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December 9, 2009

Local Government Energy Program
Energy Audit Final Report

For
Borough of Metuchen
Borough Hall
Metuchen, NJ 08840

Project Number: LGEA18

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INTRODUCTION

On July 29th, 30th and 31st of 2009, Steven Winter Associates, Inc. (SWA) performed an energy audit and conditions assessment of the Borough of Metuchen Borough Hall, Public Library, Senior Center and Department of Public Works buildings located in Metuchen, NJ in Middlesex County. This assessment was conducted under the New Jersey Clean Energy Local Government Energy Audit Program. A separate report has been submitted for each of the buildings that were assessed. This document applies only to the Metuchen Borough Hall at 500 Main Street.

Existing conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building. Energy data collected in the field was imported into the eQUEST energy conservation software to generate a baseline model of the building. SWA simulated the installation of energy improvement measures on the baseline model of the building. Energy saving calculations and projected economics are automated and served as the basis for our conclusions.

The Metuchen Borough Hall, located at 500 Main Street, was built in 2003. It is a two story building with a full cellar and an unconditioned attic. The building is a concrete block structure with a red brick façade. There is approximately 26,835 square feet of conditioned floor area.

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

The document contains the Energy Audit Final Report and conditions assessment report for the Borough of Metuchen Borough Hall located at 500 Main Street, Metuchen, NJ 08840. The Borough Hall has two above ground levels and one level below ground. There is a full, unconditioned attic.

Based on the inspections performed by Steven Winter Associates (SWA) staff on July 16th and between July 29-31, 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 and 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.

For the 24 months from April, 2007 through March 2009, the Borough Hall consumed approximately 852,160 kilowatt hours (kWh) of electricity at a cost of about $117,662. For the 15 month period for which we have data, from April 2008 until June 2009, the building used approximately 14,281 therms of natural gas at a cost of about $16,437.

For the 12-month period for which we have overlapping electrical and gas data, from April, 2008 to March 2009, the building used **429,280** kWh of electricity costing $65,336.55, $0.152 per kWh and **11,878** therms of natural gas costing about $14,424.26, $1.21 per therm. The combined energy use of both sources was 2,653 MMBtu at a cost of $78,761.

SWA benchmarked the energy performance of the Municipal building using the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. Using 2008 as a baseline year, Portfolio Manager was used to evaluate the site energy use intensity of the building. The site energy use intensity for the Municipal building is 95 kBtu/sq.ft/year. The score, or rating, was 55. Future utility bills can be added to the Portfolio Manager and the site energy use intensity for different time periods can be compared to the year 2008 baseline to track changes in energy consumption over time. After energy efficiency improvements are made, Portfolio Manager can be used to evaluate the impact over time.

SWA recommends a total of five Energy Conservation Measures (ECMs) for Borough Hall. The total investment cost for these ECMs is $**96,500.** The total investment cost for these ECMs if maximum incentives are achieved is about **$ 82,358.** SWA estimates a first year savings of **$13,569** with a simple payback of **6.2 years**.

There are various incentives for which the Borough of Metuchen could apply that could also help lower the cost of installing the ECMs. SWA recommends that the Township applies for the NJ SmartStart program through the New Jersey Office of Clean Energy. These incentives can help provide technical assistance for the building in the implementation phase of any energy conservation project. Currently, the New Jersey Office of Clean Energy offers a Renewable Energy Incentive program that would pay $5,000 for the installation of a 5 kW photovoltaic system. There is also an incentive that issues a Solar Renewable Energy Certificate for every 1000kWh (1MWh) of electricity generated that can be sold or traded for the current market rate of electricity. There are also custom electric and gas incentives based on estimated savings that are calculated on a project by project basis. The total investment cost if all the incentives are attained at their maximum amount is $82,358.

The following table summarizes the proposed Energy Conservation Measures.

SCOPE OF WORK – SUMMARY TABLE

ECM#	ECM description	Installed Cost		1st year energy savings					SPP	LoM	lifecycle savings	Averaged ROI
		Estimated $	Source	usage	unit	demand	unit	$ savings				
1	Retro-Commissioning	$ 9,400	Contractor	80.57	MMBtu	-	-	$ 3,226	2.9	15	$38,512	20.6%
2	Demand Controlled Ventilation	$ 19,100	Estimate	112.72	MMBtu	-	-	$ 3,264	5.9	12	$32,490	5.8%
3	VSD for Air Handler Blower(s)	$ 9,000	Estimate	7,662	kWh	-	-	$ 2,867	3.1	12	$28,538	18.1%
4	5 kW Solar Photovoltaic System	$ 35,000	Similar	5,915	kWh	-	-	$ 3,505	10.0	15	$41,842	1.3%
5	Solar Thermal DHW	$ 24,000	Similar	584	Therms	-	-	$ 707	33.9	15	$8,440	-4.3%
Total		$ 96,500	-	-	-		-	$ 13,569	7.1	13.8	$151,503	4.1%

Definitions:
SPP: Simple Payback
LoM: Life of Measure
ROI: Return On Investment

Assumptions:

Discount rate:	3.0%	per DOE FEMP guidelines
Energy price escalation rate:	0%	per DOE FEMP guidelines

1. HISTORIC ENERGY CONSUMPTION

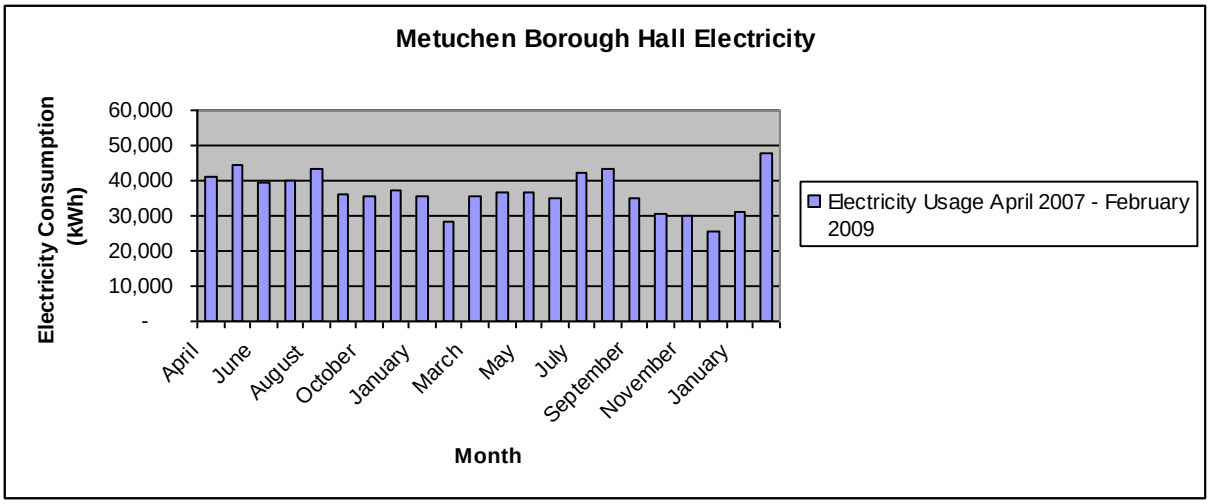
1.1. Energy usage and cost analysis

SWA analyzed utility bills provided by PSE&G and Elizabethtown Gas that showed consumption and cost for a fairly recent 12 month period.

Electricity – The Borough purchases electricity from Public Service Electric and Gas Co. (PSE&G) at **an average aggregated rate of $0.152 per kWh for the Borough Hall in 2008-2009.** The Borough Hall used **429,280 kWh at a cost of $65,337.** The data also reflected highest peak demand of 96 kW and average peak demand of 76.5 kW.

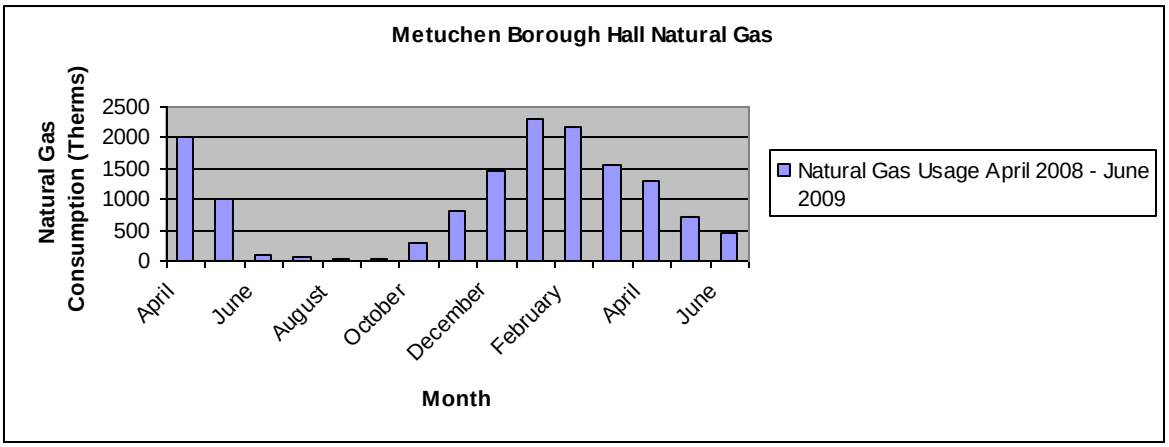
Natural Gas – The Borough Hall uses natural gas purchased from Elizabethtown Gas. **The average aggregated rate for natural gas in 2008-2009 was $1.21 per therm**. The building used **11,878 therms of gas costing $14,424.**

The following chart shows electricity usage for the Borough Hall based on utility bills for April 2007 through February of 2009.



In the above chart, the electricity spikes during the summer months reflect the cooling load as expected.

The following chart shows the natural gas usage for the Borough Hall based on utility bills for the April 2008 through June 2009.



In the above chart, the natural gas usage follows a heating trend as expected with almost no gas used through the late spring, summer and early fall.

1.2. Utility rate

The building purchases electricity from PSE&G at the MD rate. The Borough Hall uses Account #51 974 014 00 at service address 500 Main Street, Metuchen, NJ 08840. Natural Gas service is provided by Elizabethtown Gas, account number 193805800. Electricity was billed at an average aggregated rate of **$0.152/kWh** and natural gas was billed at an average aggregated rate of **$1.21/therm**.

1.3. Energy benchmarking

The building information and utility data were entered into the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. A summary report of the Portfolio Manager results is provided on the following page. Based on this analysis a performance rating of 55 was given to the building.

Per the LGEA program requirements, SWA has assisted the Township of Metuchen to create an *Energy Star Portfolio Manager* account and share the Metuchen Borough Hall facilities information to allow future data to be added and tracked using the benchmarking tool. SWA has shared this Portfolio Manager site information with TRC Energy Services, user name TRC-LGEA, as well as the Township of Metuchen with the following user name and password:

User name: "WEBoerth"
Password: "Metuchen"

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The Metuchen Borough Hall was built in 2003. It is a two story building with an unconditioned attic and full basement. The building houses the Borough municipal offices as well as the police station. There is approximately 26,835 square feet of conditioned area.

2.2. Building occupancy profiles

There are about 15 full time employees at the Borough municipal offices and another 10 to 12 at the Police Department. Due to the nature of the building's use and occupancy, the amount of people using the building at any given time is difficult to estimate.

2.3. Building Envelope

2.3.1. Exterior walls

The exterior walls of the Borough Hall are comprised of structural eight-inch concrete block with a deep red, four-inch brick façade. There is two inches of rigid board insulation between the block and brick. The building plans made available to SWA do not indicate of what material the insulation is made. Depending on the exact type of insulation, the wall could have a heat loss resistance of anywhere from R-9 to R-14. In any case, adding wall insulation is extremely expensive and is not recommended as a cost-effective option.

2.3.2. Roof

The roof of Borough Hall is built with eight-inch steel rafters, 20-gauge, one and a half inch steel sheathing and a standing seam steel roof covering. The roof is partially pitched and partially flat / low slope (1/4" in 12" run). Most of the insulation is comprised of nine-inch fiberglass batts in the ceiling joists and rafters (in the flat sections). Adding insulation to the roof or attic is not recommended as it would not be cost-effective.

2.3.3. Base

The building's base is 6-inch concrete slab-below-grade in most places. The sally port garage is a sloped 8-inch to 6-inch slab on grade. There were no reported problems with water penetration or moisture. There are two inches of rigid board insulation extending to two feet below the slab on the interior of the foundation walls and two inches of rigid board insulation under the slab extending to two feet from the foundation wall interior.

2.3.4. Windows

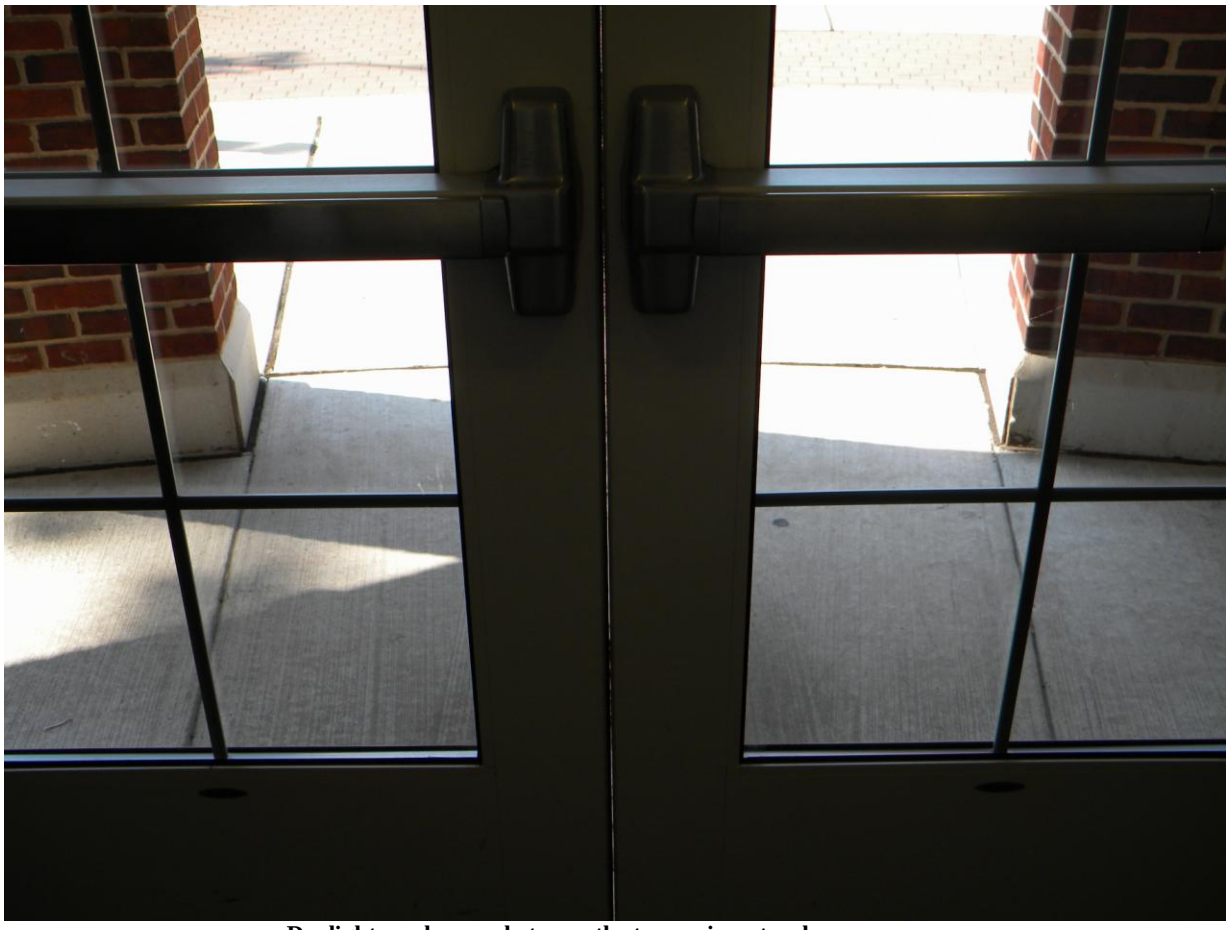
The windows are aluminum frame (with thermal isolation); double pane glazing with 3/4-inch air space with a butyl tape spacer. Considering how new the building is, the windows should perform well. Some employees, however, are not happy with the windows' performance. SWA

staff heard complaints such as: “the window frame and sill is like an iceberg” and “in winter, you can feel the breeze right through the window when the wind is right (not all the time)”.

Installation of new windows would not be economically viable. There are interior and exterior retrofit strategies that would provide increased comfort for building occupants and significant energy savings. One alternative may be the installation of an interior storm window system manufactured using two layers of high strength plastic film on an aluminum frame. This type of system has been shown to lower the u-value (u-value is a measure of transmission of heat through a material or assembly; lower numbers indicate better performance) of single pane windows from about .9 to .31, almost triple the insulating value. These systems have also been shown to reduce drafts and minimize radiation from cold surfaces. It is difficult to verify the rated energy performance of site-built assemblies, as a result, it is difficult to guarantee energy savings and any associated economic payback. Selection of the appropriate alternative should be made with consideration to comfort, durability, window functionality, and aesthetics as well as possible energy savings.

2.3.5. Exterior doors

Some of the exterior doors are in satisfactory condition with much of the weather-stripping still intact. But the weather-stripping is failing or missing in some of the doors and there are areas where the perimeter of the doors is allowing constant infiltration of unconditioned air. Exterior doors can be a major source of heat loss and infiltration and should be inspected regularly and any missing or failed weather-stripping should be repaired or replaced. There is also at least one door at which the threshold is not properly installed and is lifting away from the floor allowing infiltration of unconditioned air underneath. This is also creating a trip hazard and should be repaired or replaced and properly installed as soon as possible.



Daylight can be seen between the two main entry doors

2.3.6. Building air tightness

Based upon a visual inspection, the building appears to be fairly well sealed except for the aforementioned exterior doors. The employee complaints regarding being able to feel the breeze through the closed windows (specifically in the construction / zoning room 125) does create cause for concern. The building is too large for a blower door test to be effective and accurate so the more tedious window by window and door by door inspection on a very windy day should be performed using a smoke-stick, or even a candle at the window and door perimeters.

2.4. HVAC systems

2.4.1. Heating

The heating plant consists of two natural gas-fueled, 40 horsepower, hot water boilers. Both boilers are manufactured by Burrnham, Model V909 and have capacities of 1,673,000 Btuh (1,673 MBH) input and gross output of 1,342 MBH. Both are equipped with Power Flame Burners, model JR50A-15.

There are two 3 HP Baldor motors that power the heat water circulators to the fan/coil boxes.

The boilers are relatively new having been installed in 2003 and the rated efficiencies are in the range of 80%.

There is also a large Reznor gas furnace that is able to heat and ventilate the pistol range. According to employees of building maintenance and the police department, the Reznor is never used. If the pistol range is used regularly and if ammunition is repacked in the area, some type of ventilation is necessary. Installation of a contaminant based sensor to control fresh air would protect the health and safety of the users.

2.4.2. Cooling

The cooling equipment serving most of the Borough Hall is a York YCAL0070EC17 70-ton chiller located on the roof with the air handler in the attic. There are also two standalone systems, a Mitsubishi "Mr. Slim" 22,100 Btuh for the police department server rooms (located on the roof) and an LG LSU240CE, 22,500 Btuh for the Town phones and network servers. The York chiller provides chill water to all the fan/coil units

Maintenance and engineering staff at the building have indicated to SWA that the valves in the fan/coil units have never worked properly and they have begun replacing these in the most important zones.

SWA recommends that rather than just replacing the valves, that all the HVAC and mechanical systems be commissioned as part of a building wide retro-commissioning process. It may in fact just be improper wiring rather than defective valves that is causing the problem. Retro-commissioning would discover this or any other problems that may be keeping the heating, cooling or other systems from working as specified.

Borough employees, especially those working in the Police Department section of the building said that "the humidity is horrible" and "the HVAC doesn't work". The SWA building analyst did notice very high humidity when the temperature of the Police Department was 76 degrees, which should be a comfortable summer temperature if humidity is being controlled. Humidity problems in buildings can be caused by many factors but the most common reasons for high humidity in a building of this type are either an oversized cooling system that reaches working setpoint temperature so quickly that the system has not run long enough for the de-humidification process to operate properly, or a ventilation system that is providing too much unconditioned fresh air. The Borough Hall ventilation system is equipped with two Loren Cook Model ERV-3500H Energy Recovery Ventilators. Energy recovery ventilators are equipped to recover humidity as well as heat in the winter when higher humidity is desirable, but do not contain any dehumidification processes for the summer months. SWA is recommending a CO2 based, demand controlled ventilation system that should help with the humidity problem and save energy as well.

Attic Mechanical Room

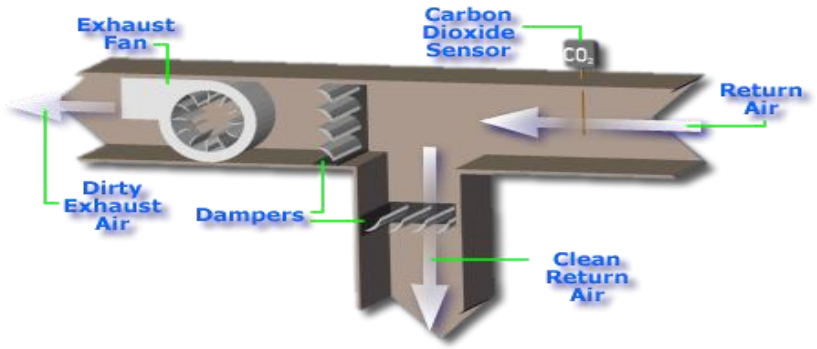
The mechanical area in attic houses the York Model FS-MC-SA air handling unit. SWA is recommending that the air handler blower fan motor be equipped with a variable speed drive. Variable speed drives control the speed of a motor based on a pre-determined logic. In this case, the drive would reduce the motor speed based on the actual cooling load so that when the zones were calling for less cooling the blower fan would run a slower speed. There are several types of variable speed drives. For the air handler blower motor, SWA recommends a variable frequency drive (VFD). VFDs work by modulating the amount of power delivered to an electric motor.

2.4.3. Ventilation

Fresh air is distributed by the air handling equipment.

ASHRAE Standard 62-99 identifies the outdoor air ventilation required for indoor air quality. Almost all municipal, state and federal jurisdictions use these guidelines as gospel in their building codes and bylaws. The traditional method of accomplishing the ventilation rates was to set the outdoor air quantity to maximum design occupancy. This can result in a tremendous waste of energy when the occupant load is not at maximum –almost always the situation in many commercial buildings - or intermittent use of the space. Carbon dioxide monitoring and control is an acceptable method of reducing ventilation rates when occupancy is below the design load. This ensures ASHRAE standards are being met and only expending the necessary amount of energy.

SWA recommends installation of CO2 based demand controlled ventilation (DCV). Instead of continuously ventilating the space at a constant rate designed to accommodate the maximum occupancy of the building, demand-controlled ventilation (DCV) will see that the amount of outside air drawn in for ventilation depends on the building's actual occupancy at any given time. This strategy results in energy savings because it reduces the amount of air that needs to be conditioned as well as the fan energy used to move that air. DCV primarily refers to when actual occupancies are approximated by measuring carbon dioxide (CO2) levels within a building with sensors. The following figure is an example of one of the ways that CO2 sensors can be used:



There also may be an issue with ventilation in the pistol range. While there is a dedicated Reznor furnace for heating and ventilation, staff indicates that it is never used. Some fresh air is necessary for this type of building use. Installation of a contaminants based demand controlled ventilation sensor or sensors would enable use of the existing ventilation system when lead or other contaminants build up to an unsafe level.

2.5. Domestic Hot Water

Domestic Hot Water for the Borough Hall is provided by one State natural gas-fired Model SBF80199NE combination 199,000Btuh water heater with 80 gallon storage tank (located in the basement mechanical room). The hot water pipes (as well as the accessible heat and chill water pipes) are well insulated.

SWA recommends installing a solar thermal hot water system to help offset the cost of the building's domestic hot water use. There is additional information regarding this energy conservation measure in the renewable energy section of this document.

More efficient hot water fixtures and equipment will save energy through reduced energy consumption for water heating and additional money, through reducing water and sewer bills. Automatic water shut-off controls for the faucets should be considered to further decrease water consumption. SWA did not see any dishwashers or clothes washers. As a best practice, at such time as the Borough deems it necessary to replace fixtures, energy saving fixtures bearing the ENERGY STAR label should be selected to ensure efficient performance.

2.6. Electrical systems

2.6.1. Lighting

Interior Lighting – Most of the lighting in the building is comprised of newer efficient technology T8 fixtures that contain electronic ballasts, which are far more efficient than the older magnetic ballasts.

There are several types of lighting that are used in the building, the most prevalent being fluorescent.

The Borough Hall uses predominantly linear and U-tube fluorescents but there are some pin-type compact fluorescents and some metal halide high intensity discharge fixtures.

The lighting for the Borough Hall is generally operating for approximately the 40 hours a week that the building is open to the public.

In accordance with requirements of the Local Government Energy Audit program, SWA, Inc. performed an investment grade lighting audit, which provides a comprehensive survey of existing lighting, and an extensive technical and financial analysis. It provides a dynamic simulation of the base building, calibrated against actual energy bills, as well as the proposed energy conservation measures.

Because the building itself, and therefore the lighting too, is relatively new, there are no lighting recommendations at this time.

Refer to Appendix A for a table detailing the survey of the existing lighting.

Appliances and process

SWA performed a basic survey of appliances installed at the Borough Hall and it would not be cost effective to replace any appliances at this time. Look for the Energy Star label when replacing appliances and equipment, including: 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.

2.6.2. Elevators

There is one hydraulic elevator in the Borough Hall. There are no cost-effective improvements presently available for hydraulic elevators.

3. EQUIPMENT LIST

Borough Hall							
Building System	**Description**	**Physical Location**	**Make / Model / Serial**	**Fuel**	**Space served**	**Date Installed**	**Estimated Remaining useful life %**
Heating	Burnham Hot Water Boiler;Input: 1,674MBH Gross output: 1,342 MBH Net IBR rating: 1,167 MBH, 1/3 HP burner	1st Fl. Rm 22, Mech Boiler Rm	Burnham Poweflame burner S#020354016 / M#V909 / S#20354016	Natural gas	All areas except court room	2002	75%
Heating	Burnham Hot Water Boiler;Input: 1,674MBH Gross output: 1,342 MBH Net IBR rating: 1,167 MBH, 1/3 HP burner	1st Fl. Rm 22, Mech Boiler Rm	Burnham, Poweflame burner S#020354017 / M#V909 / S#20354017	Natural gas	Court Room	2002	75%
Cooling	York Air-Cooled Scroll Chiller;R-22, 70 Tons	Outside, back of building	York / M#YCAL0070EC17 / S#RNLM004691	Electric	All areas	2002	75%
Cooling	Mitsubishi Condenser;2 Ton	Rooftop	Mitsubishi Mr. Slim / M#PU18EK1 / S#4YU00729A	Electric	PD Servers	2002	70%
Cooling	LG Condenser;2 Ton	Outside, north east corner of building	LG / M#LSU 240 CE	Electric	Media Equipment Rm	2002	70%
Heating / cooling	AHU-1, York Air Handling Unit with hot water and chilled water coils;R-22	Attic	York / M#YCA0061327	electric	All areas	2002	70%
Cooling / Dehumidification	ERV-1 & ERV-2, energy recovery units with cooling coils and dessicant wheel;2HP Supply Fan, 1.5 HP Exhaust Fan	Roof	Loren Cook Company / M#ERV-3500H	Electric	All areas	2002	70%
Domestic Hot Water	State storage type domestic hot water heater ;80 Gal	Mech Rm	State / M#SBF 80199NE / S#E03409006	Natural Gas (electronic ignition)	All areas	2002	60%
Domestic Hot Water	Circulating Pump;1.75 Amp, 1725 RPm, 1/2 HP	Mech Rm	Bell & Gosset / M#NA	Electric	All areas	2003	70%
Emergency Electrical	Olympian Diesel Generator ;Frame IL3014B	Outside, back of building	Olympian D100P1 Generator, Caterpillar Engine P# R56387-1184 / M#NA / S#134585/12	Diesel Fuel Oil	All areas	2002	80%

The inventory is continued on the next page.

Borough Hall							
Building System	**Description**	**Physical Location**	**Make / Model / Serial**	**Fuel**	**Space served**	**Date Installed**	**Estimated Remaining useful life %**
Heating	Two (2) Hot water pumps;1/3 HP	Attic	Bell & Gosset / M#903578	Electric	AHU-1	2002	70%
Cooling	P1, P2, Two (2) Chilled water distribution pumps ;7.5 Hp	Mech Rm	Bell & Gosset Pump, Baldor Motor / M#M3311T-8	Electric	All areas	2002	70%
Heating	P3, P4, Two (2) Hot water distribution pumps;3 HP, 1725 RPM	Mech Rm	Bell & Gosset Pump, Baldor Motor / M#M3211T-8	Electric	All areas	2002	70%

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 three categories of recommendations:

1. Capital Improvements – Upgrades not directly associated with energy savings
2. Operations and Maintenance – Low Cost/No Cost Measures
3. Energy Conservation Measures – Higher cost upgrades with associated energy savings

Category I Recommendations: Capital Improvements

- Demand controlled ventilation system for pistol range
- Interior Storm Window System

Category II Recommendations: Operations and Maintenance

- Weather Stripping/Air Sealing – As a best practice, exterior/overhead doors and vestibule doors 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. Building staff should also verify that windows open and close properly and repair, as needed. Any other accessible gaps or penetrations in the thermal envelope should also be sealed with caulk or spray foam. Particular attention should be paid to penetrations and doors connecting the main building to the garage to prevent transfer of combustion product.
- Pipe Insulation – All heat water, steam and DHW pipes should be inspected and any missing or deteriorated insulation should be replaced with new.
- Plug-In Timer Controls – For locally controlled equipment that the staff are currently responsible for turning off equipment when not in use. Plug-in timer controls can be utilized to ensure electrical equipment does not operate during unoccupied periods.
- Lighting Controls - Occupancy sensors and/or photocells, should also be considered. In applications where occupants tend to leave the lights running inadvertently, such as during fire response or other extended periods of absence, the occupancy sensors automatically shut-off the lights. Since operating hours vary, a survey of the building occupants can provide the most accurate feedback on lighting usage patterns within the facility to help determine the appropriateness of lighting controls.
- Energy Star Appliances - Consider Energy Star labeled equipment and appliances when replacement is necessary, including: refrigerators, printers, computers, copy machines, etc.
- 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.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description
1	Retro-Commissioning of All HVAC and Mechanical Systems
2	Demand Controlled Ventilation
3	Variable Speed Blower Motors at Air Handler
4	Install 5kW Solar Photovoltaic System
5	Install Solar Thermal DHW System

ECM #1: *Retro-Commissioning of All HVAC Equipment*

Description:

Commissioning is the systematic and documented process of ensuring that a new building's systems are designed, installed, tested for full functionality, and capable of being operated and maintained according to the owner's operational needs. Retro-commissioning refers to that process being performed on an existing building as an after market measure.

Installation cost:
Estimated cost: $9,400

Source of cost estimate: Estimate based on Lawrence Berkeley National Laboratory studies[1]

Economics:

Installed Cost		1st year energy savings					SPP	LoM	Lifecycle Savings	ROI
Estimated $	Source	usage	Unit	demand	unit	$ savings				
$ 9,400	LBL	80.6	mmbtu			$ 3,226	2.9	15	$38,512	20.6%

3.0% per DOE FEMP guidelines
0% per DOE FEMP guidelines

Assumptions: SWA estimated the cost and savings of the measure based on studies done by Lawrence Berkley National Laboratory (LBL), a U.S. Department of Energy laboratory operated by the University of California.

Rebates/financial incentives:

While there are no prescriptive incentives for retro-commissioning available from the New Jersey Clean Energy Program, an argument could be made that the energy savings deriving from this measure should qualify for the custom electric and custom gas savings available from the SmartStart Commercial Building Incentive Program. Applications for the custom electric and gas incentives are available by request or at the NJ Clean Energy website.

[1] Mills E et al. 2004. The cost-effectiveness of commercial buildings commissioning. Lawrence Berkeley National Laboratory. LBNL report #56637 (PDF 3.5 MB).

ECM #2: *Demand Controlled Ventilation*

Description:

Building codes require that a minimum amount of fresh air be provided to ensure adequate air quality. To comply, ventilation systems often operate at a fixed rate based on an assumed occupancy (e.g., 15 cfm per person multiplied by the maximum design occupancy). The result is there often is much more fresh air coming into buildings than is necessary, especially in buildings with long operating hours and occupancy that can be well below maximum for extended periods of time, like libraries. That air must be conditioned, resulting in higher energy consumption and costs than is necessary with appropriate ventilation. In humid climates, excess ventilation also can result in uncomfortable humidity and mold and mildew growth, making the indoor air quality (IAQ) worse rather than better.

Demand-controlled ventilation (DCV) using carbon dioxide (CO_2) sensing is a combination of two technologies: CO_2 sensors that monitor CO_2 levels in the air inside a building, and an air-handling system that uses data from the sensors to regulate the amount of ventilation air admitted.

Installation cost:
Estimated cost: $19,000

Source of cost estimate: Federal Energy management Program "Demand-Controlled Ventilation Using CO2 Sensors"; AirTest Energy Analysis Program for CO2 based demand contolled ventilation.

Economics:

Installed Cost		1st year energy savings					SPP	LoM	Lifecycle Savings	ROI
Estimated $	Source	usage	unit	demand	unit	$ savings				
$ 19,100	AirTest	112.7	mmbtu			$ 3,264	5.9	12	$32,490	5.8%

3.0% per DOE FEMP guidelines
0% per DOE FEMP guidelines

Assumptions: SWA estimated the cost and savings of the measure based on the AirTest Energy Analysis Program for CO2 based demand controlled ventilation. There are certain assumptions made within the program that are detailed in program calculations available as a separate document.

Rebates/financial incentives:

While there are no prescriptive incentives for demand controlled ventilation available from the New Jersey Clean Energy Program, an argument could be made that the energy savings deriving from this measure should qualify for the custom electric and custom gas savings available from the SmartStart Commercial Building Incentive Program. Applications for the custom electric and gas incentives are included in the Appendix B of this document.

ECM #3: *Install Variable Speed Drives at AHU Blower Motor*

Description:

Currently, the air conditioning system provides constant air flow for space. The proposed measure recommends addition of a variable speed drive that will reduce the supplied air flow at part load conditions. The logic will compare the space temperature set point with the actual space temperature and modulate the supply air fan speed.

Installation cost:

Estimated Cost: $9,000

Economics:

Installed Cost		1st year energy savings					SPP	LoM	Lifecycle Savings	ROI
Estimated $	Source	Usage	unit	demand	unit	$ savings				
$ 9,000	LBL	7,662.0	kWh			$ 1,165	7.7	12	$11,596	2.4%

3.0% per DOE FEMP guidelines
0% per DOE FEMP guidelines

Assumptions: SWA estimated the cost of implementing the measure based on similar projects. The savings estimates were based on assumption made for existing equipment run time and run time after installation of variable speed drive.

Rebates/financial incentives:

Incentives are available through the New Jersey Clean Energy SmartBuilding Program for a type of variable speed drive known as variable frequency drives (VFD). A VFD would be an excellent choice for this measure. Incentives for this measure range from $ 65 to $155 per horsepower of motor. This blower motor is a forty HP motor. Maximum incentive for this measure is $6,200

ECM #4: *Install Solar Photovoltaic System*

Please see section 5: RENEWABLE AND DISTRIBUTED ENERGY MEASURE

ECM #5: *Install Solar Thermal DHW System*

Please see section 5: RENEWABLE AND DISTRIBUTED ENERGY MEASURE

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are currently no existing renewable energy systems.

5.2. Solar Photovoltaics

ECM #4: ***Install 5 Kilowatt Solar Photovoltaic System***

Description:

Currently, the complex does not utilize any renewable energy systems. Renewable energy systems such as solar photovoltaics can offset a certain amount of the electricity purchased by the Borough. In addition, utility companies general bill for electricity in two ways – for usage and for demand. Usage is the actual amount of electricity consumed by the property in a given period (usually each month, measured in kilowatt hours). Demand is the mount of electrical power that the property requires at any given time to satisfy the building's electrical load. Peak demand is billed based on the largest amount of power required by the building at any given time during the billing period (measured in kilowatts). During the summer when demand is at its' highest due to the addition of air conditioning loads, the utility demand charges often rise to help the utility cover its' need for increased power capabilities. A photovoltaic system will not only offset the amount of electricity consumed, but will actually lower the peak demand, resulting in additional cost savings. SWA recommends installation of a small sized (5 kilowatt) solar system. As part of a concept known as net metering, when solar electricity production from the system is high and the building load is low, any excess power can be sold back to the utility. A solar photovoltaic system of this size will need approximately 1,200 square feet of roof area with a clear southern exposure.

Installation cost:

Estimated material cost:	$35,000
Rebate@$1 per watt:	$ 5,000
Total installed cost:	**$30,000**

Source of cost estimate: Similar Projects

Economics:

Installed Cost		1st year energy savings					SPP	LoM		
Estimated $	Source	usage	unit	demand	unit	$ savings			Lifecycle Savings	ROI
$ 35,000	RS Means	5,915	kWh	5	kW	$ 3,505	10.0	15	$41,842	1.3%

3.0% per DOE FEMP guidelines
0% per DOE FEMP guidelines

Assumptions: SWA estimated the cost and savings of the system based on past solar photovoltaic projects, the NREL online solar savings calculator and included the projected Solar Renewable Energy Credits in the savings estimate.

Rebates/financial incentives:

PSE&G Solar Loan Program, 15 year payback, paid with SRECs (Solar Renewable Energy Certificates) with a floor value of >$475.

Options for funding ECM:

This project may benefit from enrolling in the New Jersey SmartStart program to obtain Technical Assistance and offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

5.3. Solar Thermal

ECM #5: *Install Solar Thermal DHW System*

Description:

Solar water heaters use the sun to heat either water or a heat-transfer fluid in the collector. Heated water is then held in the storage tank ready for use, with a conventional system providing additional heating as necessary. The tank can be a modified standard water heater, but it is usually larger and better insulated. Solar water heating systems can be either active or passive, but the most common are active systems.

The building has a domestic water heater provided with storage capacity that brings in water directly from the city and heats it up to a desired set temperature. Typically, city water is delivered at approximately 55ºF and is required to be heated to 125ºF or more depending on various factors. Solar thermal collectors would offset the cost of heating city water by preheating the water before it is fed into the domestic hot water heater tank.

Installation cost:
Estimated cost: $24,000

Source of cost estimate: Similar Projects

Economics:

Installed Cost		1st year energy savings					SPP	LoM	Lifecycle Savings	ROI
Estimated $	Source	usage	unit	demand	unit	$ savings				
$ 24,000	Similar	584	Therms			$ 707	33.9	15	$8,440	-4.3%

3.0% per DOE FEMP guidelines
0% per DOE FEMP guidelines

Assumptions:

SWA assumes thermal savings based on domestic hot water base loads calculated using eQUEST modeling and by conducting the billing analysis.

Rebates/financial incentives:

While there are no prescriptive incentives for Solar Thermal DHW systems available from the New Jersey Clean Energy Program, an argument could be made that the energy savings deriving from this measure should qualify for the custom gas savings available from the SmartStart Commercial Building Incentive Program. Applications for the custom gas incentives are available as a separate document or from the NJ Clean Energy web site.

5.4. Combined Heat and Power

Description:

SWA analyzed the feasibility of installing a combined heat and power system (also know as co-generation) for the Borough of Metuchen Borough Hall but believes that the expense of this type of system makes it economically unfeasible at this time.

5.5. Geothermal

Description:

Geothermal is not applicable for the Municipal building because it would not be cost effective to change to a geothermal system.

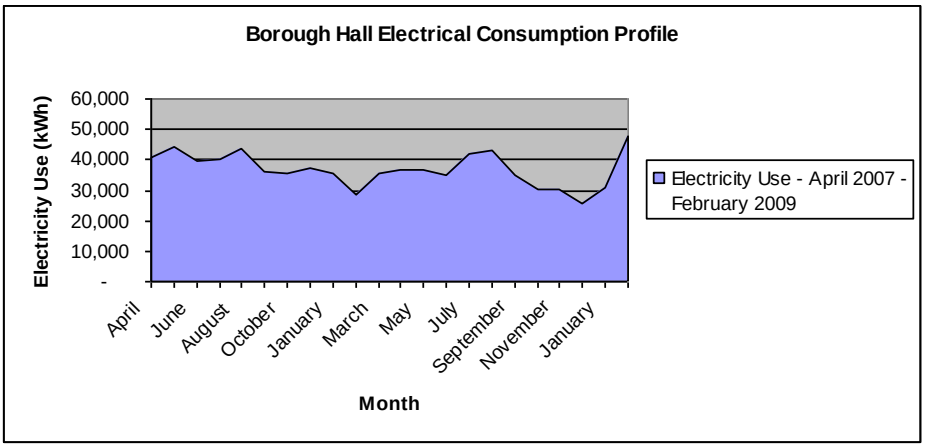
5.6. Wind

Description:

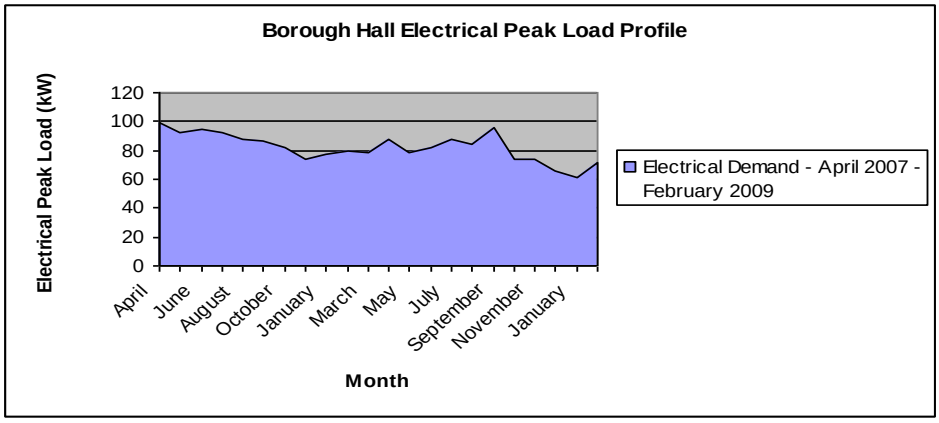
Wind power production is not appropriate for this location, because required land is not available for the wind turbine. Also available wind energy resource is very low.

6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

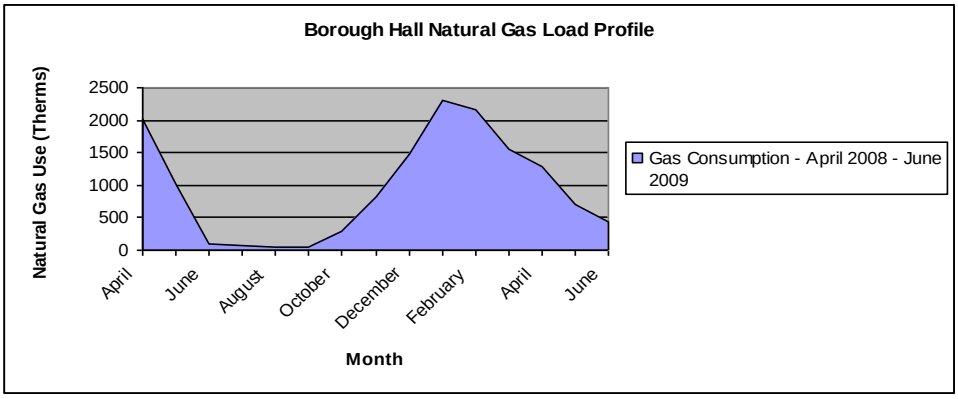
6.1. Load profiles



Electrical Consumption Profile



Electrical Monthly Peak Load Profile



Natural Gas Load Profile

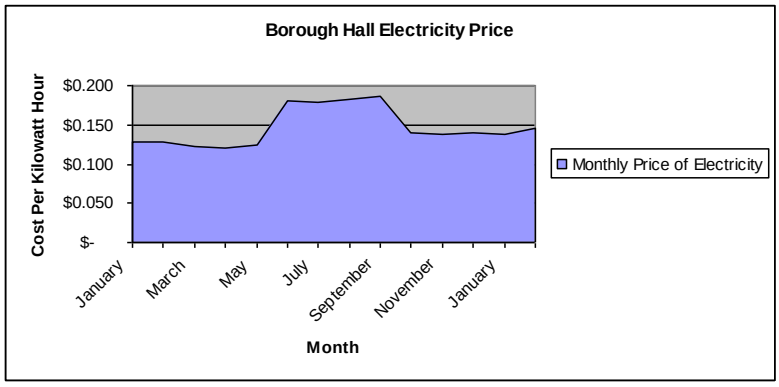
6.2. Tariff analysis

The Borough of Metuchen currently buys electricity and gas from Public Service Gas and Electric and Elizabethtown Gas respectively, on general service rates. The general service is a typical rate where customers pay for natural gas based on usage and for electricity based on consumption as well as peak electrical demand. The general service rate is the best option at this time.

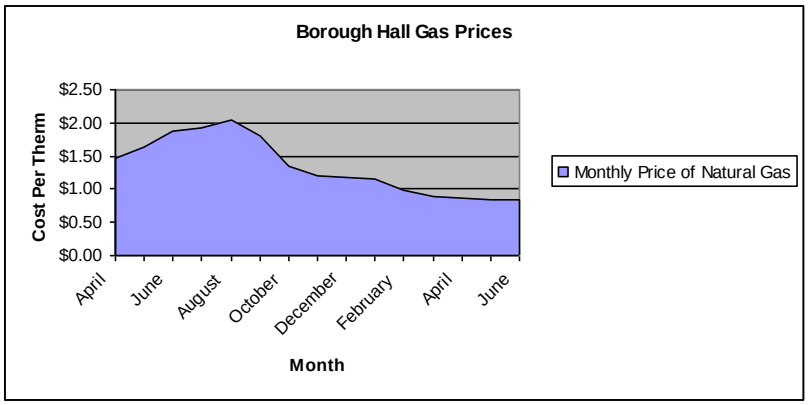
6.4. Energy Procurement Strategies

Bill analysis shows prices fluctuation of over 20% for both electricity and for natural gas over the course of January 2008 through February 2009 and April 2008 and June 2009 respectively.

Electric account



Natural Gas account



We recommend contacting the NJ Energy Choice program and deciding if a third party energy supplier for both the gas and the electricity would benefit the Township.

See http://www.state.nj.us/bpu/commercial/shopping.html.
The building would not be eligible for enrolling in a Demand Response Program because electric demand does not exceed 50kW, which is a typical threshold for considering this option.

7. METHOD OF ANALYSIS

7.1. Assumptions and tools

Energy modeling tool: eQUEST V3.6; Energy Savings Industry Calculators
Cost estimates: RS Means 2009 (Facilities Maintenance & Repair Cost Data)
RS Means 2009 (Building Construction Cost Data)
RS Means 2009 (Mechanical Cost Data)
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.

THIS DOCUMENT IS MEANT TO BE USED TO ANALYZE HOW THE BUILDING USES ENERGY AND HOW VARIOUS ENERGY CONSERVATION MEASURES MIGHT AFFECT FUTURE ENERGY AND OPERATING COSTS. IT IS NOT MEANT TO BE USED AS A DESIGN TOOL OR FOR EQUIPMENT SPECIFICATIONS.

Appendix A: Lighting Survey

BOROUGH OF METUCHEN BOROUGH HALL LIGHTING SURVEY

Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Controls
2	Court Room	18.7 (all on)	CF32recess		19	1	32	6	3648	Manual
2	Court Room	4.7	MH150	M	1	1	150	6	900	Manual
1	Court Room		CF32recess		7	1	32	24	5376	Manual
1	Court Room	9.6	CF32recess		10	1	32	6	1920	Dimmer
1	Court Room	7	CF32recess		5	1	32	6	960	Manual
2	Server Room		3F32T8	E	1	3	32	3	288	Manual
2	Police Server Room		3F32T8	E	2	3	32	3	576	Manual
2	Traffice Safety		3F32T8	E	3	3	32	9	2592	Manual
2	Borough Clerk	36	CF32recess	E	6	1	32	9	1728	Dimmer
2	Borough Clerk		1f32T8	E	1	1	32	9	288	Manual
2	Administrator Office	54	CF32recess		6	1	32	9	1728	Manual
2	Mayor's Office		CF32recess		5	1	32	9	1440	Manual
1	Council Conference Rm.	33	2FB30-U	E	7	2	30	6	2520	Manual
1	Council Conference Rm.		2FB30-U	E	1	2	30	24	1440	Manual
1	Storage Closet		1INC40	NA	1	1	40	0.5	20	Manual
1	Main Entry Vestibule	43.5	CF42		2	1	42	12	1008	Manual
1	Rotunda	4.4-ctr., 27 under Lume	CF32recess		8	1	32	12	3072	Manual
1	Pay Phone Room		3F32T8	E	1	3	32	9	864	Manual
1	PD Public Corridor		2FB30-U	E	3	2	30	12	2160	Manual
1	Boro Public Corridor	30.5	2FB30-U	E	14	2	30	12	10080	Manual
1	Public Men's Room	27.6	2FB30-U	E	1	1	30	24	720	Manual
1	Public Men's Room		3F32T8	E	2	3	32	12	2304	Manual
1	Public Men's Room	78	1F32T8	E	1	1	32	12	384	Manual
1	Violations Bureau 122	43.2 - 47.2	3F32T8	E	7	3	32	9	6048	Manual
1	Violations Bureau 122		2FB30-U	E	1	2	30	9	540	Manual

Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Controls	
1	Violations Bureau 122		1f32T8	E	2	1	32	9	576	Manual	
1	Room 122A	29	3F32T8	E	1	3	32	9	864	Manual	
1	Room 122A		1F28T8	E	2	1	28	9	504	Manual	
1	Prosecutor 123		3F32T8	E	1	3	32	9	864	Manual	
1	Zoning/Const. 125	33	3F32T8	E	8	3	32	9	6912	Manual	
1	Zoning/Const. 125	42	2FB30-U	E	3	2	30	9	1620	Manual	
1	Zoning/Const. 125		1f32T8	E	4	1	32	9	1152	Manual	
1	Finance/Tax 124	44.6 - 54	3F32T8	E	8	3	32	9	6912	Manual	
1	Finance/Tax 124		2FB30-U	E	2	2	30	9	1080	Manual	
1	Rm 124A Vault		3F32T8	E	1	3	32	3	288	Manual	
1	Finance Officer 124B		3F32T8	E	2	3	32	9	1728	Manual	
1	Room 124C	36	3F32T8	E	1	3	32	9	864	Manual	
1	Room 126		3F32T8	E	2	3	32	9	1728	Manual	
2	Public Corridor	22	2FB30T8	E	21	2	30	14	17640	Manual	
2	Public Corridor	25	MH150	M	1	1	150	14	2100	Manual	
2	Health 226	30	3F32T8	E	8	3	32	9	6912	Manual	
2	Health 226	19.97	PL-T32CF		3	1	32	9	864	Dimmer	
1	Health 226		PL-T32CF		2	1	32	9	576	Manual	
1	Lg. Conference		PL-T32CF		21	1	32	6	4032	Dimmers	
2	Lg. Conference		PL-T32CF		3	1	32	6	576	Dimmer	
2	Employee Brk 223	37.8 (all on)	3F32T8	E	5	3	32	6	2880	Manual	
2	Employee Brk 223	37 (window, no lite)	3F32T8	E	1	3	32	24	2304	Manual	
2	Public Rest Room		2FB30-U	E	1	1	30	24	720	Manual	
2	Public Rest Room		3F32T8	E	2	3	32	12	2304	Manual	
2	Public Rest Room		1F32T8	E	1	1	32	12	384	Manual	
2	Public Rest Room		2FB30-U	E	1	1	30	24	720	Manual	
2	Public Rest Room		3F32T8	E	2	3	32	12	2304	Manual	
2	Public Rest Room		1F32T8	E	1	1	32	12	384	Manual	
2	Mail 230	30	3F32T8	E	3	3	32	9	2592	Manual	
2	Mail 230		2FB30T8	E	1	2	32	9	576	Manual	

Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Controls
2	Sm. Conference 231	3.2 (no lite), 25	3F32T8	E	3	3	32	6	1728	Manual
2	Sm. Conference 231	30.6 (all on)	PL-T32CF	E	10	1	32	6	1920	Dimmers
2	Staff Rest Room		3F32T8	E	1	3	32	6	576	Manual
Cellar,1,2	Stairwell 1		2F32T8	E	4	2	32	14	3584	Manual
Cellar,1,2	Stairwell 1		2FB30T8	E	1	2	30	14	840	Manual
Cellar,1,2	Stairwell 2		2F32T8	E	4	2	32	14	3584	Manual
Cellar,1,2	Stairwell 2		2FB30T8	E	1	2	30	14	840	Manual
Cellar,1,2	Stairwell 2		2PL-L24CF		4	2	24	14	2688	Manual
Cellar,1,2	Stairwell 2	82	ED17MH	M	4	1	100	14	5600	Manual
Cellar,1,2	Stairwell 3 - PD	18	2F32T8	E	4	2	32	14	3584	Manual
Cellar,1,2	Stairwell 3 - PD	24	2FB30T8	E	1	2	30	14	840	Manual
Cellar	Public Corridor		2FB30T8-U	E	13	2	30	24	18720	Manual
Cellar	003 - Machine Room		2F32T8	E	2	2	32	6	768	Manual
Cellar	004 - Janitor		3F32T8	E	1	3	32	6	576	Manual
Cellar	021 - Gun Smith		3F32T8	E	3	3	32	6	1728	Manual
Cellar	020 - Pistol Range		2F32T8	E	8	3	32	3	2304	Manual
Cellar	020 - Pistol Range		1INC150 PR	NA	3	1	150	3	1350	Manual
Cellar	020 - Pistol Range		3F32T8	E	2	3	32	3	576	Manual
Cellar	020A - Storage		2F32T8	E	2	2	32	3	384	Manual
Cellar	002 - Records		2F32T8	E	10	2	32	6	3840	Manual
Cellar	Boiler Room		2F32T8	E	7	2	32	3	1344	Manual
Cellar	024 - Electric		2F32T8	E	3	2	32	3	576	Manual
Cellar	023 - Shell Space		2F32T8	E	4	2	32	3	768	Manual
Cellar	METV Offices		4F34T12	M	8	4	34	9	9792	Manual
Cellar	METV Offices		1HAL50	5 Tracks	26	1	50	6	7800	5 Dimmers

BOROUGH OF METUCHEN POLICE DEPARTMENT LIGHTING SURVEY										
Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Controls
2	214 - Detectives	42	3F32T8	E	8	3	32	12	9216	Manual
2	212 -Investigators	52	3F32T8	E	2	3	32	12	2304	Manual
2	213- Records	47.5	3F32T8	E	5	3	32	9	4320	Manual
2	213- Records		2FB30T8-U	E	1	2	30	9	540	Manual
2	214 - Captain	32	2FB30T8-U	E	4	2	30	12	2880	Manual
2	218 - Interview Room	20.2	3F32T8	E	2	3	32	6	1152	Manual
2	219 - Line Up	32	3F32T8	E	2	3	32	6	1152	Manual
2	216 - Chief		3F32T8	E	4	3	32	12	4608	Manual
2	Rest Room		3F32T8	E	1	3	32	6	576	Manual
2	Rest Room		1F17T8	E	1	1	17	6	102	Manual
2	Corridor	26	2FB30T8-U	E	4	2	30	24	5760	Manual
2	Corridor	2.8 (lite off)	1MH150	?	1	1	150	12	1800	Manual
1	Stairway ST-1		2FB30T8-U	E	2	2	30	24	2880	Manual
1	Secure PD Side Corridor	38	2FB30T8-U	E	6	2	30	24	8640	Manual
1	115 - Booking		3F32T8	E	3	3	32	12	3456	Manual
1	115 - Booking		2F32T8	E	2	2	32	24	3072	Manual
1	117 - Reports		3F32T8	E	1	3	32	9	864	Manual
1	119 - Sally Port		1MH70	?	2	1	70	24	3360	Manual
1	119 - Sally Port		1MH70	?	4	1	70	8	2240	Manual
1	118 - Cells - Corridor		2F32T8	E	4	2	32	24	6144	Manual
1	Cells 1 - 4		2F32T8	E	4	2	32	24	6144	Manual
1	Fingerprint* Room		3F32T8	E	1	3	32	24	2304	Manual
1	Rest Room		3F32T8	E	1	3	32	6	576	Manual
1	111 - Waiting Vestibule		2FB30T8-U	E	1	2	30	24	1440	Manual
1	111 - Waiting Vestibule		2FB30T8-U	E	5	2	30	12	3600	Manual
1	110 - Dispatch		2FB30T8-U	E	6	2	30	24	8640	Manual

Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Controls
1	107 - Interview		2FB30T8-U	E	4	2	30	6	1440	Manual
1	114 - Lt. Ofc. / Patrol		2FB30T8-U	E	4	2	30	12	2880	Manual
Cellar	012 - Work Room		3F32T8	E	2	3	32	6	1152	Manual
Cellar	016 - Storage		2FB30T8-U	E	4	2	30	6	1440	Manual
Cellar	015 - Pagers / Chargers		3F32T8	E	2	3	32	6	1152	Manual
Cellar	Men's Lockers		3F32T8	E	8	3	32	6	4608	Manual
Cellar	Men's Lockers		2F32T8	E	1	2	32	6	384	Manual
Cellar	014 - Janitor		3F32T8	E	1	3	32	6	576	Manual
Cellar	012 - Muster		3F32T8	E	7	3	32	6	4032	Manual
Cellar	012 - Muster		2FB30T8-U	E	1	2	30	6	360	Manual
Cellar	Corridor		2FB30T8-U	E	8	2	30	24	11520	Manual
Cellar	Women's Lockers		3F32T8	E	2	3	32	6	1152	Manual
Cellar	Women's Lockers		2FB30T8-U	E	3	2	30	6	1080	Manual
Cellar	Women's Lockers		1F17T8	E	1	1	17	6	102	Manual
Cellar	010 - Water Meter		2F32T8	E	1	2	32	24	1536	Manual
Cellar	010 - Water Meter		2F32T8	E	2	2	32	3	384	Manual
Cellar	007 - Phones		2F32T8	E	2	2	32	3	384	Manual
Cellar	005 - Aux. Police		2F32T8	E	3	2	32	3	576	Manual