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Local Government Energy Program
Energy audit report

For

Rutherford Borough Hall
Borough of Rutherford
Rutherford, NJ 07070

Project Number: LGEA13

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INTRODUCTION

On May 20th, 2009, Steven Winter Associates, Inc. (SWA) performed an energy audit and assessment of the Rutherford Borough Hall located in Rutherford, NJ. Current conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

The Rutherford Borough Hall was built in the early 1900s and currently houses the Borough offices including the Mayor's office, Borough Administrative offices and vaults where drawings and archived files are kept. The Rutherford Borough Hall building is three stories and consists of a total floor area of 27,579 square feet. Typical occupancy is approximately 40 persons on any given day.

Energy data and building information collected in the field were analyzed to determine the baseline energy performance of each building. Using spreadsheet-based calculation methods, SWA estimated the energy and cost savings associated with the installation of each of the recommended energy conservation measures. The findings for the building are summarized in this report.

The goal of this energy audit is to provide sufficient information to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Rutherford Borough Hall located at 176 Park Ave., Rutherford, NJ 07070. Borough Hall is a three story building. Based on the field visit performed by Steven Winter Associates (SWA) staff on May 20th, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

In the most recent full year of data collected (February 2008 through February 2009), the Borough Hall building consumed approximately 182,910 kWh or $31,813 worth of electricity and 12,402 therms or $16,939 worth of natural gas. The average aggregated cost of electricity was calculated to be $0.17/kWh and the average aggregated cost of natural gas was calculated to be $1.82/therm. With electricity and gas combined, the building consumed 1,865 MMBtus of energy at a total cost of $48,752.

SWA benchmarked Rutherford Borough Hall using the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Portfolio Manager generated a benchmark score of 80 for the building, when compared to a national average. The benchmark rating is based on the facility's source energy use, level of business activity, and geographical location. The Portfolio Manager is also capable of generating a site energy use intensity number using 2008 as a baseline year.

In order to compare commercial buildings equitably, the *Portfolio Manager* ratings convey the consumption of each type of energy in a single common unit. The EPA uses source energy to represent the total amount of raw fuel required to operate the building. The site energy use intensity for the Rutherford Borough Hall building is 61.9 kBtu/sq.ft/year. After energy efficiency improvements are made, future utility bills can be added to the Portfolio Manager and the site energy use intensity for a different time period can be compared to the year 2008 baseline to track the changes in energy consumption associated with the energy improvements.

SWA recommends some measures that may not be cost-effective based on energy savings alone but should be considered as part of a capital investment plan or as part of a routine maintenance schedule. SWA recommends that all pipe insulation is maintained to eliminate excessive energy loss through the walls of pipes. As an ECM, SWA recommended that the existing steam heating system is removed and replaced with a 4-pipe hot water system. If the existing system is not replaced, SWA recommends that the heating plant and distribution system is improved maintaining all steam traps and radiator vents. SWA also recommends that the door weather-stripping is inspected at least once a year and replaced as they begin to fail. Low-flow aerators should be installed at all sinks in order to reduce domestic hot water consumption. SWA strongly encourages that low-flow features are always considered when buying new water appliances such as faucets and toilets. Occupancy sensors are also recommended for areas such as bathrooms that do not have constant use but can benefit from periods of time when lights can be shut off automatically during the day.

SWA recommends a total of 6 Energy Conservation Measures (ECMs) for Rutherford Borough Hall. The total investment cost for these ECMs is **$776,068**. SWA estimates a first year savings of **$18,315** with a simple payback of **42.4 years**. SWA also estimates that Rutherford Borough Hall will be able to reduce their carbon footprint by **141,305 lbs of CO2 annually.** In addition to providing energy savings, this package of measures will also raise occupant comfort levels as well as reduce annual maintenance costs. SWA estimates that if the entire scope of work is installed as a package then the building can save up to 37% total site energy use.

There are various incentives that Rutherford Borough Hall could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the Borough of Rutherford applies for the NJ SmartStart program through the New Jersey Office of Clean Energy. This incentive can help provide technical assistance for the building in the implementation phase of any energy conservation project.

When pursuing incentives through the SmartStart program, SWA encourages building managers to contact the program provider to obtain more detailed information on the program guidelines and request pre-approval for all planned upgrades. At the time of this report, gas-fired boilers with a capacity between 1.5 MMBTU/hr and 4 MMBTU/hr would be eligible for an incentive of up to $1 per MBTU ($2,500 for this project). Incentives for lighting vary but replacing T12 lighting with T8 lighting would be eligible for an incentive up to $30 per fixture and LED exit signs would be eligible for up to $20 per fixture. Incentives for installing an electric air-cooled chiller would be eligible for up to $52 per ton and premium efficiency motors up to $700 per motor. There is also a solar incentive available from the New Jersey Clean Energy program that would pay $1 per Watt installed for a solar PV panel or up to $5,000 for the installed cost of the solar system recommended for this project.

Due to the amount of work that is applicable to the Rutherford Borough Hall building, SWA recommends that the Borough of Rutherford enroll the building in the New Jersey Clean Energy Program's Pay for Performance program. The Pay for Performance program or "P4P" is a program set-up to create financial incentives for buildings to do a detailed building audit and also implement measures that were studied as part of the energy audit. The P4P program currently accepts LGEA participants that are not currently also receiving incentives as part of the Federal block grant program.

For further information on both custom and prescriptive incentives, please visit:

http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/equipment-incentives/equi

The New Jersey Clean Energy website also provides information on an upcoming Direct-Install program that would be applicable to this project. The Direct-Install program is aimed at commercial buildings with an average annual demand of less than 200kW. This program is designed to offset up to 80% of the cost of replacing equipment nearing the end of its useful lifecycle with high efficiency alternatives. This program could help offset the cost of replacing the entire heating system. This program has not officially been released but can be followed online a

http://www.njcleanenergy.com/commercial-industrial/programs/programs

The following table summarizes the proposed Energy Conservation Measures (ECM) and their economical relevance. It is important to note that each measure is listed as a line item and savings are shown without any interactive effects with other measures. The Total Scope of Work included at the bottom of the table shows savings based on the entire package of Energy Conservation Measures being installed together with interactive effects.

SCOPE OF WORK – SUMMARY TABLE

ECM Table without Incentives

ECM#	ECM description	Installed Cost: Estimated Cost ($)	Installed Cost: Source	1st year energy and cost savings: Electric Savings: Consumption		Electric Savings: Demand		Fuel Savings: Natural Gas		Cost ($)	Simple Payback (SPP)	Life of Measure (LoM)	Lifetime Cost Savings ($)	Return on Invest (ROI)	Annual Carbon Reduction (lbs of CO2)
1	Upgrade existing lighting	$ 46,760	RS Means	17,640	kWh	12	kW	0	Therms	$ 2,999	15.6	25	$ 51,074	0.4%	31,584
2	Replace existing windows	$ 34,918	RS Means	210	kWh	0	kW	429	Therms	$ 816	42.8	30	$ 15,597	-1.8%	5,105
3	HVAC system replacement	$ 588,881	RS Means	23,060	kWh	8	kW	5,389	Therms	$ 13,728	42.9	25	$ 233,810	-2.4%	100,692
4	Replace existing roof and insulate attic	$ 60,330	RS Means	170	kWh	0	kW	1,838	Therms	$ 3,374	17.9	30	$ 64,456	0.2%	20,565
5	Install VendingMiser device	$ 179	RS Means	2,045	kWh	0	kW	0	Therms	$ 348	0.5	10	$ 2,935	154.0%	3,662
6	Install 5kW Photovoltaic System	$ 45,000	RS Means	5,500	kWh	0	kW	0	Therms	$ 935	48.1	25	$ 15,924	-2.6%	9,848
Total Scope of Work		**$ 776,068**	**-**	**39,925**	**kWh**	**20.0**	**kW**	**6334**	**Therms**	**$ 18,315**	**42.4**		**$ 383,796**		**141,305**

***Each ECM shows savings calculated independently of other measures. The Total Scope of Work is the entire package of ECMs installed together including interactive effects and thus does not represent a simple sum of individual savings

Definitions:

SPP: Simple Payback (years)
LoM: Life of Measure (years)
ROI: Return on Investment (%)

Assumptions:

Discount rate = 3.2% per DOE FEMP guidelines
Energy price escalation rate = 0% per DOE FEMP guidelines

Average Electric Rate = **0.17** $/kWh
Average Fuel Rate = **1.82** $/Therm

Carbon Dioxide per unit Electriciy = 1.791 lbs of CO2/kWh
Carbon Dioxide per unit of Fuel = 11.02 lbs of CO2/unit fuel

1. HISTORIC ENERGY CONSUMPTION

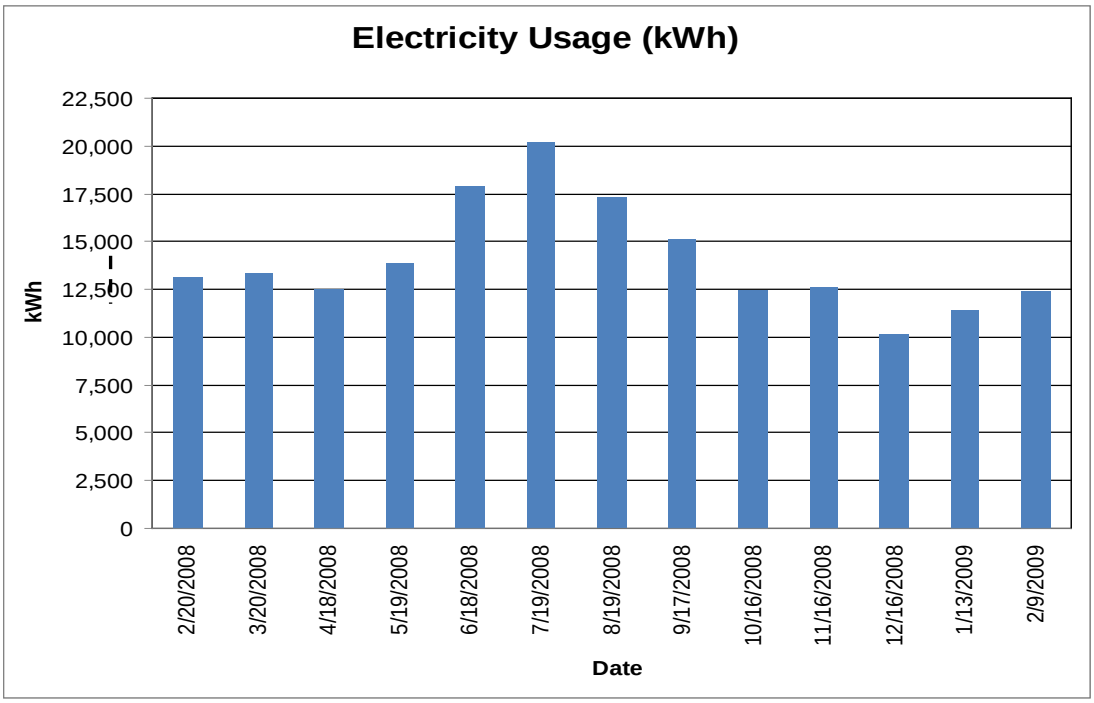
1.1. Energy usage and cost analysis

SWA received and analyzed utility bills from February 2007 through February 2009 that were received from the Borough of Rutherford.

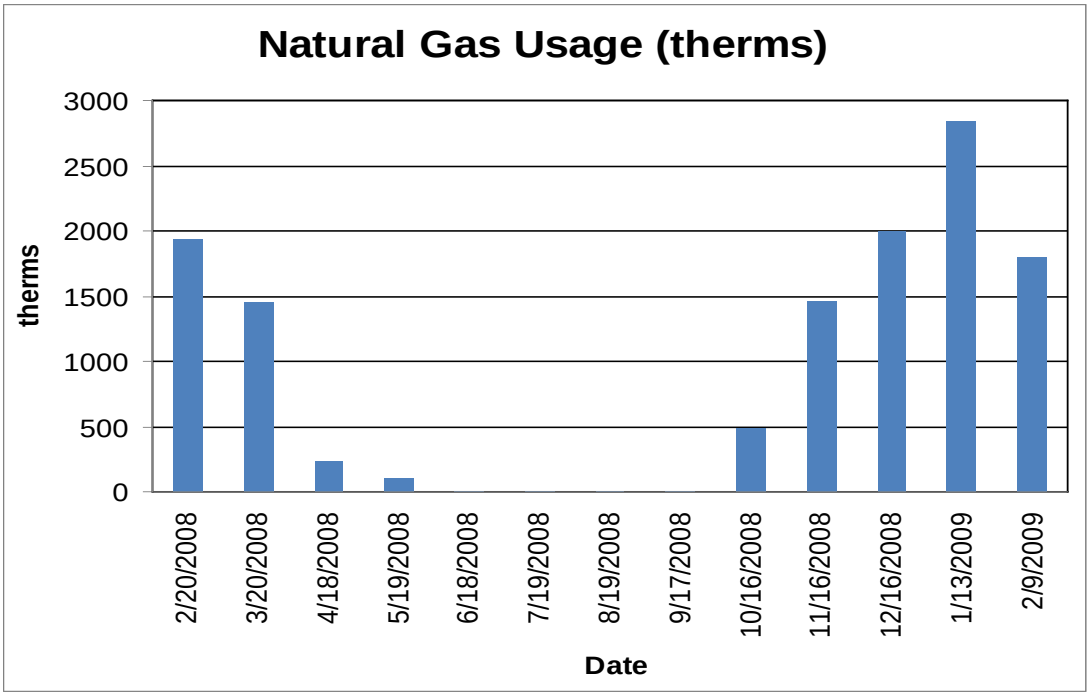
Electricity – The Rutherford Borough Hall has one electric meter for incoming electricity supply. The building purchases electricity from PSEG at **an average aggregated rate of $0.17/kWh** based on February 2008 through February 2009 electric bills. The building purchased **approximately 182,910 kWh or $31,813 worth of electricity from February 2008 through February 2009.** Based on the same time period, the building also has **an average monthly demand of 54.7 kW and monthly peak demand of 80.4 kW.**

Natural Gas – The Rutherford Borough Hall has one gas meter for incoming natural gas from PSE&G. Between February 2008 and February 2009, the building purchased **approximately 12,402 therms or $16,939 worth of natural gas.** The average aggregated cost of natural gas was calculated to be $1.82 per therm.

The following chart shows electricity usage for the Borough Hall Building based on utility bills for the 2008- 2009 billing period.



The following chart shows the natural gas usage for the Borough Hall Building based on utility bills for the year February 2008 to February 2009.



In the above chart, the natural gas usage follows a heating trend as expected. During the summer it is clear that the natural gas usage is very minimal which reflects that heat is not being used and the DHW load is minimal.

1.2. Utility rate

Rutherford Borough Hall currently buys electricity and gas from PSEG at the GSGH MD general service rate. The GSGH MD general service rate is a typical rate where customers pay for natural gas based on usage and electricity based on usage with the addition of an electrical charge demand. Rutherford Borough Hall uses PSEG account #01 21 020 470 24 at the service address of 176 Park Ave, Rutherford, NJ. Electricity for the building was billed at an average rate of **$0.17/kWh.** Natural Gas for the building was billed at an average rate of **$1.82/therm.**

1.3. Energy benchmarking

The Rutherford Borough Hall Building information and utility data were entered into the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. A performance score of 80 was generated when the building was benchmarked as an office building. SWA recommends that the Rutherford Borough maintain the Portfolio Manager account at the link below. As the account is maintained, SWA can share the Rutherford Borough Hall building and allow future data to be added and tracked using the benchmarking tool.

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Borough of Rutherford - Borough Hall

Building ID: 1800528
For 12-month Period Ending: January 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: July 30, 2009

Facility
Borough of Rutherford - Borough Hall
176 Park Avenue
Rutherford, NJ 07070

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 2009
Gross Floor Area (ft²): 27,579

Energy Performance Rating[2] (1-100) 80

Site Energy Use Summary[3]	
Natural Gas (kBtu)[4]	1,108,474
Electricity (kBtu)	598,383
Total Energy (kBtu)	1,706,857

Energy Intensity[5]	
Site (kBtu/ft²/yr)	62
Source (kBtu/ft²/yr)	115

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	150

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

National Average Comparison	
National Average Site EUI	92
National Average Source EUI	170
% Difference from National Average Source EUI	-32%
Building Type	Office

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.

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

Rutherford Borough Hall was built approximately 100 years ago. The building is three stories with a total floor area of 20,579 square feet.

2.2. Building occupancy profiles

During the site visit, there were approximately 30-40 employees observed in the building at once. The Borough Hall building is operated during the normal business hours of 8:30am to 4:30pm, with Borough Hall board meetings as well as other public assemblies running after 4:30pm. For the purpose of the audit, the building was assumed to operate from 7:30am to 7:30pm on weekdays.

2.3. Building envelope

2.3.1. Exterior walls

The exterior walls of the Borough Hall building consist of a 4" face brick. There is a second row of 4" bricks laid behind the first, providing thick walls with no insulation. The walls are furred out with 2"x4" wood framing spaced 16" on center on the interior side. The building currently has no insulation but the thick walls provide some resistance to thermal transfer. Insulation could be added to the exterior walls of the main building; however, it would not be aesthetic and it would have a significant impact on building operations. SWA has determined that it is not cost effective to do so at this time. If any portion of the building is renovated or improved as part of a capital improvement plan, SWA recommends increased insulation is added to any walls during construction. Specifically, SWA recommends that this is undertaken if the windows and roof are both replaced. Blown cellulose insulation can be added where wall cavities exist.

2.3.2. Roof

The Borough Hall roof consists of medium gray shingles. The roof surface is set on wooden slats and supported by wooden trusses. The roof surface appeared to be in deteriorating condition. The asphalt shingles are coming loose and any vapor or thermal barrier that is exists is beginning to fail. The attic space located directly under the roof is not insulated; however the town is currently using this area for document storage. The roof utilizes vents as well as a spherical passive vane to exhaust stale air from the attic and prevent heat build-up. There is currently no insulation located in the attic. The heating system sends an excessive amount of heat through the building, which is eventually lost through the un-insulated attic.

Wooden trusses that form roofline

2.3.3. Base

The building's first floor is partially below grade. The base is 4" concrete slab-below-grade. There were no reported problems with water penetration or moisture.

2.3.4. Windows

All of the windows in the building are wooden framed double-hung windows. These windows contain single-pane glass. The windows appeared to be in fair condition and did not allow for excessive air or moisture penetration around the frame however. Due to the single-pane glass and age of the windows, the windows do not have a good insulating value and allow high solar heat gain to occur. The Borough Hall windows are a major source of heat transfer into and out of the building. This excessive heat transfer adds to the cooling and heating load of the building, resulting in raised energy consumption. At this time, replacing the windows would not be cost-effective based on energy savings alone; however, newer windows will decrease maintenance costs and increase tenants comforts as well. If the building is classified as a historic building then regulations may apply for replacing the windows and other cosmetic work.

2.3.5. Exterior doors

The entrance ways for the Rutherford Municipal Building consists of insulated steel doors or glass doors set in a metal frame. The frames of these doors are poor insulators and allow expensive, conditioned air to leak out of the building. Many of the doors were observed to be having deteriorated weather-stripping so that they did not seal well to the frames. SWA recommends weather-stripping around all of the doors of the building in order to prevent conditioned air from leaking outside of the building. Weather-stripping should be checked at least once a year and replaced as soon as signs of deterioration show.

2.3.6. Building air tightness

The Rutherford Municipal Building was relatively tight with the exception of the exterior doors and some small penetrations inside of the building. Windows and Entranceways such as the front and back vestibule of the main Borough Hall Building should be maintained so that a tight seal is always formed to keep conditioned are from leaking outside of the building.

2.4. HVAC systems

2.4.1. Heating

The Rutherford Borough Hall Building contains one natural gas-fired Weil McLain Steam boiler with an input of 2,396 MBH. According to building staff, this boiler originally operated on light oil and was converted to Natural Gas around 1994. This boiler is a very old, cast-iron steam boiler that is currently outliving its useful life. The original efficiency of this boiler when installed new was 79%. The old steam boiler also lacks proper controls to allow it to modulate and reset with outside air. The boiler is currently shut off manually at 11pm each week night and over the weekend and is turned on at 8am. The boiler is now performing inefficiently as well as the distribution of steam throughout the building. Steam traps and radiator vents throughout the building have not been replaced in the building and are leaking valuable heating energy. Steam is distributed via a one pipe system to approximately 25 steam radiators for heating.

This system design is original to the building and is inefficient at both the heating plant itself and throughout the entire distribution system. The entire building uses a single zone for heating with one thermostat located in the court room on the top floor. As a result of their only being one thermostat, located in a room that is not used consistently throughout the day, occupants on each floor are uncomfortable and excessive amounts of energy are being wasted. By-product heat from the boiler itself rises directly to the main floor and aids in overheating the main floor. The thermostat in the court room must be kept low in order to prevent the steam radiators from dumping even more heat onto the main floor. In the evenings, when the courtroom is used, the thermostat must then be turned up higher to provide enough heat to meet the demands of the upstairs and thus overheat the main floor. Most tenants are uncomfortable throughout the day. The hallways in the below-grade level are mounted in the ceiling and are inefficient at providing comfort.

2.4.2. Cooling

The majority of the Rutherford Borough Hall Building utilizes approximately 25 DX window-type cooling units for room specific cooling. These units were of various makes and models. The Borough Clerk and Tax offices are the only portions of the building that use central cooling. Each of offices has their own split-system AC units installed to provide cooling. The cooling system that consists of both the window units and split-system units is inefficient. In addition to being inefficient, occupants have many complaints regarding the level of noise that each unit makes. Smaller AC units cool very specific areas and require more maintenance due to the number of units installed.

2.4.3. Ventilation

The Borough Hall Building currently has no ventilation supply. The building relies on exhaust fans to induce fresh air through out occupied areas. The attic is currently ventilated using a spherical, passive vane exhaust fan.

2.4.4. Domestic Hot Water

The building contains one gas-fired domestic hot water with a capacity of 75 MBTU/hr and a total storage of 76 gallons. It is unclear based on utility bills if the domestic hot water is turned off during summer months or if usage very minimal. SWA estimates that there is approximately 30% of useful life left in the equipment.

It is not cost-effective to replace the existing water heating equipment with higher efficiency equipment. However, higher efficiency water heating equipment will save energy and should be

strongly considered upon replacement of the equipment. Energy saving appliances bearing the ENERGY STAR label should be selected to ensure efficiency performance. Incentives may be available to offset any added costs for the installed equipment.

More efficient water-consuming fixtures and appliances save both energy and money through reduced energy consumption for water heating, as well decreased water and sewer bills. SWA recommends that the aerators in all sinks are retrofitted with low-flow aerators that constrict the volume of water allowed to flow out of the faucets during the time it takes to wash hands, wash dishes, etc. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce hot water consumption. In addition, routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – Most of the lighting within the Borough Hall Building consisted of older, inefficient T12 lighting with magnetic ballasts as well as incandescent bulbs. This lighting is outdated and needs to be replaced. There are approximately 228 fixtures throughout the building that contain T12 fluorescent bulbs with magnetic ballasts that should be replaced with T8 fluorescent bulbs with electronic ballasts. There were approximately 64 incandescent lights found in the building. CFL bulbs save money since they require less power to operate and they also have a better light quality. Since the original audit has occurred, the two basement level bathrooms have been renovated with new lights installed. There are currently two light fixtures per bathroom; the second fixture is also directly wired to the ventilation fan. SWA recommends that an occupancy sensor is installed to control the second fixture that is connected to the exhaust fan. Occupancy sensors can help prevent energy being wasted when lights are left on between uses or left on overnight by mistake. The majority of the building has already been fitted with LED exit signs but there are still 2 exit signs that still use fluorescent bulbs. LED exit signs are always cost-effective since they use such little power and operate 24 hours a day, 365 days a year. See attached existing and proposed lighting schedule in Appendix A.

2.5.2. Appliances and process

The Borough Hall building contains one soda machine on the below-grade level. Soda machines are generally a good opportunity to save energy by installing a photocell on top of the machine that allows the display lights to turn off when no motion is detected for a set period of time. These devices installed on soda and snack machines generally save energy on nights and weekends when the building is not occupied.

Appliances, such as refrigerators, copiers and computers that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315kwh/hr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Look for the Energy Star label when replacing appliances and equipment, including: window air conditioners, refrigerators, printers, computers, copy machines, etc. More information can be found in the “Products” section of the Energy Star website at: http://www.energystar.gov

2.5.3. Elevators

There are no elevators at the Rutherford Borough Hall building.

2.5.4. Other electrical systems

There are currently no other electrical systems in the building.

3. EQUIPMENT LIST

Building System	Description	Make/ Model	Fuel	Space served	Estimated Remaining useful life %
Heating	One (1) Natural Gas, Weil McLain Steam Boiler with 2.396 MMBTU/hr input	Weil McLain 88 series boiler, Model #888	Natural Gas	All areas	0% (Equipment has exceeded useful life and is no longer performing efficiently)
Heating	One (1) PowerFlame Natural Gas Burner attached to boiler with 1HP GE motor	PowerFlame Burner, Model #WCR2-G0-20A	Natural Gas	All areas	0%
Heating	One (1) GE 1HP motor, with 3450 RPM attached to PowerFlame Natural Gas Burner	GE, Model #5KC39RN44GX	Electric	All areas	0%
Heating	Various radiators throughout building	NA	Steam	All areas	-
Domestic Hot Water	One (1) AO Smith atmospheric hot water heater with 75 MBH input and 75 gallons of storage	AO Smith, Model #BT 80 230	Natural Gas	All areas	30%
Cooling	Approximately Twenty-five window AC units for room specific use throughout building	Various makes and models	Electric	Room specific	40%-90%
Cooling	Trane Condensor (smaller unit) located outside of building using R-22 refrigerant with 1/8 HP compressor motor	Trane xR13, Model #2TTR3030A1000AA	Electric	Tax Office	88%
Cooling	Trane Condensor (larger unit) located outside of building using R-22 refrigerant with 1/4 HP compressor motor	Trane xR13, Model #2TTR3060A1000AA	Electric	Borough Clerk's Office	88%
Generator	Onan electric generator	NA	Natural Gas	All areas	0%

Note: The remaining useful life of a system (in %) is an estimate based on the system date of built and existing conditions derived from visual inspection.

4. ENERGY CONSERVATION MEASURES

Based on the assessment of this building, SWA has separated the investment opportunities into two categories of recommendations:

General Recommendations: Operations and Maintenance

- Pipe Insulation – The energy efficiency of the heating plant and distribution system can be improved by repairing and/or replacing damaged pipe insulation. This recommendation can easily be undertaken by maintenance personnel for minimal cost.
- Occupancy sensors – The basement level bathrooms contain two light fixtures; the second fixture is also connected to the bathroom exhaust fan. An occupancy sensor can be installed and connected to the second light fixture in order to shutdown the light and exhaust fan in the bathroom between uses and prevent the appliances from being left on overnight mistakenly.
- Steam Traps – Similarly, the energy efficiency of the heating plant and distribution system can be improved by repairing and/or replacing damaged steam traps. SWA recommends that building personnel conduct a steam trap and radiator vents inventory to determine the scope of the project. According to building staff, the steam traps in the building are leaky and have not been recently replaced or maintained. In order to maximize the savings associated with replacing the boiler, steam traps must be maintained and in good working order.
- Weather Stripping/Air Sealing - SWA observed that exterior door weather-stripping was beginning to deteriorate. Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. The perimeter of all window frames should also be regularly inspected and any missing or deteriorated caulking should be re-caulked to provide an unbroken seal around the window frame. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.
- Water Efficient Fixtures & Controls - Adding controlled on/off timers on all lavatory faucets is a cost-effect way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consuming fixtures and appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water and sewer bills.

Specified Recommendations: Energy Conservation Measures

Summary table

ECM#	Description
1	**Upgrade existing lighting; See Appendix A for entire lighting retrofit schedule**
2	**Replace existing windows**
3	**HVAC system replacement**
4	**Replace existing roof and insulate attic**
5	**Install VendingMiser device**
6	**Install 5kW Photovoltaic System**

ECM#1: *Lighting Upgrade*

Description:

The Rutherford Borough Hall building consists of mostly outdated T12 fluorescent lighting with magnetic ballasts. SWA recommends that each T12 fixture is replaced with a T8 fixture with electronic ballasts. Typically, T8 fluorescent lights with electronic ballasts have an electrical savings of 30% over T12 fixtures with magnetic ballasts. T8 fluorescent fixtures also have a better quality light output and can save on maintenance costs over T12 fixtures. There are currently 64 incandescent light bulbs that were found during the audit, these should be replaced with newer type CFL bulbs. The Borough Hall building also has 2 fluorescent exit signs installed in the building that should be changed to LED exit signs. Exit signs are one good opportunity for energy efficiency since they are required to operate 24 hours per day. See Appendix A for complete existing and proposed lighting schedules.

Installation cost:

Estimated installed cost: $46,760
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
17,640	kWh	12	kW	0	Therms	$2,999	15.59	25	$51,074	0.37%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit, and billing analysis.

Rebates/financial incentives:

NJ Clean Energy – Prescriptive Lighting Incentive, Incentive based on installing T5 or T8 lamps with electronic ballasts in existing facilities ($10-$30 per fixture, depending on quantity of lamps).
Maximum incentive amount is $6,840.

NJ Clean Energy – Prescriptive Lighting Incentive, Incentive based on installing LED Exit signs ($10/$20 per fixture).
Maximum incentive amount is $40.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#2: *Replace existing windows*

Description:

The existing windows contain only single panes without any low-e coating. In addition to the glass, the frames also provide a poor thermal barrier between interior and exterior conditions. SWA recommends replacing these windows with windows containing an aluminum-clad, wood frame and also contains argon-filled, double-paned glass. In addition, SWA recommends that these windows contain a low-e coating to reduce the amount of solar heat allowed to penetrate the window. The replacement of the windows will not be cost-effective from energy savings alone but will help decrease energy consumption, increase comfort and also reduce maintenance costs. If the building is classified as a historic building then regulations may apply for replacing the windows and other cosmetic work.

Installation cost:

Estimated installed cost: $34,918
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
210	kWh	0	kW	429	Therms	$816	42.77	30	$15,597	-1.84%

Assumptions: SWA calculated the savings for this measure using information collected during the field visit and analysis of historical utility consumption information. SWA assumed that replacing the old windows will also result in an infiltration reduction of 5% for each wall that contains a window to be replaced.

Rebates/financial incentives:

There are currently no specific incentives for this measure.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#3: *HVAC System replacement*

Description:

Currently, heat is provided by a steam boiler via a one-pipe steam system. There is currently only one thermostat for the entire building. Cooling uses a de-centralized system made up of two split-systems and approximately 25 window units. The existing steam system is inefficient and would need to be re-designed, creating more zones in order to raise the efficiency of the distribution system. SWA recommends replacing the existing steam system with a hot water system and also adding central cooling. First, the entire HVAC system would need to be removed including all existing AC units, radiators, the steam boiler and all steam piping. SWA recommends that a sealed-combustion hot water boiler as well as a 4-pipe distribution be installed throughout the building. A high efficiency boiler should be installed, condensing if deemed applicable by the designer of the system. The 4-pipe system allows for central heating as well as central cooling. SWA recommends that an air-cooled electric chiller is placed outside of the building on or near the parking lot to be able to provide cooling. The 4-pipe system would run throughout the building and fan coil units would be placed in each space. Fan coil units would be able to supply heat or air conditioning since they would be connected to the 4-pipe system that has hot water and chilled water running through them. Fan coil units would also provide the flexibility of having localized control and being able to adjust the temperature for each space individually. These fan coil units would take room air and blow it over a coil to either heat or cool each space. The system will need to be sized by a professional design engineer to make sure that peak loads would be met while retaining energy efficiency. A 4-pipe system with hot water and an electric chiller shows to be the most cost-effective option for fixing the HVAC system as it exists today. Any pumps and motors associated with this retrofit should be selected as premium efficiency.

Installation cost:

Estimated installed cost: $588,881
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
23,060	kWh	8	kW	5,389	Therms	$13,728	42.90	25	$233,810	-2.41%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit and historical billing analysis. SWA estimated savings based on replacing the entire HVAC system as explained above, as well as correcting thermostat adjustments that are currently made to the existing conditions to account for the single thermostat setup. SWA assumes that the existing boiler efficiency is 79% and will be increased to 85% with the installation of a high efficiency sealed-combustion boiler.

Rebates/financial incentives:

NJ Clean Energy – Electric Chiller Incentive, Incentive based on installing an air-cooled chiller ($8-$52 per ton).
Maximum incentive amount is TBD. Design required.

NJ Clean Energy – Gas Heating Incentive, Incentive based on installing a gas-fired boiler >1500MBH<4000MBH ($1.00 per MBH).
Maximum incentive amount is TBD. Design required.

NJ Clean Energy – Premium Motors Incentive, Incentive based on installing premium efficiency, three phase motors ($45-$700 per motor).
Maximum incentive amount is TBD. Design required.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#4: *Replace existing roof and insulate attic*

Description:

The Rutherford Borough Hall contains an attic space that is unfinished and partially used for storage. The shingled-roof shows signs of deterioration, which compromises the integrity of the entire roof system. SWA recommends removing the existing roof and installing a new roof system that includes a radiation barrier. Replacing the roof will result in a well-sealed space for the storage of files and can also result in significant energy savings. New shingles will help lock out water, while the radiation barrier helps reflect much of the heat due to radiation from the sun. In addition to replacing the roof surface, SWA recommends R-19 fiberglass batt insulation to create a thermal barrier between the top floor and the attic. Currently, a large amount of heat is lost during the winters as it rises out of the building through the roof. Installing insulation will help keep the heat inside of the conditioned spaces of the building and therefore reducing the load on the heating system. Replacing the roof surface and adding insulation also helps the existing passive vane vent to remove stale air more efficiently, helping create better conditions to store files in an unconditioned space. If a roof-mounted photovoltaic system is desired, SWA encourages the Borough of Rutherford to install roofing panels in place of shingles that have integrated photovoltaic cells. For the purposes of this energy audit, solar photovoltaic cells were calculated as a separate measure. If PV cells are integrated into a new roof system then the installed cost can be reduced and savings will become more financially attractive.

Installation cost:

Estimated installed cost: $60,330
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
170	kWh	0	kW	1,838	Therms	$3,374	17.88	30	$64,456	0.23%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit and historical billing analysis. Although there is no insulation currently installed in the attic, SWA assumes that the existing top floor ceiling has an R-value of R-4 and will be upgraded to an insulation value of R-19. Installed costs include the installation of a shingled roof with radiation barrier as well as R-19 fiberglass batts for the attic floor.

Rebates/financial incentives:

There are currently no incentives available for this measure.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#5: *Install VendingMiser device*

Description:

The Rutherford Borough Hall building currently contains one soda vending machine on the basement level. Soda machines contain incandescent or fluorescent display lights that remain on 24 hours per day. VendingMiser devices can be installed on top of the machine in order to control the display lights based on occupancy.

Installation cost:

Estimated installed cost: $179
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
2,045	kWh	0	kW	0	Therms	$347.71	<1	10	$2,935	153.99%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit, and billing analysis.

Rebates/financial incentives:

There are currently no specific incentives available for this measure.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#6: *Install 5kW solar PV system*

See Section 5.2. Solar Photovoltaic below

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are currently no existing renewable energy systems.

5.2. Solar Photovoltaic

ECM#6: *Install 5 kW solar PV system*

Description:

The Rutherford Borough Hall does not currently utilize any type of renewable energy. SWA recommends the installation of a minimum 5 kW solar PV system on the roof of the Borough Hall building. There is approximately 1,500 square feet of South/West exposure on the roof for the system to be installed. Currently, there are minimal state incentives available for installing PV technology for local governments. Any additional funding can help bring down the installed cost of the PV system in addition to low interest loans that the Borough could apply for to finance the system. The 5 kW size system is a minimally sized system in order to help offset a portion of the building's electrical baseload. The Borough of Rutherford should contact a solar installer to determine if a larger system can be installed with the existing roof. Generally, solar systems become more efficient as the size of the array increases and therefore can increase the return on investment. The Borough of Rutherford can also combine integrated solar panels with a new roof system if they decided to replace the roof at the same time. By adding integrated solar panels, the installed cost will be reduced by offsetting the amount of shingled roof that will no longer need to be installed at the area where integrated panels will be installed.

Installation cost:

Estimated installed cost: $45,000
Source of cost estimate: RS *Means*

Economics:

1st year energy and cost savings							Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)
Electricity Savings				Fuel Savings		Cost Savings				
Consumption		Demand		Natural Gas						
5,500	kWh	0	kW	0	Therms	$935	48.13	25	$15,924	-2.58%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit, and billing analysis. The system was sized based on the available roof area. Further feasibility studies by a solar professional may reveal that a larger system can be installed.

Rebates/financial incentives:

NJ Clean Energy – Renewable Energy Incentive Program, $1.00/watt installed.
Maximum incentive amount is $5,000.

Options for funding ECM:

This project may benefit from enrolling in either the NJ Pay-for-Performance program or the NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation. http://www.njcleanenergy.com/commercial-industrial/home/home

5.3. Solar Thermal Collectors

Solar thermal collectors are not cost effective for this project and are not recommended due to the low amount of domestic hot water use throughout the building.

5.4. Combined Heat and Power

CHP is not applicable to this project because of the HVAC system type and limited domestic hot water usage.

5.5. Geothermal

Geothermal is not applicable to this project because it would require modifications to the existing heat distribution system, which would not be cost effective.

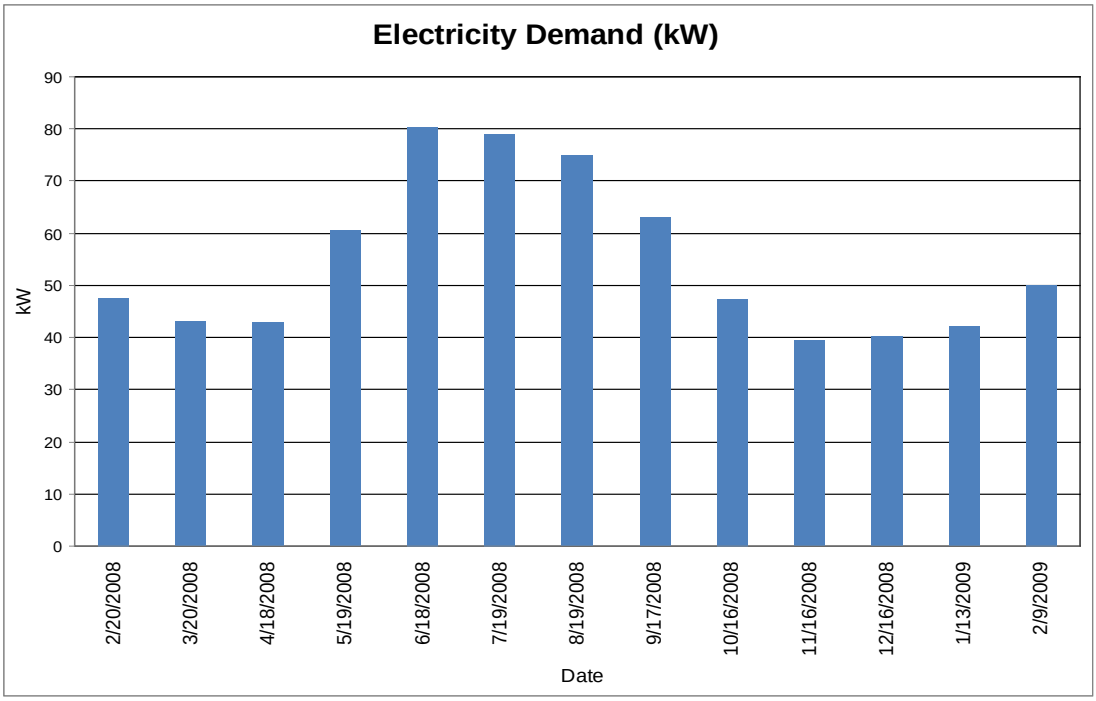
5.6. Wind

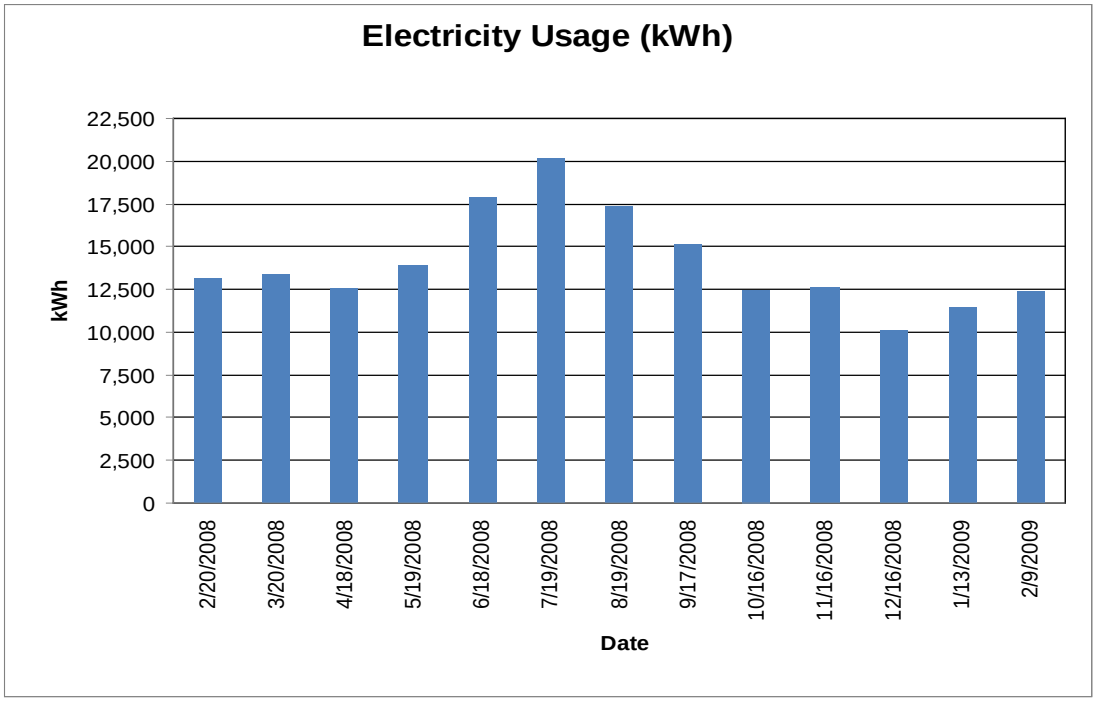
Wind power production is not appropriate for this location because required land is not available for the wind turbine. Also, the available wind energy resource is very low.

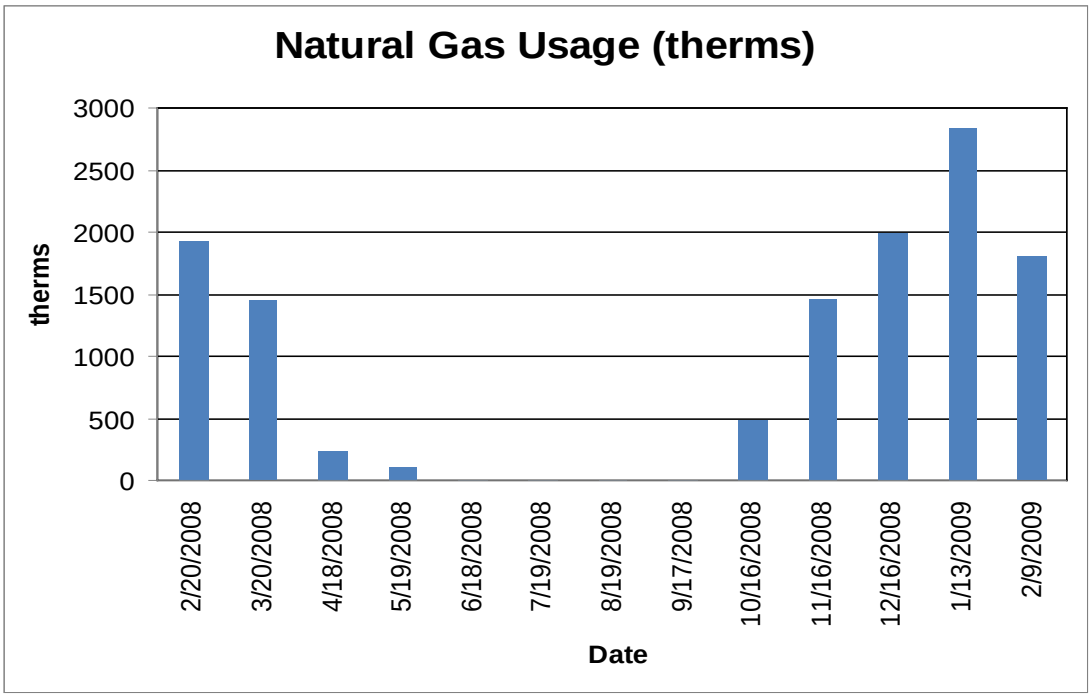
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Load profiles

The average electrical peak demand for the previous year was 55.0 kW and the maximum peak demand was 80.4 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows electric demand (in kW) for the previous 12 months and the other two charts show electric and gas usage (in kWh), respectively.


Electricity Demand (kW)
kW
90
80
70
60
50
40
30
20
10
0
2/20/2008
3/20/2008
4/18/2008
5/19/2008
6/18/2008
7/19/2008
8/19/2008
9/17/2008
10/16/2008
11/16/2008
12/16/2008
1/13/2009
2/9/2009
Date


Electricity Usage (kWh)
kWh
22,500
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
2/20/2008
3/20/2008
4/18/2008
5/19/2008
6/18/2008
7/19/2008
8/19/2008
9/17/2008
10/16/2008
11/16/2008
12/16/2008
1/13/2009
2/9/2009
Date

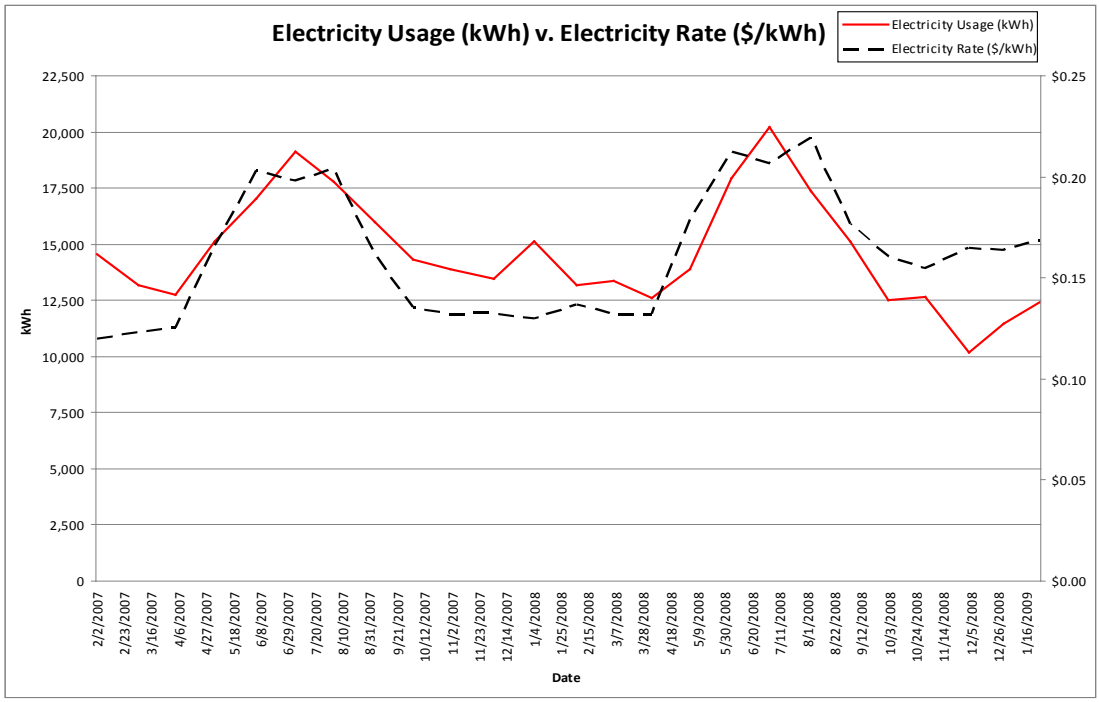


6.2. Tariff analysis

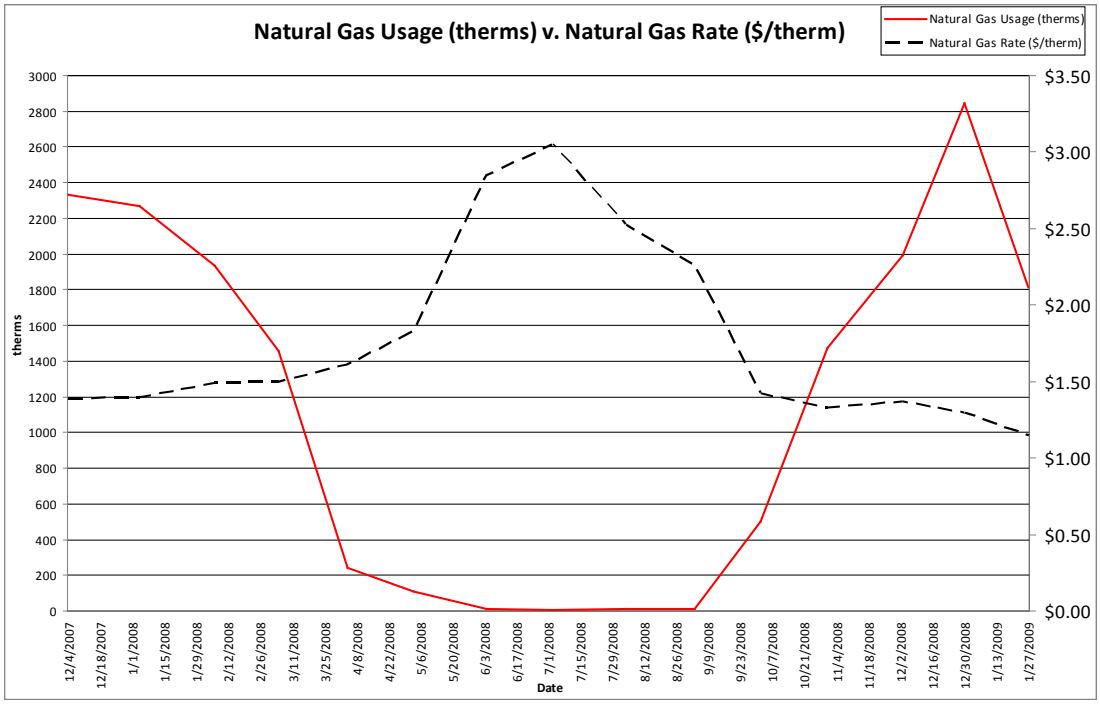
The Rutherford Borough Hall currently buys electricity from PSEG at the general service rate, which charges customers based on the market rate of electricity usage as well as monthly peak demand. Gas is purchased from PSEG at the BGSS service rate which charges customers based on the market rate of natural gas usage. General Service rates are appropriate for this building due to its size.

6.3. Energy Procurement strategies

Billing analysis shows price fluctuations of over 20% over the course of the year for the building electrical and natural gas accounts. Customers that have a large variation in monthly billing rates can often reduce the costs associated with energy procurement by selecting a third party energy supplier. Contact the NJ Energy Choice Program for further information on Energy Services Companies (ESCOs) that can act as third party energy suppliers. Purchasing electricity from an ESCO can reduce electric rate fluctuation and ultimately reduce the annual cost of energy for the school. Appendix B contains a complete list of third party energy suppliers.



Electricity prices reflect electricity usage



Natural gas prices fluctuate as expected with usage

The building would not be eligible for enrollment in a Demand Response Program because the minimum electric demand each month does not greatly exceed 50 kW, which is the typical threshold for considering this option.

7. METHOD OF ANALYSIS

7.1. Assumptions and methods

Energy modeling method:	Spreadsheet-based calculation methods
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Note: Cost estimates also based on utility bill analysis and prior experience with similar projects.

7.2. Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE BUILDING SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE BUILDING(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.

Appendix A: Lighting study

Existing Lighting Conditions																
#	Building	Level/Floor	Measured Lighting Level in Footcandles	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/ Lamp	Hrs/Day	Energy Use (Watt hours/day)	Annual Energy Use (kWh/year)	Controls	Daylighting possible?	Total Power (W)
1	Borough Hall	Basement	73	Bureau of Safety Vestibule	2' U-shaped T12	magnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
2	Borough Hall	Basement	10	Maintenance	75W incandescent	-	3	1	incandescent	75	4	900	235	Switch	No	225
3	Borough Hall	Basement	24	Borough of Safety - storage	8' linear T12	magnetic	1	2	fluorescent	72	4	576	150	Switch	No	144
4	Borough Hall	Basement	110	Borough of Safety	4' linear T12	magnetic	3	4	fluorescent	40	9	4320	1128	Switch	No	480
5	Borough Hall	Basement	100	Borough of Safety - file room	4' linear T12	magnetic	1	4	fluorescent	40	4	640	167	Occ. Sensor	No	160
6	Borough Hall	Basement	73	Borough of Safety - break room	4' linear T12	magnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
7	Borough Hall	Basement	150	Borough of Safety - Main Area	4' linear T12	magnetic	4	8	fluorescent	40	9	11520	3007	Switch	No	1280
8	Borough Hall	Basement	150	Borough of Safety - Main Area	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
9	Borough Hall	Basement	32	Men's Room	4' linear T12	magnetic	1	4	fluorescent	40	9	1440	376	Switch	No	160
10	Borough Hall	Basement	32	Women's Room	4' linear T12	magnetic	1	4	fluorescent	40	9	1440	376	Switch	No	160
11	Borough Hall	Basement	20	Downtown Partnership	4' linear T12	magnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640
12	Borough Hall	Basement	13	Downtown Partnership - Closet	75W incandescent	-	1	1	incandescent	75	2	150	39	Switch	No	75
13	Borough Hall	Basement	18	Vestibule	4' linear T12	magnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640
14	Borough Hall	Basement	30	Rec. Dept. Closet	4' linear T12	magnetic	1	4	fluorescent	40	2	320	84	Switch	No	160
15	Borough Hall	Basement	70	Rec. Dept.	4' linear T12	magnetic	6	4	fluorescent	40	9	8640	2255	Switch	No	960
16	Borough Hall	Basement	70	Rec. Dept.	2' U-shaped T12	magnetic	5	2	fluorescent	40	9	3600	940	Switch	No	400
17	Borough Hall	Basement	82	Rec. Dept. Conference	4' linear T12	magnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640
18	Borough Hall	Basement	12	Rec. Dept. Bath	75W incandescent	-	1	1	incandescent	75	4	300	78	Switch	No	75
19	Borough Hall	Basement	16	Rec. Dept. Storage	4' linear T12	magnetic	1	4	fluorescent	40	4	640	167	Switch	No	160
20	Borough Hall	Basement	7	Storage 1	75W incandescent	-	1	1	incandescent	75	4	300	78	Switch	No	75
21	Borough Hall	Basement	17	Storage 2	75W incandescent	-	1	1	incandescent	75	4	300	78	Switch	No	75
22	Borough Hall	Basement	17	Storage 2	13W CFL	-	1	1	CFL	13	4	52	14	Switch	No	13
23	Borough Hall	Basement	62	Elevators machine room	2' U-shaped T12	magnetic	1	2	fluorescent	40	4	320	84	Switch	No	80
24	Borough Hall	Basement	110	Food Pantry	8' linear T12	magnetic	6	4	fluorescent	72	9	15552	4059	Switch	No	1728
25	Borough Hall	Basement	10	Food Pantry - Electrical Room	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
26	Borough Hall	Basement	40	Food Pantry - Bath/Closet	40W incandescent	-	2	1	incandescent	40	4	320	84	Switch	No	80
27	Borough Hall	Basement	6	Food Pantry - Sink room	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
28	Borough Hall	Basement	150	Dept of Social Services	4' linear T12	magnetic	2	4	fluorescent	40	9	2880	752	Switch	No	320
29	Borough Hall	Basement	28	Traffic Control	4' linear T12	magnetic	1	4	fluorescent	40	9	1440	376	Switch	No	160
30	Borough Hall	Basement	56	Fire Alarm Station	4' linear T12	magnetic	2	4	fluorescent	40	9	2880	752	Switch	No	320
31	Borough Hall	Basement	50	Fire Alarm Station - storage	4' linear T12	magnetic	1	4	fluorescent	40	9	1440	376	Switch	No	160
32	Borough Hall	Basement	11	Fire Alarm Station - Hallway	72W incandescent	-	3	1	incandescent	72	9	1944	507	Switch	No	216
33	Borough Hall	Basement	20	Main Hall	4' linear T12	magnetic	2	2	fluorescent	40	12	1920	501	Switch	No	160
34	Borough Hall	Basement	20	Main Hall	72W incandescent	-	3	1	incandescent	72	12	2592	677	Switch	No	216
35	Borough Hall	Basement	20	Main Hall	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
36	Borough Hall	Basement	20	Main Hall	Fluorescent Exit Sign	-	1	1	Fl. Exit	20	12	240	63	None	No	20
37	Borough Hall	Basement	40	Storage off of Main hall	4' linear T12	magnetic	4	4	fluorescent	40	4	2560	668	Switch	No	640
38	Borough Hall	Basement	17	Boiler Room	4' linear T12	magnetic	6	2	fluorescent	40	9	4320	1128	Switch	No	480
39	Borough Hall	Basement	17	Boiler Room	45W incandescent	-	1	1	incandescent	45	9	405	106	Switch	No	45
40	Borough Hall	Basement	17	Boiler Room	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
41	Borough Hall	Basement	-	Display - Trophy case	4' linear T12	magnetic	4	2	fluorescent	40	9	2880	752	Switch	No	320
42	Borough Hall	Basement	90	North Stairwells	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2004	Switch	No	640
43	Borough Hall	1st Floor	60	Tax office vestibule	4' linear T12	magnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640
44	Borough Hall	1st Floor	60	Tax office	4' linear T12	magnetic	8	4	fluorescent	40	9	11520	3007	Switch	No	1280
45	Borough Hall	1st Floor	17	Tax vault	4' linear T12	magnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
46	Borough Hall	1st Floor	22	Borough Clerk - Supply vault	4' linear T12	magnetic	1	4	fluorescent	40	9	1440	376	Switch	No	160
47	Borough Hall	1st Floor	90	Borough Clerk - Kitchenette	2' U-shaped T12	magnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
48	Borough Hall	1st Floor	92	Borough Clerk	4' linear T12	magnetic	13	4	fluorescent	40	9	18720	4886	Switch	No	2080
49	Borough Hall	1st Floor	14	Borough Clerk - bathroom	42W incandescent	-	1	1	incandescent	42	4	168	44	Switch	No	42
50	Borough Hall	1st Floor	55	Borough Clerk - office	4' linear T12	magnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640

51	Borough Hall	1st Floor	30	Borough Clerk - storage vault	8' linear T12	nagnetic	2	2	fluorescent	72	9	2592	677	Switch	No	288
52	Borough Hall	1st Floor	5	Borough Clerk - storage vault 2	150W incandescent	-	6	1	incandescent	150	9	8100	2114	Switch	No	900
53	Borough Hall	1st Floor	45	Borough Administrator - reception area	4' linear T12	nagnetic	6	4	fluorescent	40	9	8640	2255	Switch	No	960
54	Borough Hall	1st Floor	105	BA- Office 1	4' linear T12	nagnetic	21	4	fluorescent	40	9	30240	7893	Switch	No	3360
55	Borough Hall	1st Floor	60	BA - Office	4' linear T12	nagnetic	5	4	fluorescent	40	9	7200	1879	Switch	No	800
56	Borough Hall	1st Floor	55	BA Hallway	4' linear T12	nagnetic	1	4	fluorescent	40	12	1920	501	Switch	No	160
57	Borough Hall	1st Floor	70	Purchasing	4' linear T12	nagnetic	7	4	fluorescent	40	9	10080	2631	Switch	No	1120
58	Borough Hall	1st Floor	67	Purchasing Assistant (left room)	4' linear T12	nagnetic	2	4	fluorescent	40	9	2880	752	Switch	No	320
59	Borough Hall	1st Floor	65	Purchasing (right room)	4' linear T12	nagnetic	3	4	fluorescent	40	9	4320	1128	Switch	No	480
60	Borough Hall	1st Floor	50	Purchasing	2' U-shaped T12	nagnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
61	Borough Hall	1st Floor	55	Court Administrator	4' linear T12	nagnetic	4	4	fluorescent	40	9	5760	1503	Switch	No	640
62	Borough Hall	1st Floor	40	Court Office	4' linear T12	nagnetic	7	4	fluorescent	40	9	10080	2631	Switch	No	1120
63	Borough Hall	1st Floor	7	Court Office - closet	40W incandescent	-	1	1	incandescent	40	2	80	21	Switch	No	40
64	Borough Hall	1st Floor	9	Court Offce - bathroom	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
65	Borough Hall	1st Floor	60	East Entrance	15W incandescent candles	-	1	5	incandescent	15	12	900	235	Switch	No	75
66	Borough Hall	1st Floor	60	East Hall	4' linear T12	nagnetic	1	4	fluorescent	40	12	1920	501	Switch	No	160
67	Borough Hall	1st Floor	25	Hall	4' linear T12	nagnetic	7	4	fluorescent	40	12	13440	3508	Switch	No	1120
68	Borough Hall	1st Floor	25	Hall	LED Exit Sign	-	2	1	fluorescent	5	24	240	63	None	No	10
69	Borough Hall	1st Floor	67	Building Department	Fluorescent Exit Sign	-	1	1	Fl. Exit	20	24	480	125	None	No	20
70	Borough Hall	1st Floor	25	Building Dept - storage	4' linear T12	nagnetic	2	4	fluorescent	40	2	640	167	Switch	No	320
71	Borough Hall	1st Floor	13	Building Dept - bath	40W incandescent	-	2	1	incandescent	40	4	320	84	Switch	No	80
72	Borough Hall	1st Floor	70	Building Dept	4' linear T12	lectroni	10	4	fluorescent	34	9	12240	3195	Switch	No	1360
73	Borough Hall	2nd Floor	118	Board of Education	4' linear T12	lectroni	4	4	fluorescent	34	9	4896	1278	Switch	No	544
74	Borough Hall	2nd Floor	95	Office 1 (left)	4' linear T12	lectroni	2	4	fluorescent	34	9	2448	639	Switch	No	272
75	Borough Hall	2nd Floor	120	Offce 2 (right)	4' linear T12	lectroni	4	4	fluorescent	34	9	4896	1278	Switch	No	544
76	Borough Hall	2nd Floor	11	Hallway - Custodians	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
77	Borough Hall	2nd Floor	55	Copy/Supply Room	4' linear T12	lectroni	3	4	fluorescent	34	4	1632	426	Switch	No	408
78	Borough Hall	2nd Floor	9	Copy - Closet	40W incandescent	-	1	1	incandescent	40	2	80	21	Switch	No	40
79	Borough Hall	2nd Floor	14	Judge Chambers	40W incandescent	-	4	1	incandescent	40	4	640	167	Switch	No	160
80	Borough Hall	2nd Floor	7	Council Chambers	40W incandescent	-	21	2	incandescent	40	4	6720	1754	Switch	No	1680
81	Borough Hall	2nd Floor	7	Council Chambers	LED Exit Sign	-	2	1	LED Exit	5	24	240	63	None	No	10
82	Borough Hall	2nd Floor	66	Council Meeting Room (blue)	4' linear T12	nagnetic	5	4	fluorescent	40	4	3200	835	Switch	No	800
83	Borough Hall	2nd Floor	20	Council Bath	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
84	Borough Hall	2nd Floor	22	Mayor's Office	2' U-shaped T12	nagnetic	9	2	fluorescent	40	9	6480	1691	Switch	No	720
85	Borough Hall	2nd Floor	18	Mayor's Bath	40W incandescent	-	1	1	incandescent	40	4	160	42	Switch	No	40
86	Borough Hall	2nd Floor	9	Mayor's Hall	4' linear T12	nagnetic	2	2	fluorescent	40	12	1920	501	Switch	No	160
87	Borough Hall	2nd Floor	66	Business Admin.	4' linear T12	lectroni	8	4	fluorescent	34	9	9792	2556	Switch	No	1088
88	Borough Hall	2nd Floor	65	Business Admin. - File Storage	4' linear T12	nagnetic	2	4	fluorescent	40	4	1280	334	Switch	No	320
89	Borough Hall	2nd Floor	98	Business Admin. - Office	4' linear T12	lectroni	2	4	fluorescent	34	9	2448	639	Switch	No	272
90	Borough Hall	2nd Floor	66	Business Admin. - Office	2' U-shaped T12	nagnetic	1	2	fluorescent	40	9	720	188	Switch	No	80
91	Borough Hall	2nd Floor	45	2nd Floor Hallway	4' linear T12	lectroni	4	4	fluorescent	34	12	6528	1704	Switch	No	544
92	Borough Hall	2nd Floor	45	2nd Floor Hallway	LED Exit Sign	-	2	1	LED Exit	5	24	240	63	None	No	10
93	Borough Hall	Attic	35	Attic	4' linear T8	lectroni	5	2	fluorescent	32	2	640	167	Switch	No	320
94	Borough Hall	Attic	35	Attic	40W incandescent	-	1	1	incandescent	40	2	80	21	Switch	No	40

Proposed Lighting Conditions															
#	Building	Level/Floor	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/ Lamp	Hrs/ Day	Energy Use (Watt hours/day)	Annual Energy Use (kWh/year)	Controls	Daylighting possible?	Total Power (W)
1	Borough Hall	Basement	Bureau of Safety Vestibule	2' U-shaped T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
2	Borough Hall	Basement	Maintenance	20W CFL	-	3	1	CFL	20	4	240	63	Switch	No	60
3	Borough Hall	Basement	Borough of Safety - storage	8' linear T8	electronic	1	2	fluorescent	59	4	472	123	Switch	No	118
4	Borough Hall	Basement	Borough of Safety	4' linear T8	electronic	3	4	fluorescent	32	9	3456	902	Switch	No	384
5	Borough Hall	Basement	Borough of Safety - file room	4' linear T8	electronic	1	4	fluorescent	32	4	512	134	Occ. Sensor	No	128
6	Borough Hall	Basement	Borough of Safety - break room	4' linear T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
7	Borough Hall	Basement	Borough of Safety - Main Area	4' linear T8	electronic	4	8	fluorescent	32	9	9216	2405	Switch	No	1024
8	Borough Hall	Basement	Borough of Safety - Main Area	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
9	Borough Hall	Basement	Men's Room	4' linear T8	electronic	1	4	fluorescent	32	9	1152	301	Switch	No	128
10	Borough Hall	Basement	Women's Room	4' linear T8	electronic	1	4	fluorescent	32	9	1152	301	Switch	No	128
11	Borough Hall	Basement	Downtown Partnership	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
12	Borough Hall	Basement	Downtown Partnership - Closet	20W CFL	-	1	1	CFL	20	2	40	10	Switch	No	20
13	Borough Hall	Basement	Vestibule	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
14	Borough Hall	Basement	Rec. Dept. Closet	4' linear T8	electronic	1	4	fluorescent	32	2	256	67	Switch	No	128
15	Borough Hall	Basement	Rec. Dept.	4' linear T8	electronic	6	4	fluorescent	32	9	6912	1804	Switch	No	768
16	Borough Hall	Basement	Rec. Dept.	2' U-shaped T8	electronic	5	2	fluorescent	32	9	2880	752	Switch	No	320
17	Borough Hall	Basement	Rec. Dept. Conference	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
18	Borough Hall	Basement	Rec. Dept. Bath	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
19	Borough Hall	Basement	Rec. Dept. Storage	4' linear T8	electronic	1	4	fluorescent	32	4	512	134	Switch	No	128
20	Borough Hall	Basement	Storage 1	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
21	Borough Hall	Basement	Storage 2	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
22	Borough Hall	Basement	Storage 2	13W CFL	-	1	1	CFL	13	4	52	14	Switch	No	13
23	Borough Hall	Basement	Elevators machine room	2' U-shaped T8	electronic	1	2	fluorescent	32	4	256	67	Switch	No	64
24	Borough Hall	Basement	Food Pantry	8' linear T8	electronic	6	4	fluorescent	59	9	12744	3326	Switch	No	1416
25	Borough Hall	Basement	Food Pantry - Electrical Room	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
26	Borough Hall	Basement	Food Pantry - Bath/Closet	20W CFL	-	2	1	CFL	20	4	160	42	Switch	No	40
27	Borough Hall	Basement	Food Pantry - Sink room	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
28	Borough Hall	Basement	Dept of Social Services	4' linear T8	electronic	2	4	fluorescent	32	9	2304	601	Switch	No	256
29	Borough Hall	Basement	Traffic Control	4' linear T8	electronic	1	4	fluorescent	32	9	1152	301	Switch	No	128
30	Borough Hall	Basement	Fire Alarm Station	4' linear T8	electronic	2	4	fluorescent	32	9	2304	601	Switch	No	256
31	Borough Hall	Basement	Fire Alarm Station - storage	4' linear T8	electronic	1	4	fluorescent	32	9	1152	301	Switch	No	128
32	Borough Hall	Basement	Fire Alarm Station - Hallway	32W CFL	-	3	1	CFL	32	9	864	226	Switch	No	96
33	Borough Hall	Basement	Main Hall	4' linear T8	electronic	2	2	fluorescent	40	12	1920	501	Switch	No	160
34	Borough Hall	Basement	Main Hall	32W CFL	-	3	1	CFL	72	12	2592	677	Switch	No	216
35	Borough Hall	Basement	Main Hall	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
36	Borough Hall	Basement	Main Hall	LED Exit Sign	-	1	1	LED Exit	5	12	60	16	None	No	5
37	Borough Hall	Basement	Storage off of Main hall	4' linear T8	electronic	4	4	fluorescent	32	4	2048	535	Switch	No	512
38	Borough Hall	Basement	Boiler Room	4' linear T8	electronic	6	2	fluorescent	32	9	3456	902	Switch	No	384
39	Borough Hall	Basement	Boiler Room	20W CFL	-	1	1	CFL	20	9	180	47	Switch	No	20
40	Borough Hall	Basement	Boiler Room	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
41	Borough Hall	Basement	Display - Trophy case	4' linear T8	electronic	4	2	fluorescent	32	9	2304	601	Switch	No	256
42	Borough Hall	Basement	North Stairwells	4' linear T8	electronic	4	4	fluorescent	32	12	6144	1604	Switch	No	512
43	Borough Hall	1st Floor	Tax office vestibule	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
44	Borough Hall	1st Floor	Tax office	4' linear T8	electronic	8	4	fluorescent	32	9	9216	2405	Switch	No	1024
45	Borough Hall	1st Floor	Tax vault	4' linear T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
46	Borough Hall	1st Floor	Borough Clerk - Supply vault	4' linear T8	electronic	1	4	fluorescent	32	9	1152	301	Switch	No	128

47	Borough Hall	1st Floor	Borough Clerk - Kitchenette	2' U-shaped T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
48	Borough Hall	1st Floor	Borough Clerk	4' linear T8	electronic	13	4	fluorescent	32	9	14976	3909	Switch	No	1664
49	Borough Hall	1st Floor	Borough Clerk - bathroom	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
50	Borough Hall	1st Floor	Borough Clerk - office	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
51	Borough Hall	1st Floor	Borough Clerk - storage vault	8' linear T8	electronic	2	2	fluorescent	59	9	2124	554	Switch	No	236
52	Borough Hall	1st Floor	Borough Clerk - storage vault 2	32W CFL	-	6	1	CFL	32	9	1728	451	Switch	No	192
53	Borough Hall	1st Floor	Borough Administrator - reception area	4' linear T8	electronic	6	4	fluorescent	32	9	6912	1804	Switch	No	768
54	Borough Hall	1st Floor	BA- Office 1	4' linear T8	electronic	21	4	fluorescent	32	9	24192	6314	Switch	No	2688
55	Borough Hall	1st Floor	BA - Office	4' linear T8	electronic	5	4	fluorescent	32	9	5760	1503	Switch	No	640
56	Borough Hall	1st Floor	BA Hallway	4' linear T8	electronic	1	4	fluorescent	32	12	1536	401	Switch	No	128
57	Borough Hall	1st Floor	Purchasing	4' linear T8	electronic	7	4	fluorescent	32	9	8064	2105	Switch	No	896
58	Borough Hall	1st Floor	Purchasing Assistant (left room)	4' linear T8	electronic	2	4	fluorescent	32	9	2304	601	Switch	No	256
59	Borough Hall	1st Floor	Purchasing (right room)	4' linear T8	electronic	3	4	fluorescent	32	9	3456	902	Switch	No	384
60	Borough Hall	1st Floor	Purchasing	4' linear T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
61	Borough Hall	1st Floor	Court Administrator	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
62	Borough Hall	1st Floor	Court Office	4' linear T8	electronic	7	4	fluorescent	32	9	8064	2105	Switch	No	896
63	Borough Hall	1st Floor	Court Office - closet	20W CFL	-	1	1	CFL	20	2	40	10	Switch	No	20
64	Borough Hall	1st Floor	Court Offce - bathroom	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
65	Borough Hall	1st Floor	East Entrance	7W CFLCandelabra	-	1	5	CFL	7	12	420	110	Switch	No	35
66	Borough Hall	1st Floor	East Hall	4' linear T8	electronic	1	4	fluorescent	32	12	1536	401	Switch	No	128
67	Borough Hall	1st Floor	Hall	4' linear T8	electronic	7	4	fluorescent	32	12	10752	2806	Switch	No	896
68	Borough Hall	1st Floor	Hall	LED Exit Sign	-	2	1	fluorescent	5	24	240	63	None	No	10
69	Borough Hall	1st Floor	Building Department	LED Exit Sign	-	1	1	LED Exit	5	24	120	31	None	No	5
70	Borough Hall	1st Floor	Building Dept - storage	4' linear T8	electronic	2	4	fluorescent	32	2	512	134	Switch	No	256
71	Borough Hall	1st Floor	Building Dept - bath	20W CFL	-	2	1	CFL	20	4	160	42	Switch	No	40
72	Borough Hall	1st Floor	Building Dept	4' linear T8	electronic	10	4	fluorescent	32	9	11520	3007	Switch	No	1280
73	Borough Hall	2nd Floor	Board of Education	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
74	Borough Hall	2nd Floor	Office 1 (left)	4' linear T8	electronic	2	4	fluorescent	32	9	2304	601	Switch	No	256
75	Borough Hall	2nd Floor	Offce 2 (right)	4' linear T8	electronic	4	4	fluorescent	32	9	4608	1203	Switch	No	512
76	Borough Hall	2nd Floor	Hallway - Custodians	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
77	Borough Hall	2nd Floor	Copy/Supply Room	4' linear T8	electronic	3	4	fluorescent	32	4	1536	401	Switch	No	384
78	Borough Hall	2nd Floor	Copy - Closet	20W CFL	-	1	1	CFL	20	2	40	10	Switch	No	20
79	Borough Hall	2nd Floor	Judge Chambers	20W CFL	-	4	1	CFL	20	4	320	84	Switch	No	80
80	Borough Hall	2nd Floor	Council Chambers	20W CFL	-	21	2	CFL	20	4	3360	877	Switch	No	840
81	Borough Hall	2nd Floor	Council Chambers	LED Exit Sign	-	2	1	LED Exit	5	24	240	63	None	No	10
82	Borough Hall	2nd Floor	Council Meeting Room (blue)	4' linear T8	electronic	5	4	fluorescent	32	4	2560	668	Switch	No	640
83	Borough Hall	2nd Floor	Council Bath	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
84	Borough Hall	2nd Floor	Mayor's Office	2' U-shaped T8	electronic	9	2	fluorescent	32	9	5184	1353	Switch	No	576
85	Borough Hall	2nd Floor	Mayor's Bath	20W CFL	-	1	1	CFL	20	4	80	21	Switch	No	20
86	Borough Hall	2nd Floor	Mayor's Hall	4' linear T8	electronic	2	2	fluorescent	32	12	1536	401	Switch	No	128
87	Borough Hall	2nd Floor	Business Admin.	4' linear T8	electronic	8	4	fluorescent	32	9	9216	2405	Switch	No	1024
88	Borough Hall	2nd Floor	Business Admin. - File Storage	4' linear T8	electronic	2	4	fluorescent	32	4	1024	267	Switch	No	256
89	Borough Hall	2nd Floor	Business Admin. - Office	4' linear T8	electronic	2	4	fluorescent	32	9	2304	601	Switch	No	256
90	Borough Hall	2nd Floor	Business Admin. - Office	2' U-shaped T8	electronic	1	2	fluorescent	32	9	576	150	Switch	No	64
91	Borough Hall	2nd Floor	2nd Floor Hallway	4' linear T8	electronic	4	4	fluorescent	32	12	6144	1604	Switch	No	512
92	Borough Hall	2nd Floor	2nd Floor Hallway	LED Exit Sign	-	2	1	LED Exit	5	24	240	63	None	No	10
93	Borough Hall	Attic	Attic	4' linear T8	electronic	5	2	fluorescent	32	2	640	167	Switch	No	320
94	Borough Hall	Attic	Attic	20W CFL	-	1	1	CFL	20	2	40	10	Switch	No	20

Existing Lighting Energy Use (kWh/year)	85,355
Proposed Lighting Energy Use (kWh/year)	67,715
Existing Lighting Energy Cost ($/year)	$14,510
Proposed Lighting Energy Cost ($/year)	$11,512
Estimated Savings (kWh/year)	17,640
Estimated Savings ($/year)	$2,999
Existing lighting power density (W/sqft)	1.41
Proposed lighting power density (W/sqft)	1.10

Appendix B: Third Party Energy Suppliers (ESCOs)

Third Party Electric Suppliers for PSEG Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com
ConEdison Solutions 535 State Highway 38 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Strategic Energy, LLC 55 Madison Avenue, Suite 400 Morristown, NJ 07960	(888) 925-9115 www.sel.com
Suez Energy Resources NA, Inc. 333 Thornall Street, 6th Floor Edison, NJ 08837	(888) 644-1014 www.suezenergyresources.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com

Third Party Gas Suppliers for PSEG Service Territory	Telephone & Web Site
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativenet.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
Dominion Retail, Inc. 395 Highway 170, Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.retail.dom.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com
Great Eastern Energy 116 Village Riva, Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateastern.com
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Hudson Energy Services, LLC 545 Route 17 South Ridgewood, NJ 07450	(877) 483-7669 www.hudsonenergyservices.com
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
Keil & Sons 1 Bergen Blvd. Fairview, NJ 07002	(877) 797-8786 www.systrumenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 www.natgasco.com
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	(800) 646-6457 www.stuyfuel.com
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	(800) 557-1121 www.woodruffenergy.com