kWh
Heat Content	3,413	Btuh/kW	Ex Unoccupied Clng Temp.	72	°F	Ex Unoccupied Htg Temp.	70	°F	**Heating Energy Savings**	8,794	kWh
Cooling Efficiency	1.3	kW/ton	Prop Occupied Clng Temp.	73	°F	Prop Occupied Htg Temp.	70	°F	**Cooling Energy Savings**		kWh
Building Balance Temp.	60	°F	Prop Unoccupied Clng Temp.	80	°F	Prop Unoccupied Htg Temp.	60	°F	**Total Energy Savings**	8,794	kWh
Internal Gains	7,224	btu/h	Occupied Cooling UA	458	btu/hr/°F	Occupied Heating UA	426	btu/hr/°F	**Total Cost Savings**	$ 1,268	
Unoc Internal Gain factor	0.03		Unoccupied Cooling UA	458	btu/hr/°F	Unoccupied Heating UA	426	btu/hr/°F			
Ave Occ Internal Gain Factor	0.5		Cooling Occ Enthalpy Setpoint	27.6	Btu/lb						
			Cooling Unocc Enthalpy Setpoint	27.6	Btu/lb						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS						PROPOSED LOADS									
					Occupied			Unoccupied			Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	13,976	-9,496	-3,612	13,976	-9,496	-217	13,518	-9,496	-3,612	10,310	-9,496	-217	0	0	0	0
97.5	42.5	3	0	3	11,685	-6,595	-3,612	11,685	-6,595	-217	11,227	-6,595	-3,612	8,019	-6,595	-217	0	0	4	1
92.5	39.5	34	1	33	9,394	-5,276	-3,612	9,394	-5,276	-217	8,936	-5,276	-3,612	5,728	-5,276	-217	0	0	38	2
87.5	36.6	131	2	129	7,103	-4,001	-3,612	7,103	-4,001	-217	6,644	-4,001	-3,612	3,437	-4,001	-217	0	11	0	0
82.5	34	500	9	491	4,811	-2,858	-3,612	4,811	-2,858	-217	4,353	-2,858	-3,612	1,146	-2,858	-217	2	105	0	0
77.5	31.6	620	11	609	2,520	-1,803	-3,612	2,520	-1,803	-217	2,062	-1,803	-3,612	0	0	-217	3	18	0	0
72.5	29.2	664	12	652	229	-747	-3,612	229	-747	-217	0	0	-3,612	0	0	-217	57	20	0	0
67.5	27	854	15	839	1,065	264	-3,612	1,065	264	-217	1,065	264	-3,612	0	0	-217	4	23	0	0
62.5	24.5	927	17	910	3,196	791	-3,612	3,196	791	-217	3,196	791	-3,612	0	0	-217	0	0	1,008	-56
57.5	21.4	600	11	589	5,327	1,319	-3,612	5,327	1,319	-217	5,327	1,319	-3,612	1,065	264	-217	0	0	1,120	202
52.5	18.7	610	11	599	7,458	1,847	-3,612	7,458	1,847	-217	7,458	1,847	-3,612	3,196	791	-217	0	0	1,613	680
47.5	16.2	611	11	600	9,589	2,374	-3,612	9,589	2,374	-217	9,589	2,374	-3,612	5,327	1,319	-217	0	0	2,092	1,157
42.5	14.4	656	12	644	11,720	2,902	-3,612	11,720	2,902	-217	11,720	2,902	-3,612	7,458	1,847	-217	0	0	2,757	1,753
37.5	12.6	1,023	18	1,005	13,851	3,429	-3,612	13,851	3,429	-217	13,851	3,429	-3,612	9,589	2,374	-217	0	0	5,097	3,531
32.5	10.7	734	13	721	15,982	3,957	-3,612	15,982	3,957	-217	15,982	3,957	-3,612	11,720	2,902	-217	0	0	4,228	3,105
27.5	8.6	334	6	328	18,113	4,484	-3,612	18,113	4,484	-217	18,113	4,484	-3,612	13,851	3,429	-217	0	0	2,184	1,673
22.5	6.8	252	4	248	20,244	5,012	-3,612	20,244	5,012	-217	20,244	5,012	-3,612	15,982	3,957	-217	0	0	1,844	1,459
17.5	5.5	125	2	123	22,375	5,540	-3,612	22,375	5,540	-217	22,375	5,540	-3,612	18,113	4,484	-217	0	0	1,012	821
12.5	4.1	47	1	46	24,506	6,067	-3,612	24,506	6,067	-217	24,506	6,067	-3,612	20,244	5,012	-217	0	0	417	345
7.5	2.6	22	1	21	26,637	6,595	-3,612	26,637	6,595	-217	26,637	6,595	-3,612	22,375	5,540	-217	0	0	212	179
2.5	1	13	0	13	28,768	7,122	-3,612	28,768	7,122	-217	28,768	7,122	-3,612	24,506	6,067	-217	0	0	136	116
-2.5	0	0	0	0	30,899	7,650	-3,612	30,899	7,650	-217	30,899	7,650	-3,612	26,637	6,595	-217	0	0	0	0
-7.5	-1.5	0	0	0	33,030	8,177	-3,612	33,030	8,177	-217	33,030	8,177	-3,612	28,768	7,122	-217	0	0	0	0
TOTALS		8,760	157	8,603													66	178	23,763	14,970

Existing Building Ventilation & Infiltration (occ)	**98 cfm**
Overheat Ventilation Factor	**1.00**
Additional ventilation to offset overheat	**0 cfm**
Existing Building Ventilation & Infiltration (unocc)	**98 cfm**

North Brunswick
CHA #20418
Princess Drive Pump Station

ECM-5 Cost Estimate

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Programmable thermostat	2	ea	$ 100	$ 150	$ -	$ 196	$ 363	$ -	$ 559	
Electric Wiring	2	ea	$ 150	$ 150		$ 294	$ 363	$ -	$ 657	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

How Lane has three - 3 kw electric heaters on upper level and two -3 kw electric heaters in basement

Proposed estimate is for one thermostat to control upper heaters and one to control basement heaters

$ 1,216		Subtotal
$ 122	10%	Contingency
$ 134	10%	Contractor O&P
$ -	0%	Engineering
$ 1,471	**Total**	

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	Princess Drive Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

Outdoor Winter Design DB Temperature	1 *F	**Indoor Winter Design DB Temperature**	70 *F
Outdoor Summer Design DB Temperature	98 *F	**Indoor Summer Design DB Temperature**	72 *F
Outdoor Summer Design WB Temperature	74 *F	**Indoor Summer Design WB Temperature**	60 *F
Outdoor Summer Humidity Ratio	0.0121 ##	**Indoor Air (70*F) Humidity Ratio**	0.0078 ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)

		R Value	Wall Type
	Steel Siding, 4" Insulation, Steel Siding	15.2	1
	Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
	4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
	Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
	4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
	4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
	Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
	Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
	Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
	4" Block, 1" insulation, 8" Block	19.9	16
x	4" Face Brick, 8" CMU filled	5.2	

Roofs (Select One)

		R Value	Roof Type
	Tectum Deck, 3.3" Insul., BU Roof	13.0	1
	Steel Deck, 5" Insul., BU Roof	18.2	1
x	Attic Roof with 6" Insul.	25.0	4
	4" HW Concrete Deck, BU Roof	2.7	2
	Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
	Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
	Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
	Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
	Wood Deck, 6" insulation, Felt & Membrane	18.0	
	Wood Deck, 6" insulation, Felt & Membrane	40.20	

Windows (Select One)

		U Value
	Aluminum Frame, 1/8" SP Glazing	1.05
	Aluminum Frame, 1/4" DP Glazing	0.60
	Aluminum Frame, 3/16" DP Glazing	0.62
	Aluminum Frame, 1/2" DP Glazing	0.50
	Skylights	0.90
	Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area	1,092 SF		
Occupied Area	1,092 SF	**Return Plenum?**	n

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	26 Ft	13.5 Ft	13.5 Ft	0 SF	42 SF	309 SF
East Exposure	42 Ft	13.5 Ft	13.5 Ft	0 SF	0 SF	567 SF
South Exposure	26 Ft	13.5 Ft	13.5 Ft	0 SF	0 SF	351 SF
West Exposure	42 Ft	13.5 Ft	13.5 Ft	0 SF	0 SF	567 SF

Forced Ventilation 0 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	Princess Drive Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor		Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						0 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	309	0.19	26 *F	1.0	1,545 Btu/hr
East Exposure	567	0.19	26 *F	1.0	2,835 Btu/hr
South Exposure	351	0.19	35 *F	1.0	2,363 Btu/hr
West Exposure	567	0.19	26 *F	1.0	2,835 Btu/hr
Roof	1,092	0.04	50 *F	1.0	2,184 Btu/hr
Fenestration	0	0.00	26 *F		0 Btu/hr
Doors	42	0.14	26 *F		153 Btu/hr
Ceiling	1,092	0.14	0 *F		0 Btu/hr
Partition		0.05	0 *F		0 Btu/hr
Floor	1,092	0.04	0 *F		0 Btu/hr
					11,914 Btu/h

INTERNAL HEAT GAINS

							Room Heat Gain
Lights	0.00 w/sf x	1,092 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		0 Btu/h
Plug Load	0.10 w/sf x	1,092 Occ Area =	0.1 kW x 3.4x		1.0 RAF =		373 Btu/h
People	2 people x	255 btu/person x	5% time in space =				26 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =			0 Btu/h
Equipment	2.0 kW x 3.413 =						6,826 Btu/h
Misc.							0 Btu/h
							7,224 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor		Perimeter Ratio		Coef	Temp. Diff.	Room Heat Gain
Walls	1,794 SF	0.12	CFM/SF			1.08	26 *F	6,542 Btu/h
Doors	42 SF	0.20	CFM/LF	0.95	LF/SF	1.08	26 *F	243 Btu/h
Windows	0 SF	0.20	CFM/LF	1.30	LF/SF	1.08	26 *F	0 Btu/h
Ventilation	0 cfm					1.08	26 *F	0 Btu/h
								6,785 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	0	0.19	26	1.0	0 Btu/hr
East Exposure	0	0.19	26	1.0	0 Btu/hr
South Exposure	0	0.19	35	1.0	0 Btu/hr
West Exposure	0	0.19	26	1.0	0 Btu/hr
Roof	1,092	0.04	50	0.0	0 Btu/hr
					0 Btu/h

INTERNAL HEAT GAINS

					Room Heat Gain
Lights	0.00 w/sf x	1,092 Occ Area =	0.0 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT	
Solar	0
Conduction to Room	11,914
Conduction to Plenum	0
Ventilation and Infiltration	6,785
Sub Total	18,700

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT	
Internal Gains to Room	7,224
Internal Gains to Plenum	0
Sub Total	7,224

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	Princess Drive Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	1,092 SF	0.12 CFM/SF	4,800	0.0043 ##	2,732 Btu/h
Doors	42 SF	0.20 CFM/LF	4,800	0.0043 ##	167 Btu/h
Windows	0 SF	0.20 CFM/LF	4,800	0.0043 ##	0 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##	0 Btu/h
People	2 people	0.05 time in space		250 Btu/hr/person	25 Btu/h
					2,923 Btu/h

Cooling Load Summary

	Sensible	Latent	Total		
Temperature Dependent Gains	18,700	2,923	21,623		
Temperature Indep. Gains	7,224		7,224	SHR=	0.90
Total	25,924	2,923	28,847		

Building Cooling Load: 2.4 Tons at 454 SF/Ton

Building Air Flow to Condition Space based on a 12*F Temp Rise is: 1,996 CFM (1.83 CFM/sf)

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	309	0.19	69	4,100 Btu/h
East Exposure	567	0.19	69	7,524 Btu/h
South Exposure	351	0.19	69	4,658 Btu/h
West Exposure	567	0.19	69	7,524 Btu/h
Fenestration	0	0.00	69	0 Btu/h
Roof	1,092	0.04	69	3,014 Btu/h
Doors	42	0.14	69	405 Btu/h
Ceiling	1,092	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	1,092	0.04	50	2,184 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	1,794 SF	0.05 CFM/SF	1.08	69	90 cfm	6,698 Btu/h
Doors	42 SF	0.20 CFM/LF	1.08	69	8 cfm	597 Btu/h
Windows	0 SF	0.20 CFM/LF	1.08	69	0 cfm	0 Btu/h
Ventilation Load	0 cfm		1.08	69	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load					98 cfm	7,296 Btu/h

Building Heating Load	36,704	btu/h
		33.6 btu/sf

APPENDIX G

ECM-6 Schmidt Lane Space Temperature Setback

North Brunswick
CHA #20418
Schmidt Lane Pump Station

ECM-6 Space Temperature Setback

Building Footprint	200	SF	Ex Occupied Clng Temp.	72	°F	Ex Occupied Htg Temp.	70	°F	Blended Electric Cost	0.1591	$/kWh
Heat Content	3,413	Btuh/kW	Ex Unoccupied Clng Temp.	72	°F	Ex Unoccupied Htg Temp.	70	°F	**Heating Energy Savings**	3,826	kWh
Cooling Efficiency	1.3	kW/ton	Prop Occupied Clng Temp	73	°F	Prop Occupied Htg Temp.	70	°F	**Cooling Energy Savings**		kWh
Building Balance Temp.	60	°F	Prop Unoccupied Clng Temp.	80	°F	Prop Unoccupied Htg Temp.	60	°F	**Total Energy Savings**	3,826	kWh
Internal Gains	6,920	btu/h	Occupied Cooling UA	216	btu/hr/°F	Occupied Heating UA	157	btu/hr/°F	**Total Cost Savings**	$ 609	
Unoc Internal Gain factor	0.2		Unoccupied Cooling UA	216	btu/hr/°F	Unoccupied Heating UA	157	btu/hr/°F			
Ave Occ Internal Gain Factor	0.05		Cooling Occ Enthalpy Setpoint	27.6	Btu/lb						
			Cooling Unocc Enthalpy Setpoint	27.6	Btu/lb						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS						PROPOSED LOADS									
					Occupied			Unoccupied			Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	6,586	-6,341	-346	6,586	-6,341	-1,384	6,370	-6,341	-346	4,859	-6,341	-1,384	0	0	0	0
97.5	42.5	3	0	3	5,507	-4,404	-346	5,507	-4,404	-1,384	5,291	-4,404	-346	3,779	-4,404	-1,384	0	0	0	-2
92.5	39.5	34	1	33	4,427	-3,523	-346	4,427	-3,523	-1,384	4,211	-3,523	-346	2,699	-3,523	-1,384	0	0	-5	-22
87.5	36.6	131	2	129	3,347	-2,672	-346	3,347	-2,672	-1,384	3,131	-2,672	-346	1,620	-2,672	-1,384	0	0	-26	-92
82.5	34	500	9	491	2,267	-1,908	-346	2,267	-1,908	-1,384	2,051	-1,908	-346	540	-1,908	-1,384	0	147	-147	0
77.5	31.6	620	11	609	1,188	-1,204	-346	1,188	-1,204	-1,384	972	-1,204	-346	0	0	-1,384	93	92	0	0
72.5	29.2	664	12	652	108	-499	-346	108	-499	-1,384	0	0	-346	0	0	-1,384	126	98	0	0
67.5	27	854	15	839	393	176	-346	393	176	-1,384	393	176	-346	0	0	-1,384	0	0	-199	-339
62.5	24.5	927	17	910	1,179	528	-346	1,179	528	-1,384	1,179	528	-346	0	0	-1,384	0	0	93	-363
57.5	21.4	600	11	589	1,966	881	-346	1,966	881	-1,384	1,966	881	-346	393	176	-1,384	0	0	260	-133
52.5	18.7	610	11	599	2,752	1,233	-346	2,752	1,233	-1,384	2,752	1,233	-346	1,179	528	-1,384	0	0	468	68
47.5	16.2	611	11	600	3,538	1,585	-346	3,538	1,585	-1,384	3,538	1,585	-346	1,966	881	-1,384	0	0	673	272
42.5	14.4	656	12	644	4,325	1,938	-346	4,325	1,938	-1,384	4,325	1,938	-346	2,752	1,233	-1,384	0	0	941	511
37.5	12.6	1,023	18	1,005	5,111	2,290	-346	5,111	2,290	-1,384	5,111	2,290	-346	3,538	1,585	-1,384	0	0	1,809	1,139
32.5	10.7	734	13	721	5,897	2,642	-346	5,897	2,642	-1,384	5,897	2,642	-346	4,325	1,938	-1,384	0	0	1,543	1,062
27.5	8.6	334	6	328	6,683	2,995	-346	6,683	2,995	-1,384	6,683	2,995	-346	5,111	2,290	-1,384	0	0	813	595
22.5	6.8	252	4	248	7,470	3,347	-346	7,470	3,347	-1,384	7,470	3,347	-346	5,897	2,642	-1,384	0	0	698	533
17.5	5.5	125	2	123	8,256	3,699	-346	8,256	3,699	-1,384	8,256	3,699	-346	6,683	2,995	-1,384	0	0	388	306
12.5	4.1	47	1	46	9,042	4,051	-346	9,042	4,051	-1,384	9,042	4,051	-346	7,470	3,347	-1,384	0	0	162	131
7.5	2.6	22	1	21	9,829	4,404	-346	9,829	4,404	-1,384	9,829	4,404	-346	8,256	3,699	-1,384	0	0	83	69
2.5	1	13	0	13	10,615	4,756	-346	10,615	4,756	-1,384	10,615	4,756	-346	9,042	4,051	-1,384	0	0	53	45
-2.5	0	0	0	0	11,401	5,108	-346	11,401	5,108	-1,384	11,401	5,108	-346	9,829	4,404	-1,384	0	0	0	0
-7.5	-1.5	0	0	0	12,187	5,461	-346	12,187	5,461	-1,384	12,187	5,461	-346	10,615	4,756	-1,384	0	0	0	0
TOTALS		8,760	157	8,603													219	337	7,607	3,781

Existing Building Ventilation & Infiltration (occ)	**65**	**cfm**
Overheat Ventilation Factor	**1.00**	
Additional ventilation to offset overheat	**0**	**cfm**
Existing Building Ventilation & Infiltration (unocc)	**65**	**cfm**

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	Schmidt Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

Outdoor Winter Design DB Temperature	1 *F	**Indoor Winter Design DB Temperature**	70 *F
Outdoor Summer Design DB Temperature	98 *F	**Indoor Summer Design DB Temperature**	72 *F
Outdoor Summer Design WB Temperature	74 *F	**Indoor Summer Design WB Temperature**	60 *F
Outdoor Summer Humidity Ratio	0.0121 #/#	**Indoor Air (70*F) Humidity Ratio**	0.0078 #/#

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)

		R Value	Wall Type
	Steel Siding, 4" Insulation, Steel Siding	15.2	1
	Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
	4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
	Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
	4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
	4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
	Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
	Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
	Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
	4" Block, 1" insulation, 8" Block	19.9	16
x	4" Face Brick, 8" CMU filled	5.2	

Roofs (Select One)

		R Value	Roof Type
	Tectum Deck, 3.3" Insul., BU Roof	13.0	1
	Steel Deck, 5" Insul., BU Roof	18.2	1
	Attic Roof with 6" Insul.	25.0	4
	4" HW Concrete Deck, BU Roof	2.7	2
	Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
	Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
	Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
	Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
	Wood Deck, 6" insulation, Felt & Membrane	18.0	
x	Plywood, asphalt shingles, no insulation	3.20	

Windows (Select One)

		U Value
	Aluminum Frame, 1/8" SP Glazing	1.05
	Aluminum Frame, 1/4" DP Glazing	0.60
	Aluminum Frame, 3/16" DP Glazing	0.62
	Aluminum Frame, 1/2" DP Glazing	0.50
	Skylights	0.90
	Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area	200 SF				
Occupied Area	200 SF			**Return Plenum?**	n

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	12 Ft	8.5 Ft	8.5 Ft	0 SF	49 SF	53 SF
East Exposure	16 Ft	8.5 Ft	8.5 Ft	0 SF	0 SF	136 SF
South Exposure	12 Ft	8.5 Ft	8.5 Ft	0 SF	0 SF	102 SF
West Exposure	16 Ft	8.5 Ft	8.5 Ft	0 SF	0 SF	136 SF

Forced Ventilation 0 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	Schmidt Lane Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor		Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						0 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	53	0.19	26 *F	1.0	265 Btu/hr
East Exposure	136	0.19	26 *F	1.0	680 Btu/hr
South Exposure	102	0.19	35 *F	1.0	687 Btu/hr
West Exposure	136	0.19	26 *F	1.0	680 Btu/hr
Roof	200	0.31	50 *F	1.0	3,125 Btu/hr
Fenestration	0	0.00	26 *F		0 Btu/hr
Doors	49	0.14	26 *F		178 Btu/hr
Ceiling	200	0.14	0 *F		0 Btu/hr
Partition		0.05	0 *F		0 Btu/hr
Floor	200	0.04	0 *F		0 Btu/hr
					5,614 Btu/h

INTERNAL HEAT GAINS

							Room Heat Gain
Lights	0.00 w/sf x	200 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		0 Btu/h
Plug Load	0.10 w/sf x	200 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		68 Btu/h
People	2 people x	255 btu/person x	5% time in space =				26 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =			0 Btu/h
Equipment	2.0 kW x 3.413 =						6,826 Btu/h
Misc.							0 Btu/h
							6,920 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	427 SF	0.12 CFM/SF		1.08	26 *F	1,557 Btu/h
Doors	49 SF	0.20 CFM/LF	0.95 LF/SF	1.08	26 *F	284 Btu/h
Windows	0 SF	0.20 CFM/LF	1.30 LF/SF	1.08	26 *F	0 Btu/h
Ventilation	0 cfm			1.08	26 *F	0 Btu/h
						1,841 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE 4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	0	0.19	26	1.0	0 Btu/hr
East Exposure	0	0.19	26	1.0	0 Btu/hr
South Exposure	0	0.19	35	1.0	0 Btu/hr
West Exposure	0	0.19	26	1.0	0 Btu/hr
Roof	200	0.31	50	0.0	0 Btu/hr
					0 Btu/h

INTERNAL HEAT GAINS

Lights	0.00 w/sf x	200 Occ Area =	0.0 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT		SENSIBLE HEAT GAINS - TEMP. INDEPENDENT	
Solar	0	Internal Gains to Room	6,920
Conduction to Room	5,614	Internal Gains to Plenum	0
Conduction to Plenum	0		
Ventilation and Infiltration	1,841		
Sub Total	7,455	Sub Total	6,920

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	Schmidt Lane Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	200 SF	0.12 CFM/SF	4,800	0.0043 ##/#	500 Btu/h
Doors	49 SF	0.20 CFM/LF	4,800	0.0043 ##/#	195 Btu/h
Windows	0 SF	0.20 CFM/LF	4,800	0.0043 ##/#	0 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##/#	0 Btu/h
People	2 people	0.05 time in space		250 Btu/hr/person	25 Btu/h
					720 Btu/h

Cooling Load Summary

	Sensible	Latent	Total		
Temperature Dependent Gains	7,455	720	8,175		
Temperature Indep. Gains	6,920		6,920	SHR=	0.95
Total	14,375	720	15,095		

Building Cooling Load 1.3 Tons at 159 SF/Ton

Building Air Flow to Condition Space based on a 12*F Temp Rise is **1,107 CFM** / **5.53 CFM/sf**

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	53	0.19	69	703 Btu/h
East Exposure	136	0.19	69	1,805 Btu/h
South Exposure	102	0.19	69	1,353 Btu/h
West Exposure	136	0.19	69	1,805 Btu/h
Fenestration	0	0.00	69	0 Btu/h
Roof	200	0.31	69	4,313 Btu/h
Doors	49	0.14	69	472 Btu/h
Ceiling	200	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	200	0.04	50	400 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	427 SF	0.12 CFM/SF	1.08	69	51 cfm	3,826 Btu/h
Doors	49 SF	0.30 CFM/LF	1.08	69	14 cfm	1,045 Btu/h
Windows	0 SF	0.20 CFM/LF	1.08	69	0 cfm	0 Btu/h
Ventilation Load	0 cfm		1.08	69	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load					65 cfm	4,872 Btu/h

Building Heating Load **15,723** **btu/h**

78.6 btu/sf

North Brunswick
CHA #20418
Schmidt Lane Pump Station

ECM-6 Cost Estimate

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Programmable thermostat	1	ea	$ 100	$ 150	$ -	$ 98	$ 182	$ -	$ 280	
Electric Wiring	1	ea	$ 150	$ 150		$ 147	$ 182	$ -	$ 329	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Schmidt lane has two 5 kw electric heaters

Proposed cost estimate is to control both heaters with one thermostat

$ 608		Subtotal
$ 61	10%	Contingency
$ 67	10%	Contractor O&P
$ -	0%	Engineering
$ 736		**Total**

APPENDIX H

ECM-7 West Lawrence Space Temperature Setback

North Brunswick
CHA #20418
West Lawrence Pump Station

ECM-7 Space Temperature Setback

Building Footprint	740	SF	Ex Occupied Clng Temp.	72	°F	Ex Occupied Htg Temp.	70	°F	Blended Electric Cost	0.1484	$/kWh
Heat Content	3,413	Btuh/kW	Ex Unoccupied Clng Temp.	72	°F	Ex Unoccupied Htg Temp.	70	°F	**Heating Energy Savings**	5,413	**kWh**
Cooling Efficiency	1.3	kW/ton	Prop Occupied Clng Temp	73	°F	Prop Occupied Htg Temp.	70	°F	**Cooling Energy Savings**		**kWh**
Building Balance Temp.	60	°F	Prop Unoccupied Clng Temp.	80	°F	Prop Unoccupied Htg Temp.	60	°F	**Total Energy Savings**	5,413	**kWh**
Internal Gains	7,104	btu/h	Occupied Cooling UA	293	btu/hr/°F	Occupied Heating UA	200	btu/hr/°F	**Total Cost Savings**	$ 803	
Unoc Internal Gain factor	0.03		Unoccupied Cooling UA	293	btu/hr/°F	Unoccupied Heating UA	200	btu/hr/°F			
Ave Occ Internal Gain Factor	0.5		Cooling Occ Enthalpy Setpoint	27.6	Btu/lb						
			Cooling Unocc Enthalpy Setpoint	27.6	Btu/lb						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS						PROPOSED LOADS									
					Occupied			Unoccupied			Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	8,936	-15,681	-3,552	8,936	-15,681	-213	8,643	-15,681	-3,552	6,592	-15,681	-213	0	0	0	0
97.5	42.5	3	0	3	7,471	-10,889	-3,552	7,471	-10,889	-213	7,178	-10,889	-3,552	5,127	-10,889	-213	1	2	0	0
92.5	39.5	34	1	33	6,006	-8,712	-3,552	6,006	-8,712	-213	5,713	-8,712	-3,552	3,662	-8,712	-213	11	19	0	0
87.5	36.6	131	2	129	4,541	-6,606	-3,552	4,541	-6,606	-213	4,248	-6,606	-3,552	2,197	-6,606	-213	33	66	0	0
82.5	34	500	9	491	3,076	-4,719	-3,552	3,076	-4,719	-213	2,783	-4,719	-3,552	732	-4,719	-213	104	229	0	0
77.5	31.6	620	11	609	1,611	-2,976	-3,552	1,611	-2,976	-213	1,318	-2,976	-3,552	0	0	-213	110	20	0	0
72.5	29.2	664	12	652	146	-1,234	-3,552	146	-1,234	-213	0	0	-3,552	0	0	-213	98	20	0	0
67.5	27	854	15	839	500	436	-3,552	500	436	-213	500	436	-3,552	0	0	-213	4	24	0	0
62.5	24.5	927	17	910	1,500	1,307	-3,552	1,500	1,307	-213	1,500	1,307	-3,552	0	0	-213	1	22	0	0
57.5	21.4	600	11	589	2,500	2,178	-3,552	2,500	2,178	-213	2,500	2,178	-3,552	500	436	-213	0	0	774	128
52.5	18.7	610	11	599	3,500	3,049	-3,552	3,500	3,049	-213	3,500	3,049	-3,552	1,500	1,307	-213	0	0	1,122	465
47.5	16.2	611	11	600	4,500	3,920	-3,552	4,500	3,920	-213	4,500	3,920	-3,552	2,500	2,178	-213	0	0	1,459	801
42.5	14.4	656	12	644	5,500	4,791	-3,552	5,500	4,791	-213	5,500	4,791	-3,552	3,500	3,049	-213	0	0	1,926	1,219
37.5	12.6	1,023	18	1,005	6,500	5,663	-3,552	6,500	5,663	-213	6,500	5,663	-3,552	4,500	3,920	-213	0	0	3,564	2,462
32.5	10.7	734	13	721	7,500	6,534	-3,552	7,500	6,534	-213	7,500	6,534	-3,552	5,500	4,791	-213	0	0	2,959	2,169
27.5	8.6	334	6	328	8,500	7,405	-3,552	8,500	7,405	-213	8,500	7,405	-3,552	6,500	5,663	-213	0	0	1,530	1,170
22.5	6.8	252	4	248	9,500	8,276	-3,552	9,500	8,276	-213	9,500	8,276	-3,552	7,500	6,534	-213	0	0	1,292	1,021
17.5	5.5	125	2	123	10,500	9,147	-3,552	10,500	9,147	-213	10,500	9,147	-3,552	8,500	7,405	-213	0	0	710	575
12.5	4.1	47	1	46	11,500	10,018	-3,552	11,500	10,018	-213	11,500	10,018	-3,552	9,500	8,276	-213	0	0	293	242
7.5	2.6	22	1	21	12,500	10,889	-3,552	12,500	10,889	-213	12,500	10,889	-3,552	10,500	9,147	-213	0	0	148	125
2.5	1	13	0	13	13,500	11,761	-3,552	13,500	11,761	-213	13,500	11,761	-3,552	11,500	10,018	-213	0	0	95	81
-2.5	0	0	0	0	14,500	12,632	-3,552	14,500	12,632	-213	14,500	12,632	-3,552	12,500	10,889	-213	0	0	0	0
-7.5	-1.5	0	0	0	15,500	13,503	-3,552	15,500	13,503	-213	15,500	13,503	-3,552	13,500	11,761	-213	0	0	0	0
TOTALS		8,760	157	8,603													363	402	15,872	10,459

Existing Building Ventilation & Infiltration (occ)	**161**	**cfm**
Overheat Ventilation Factor	**1.00**	
Additional ventilation to offset overheat	**0**	**cfm**
Existing Building Ventilation & Infiltration (unocc)	**161**	**cfm**

North Brunswick
CHA #20418

West Lawrence Pump Station

ECM-7 Cost Estimate

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Programmable thermostat	1	ea	$ 100	$ 150	$ -	$ 98	$ 182	$ -	$ 280	
Electric Wiring	1	ea	$ 150	$ 150		$ 147	$ 182	$ -	$ 329	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

West Lawrence has two 5 kw electric heaters

Proposed cost estimate is to control both heaters with one thermostat

$ 608		Subtotal
$ 61	10%	Contingency
$ 67	10%	Contractor O&P
$ -	0%	Engineering
$ 736		**Total**

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	West Lawrence Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

Outdoor Winter Design DB Temperature	1 *F	**Indoor Winter Design DB Temperature**	70 *F
Outdoor Summer Design DB Temperature	98 *F	**Indoor Summer Design DB Temperature**	72 *F
Outdoor Summer Design WB Temperature	74 *F	**Indoor Summer Design WB Temperature**	60 *F
Outdoor Summer Humidity Ratio	0.0121 ##	**Indoor Air (70*F) Humidity Ratio**	0.0078 ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)		R Value	Wall Type
	Steel Siding, 4" Insulation, Steel Siding	15.2	1
	Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
	4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
	Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
	4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
	4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
	Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
	Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
	Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
	4" Block, 1" insulation, 8" Block	19.9	16
x	4" Face Brick, 8" CMU filled	5.2	

Roofs (Select One)		R Value	Roof Type
	Tectum Deck, 3.3" Insul., BU Roof	13.0	1
	Steel Deck, 5" Insul., BU Roof	18.2	1
x	Attic Roof with 6" Insul.	25.0	4
	4" HW Concrete Deck, BU Roof	2.7	2
	Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
	Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
	Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
	Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
	Wood Deck, 6" insulation, Felt & Membrane	18.0	
	Wood Deck, 6" insulation, Felt & Membrane	40.20	

Windows (Select One)		U Value
	Aluminum Frame, 1/8" SP Glazing	1.05
	Aluminum Frame, 1/4" DP Glazing	0.60
	Aluminum Frame, 3/16" DP Glazing	0.62
	Aluminum Frame, 1/2" DP Glazing	0.50
	Skylights	0.90
	Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area	740 SF		
Occupied Area	740 SF	**Return Plenum?**	n

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	37 Ft	10.0 Ft	10.0 Ft	0 SF	127 SF	243 SF
East Exposure	20 Ft	10.0 Ft	10.0 Ft	0 SF	21 SF	179 SF
South Exposure	37 Ft	10.0 Ft	10.0 Ft	0 SF	0 SF	370 SF
West Exposure	20 Ft	10.0 Ft	10.0 Ft	0 SF	0 SF	200 SF

Forced Ventilation 0 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	Project No.:	CHA #20418		
Location	North Brunswick, NJ	Site Elevation:	460 Feet	Specific Volume	13.50 CF/#
Building Name	West Lawrence Pump Station	Date:	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation: Pump Station Building

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor		Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						0 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	243	0.19	26 *F	1.0	1,215 Btu/hr
East Exposure	179	0.19	26 *F	1.0	895 Btu/hr
South Exposure	370	0.19	35 *F	1.0	2,490 Btu/hr
West Exposure	200	0.19	26 *F	1.0	1,000 Btu/hr
Roof	740	0.04	50 *F	1.0	1,480 Btu/hr
Fenestration	0	0.00	26 *F		0 Btu/hr
Doors	148	0.14	26 *F		537 Btu/hr
Ceiling	740	0.14	0 *F		0 Btu/hr
Partition		0.05	0 *F		0 Btu/hr
Floor	740	0.04	0 *F		0 Btu/hr
					7,618 Btu/h

INTERNAL HEAT GAINS

							Room Heat Gain
Lights	0.00 w/sf x	740 Occ Area =	0.0 kW x 3.4x		1.0 RAF =		0 Btu/h
Plug Load	0.10 w/sf x	740 Occ Area =	0.1 kW x 3.4x		1.0 RAF =		253 Btu/h
People	2 people x	255 btu/person x	5% time in space =				26 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =			0 Btu/h
Equipment	2.0 kW x 3.413 =						6,826 Btu/h
Misc.							0 Btu/h
							7,104 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	992 SF	0.12 CFM/SF		1.08	26 *F	3,618 Btu/h
Doors	148 SF	0.20 CFM/LF	0.95 LF/SF	1.08	26 *F	857 Btu/h
Windows	0 SF	0.20 CFM/LF	1.30 LF/SF	1.08	26 *F	0 Btu/h
Ventilation	0 cfm			1.08	26 *F	0 Btu/h
						4,474 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE 4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	0	0.19	26	1.0	0 Btu/hr
East Exposure	0	0.19	26	1.0	0 Btu/hr
South Exposure	0	0.19	35	1.0	0 Btu/hr
West Exposure	0	0.19	26	1.0	0 Btu/hr
Roof	740	0.04	50	0.0	0 Btu/hr
					0 Btu/h

INTERNAL HEAT GAINS

Lights	0.00 w/sf x	740 Occ Area =	0.0 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT		SENSIBLE HEAT GAINS - TEMP. INDEPENDENT	
Solar	0	Internal Gains to Room	7,104
Conduction to Room	7,618	Internal Gains to Plenum	0
Conduction to Plenum	0		
Ventilation and Infiltration	4,474		
Sub Total	12,092	Sub Total	7,104

HEAT GAIN/LOSS WORKSHEET

Project Name:	Town Of North Brunswick	**Project No.:**	CHA #20418		
Location	North Brunswick, NJ	**Site Elevation:**	460 Feet	**Specific Volume**	13.50 CF/#
Building Name	West Lawrence Pump Station	**Date:**	11/24/09		
Engineer:	G Pfaff				

Building/Facility Designation Pump Station Building

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	740 SF	0.12 CFM/SF	4,800	0.0043 ##	1,851 Btu/h
Doors	148 SF	0.20 CFM/LF	4,800	0.0043 ##	588 Btu/h
Windows	0 SF	0.20 CFM/LF	4,800	0.0043 ##	0 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##	0 Btu/h
People	2 people	0.05 time in space		250 Btu/hr/person	25 Btu/h
					2,464 Btu/h

Cooling Load Summary

	Sensible	Latent	Total		
Temperature Dependent Gains	12,092	2,464	14,556		
Temperature Indep. Gains	7,104		7,104	SHR=	0.89
Total	19,196	2,464	21,660		

Building Cooling Load 1.8 Tons at 410 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is **1,478 CFM** / **2.00 CFM/sf**

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	243	0.19	69	3,224 Btu/h
East Exposure	179	0.19	69	2,375 Btu/h
South Exposure	370	0.19	69	4,910 Btu/h
West Exposure	200	0.19	69	2,654 Btu/h
Fenestration	0	0.00	69	0 Btu/h
Roof	740	0.04	69	2,042 Btu/h
Doors	148	0.14	69	1,426 Btu/h
Ceiling	740	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	740	0.04	50	1,480 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	992 SF	0.12 CFM/SF	1.08	69	119 cfm	8,889 Btu/h
Doors	148 SF	0.30 CFM/LF	1.08	69	42 cfm	3,158 Btu/h
Windows	0 SF	0.20 CFM/LF	1.08	69	0 cfm	0 Btu/h
Ventilation Load	0 cfm		1.08	69	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load					161 cfm	12,047 Btu/h

Building Heating Load 30,159 **btu/h**

40.8 btu/sf

APPENDIX I

ECM-8 Replace Schmidt Lane Window AC Unit with Cabinet AC Unit

North Brunswick

CHA #20418

Schmidt Lane Pump Station

ECM-8: Replace window AC unit with electric enclosure AC Unit

ASSUMPTIONS				Comments
Electric Cost		$0.159	/ kWh	
Annual Cooling Hours / Year		1,465	Hours/yr	(Assumed to run when outdoor temp. is 70°F or above)
BTU / Hr Rating of existing AC unit		12,000	Btu / Hr	Per nameplate data
Average EER		9.8		per manufacturers nameplate

Item		Value	Units	Comments
Total Number of Units		1		
BTU / Hr Rating of proposed AC unit		2,664		110 volt unit to mount directly on VSD electric enclosure cabinet
Existing Annual Electric Usage		1,794	kWh	
Annual Cooling Hours / Year		1,465	Hours	(Assumed to run when outdoor temp. is 70°F or above)
Proposed EER		12.0		New cabinet AC unit (per manufacturer)
Proposed Annual Electric Usage		325	kWh	Unit will cycle on w/ temp of cabinet

ANNUAL SAVINGS			
Annual Savings		1,469	kWh
Annual Cost Savings		$234	

Set Point	70	deg F

OAT - DB Bin Temp F	Hrs of Occurrence Annually	Cooling Hrs at Temp Above set point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	3	3	100%	3
92.5	34	34	100%	34
87.5	131	131	100%	131
82.5	500	500	100%	500
77.5	620	620	75%	465
72.5	664	664	50%	332
67.5	854	0	25%	0
62.5	927	0	13%	0
57.5	600	0	0%	0
52.5	610	0	0%	0
47.5	611	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	22	0	0%	0
2.5	13	0	0%	0
-2.5	0	0	0%	0
Total	8,760	1,952	75%	1465

North Brunswick
CHA #20418
Schmidt Lane Pump Station

ECM-8: Replace window AC unit with electric enclosure AC Unit

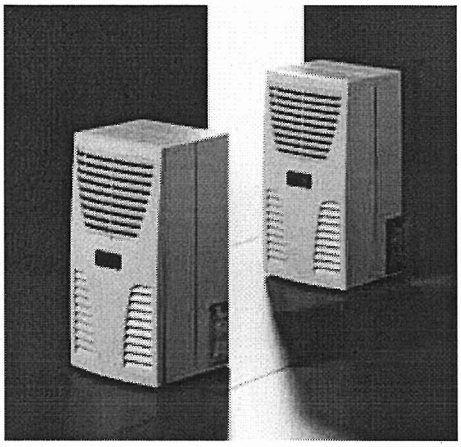
Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

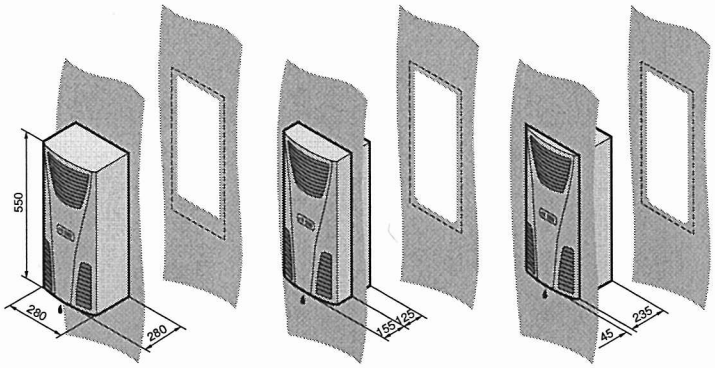
Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Window AC Unit Removal	1	LS	$ 50	$ 50		$ 49	$ 61	$ -	$ 110	
						$ -	$ -	$ -	$ -	
2,600 BTUH Cabinet AC unit	1	LS	$ 1,800	$ 500		$ 1,764	$ 605	$ -	$ 2,369	Includes Labor
Electric wiring	1	LS	$ 100	$ 200		$ 98	$ 242	$ -	$ 340	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$	2,819	Subtotal
$	282	10% Contingency
$	310	10% Contractor O&P
$	-	0% Engineering
$	**3,410**	**Total**

Sample

Useful cooling capacity 780 W (2664 BTU)





RITTAL TOP—THERM

Configuration:
Fully wired ready for connection, including drilling template and assembly parts.

Note:
Air conditioners with comfort controller may be integrated into a superordinate remote monitoring system with an optional interface board **SK 3124.200** (RS 232, RS 485, RS 422 and PLC interface).

Certifications,
see page 70.

Detailed drawing,
see page 1167.

Performance diagrams,
available on the Internet, log onto www.rittal-corp.com.

Property rights:
German registered designs no. 402 02 324 and no. 402 02 325
Japanese registered design no. 1 187 896
Indian registered design no. 189 953
US design patent no. D 488,480
IR reg. design no. DM/061 967 with validity for FR, IT, ES

Part No. SK with basic controller, RAL 7035 (light gray)		**3361.100**	**3361.110**	**3361.140**
Part No. SK with comfort controller, RAL 7035 (light gray)		**3361.500**	**3361.510**	**3361.540**
Part No. SK with basic controller, stainless steel[1)]		**3361.200**	**3361.210**	**3361.240**
Part No. SK with comfort controller, stainless steel[1)]		**3361.600**	**3361.610**	**3361.640**
Voltage V, Hz		230, 50/60[3)]	115, 60[3)]	400[2)], 2~, 50/60[3)]
Dimensions in mm (inches)	H W D	550 (21.7) 280 (11.0) 280 (11.0)		
Useful cooling capacity $\dot{Q}_K$ to DIN 3168 in W (BTU)	**L 35 L 35** **L 35 L 50**	**750/780 (2561/2664)** **510/540 (1742/1844)**	**750/780 (2561/2664)** **500/540 (1708/1844)**	**750/780 (2561/2664)** **510/540 (1742/1844)**
Rated current maximum		2.3 A/2.4 A	6.5 A	1.3 A/1.4 A
Starting current		5.7 A/5.7 A	13.9 A	3.3 A/3.3 A
Pre-fuse T		10 A/10 A	10 A	10 A/10 A
Power consumption P_{el} to DIN 3168	L 35 L 35 L 35 L 50	480 W/555 W 545 W/610 W	560 W 650 W	490 W/570 W 560 W/630 W
Cooling coefficient $\varepsilon = \dot{Q}_K/P_{el}$	L 35 L 35	1.5		
Refrigerant		R134a, 280 g (9.9 oz)		
Maximum allowable operating pressure		28 bar (406 psi)		
Temperature and setting range		+20°C to +55°C (68°F to 131°F)		
Ratings to EN 60 529/10.91	External circuit	IP 34 (NEMA 2)		
	Internal circuit	IP 54 (NEMA 12)		
Duty cycle		100 %		
Type of connection		Plug-in terminal strip		
Weight in kg (lb)		22 (48.5)		
Air displacement of fans (unimpeded air flow)	External circuit	480 m³/h (283 cfm)		
	Internal circuit	600 m³/h (353 cfm)		
Temperature control		Basic or comfort controller (factory setting +35°C (95°F))		

Accessories	PU		Page
Filter mats	3	3286.300	668
Metal filters	1	3286.310	669
Door-operated switch	1	4127.000	956
SK bus system for comfort controller	1	3124.100	663
RiDiag II including cables for comfort controller	1	3159.100	1063
Interface card for comfort controller	1	3124.200	662
Condensate hose	1	3301.608	665

[1)] Delivery times on request.
[2)] External toroidal core transformer Ø 126 x 65 mm (5.0 x 2.6") deep for mounting in the enclosure.
[3)] T_u maximum = 52°C (125°F)/60 Hz.
Special voltages available on request. We reserve the right to make technical modifications.

Accessories Page 657 **Configuration software** Page 1063

APPENDIX J

New Jersey Pay For Performance Incentive Program

North Brunswick
CHA #20418
Building: Edly Lane Pump Station

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	347,600	0
Proposed Savings	45,271	0
Existing Total MMBtus	1,186	
Proposed Savings MMBtus	155	
% Reduction	13.0%	
Proposed Annual Savings	$6,715	

	≥%15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$37,599
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$37,599

Project Payback (years)	
w/o Incentives	w/ Incentives
5.6	5.6

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

North Brunswick
CHA #20418
Building: How Lane Pump Station

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	124,000	0
Proposed Savings	4,062	0
Existing Total MMBtus	423	
Proposed Savings MMBtus	14	
% Reduction	3.3%	
Proposed Annual Savings	$600	

	≥%15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$736
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$736

Project Payback (years)	
w/o Incentives	w/ Incentives
1.2	1.2

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

North Brunswick
CHA #20418
Building: Princess Drive Pump Station

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	90,780	0
Proposed Savings	10,895	0
Existing Total MMBtus	310	
Proposed Savings MMBtus	37	
% Reduction	12.0%	
Proposed Annual Savings	$1,851	

	≥%15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$10,274
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$10,274

Project Payback (years)	
w/o Incentives	w/ Incentives
5.6	5.6

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

North Brunswick
CHA #20418
Building: Schmidt Lane Pump Station

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	185,600	0
Proposed Savings	5,294	0
Existing Total MMBtus	633	
Proposed Savings MMBtus	18	
% Reduction	2.9%	
Proposed Annual Savings	$842	

	≥%15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$4,146
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$4,146

Project Payback (years)	
w/o Incentives	w/ Incentives
4.9	4.9

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

North Brunswick
CHA #20418
Building: West Lawrence Pump Station

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	62,080	0
Proposed Savings	5,413	0
Existing Total MMBtus	212	
Proposed Savings MMBtus	18	
% Reduction	8.7%	
Proposed Annual Savings	$842	

	≥%15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$4,146
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$4,146

Project Payback (years)	
w/o Incentives	w/ Incentives
4.9	4.9

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

APPENDIX K

Photovoltaic (PV) Rooftop Solar Power Generation

PVWatts *** AC Energy & Cost Savings

Cautions for Interpreting the Results

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	50.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	38.5 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	14.5 ¢/kWh

Results			
Month	Solar Radiation (kWh/m^2/day)	AC Energy (kWh)	Energy Value ($)
1	3.36	4139	600.15
2	4.05	4469	648.00
3	4.58	5422	786.19
4	4.84	5299	768.36
5	5.30	5838	846.51
6	5.33	5506	798.37
7	5.27	5561	806.35
8	5.25	5503	797.94
9	5.06	5338	774.01
10	4.46	5027	728.91
11	3.15	3588	520.26
12	2.87	3460	501.70
Year	4.46	59150	8576.75

Output Hourly Performance Data

About the Hourly Performance Data

*

Output Results as Text

Saving Text from a Browser

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

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

Cautions for Interpreting the Results

The monthly and yearly energy production are modeled using the PV system parameters you selected and weather data that are typical or representative of long-term averages. For reference, or comparison with local information, the solar radiation values modeled for the PV array are included in the performance results.

Because weather patterns vary from year-to-year, the values in the tables are better indicators of long-term performance than performance for a particular month or year. PV performance is largely proportional to the amount of solar radiation received, which may vary from the long-term average by ± 30% for monthly values and ± 10% for yearly values. How the solar radiation might vary for your location may be evaluated by examining the tables in the *Solar Radiation Data Manual for Flat-Plate and Concentrating Collectors* (*http://rredc.nrel.gov/solar/old_data/nsrdb/redbook/*).

For these variations and the uncertainties associated with the weather data and the model used to model the PV performance, future months and years may be encountered where the actual PV performance is less than or greater than the values shown in the table. The variations may be as much as 40% for individual months and up to 20% for individual years. Compared to long-term performance over many years, the values in the table are accurate to within 10% to 12%.

If the default overall DC to AC derate factor is used, the energy values in the table will overestimate the actual energy production if nearby buildings, objects, or other PV modules and array structure shade the PV modules; if tracking mechanisms for one- and two-axis tracking systems do not keep the PV arrays at the optimum orientation with respect to the sun's position; if soiling or snow cover related losses exceed 5%; or if the system performance has degraded from new. (PV performance typically degrades 1% per year.) If any of these situations exist, an overall DC to AC derate factor should be used with PVWATTS that was calculated using system specific component derate factors for *shading*, *sun-tracking*, *soiling*, and *age*.

The PV system size is the nameplate DC power rating. The energy production values in the table are valid only for crystalline silicon PV systems.

The cost savings are determined as the product of the number of kilowatt hours (kWh) and the cost of electricity per kWh. These cost savings occur if the owner uses all the electricity produced by the PV system, or if the owner has a net-metering agreement with the utility. With net-metering, the utility bills the owner for the net electricity consumed. When electricity flows from the utility to the owner, the meter spins forward. When electricity flows from the PV system to the utility, the meter spins backwards.

If net-metering isn't available and the PV system sends surplus electricity to the utility grid, the utility generally buys the electricity from the owner at a lower price than the owner pays the utility for electricity. In this case, the cost savings shown in the table should be reduced.

Besides the cost savings shown in the table, other benefits of PV systems include greater energy independence and a reduction in fossil fuel usage and air pollution. For commercial customers, additional cost savings may come from reducing demand charges. Homeowners can often include the cost of the PV system in their home mortgage as a way of accommodating the PV system's initial cost.

To accelerate the use of PV systems, many state and local governments offer financial incentives and programs. Go to http://www.nrel.gov/stateandlocal for more information.



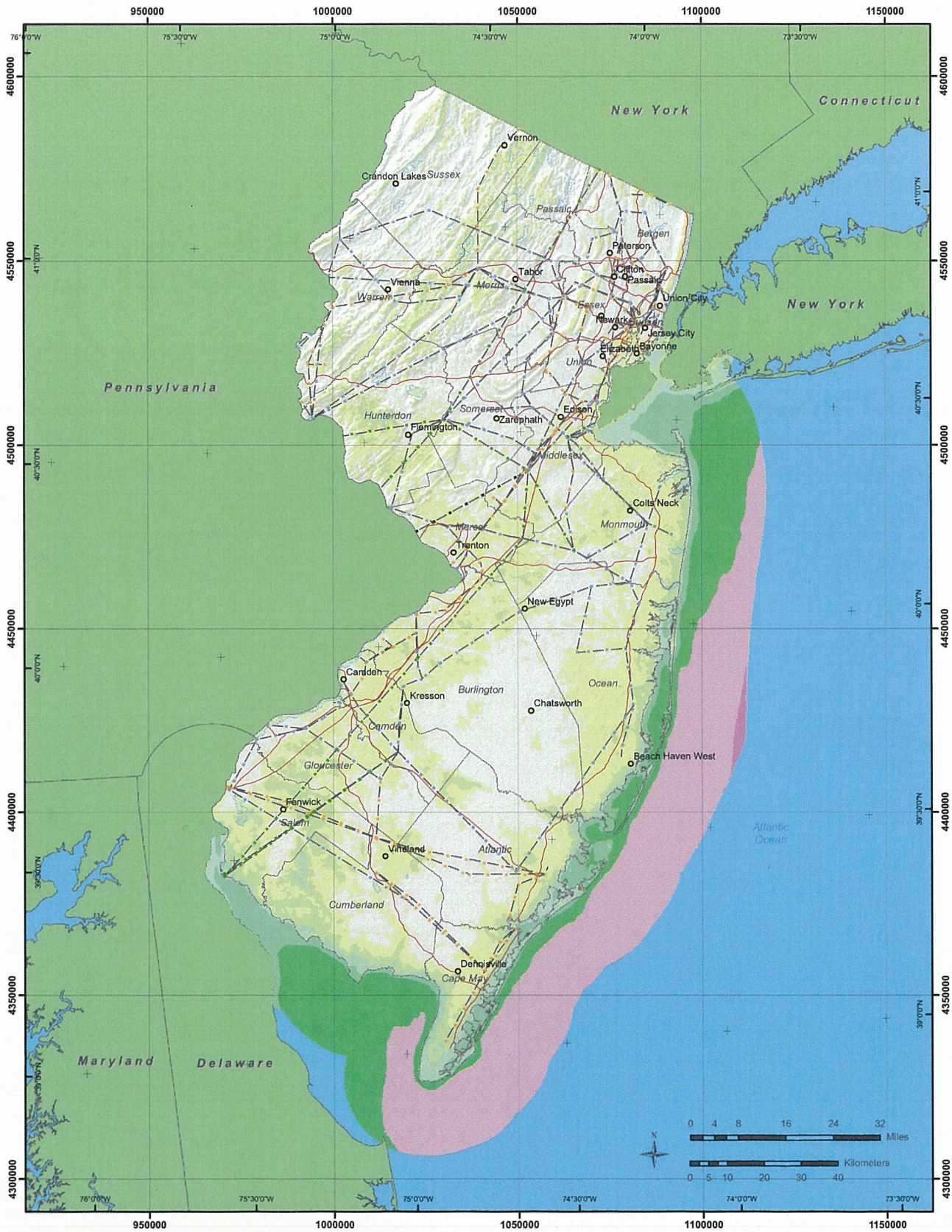
Township of North Brunswick
Edly Lane Pump Station

APPENDIX L

Wind



Township of North Brunswick
Edly Lane Pump Station



Wind Resource of New Jersey

Mean Annual Wind Speed at 30 Meters

Features
- City
- Interstate Highway
- County Boundary
- Water Body

Generalized Transmission Line

Category	
Under 100 kV	500 kV
100 kV-161 kV	735 kV +
230 kV-287 kV	Step-Up
345 kV	DC Line

Mean Speed at 30 m			
mph	m/s		
< 10.1	< 4.5	13.4 - 14.5	6.0 - 6.5
10.1 - 11.2	4.5 - 5.0	14.5 - 15.7	6.5 - 7.0
11.2 - 12.3	5.0 - 5.5	15.7 - 16.8	7.0 - 7.5
12.3 - 13.4	5.5 - 6.0	16.8 - 17.9	7.5 - 8.0
		17.9 - 19.0	8.0 - 8.5
		> 19.0	> 8.5

AWS Truewind

Projection: Tranverse Mercator, UTM Zone 17 WGS84
Spatial Resolution of Wind Resource Data: 200m
This map was created by AWS Truewind using the MesoMap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.

The transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information.

AWS Truewind, LCC

APPENDIX M

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Edly Lane Pump Station

Building ID: 1944054
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 04, 2009

Facility
Edly Lane Pump Station
200 Edly Lane
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

Year Built: 1975
Gross Floor Area (ft²): 3,150

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,186,625
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	1,186,625

Energy Intensity[5]

Site (kBtu/ft²/yr)	377
Source (kBtu/ft²/yr)	1258

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	181

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	491%
Building Type	Other

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Edly Lane Pump Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	200 Edly Lane, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Edly Lane Pump Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	3,150 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	25,680.00
11/01/2008	11/30/2008	26,560.00
10/01/2008	10/31/2008	25,860.00
09/01/2008	09/30/2008	16,240.00
08/01/2008	08/31/2008	18,160.00
07/01/2008	07/31/2008	17,360.00
06/01/2008	06/30/2008	24,800.00
05/01/2008	05/31/2008	16,000.00
04/01/2008	04/30/2008	26,560.00
03/01/2008	03/31/2008	39,360.00
02/01/2008	02/29/2008	71,840.00
01/01/2008	01/31/2008	39,360.00
Electric Consumption (kWh (thousand Watt-hours))		**347,780.00**
Electric Consumption (kBtu (thousand Btu))		**1,186,625.36**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,186,625.36**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Edly Lane Pump Station
200 Edly Lane
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

General Information

Edly Lane Pump Station	
Gross Floor Area Excluding Parking: (ft²)	3,150
Year Built	1975
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Edly Lane Pump Station	
Space Type	Other - Other
Gross Floor Area(ft²)	3,150
Number of PCs°	0
Weekly operating hours°	168
Workers on Main Shift°	1

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	377	377	0	N/A	104
Source (kBtu/ft²)	1258	1258	0	N/A	213
Energy Cost					
$/year	$ 50,327.00	$ 50,327.00	N/A	N/A	$ 13,894.00
$/ft²/year	$ 15.98	$ 15.98	N/A	N/A	$ 4.41
Greenhouse Gas Emissions					
$MtCO_2e$/year	181	181	0	N/A	50
$kgCO_2e$/ft²/year	57	57	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
How Lane Pump Station

Building ID: 1945689
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 04, 2009

Facility
How Lane Pump Station
1240 How Lane
North Bruswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

Year Built: 2001
Gross Floor Area (ft²): 300

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	423,088
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	423,088

Energy Intensity[5]

Site (kBtu/ft²/yr)	1410
Source (kBtu/ft²/yr)	4710

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	64

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	2112%
Building Type	Other

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	How Lane Pump Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	1240 How Lane, North Bruswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
How Lane Pump Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	300 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	15,040.00
11/01/2008	11/30/2008	3,040.00
10/01/2008	10/31/2008	4,480.00
09/01/2008	09/30/2008	9,520.00
08/01/2008	08/31/2008	5,360.00
07/01/2008	07/31/2008	5,440.00
06/01/2008	06/30/2008	5,920.00
05/01/2008	05/31/2008	25,200.00
04/01/2008	04/30/2008	7,920.00
03/01/2008	03/31/2008	8,960.00
02/01/2008	02/29/2008	10,560.00
01/01/2008	01/31/2008	22,560.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**124,000.00**
Electric Meter Consumption (kBtu (thousand Btu))		**423,088.00**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**423,088.00**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
How Lane Pump Station
1240 How Lane
North Bruswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

General Information

How Lane Pump Station	
Gross Floor Area Excluding Parking: (ft^2)	300
Year Built	2001
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

How Lane Pump Station	
Space Type	Other - Other
Gross Floor Area(ft^2)	300
Number of PCs°	0
Weekly operating hours°	168
Workers on Main Shift°	1

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	1410	1410	0	N/A	104
Source (kBtu/ft²)	4710	4710	0	N/A	213
Energy Cost					
$/year	$ 18,311.39	$ 18,311.39	N/A	N/A	$ 1,350.35
$/ft²/year	$ 61.04	$ 61.04	N/A	N/A	$ 4.50
Greenhouse Gas Emissions					
$MtCO_2e$/year	64	64	0	N/A	5
$kgCO_2e/ft^2$/year	215	215	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Princess Drive Pump Station

Building ID: 1947955
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 04, 2009

Facility
Princess Drive Pump Station
36 Princess Drive
North Brunswick, NJ 08906

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

Year Built: 1988
Gross Floor Area (ft²): 1,100

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	309,741
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	309,741

Energy Intensity[5]

Site (kBtu/ft²/yr)	282
Source (kBtu/ft²/yr)	940

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	47

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	342%
Building Type	Other

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Princess Drive Pump Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	36 Princess Drive, North Brunswick, NJ 08906	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Princess Drive Pump Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	1,100 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	11,640.00
11/01/2008	11/30/2008	5,280.00
10/01/2008	10/31/2008	5,340.00
09/01/2008	09/30/2008	5,700.00
08/01/2008	08/31/2008	10,560.00
07/01/2008	07/31/2008	5,940.00
06/01/2008	06/30/2008	4,200.00
05/01/2008	05/31/2008	5,940.00
04/01/2008	04/30/2008	6,660.00
03/01/2008	03/31/2008	9,300.00
02/01/2008	02/29/2008	10,200.00
01/01/2008	01/31/2008	10,020.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**90,780.00**
Electric Meter Consumption (kBtu (thousand Btu))		**309,741.36**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**309,741.36**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Princess Drive Pump Station
36 Princess Drive
North Brunswick, NJ 08906

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

General Information

Princess Drive Pump Station	
Gross Floor Area Excluding Parking: (ft^2)	1,100
Year Built	1988
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Princess Drive Pump Station	
Space Type	Other - Other
Gross Floor Area(ft^2)	1,100
Number of PCs[o]	0
Weekly operating hours[o]	168
Workers on Main Shift[o]	1

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	282	282	0	N/A	104
Source (kBtu/ft²)	940	940	0	N/A	213
Energy Cost					
$/year	$ 13,087.91	$ 13,087.91	N/A	N/A	$ 4,833.95
$/ft²/year	$ 11.90	$ 11.90	N/A	N/A	$ 4.40
Greenhouse Gas Emissions					
$MtCO_2e$/year	47	47	0	N/A	17
$kgCO_2e/ft^2$/year	43	43	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Schmidt Lane Pump Station

Building ID: 1947958
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 04, 2009

Facility
Schmidt Lane Pump Station
1280 Schmidt Lane
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

Year Built: 1998
Gross Floor Area (ft²): 200

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	633,267
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	633,267

Energy Intensity[5]

Site (kBtu/ft²/yr)	3166
Source (kBtu/ft²/yr)	10576

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	96

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	4865%
Building Type	Other

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

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ENERGY STAR® Data Checklist for Commercial Buildings

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Schmidt Lane Pump Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	1280 Schmidt Lane, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Schmidt Lane Pump Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	200 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	19,600.00
11/01/2008	11/30/2008	12,800.00
10/01/2008	10/31/2008	11,040.00
09/01/2008	09/30/2008	12,400.00
08/01/2008	08/31/2008	8,960.00
07/01/2008	07/31/2008	12,800.00
06/01/2008	06/30/2008	12,480.00
05/01/2008	05/31/2008	12,800.00
04/01/2008	04/30/2008	12,080.00
03/01/2008	03/31/2008	37,440.00
02/01/2008	02/29/2008	12,640.00
01/01/2008	01/31/2008	20,560.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**185,600.00**
Electric Meter Consumption (kBtu (thousand Btu))		**633,267.20**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**633,267.20**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

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Facility
Schmidt Lane Pump Station
1280 Schmidt Lane
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

General Information

Schmidt Lane Pump Station	
Gross Floor Area Excluding Parking: (ft^2)	200
Year Built	1998
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Schmidt Lane Pump Station	
Space Type	Other - Other
Gross Floor Area(ft^2)	200
Number of PCs[o]	0
Weekly operating hours[o]	168
Workers on Main Shift[o]	1

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft2)	3166	3166	0	N/A	104
Source (kBtu/ft2)	10576	10576	0	N/A	213
Energy Cost					
$/year	$ 29,521.09	$ 29,521.09	N/A	N/A	$ 969.63
$/ft2/year	$ 147.61	$ 147.61	N/A	N/A	$ 4.85
Greenhouse Gas Emissions					
$MtCO_2e$/year	96	96	0	N/A	3
$kgCO_2e/ft^2$/year	482	482	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
West Lawrence Pump Station

Building ID: 1947963
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 04, 2009

Facility
West Lawrence Pump Station
416 West Lawrene Drive
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

Year Built: 2006
Gross Floor Area (ft²): 1,420

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	211,817
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	211,817

Energy Intensity[5]	
Site (kBtu/ft²/yr)	149
Source (kBtu/ft²/yr)	498

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	32

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	134%
Building Type	Other

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**	
Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	West Lawrence Pump Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	416 West Lawrene Drive, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
West Lawrence Pump Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	1,420 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	5,760.00
11/01/2008	11/30/2008	5,040.00
10/01/2008	10/31/2008	4,720.00
09/01/2008	09/30/2008	2,880.00
08/01/2008	08/31/2008	3,760.00
07/01/2008	07/31/2008	3,440.00
06/01/2008	06/30/2008	4,400.00
05/01/2008	05/31/2008	4,800.00
04/01/2008	04/30/2008	6,320.00
03/01/2008	03/31/2008	7,040.00
02/01/2008	02/29/2008	6,960.00
01/01/2008	01/31/2008	6,960.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**62,080.00**
Electric Meter Consumption (kBtu (thousand Btu))		**211,816.96**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**211,816.96**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
West Lawrence Pump Station
416 West Lawrene Drive
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Christopher Gianotto
710 Herman Road
North Brunswick, NJ 08902

General Information

West Lawrence Pump Station	
Gross Floor Area Excluding Parking: (ft^2)	1,420
Year Built	2006
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

West Lawrence Pump Station	
Space Type	Other - Other
Gross Floor Area(ft^2)	1,420
Number of PCs°	0
Weekly operating hours°	168
Workers on Main Shift°	1

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	149	149	0	N/A	104
Source (kBtu/ft²)	498	498	0	N/A	213
Energy Cost					
$/year	$ 9,210.35	$ 9,210.35	N/A	N/A	$ 6,421.37
$/ft²/year	$ 6.49	$ 6.49	N/A	N/A	$ 4.52
Greenhouse Gas Emissions					
$MtCO_2e$/year	32	32	0	N/A	22
$kgCO_2e/ft^2$/year	23	23	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

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

APPENDIX N

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #20418
Township of North Brunswick
Equipment Inventory - Pump Station Buildings

Description	Manufacturer Name	Model No. / Serial No.	Equipment Type	Capacity/Size	Location	Areas Served	Date Installed	Useable Life Expectancy	Other Info.
Unit Heater	Dayton	Model No: 3UF93	Electric Unit Heater	20 kW	Edly Lane	Entire Building	2000	20 years	480 volt
Unit Heater	Dayton	Model No: 3UF78	Electric Unit Heater	4 kW	How Lane	Entire Building	2001	20 years	Electric
Unit Heater	Marley	Model No: MUH-03-8	Electric Unit Heater	3 kW	Princess Drive	Upper Level	1988	20 years	Electric
Unit Heater	Marley	Model No: MUH-03-8	Electric Unit Heater	3 kW	Princess Drive	Basement	1988	20 years	Electric
Unit Heater	Marley	Model No: MUH-03-8	Electric Unit Heater	3 kW	Princess Drive	Basement	1988	20 years	Electric
Unit Heater	Marley	Model No: MUH-03-8	Electric Unit Heater	3 kW	Princess Drive	Upper Level	1988	20 years	Electric
Unit Heater	Marley	Model No: MUH-03-8	Electric Unit Heater	3 kW	Princess Drive	Upper Level	1988	20 years	Electric
Window AC Unit	GE	Model No: AGW12ACGI Serial No: FG007211	Window AC unit	12,000 BTUH	Schmidt Lane	Entire Building	2007	20 years	Installed for electric equipment cooling.
Unit Heater	TPI Corporation	Model No:P3P5105CA1N	Electric Unit Heater	5 kW	Schmidt Lane	Upper Level	2007	20 years	Electric
Unit Heater	QMARK	Model No:MUH05-41	Electric Unit Heater	5 kW	Schmidt Lane	Upper Level	2007	20 years	Electric
Unit Heater	Chromalox	Model No LLH-04-23-34-00	Electric Unit Heater	4 kW	West Lawrence	Upper Level	2007	20 years	240 volt
Unit Heater	Chromalox	Model No LLH-04-23-34-00	Electric Unit Heater	4 kW	West Lawrence	Upper Level	2007	20 years	240 Volt
Baseboard Electric Heat	Chromalox	Model No 123A8 400	Baseboard Electric Heater	1 KW	West Lawrence	Upper Level	2007	20 years	240 Volt