ENERGY AUDIT – FINAL REPORT

WILDWOOD CREST
VON SAVAGE MEMORIAL POOL
8800 NEW JERSEY AVENUE
WILDWOOD CREST, NJ 08260
ATTN: MR. KEVIN M. YECCO
Borough Clerk/Administrator

CEG PROJECT NO. 9P09039

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I. EXECUTIVE SUMMARY

This report presents the findings of an energy audit conducted for:

The Borough of Wildwood Crest
Von Savage Memorial Pool
8800 New Jersey Avenue
Wildwood Crest, NJ 08260

Municipal Contact: Mr. Kevin M. Yecco, Clerk / Administrator
Facility Contact: Mr. Michael Velardo, DPW

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 57,185
Natural Gas	$ 13,177
Total	$ 70,361

The potential annual energy cost savings for each energy conservation measure (ECM) are shown below in Table 1. Be aware that the ECM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST [A]	ANNUAL SAVINGS [B]	SIMPLE PAYBACK (YEARS)	SIMPLE ROI
1	Replace 95 KW Duct Heater with Infra-red Heaters	$35,000	$16,208	2.16	48.5 %
2	Pool Cover	$2,500	$1,338	1.9	55.8 %
3	Dectron Unit Replacement	$91,569	$12,180	7.52	12.4%

Notes: A. Cost takes into consideration applicable NJ SmartStart™ incentives and maintenance savings.
B. Savings takes into consideration applicable maintenance savings.

The estimated demand and energy savings are shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECT DEMAND (KW)	ELECT CONSUMPTION (KWH)	NAT GAS (THERMS)
1	Replace 95 KW Duct Heater with Infra-red Heaters	95	188,252	(-6424)
2	Pool Cover	-	-	4315
3	Dectron Unit Replacement	50.2	40,179	3452

Recommendations:

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under Ten (10) years. The following Energy Conservation Measures are recommended for the Wildwood Crest – Joseph Von Savage Memorial Pool:

- **ECM #1:** Replace 95 KW Duct heater with Infra-red Heaters
- **ECM #2:** Pool Cover
- **ECM#3:** Dectron Unit Replacement

Note: The Dectron pool dehumidification unit should be replaced as soon as possible due to service life and operational problems.

In addition to the ECM's, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECM's listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

II. INTRODUCTION

This comprehensive energy audit covers the **8,290** square foot Von Savage Memorial Pool building located at 8800 New Jersey Avenue. The building is a heated indoor pool used for recreational swimming with locker rooms.

Note: The building square footage was verified after field survey and architectural drawing review. The square footage was incorrectly noted on Application "C" as **6,000** square feet.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Intensity (EUI) is established for the building. Energy Use Intensity (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECM's). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECM's. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECM's are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ SmartStart Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The costs and savings are applied and a simple payback and simple return on investment (ROI) is calculated. The simple payback is based on the years that it takes for the savings to pay back the net installation cost (Net Installation divided by Net Savings.) A simple return on investment is calculated as the percentage of the net installation cost that is saved in one year (Net Savings divided by Net Installation.)

A simple life-time calculation is shown for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The energy savings is extrapolated throughout the life-time of the ECM. The total energy savings is calculated as the total life-time multiplied by the yearly savings.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from September-08 to August-09. Atlantic City Electric Utility provides electricity to the facility under the AGS (Annual General Service Secondary) rate. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

Natural Gas

Table 4 and Figure 2 show the natural gas energy usage from August-08 to July-09. . South Jersey Gas supplies the natural gas utilizing the GSG rate schedule and delivers the fuel to the burner under the firm transportation rate at the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy. Below is the average unit cost for the utilities at this facility.

Description	Average
Electricity	13.9¢ / kWh (4.07¢ / kBtu)
*Natural Gas	$1.55 / therm (1.55¢ / kBtu)

*Note: The Natural Gas cost per Therm includes customer service charges.

Table 3
Electricity Billing Data

Utility Provider: ACE, Annual General Service Secondary (Acct. #0320545-9997-5)

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Sep-08	15,560	112.80	$2,930
Oct-08	19,600	106.40	$3,379
Nov-08	38,560	116.40	$5,097
Dec-08	48,920	104.00	$6,232
Jan-09	66,320	103.60	$8,222
Feb-09	62,360	109.60	$7,732
Mar-09	49,440	103.20	$6,369
Apr-09	39,920	108.40	$5,266
May-09	28,920	89.60	$4,004
Jun-09	20,320	86.40	$3,267
Jul-09	13,960	81.60	$2,765
Aug-09	8,360	67.60	$1,920
Totals	**412,240**	**116.4 Max**	**$57,185**

AVERAGE DEMAND 99.1 KW average
AVERAGE RATE $0.139 $/kWh

Figure 1
Electricity Usage Profile

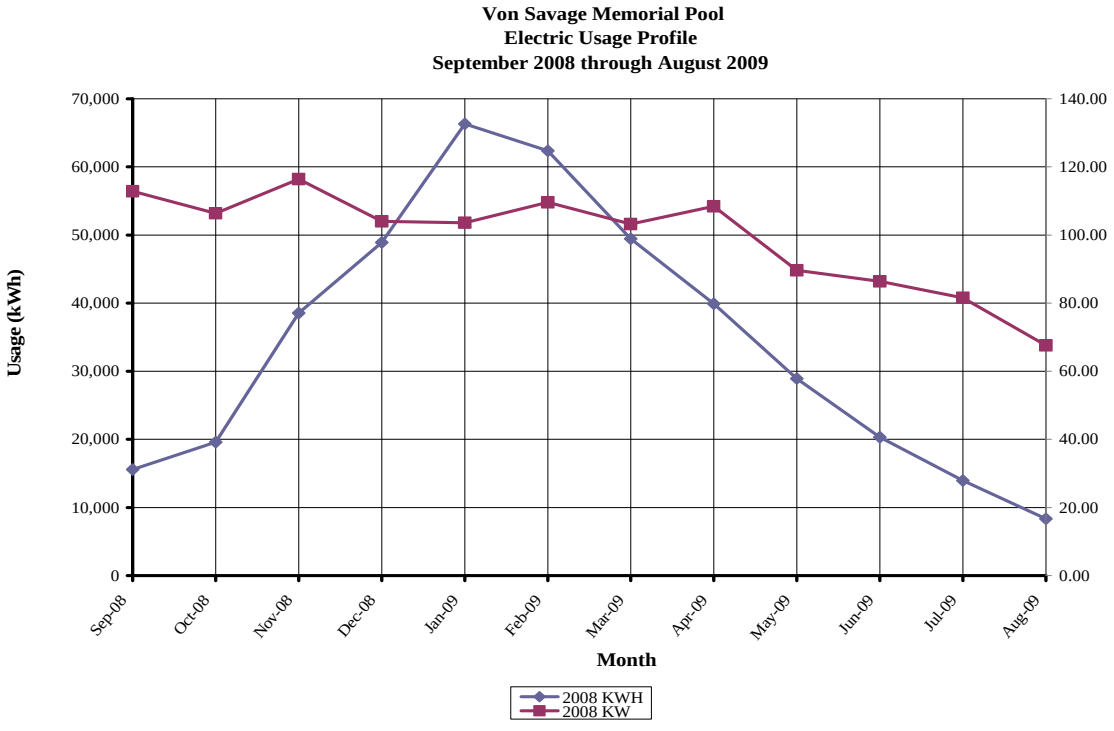
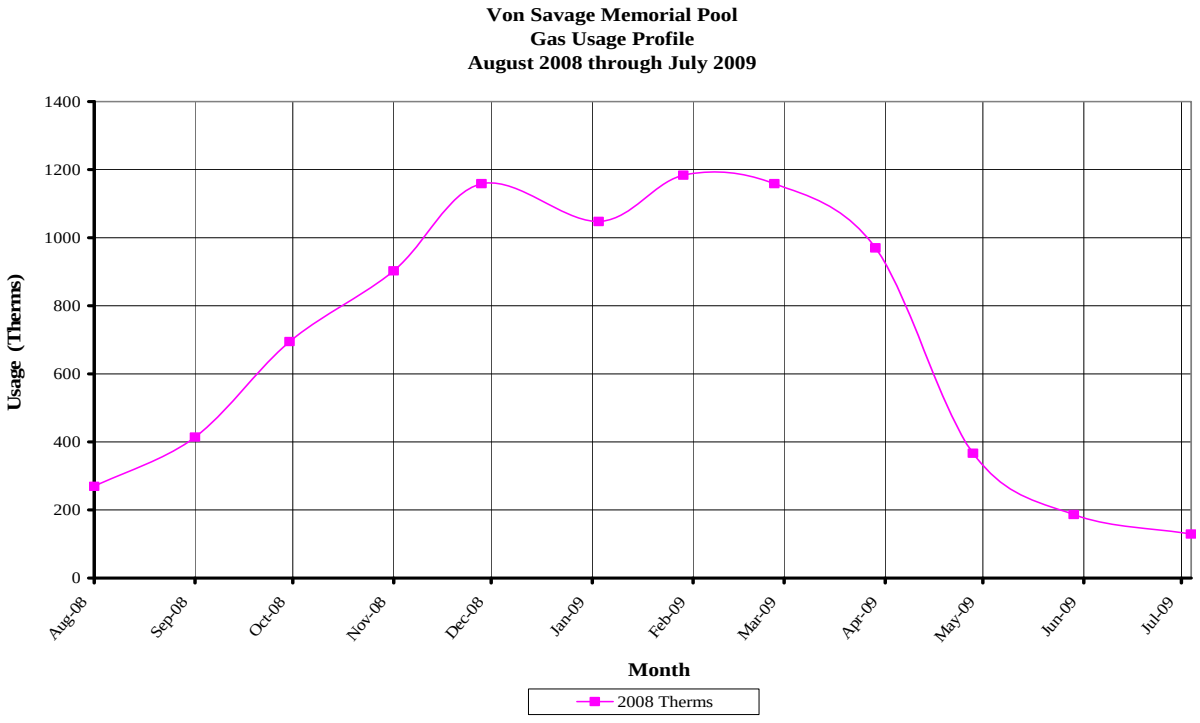


Table 4
Natural Gas Billing Data

Utility Provider: SJ Gas - Rate - GSG, (Meter #0515133)		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-08	269.34	$416
Sep-08	414.4	$592
Oct-08	694.54	$903
Nov-08	902.36	$1,087
Dec-08	1158.41	$1,873
Jan-09	1047.40	$1,718
Feb-09	1183.7	$1,935
Mar-09	1158.84	$1,896
Apr-09	969.99	$1,593
May-09	366.39	$616
Jun-09	186.3	$321
Jul-09	129	$228
TOTALS	**8480.67**	**$13,177**
AVERAGE RATE:	**$1.55**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Intensity (EUI)

Energy Use Intensity (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows. (See Table 5 for details):

$$Building\ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ Square\ Footage}$$

$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

Table 5
Von Savage Memorial Pool EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	412,240			1,407,387	3.340	4,700,674
NATURAL GAS		8,480.67		848,067	1.047	887,926
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				2,255,454		5,588,600
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		8,290		SQUARE FEET		
BUILDING SITE EUI		272.07		kBtu/SF/YR		
BUILDING SOURCE EUI		**674.14**		**kBtu/SF/YR**		

C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows you to track and assess energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and more emphasis is being placed throughout multiple arenas on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Star account for the municipality in order to allow access to monitor their yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

User Name:	wildwoodcrestboro
Password:	lgeaceg09012
Security Question:	What is your birth city?
Security Answer:	“Wildwood Crest”

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 6
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Von Savage Memorial Pool	N/A	N/A

* N/A Due to building category, see below.

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category. The "Other" category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Star Performance Rating cannot be calculated if more then 10% of a building is classified as "Other," or if the building is an office with less than 5,000 square feet of floor space.

Due to the building category and use, this facility is classified as "Other" and an Energy Star Performance Rating could not be calculated. Despite this, the Portfolio Manager calculates the Building Source Energy Use Intensity (EUI).

The (EUI) is also an important tool that can be used to track the energy efficiency of the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the Borough of Wildwood Crest keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section and in the Energy Star Portfolio Manager is a good indicator of the energy performance of the facility in the absence of the Energy Star Performance Rating.

The Von Savage Memorial Pool has a Building Source EUI of 674.14 rating for this type of facility. This high energy use is mostly attributed to the electric heating of the air to maintain space temperature in the winter and the inoperability of the dehumidification unit for heat recovery. The lower the EUI the less energy the facility uses per squarefoot. A low EUI indicates a more efficient building. There maybe some opportunity for improvement making the facility more energy efficient and saving more on the utility costs.

Note: The Oak Ridge National Laboratory does not have a Source EUI Chart for Public Swimming Pools.

Refer to Appendix D for detailed energy benchmarking report entitled "STATEMENT OF ENERGY PERFORMANCE."

V. FACILITY DESCRIPTION

The Von Savage Memorial Pool building is a single-story slab on grade building. The facility was built in 1994 and is 8,290 sq. ft. in area. The majority of the building footprint is the pool and deck area. This type of facility is known as a Natatorium. Also included are mens and womens locker rooms, a main office, a general purpose room, storage room and mechanical room. The walls are constructed with 8" split face block and "Blok-fill" insulation inserts with only a a 7.14 R-value (per Architects drawing). Windows are vinyl replacement type. The roof main pool are roof is a pitched roof contructed with an aluminum frame and translucent "Kalwall" 2-3/4" FRP panels. Approx. 20% on the roof panels are operable and can be opened when weather conditions are appropriate. The flat roof portion of the building is constructed with 8"concrete panels, 3" insulation and an EPDM roof. Based upon our inspection and a review of the Architectural drawings ,it does not appear that a fixed vapor barrier was designed or installed as part of the building envelope. Reportedly, a vapor resistant paint was applied to the interior walls. This lack of vapor barrier could result in condensation forming in the structure, and potentially serious damage.

Reportedly, temperature and humidity swings are common within the space since it was constructed. During winter, condensation formation has been evidenced on the windors, walls and roof. Per ASHRAE 2007 Applications handbook, pg 4.6, Natatoriums require year round humidity levels between 40% and 60% for comfort, energy consumption, and buiding protection. Air temperatures should be maintained 2° to 4°F above the water temperature to reduce the evaporation rate and to avoid chill effects on the swimmers

Pool Filter Systems

The pool is a six lane, 38 ft. x75 ft., 4ft -5ft deep lap pool, 92,600 gallons capacity. A standard commercial gas-fired pool heater maintains at a82°F to 85°F year round, appropriate for recreational use. A 10 hp pump circulating and filter arrangement has a capacity of 253 gpm for a 6 hr turnover rate.

Dectron Environmental Control Unit

The facility is served by a single rooftop dehumidification unit with energy recovery capabilities. The unit is a Dectron RB-100 model installed as part of the original building's construction in 1994. The Dectron system is designed to dehumidify the space and also heat pool water with the waste heat from the direct expansion mechanical refrigeration system. In addition the Dectron system is equipped with an auxillary condenser unit to provide space cooling and a 95 kw duct heater for space heating.

The unit design is for 10,000 cfm supply air and 3000 cfm outdoor air. Supply air is delivers via downblast supply registers connected to exposed spiral duct running down each side of the pool deck. Return air is ducted back to the rooftop unit through one large return register located at the entryway to the men's locker room. Ventilation air from this system is also ducted to the office, locker and general purpose room from this system.

Heat/Cool thermostats exist in the office and general purpose room but reportedly do not control anything. A review of the original HVAC design drawing shows these thermostats tied to modulating duct dampers. It is not known if these dampers exists, but regardless they do not function.

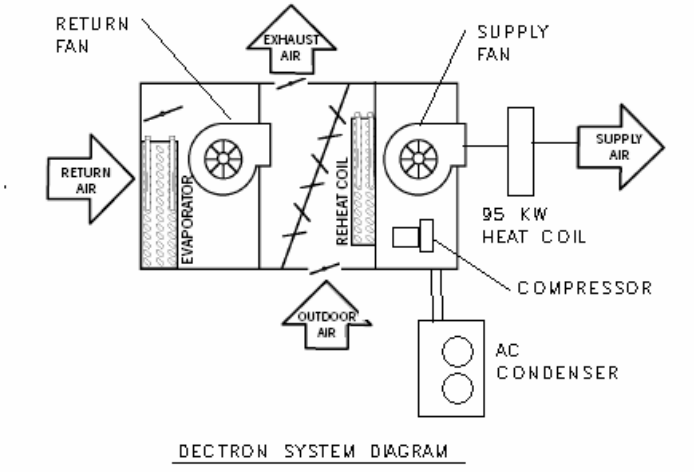
Modulating dampers control outdoor air intake to provide code required outdoor air ventilation rates. However, at the time of our survey the outdoor air damper was non-functional and siezed in the closed position.

The unit also is equipped with a return fan, and modulating OA, EA and mixed air dampers to permit operating the unit in full Economizer or Purge mode. When outdoor air conditions are appropriate, the unit is designed to operate in 100% outdoor air mode as an energy saving feature. However, this feature is not functional as the OA damper is siezed closed, as discussed above

The Dectron unit is equipped with a unit mounted electronic unit controller which is designed to operate the unit in dehumidification, cooling or heating mode depending upon space conditions and space setpoints. The existing system is not equipped with a local thermostat or humidistat. The only occupant interface is an on/off switch located in the office. The temperature and humidity setpoints are progammed into the rooftop controller and are not accesible to the pool operators. Thus, the building operators do not have any indication as to what the system is doing or trying to do.

One of the primary justifications for providing a high end dehumidifier such as this is its ability to heat the pool water with waste heat from the dehumidification cycle. Reportedly, this feature was disabled shortly after construction do to operational problems. We do not know the actual scenario justifying deleting this energy saving feature as it occurred many years ago.

Below is a diagram to assist in understanding this units configuration.



Ventilation Fans and Operable Rooftop

Two (2) large wall mounted propellor type fans are installed at the rear of the facility. Each fan is operated manually via off/on wall switches at the discretion of the pool operator. A corresponding air intake louver at the front of the facility opens upon activation of the exhaust fans. In addition the roof can be partially opened at the descretion of the pool operator. It is not known how often thes fans are operated or the roof is opened frequently.

In addition, standard rooftop exhaust fans serve the locker, toilet and shower areas.

Supplemental Heating and Cooling Units

A ½ ton capacity window air conditioner provides air conditioning for the office.

Ceiling mounted electric heaters are installed in the Lobby, Mens locker and Womens Locker rooms. Only the lobby unit was functional at the time of our survey.

A 40,000 Btuh gas-fired horizontal unit heater provide heat for the mechanical room. The mechanicat room is also equipped with a compustion air / ventilation air wall supply fan which is interlocked with the pool heaters operation.

Domestic Hot Water

A gas-fired Hot Water Heater with auxilary storage tank provides domestic hot water for the facility. Located in the mechanical room, it's large capacity is justified due to the presence of many showers in the locker room.

Lighting System

Typical lighting throughout the building uses fluorescent tube fixtures with energy efficient T-8 lamps and electronic ballasts. Pendant hung metal halide fixtures are located near the pool. Standard switching is utilized and there are no other types of lighting controls present.

The exterior lighting is a combination of building mounted high pressure sodium wall mounted fixtures and utility company owned and maintained pole mounted fixtures.

Alternative lighting fixtures were considered as an Energy Conservation Measure, but are not recommended. The pool ceiling is retractable and provides high level of daylighting. It was observed during the survey that the fixtures were not illuminated and that the available daylighting provided adequate illumination. Energy efficient T8 lamps with electronic ballasts are used in most remaining areas of the facility. Fixture replacement cost, relatively low annual lamp "burn hours" and manual lighting control utilized by facility staff, combine to produce an extended payback period.

It was also noted during the survey that the facility staff appears to actively practice manual lighting control energy conservation. Lighting in areas that were not being utilized was switched

"off". Accordingly, although the facility operation hours were reported to be between 60-80 hours per week, lighting energy usage of many areas of the building may not reflect this estimate. The light fixture "usage hours per year" indicated in Appendix E have been adjusted by room/area to account for this observation.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial savings. In addition, the list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment if a manufacturers date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

Refer to Appendix C for the Major Equipment List for this facility.

VII. ENERGY CONSERVATION MEASURES (ECM)

ECM #1 Replace 95 KW Duct Heater with Infra-red Heaters

Description:

The space heating for the facility includes a 95 KW duct heater which is installed on the rooftop in the spply duct. Electric heating elements are technically 100% efficient but due to the high cost of electric these units become incredibly expensive to operate. The prices can be compared on a $/kBtu basis where electricity costs $0.048 /kBtu versus natural gas at $0.017 /kBtu. (3 times the cost) The winter electric bills are approximately $4000 per month higher than the summer due to the electric heat coil. Annually, this coil accounts for approximately 45% of the facility's electric bill.

This ECM proposes to replace the electric duct heater with a eight Infr-red gas-fired heaters. The Infra-red heating concept is ideal for this application as it heats room objects(people) instead of the air. The heaters shall be installed in the space, hung from the ceiling, with infrra-red heat thrown towards the pool deck.. Each heater shall be a self contained unit, constructed of materials resistant to a corrosive, humid environment. ECM calculations are based on eight (8) Detroit Radiant Re-Verber-Ray DET3 Series, 20 foot long, 45,000 Btuh each, two stage, with stainless steel upgrade package. Each unit will have a flue vent and a combustion air intake.

The following calculations show the potential energy savings from this ECM.

Energy Savings Calculations:

Heating Degree Days (HDD) = 4,954°F – day/yr.

Heating Load (HL) = 95 Kw * 3413 Btuh/Kw = 324,235 Btuh

Energy Use (Btu/yr) = (HL* HDD *2 4) / (60°f * efficiency * 1 Btu/Btu)

Energy Use (Electric @100% eff) = (324,235 * 4954 * 24) / (60 * 1 * 1) = 642,505 kBtu / yr

Energy Use (Gas @ 92% eff) = (324,235 * 4954 * 24) / (60 * 0.92 * 1) = 698,375 kBtu / yr

Annual Electric Heating Cost = 642,505 kBtu * (1Kw / 3.413 kBtuh) *$0.139 /Kw = $26,167

Annual Natural Gas Heating Cost = 642,505 kBtu * $0.0155 /kBtu = $9,959

Annual Energy Savings = $26,167 - $9,959 = $16,208

The Cost to install the Gas-fired system is estimated at $35,000.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$35,000
NJ Smart Start Equipment Incentive ($):	-
Net Installation Cost ($):	*$35,000*
Maintenance Savings ($ / yr):	-
Energy Savings ($ / yr):	*$16,208*
Net Savings ($ / yr):	*$16,208*
Simple Payback (yrs):	*2.16*
Simple Return On Investment (%):	*48.5%*
Estimated ECM Lifetime (yr):	*13*
Simple Lifetime Savings ($):	*$175,704*

ECM #2: Pool Cover

Description:

This ECM includes providing a thermal pool cover system. The cover will be used to limit evaporation and thermal losses from the pool water during unoccupied hours. A pool cover, when utilized properly, almost always provides significant energy savings. Since the pool cover will limit evaporation, it will also decrease hours of operation for the Dectron dehumidification system.

At present, pool heater natural gas consumption is estimated to be approximately 4315 Therms. The pool cover is estimated to save 20%.

Energy Savings Calculations:

Annual Savings = 4315 Therms x 20% x $1.55/Therm = $1338

Installation cost for the pool cover and roll-up mechanism is estimated at $2,500.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$2,500
NJ Smart Start Equipment Incentive ($):	($0)
Net Installation Cost ($):	*$2,500*
Maintenance Savings ($ / yr):	-
Energy Savings ($ / yr):	*$1,338*
Net Savings ($ / yr):	*$1,338*
Simple Payback (yrs):	*1.9*
Simple Return On Investment (%):	*55.8%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Savings ($):	*$17,570*

ECM #3: Dectron Unit Replacement

Description:

This ECM includes replacing the existing Dectron Rooftop Dehumidifier with a new Dectron Unit. The existing unit is past its useful lifetime, does not have acceptable controls, and is not contributing to pool water heating. The replacement unit will feature a user accessible unit controller and will have its design intent restored to provide heating of the pool water. In addition the newer unit will have improved overall equipment efficiencies.

Heating Season Heating Degree Days =4,888 HDD
Cooling Season Full Load Cooling Hrs. = 800 hrs/yr.
Average Cost of Electricity = $0.139/kWh

Total Rated Cooling Capacity = 93 Tons
Existing System Efficiency = 8 EER
Proposed System Efficiency = 12.5 EER

Energy Savings Calculations:

Pool Water Heating:

Present Pool Heater Gas Use = 4315 therms / yr.
Estimated contribution from dehumidifier = 80% of load

Gas Savings = 4315 therms x 80% = 3452 Therms

Cost savings = 3452 therms x $1.55/Therm = $5350 / yr.

Cooling Savings Calculation:

$$EnergySavings = \frac{Cooling(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}}\right) \times Full\ Load\ Hrs.$$

$$EnergySavings = \frac{93\,(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{8\left(\frac{Btu}{W}\right)} - \frac{1}{12.5\left(\frac{Btu}{W}\right)}\right) \times 800\ hours$$

$= 40{,}179\ kWh$

$$Demand\ Savings = \frac{Energy\ Savings\,(kWh)}{Hrs\ of\ Cooling}$$

$$Demand\ Savings = \frac{40{,}179\,(kWh)}{800\ Hrs.} = 50.2\ KW$$

$$Cooling\ Cost\ Savings = 40{,}179\,(kWh) \times 0.170\left(\frac{\$}{kWh}\right) = \$6{,}830$$

Total Energy Savings = $5350 + $6830 = $12,180

Installed cost for this ECMs is estimated at $100,125. Note that this estimate includes the demolition of the existing units.

From the NJ Smart Start® Program appendix, the rooftop unit replacement falls under the category "Unitary AC" and warrants an incentive based on efficiency (EER) at a certain cooling tonnage. The program incentives are calculated as follows:

$$\text{Smart Start® } Incentive = (Cooling\ Tons \times\ \$/Ton\ Incentive)$$
$$= (93 Tons \times \$92/Ton) = \$8556$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$100,125
NJ Smart Start Equipment Incentive ($):	($8,556)
Net Installation Cost ($):	*$91,569*

Maintenance Savings ($ / yr):	-
Energy Savings ($ / yr):	*$12,180*
Total Energy Savings ($ / yr):	*$12,180*
Simple Payback (yrs):	*7.52*
Simple Return On Investment (%):	*12.4%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Savings ($):	*$91,131*

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy technologies for the Wildwood Crest – Von Savage Memorial Pool, to evaluate if there is any potential for solar or wind energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. Due to the roof structure and limited roof area facing south, it is our opinion that a roof mounted, PV Solar Panel system is not feasible for the building roof.

Refer to Appendix F for an aerial photo of the building.

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to the Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The facility is known as a Natatorium. This type of structure requires year round humidity levels of 40-60% for comfort, energy consumption and building protection. Air temperature is required to be between 2-4 degree's F above the water temperature.

The Electric Usage Profile demonstrates an atypical electric load profile. There is increased consumption in the winter period (October – April), with a peak occurring in January 2009. A single roof-top dehumidification unit (Dectron RB-100) with 95 KW duct heater, is the cause for a large portion of winter electric consumption. Further reasons for the winter increase in electric consumption are due to the presence of ceiling mounted electric heaters located in the lobby, men's locker room and women's locker room. And a ½ ton capacity window air conditioner which provides cooling for the office. A flatter load profile of this type, will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very atypical natural gas (heat load) profile. The months (August – April) demonstrate an extremely high natural gas load profile. This has much to do with the requirements of such a facility in maintaining humidity and temperature. The increase in consumption can be attributed to a Commercial Grade natural gas-fired pool heater and a 40,000 BTUh gas fired horizontal unit heater for the mechanical room. Domestic hot water is supplied by a natural gas fired hot water heater. The shower room has many showers present, adding to the natural gas profile as well. A base-load shaping (flat) will secure more competitive energy prices when procuring energy through an alternative energy source.

Tariff Analysis:

Electricity:

This facility receives electrical Delivery Service from Atlantic City Electric on a MGS Secondary (Monthly General Service) utility rate. This rate is available at any point of Company's system where facilities of adequate character and capacity exist for the entire electric

service requirements of any customer delivered at one point and metered at or compensated to the voltage of delivery. This schedule is not available to residential customers. This service includes the following charges: Delivery Service Charges, Distribution Demand Charges, Reactive Demand Charges, Non-Utility Generation Charges, Societal Benefits Charges, Regulatory Assets Recovery Charges, Transition Bond Charges, Market Transition Charge Tax, Transmission Demand Charge, Regional Greenhouse Gas Initiative Recovery Charge, and Infrastructure Investment Surcharge.

This facility receives electrical supply service through Atlantic City Electric on a BGS (Basic Generation Service) rate. Since the passing and implementation of the Electricity Discount and Energy Competition Act (EDECA) in 1999, there have been many changes brought about by the deregulation of the electric industry in New Jersey. Since that time, customers in New Jersey have been able to choose their electrical supplier. Customers who do not choose to switch to a Third Party Supplier (TPS), or who leave a TPS to return to their Electric Delivery Company are supplied with Basic Generation Service. Beside the commodity itself, BGS also has the following charges: System Control Charge, CIEP Standby Fee, Transmission Enhancement Charge and Basic Generation Service Charge.

Natural Gas:

This facility is serviced by South Jersey Gas Company (SJG) on its Firm Delivery rate (GSG) General Service Gas from the utility and BGSS (Basic Generation Supply Service) when not being served by a Third Party Supplier (TPS). This Delivery Rate has the following charges: Customer Charge, Delivery Charge, BSC Volume Charge and Commodity Charge under this rate structure. The BGSS Supply rates are designed to recover SJG's cost of gas applicable to customers who purchase gas from SJG. The company earns no profit from BGSS. BGSS consists of (2) two pricing mechanisms: Residential and Commercial customers that use less than 5,000 therms annually and Commercial and Industrial customers that consume at least 5,000 therms annually.

Imbalances occur when Third Party Suppliers (TPS) are used to supply natural gas and full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility.

Note: It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used otherwise, imbalances can occur, jeopardizing economics and scheduling. If the supplier does not deliver they can be placed on a very costly rate. A customer can automatically be put on an alternative supply rate by the utility.

A "firm account" refers to the type of interstate pipeline service that the utility has subscribed for and delivered on behalf of the customer. Much like the telecom industry, the pipeline space (capacity) has been deregulated. The pipeline capacity is broken down into reliability of service. "Firm service" is the highest level of reliability and is the last, in pecking order, for interruption.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the borough. The primary area for potential improvement is seen in the electric costs. The average price per kWh (kilowatt hour) for all buildings based on 1-year historical average price is $.1294/kWh (this is the average "price to compare" if the client intends to shop for energy). The average price per decatherm for natural gas is $ 11.83 / dth (dth, is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The borough could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on annual historical consumption (September 2008 through August 2009) and current electric rates, the township could see an improvement in its electric costs of up to 26 % annually. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's secondary recommendation coincides with the boroughs' natural gas costs. Based on the current market, Wildwood Crest could improve its natural gas costs by up to 26 %. Currently the township is utilizing the services of the utility. CEG recommends advisement on energy prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends scheduling a meeting with the current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the municipality can learn more about the competitive supply process. The borough can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. The borough should ask the utility representative about alternative billing options, such as consolidated billing when utilizing the service of a Third Party Supplier. Finally, if the supplier for energy (natural gas) is changed, closely monitor balancing, particularly when the contract is close to termination. This could be performed with the aid of an "energy advisor".

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the Owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

E. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for this facility. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

APPENDIX

Von Savage Memorial Pool

CONSTRUCTION COST AND REBATES					
ECM # 1 - REPLACE 95KW HEATER WITH INFRA-RED GAS HEATERS	Qty	Unit Cost $	Material $	Labor $	Total $
Demo Existing 95 KW Heater	1	$1,000	$0	$1,000	$1,000
Re-Verber-Ray DET3	8	$1,500	$12,000	$12,000	$24,000
Gas Piping	2	$2,000	$4,000	$1,000	$5,000
Electrical & Controls	2	$2,000	$4,000	$1,000	$5,000
Total Cost					$35,000
Utility Incentive					$0
Total Net Cost					**$35,000**
ECM # 2 - POOL COVER	Qty	Unit Cost $	Material $	Labor $	Total $
Pool Cover and Accessoriers	1	$1,500	$1,500	$1,000	$2,500
Total Cost					$2,500
Utility Incentive					$0
Total Net Cost					**$2,500**
ECM # 3 - REPLACE DECTRON UNIT	Qty	Unit Cost $	Material $	Labor $	Total $
Dectron Dehumidifier Unit	1	$75,000	$75,000	$18,750	$93,750
Unit Controls	1	$1,500	$1,500	$375	$1,875
Gas Piping	1	$2,000	$2,000	$500	$2,500
Pool heater Piping	1	$1,000	$1,000	$1,000	$2,000
Total Cost					$100,125
Utility Incentive					$8,556
Total Net Cost					**$91,569**

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of January, 2009:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

	$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per hp
Compressors	$5,250 to $12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters >50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive

Von Savage Memorial Pool

EQUIPMENT LIST

TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
EHR-1	DECTRON	RB-100-43	NATATORIUM DEHUMIDIFICATION UNIT	10,000 CFM, 95 KW HEAT	-	POOL & LOCKER AREAS	ROOF	0	
-	WITT	CD5027UM	AC CONDENSER FOR EHR-1	-	-	POOL & LOCKER AREAS	ROOF	0	
-	PENTAIR	MINIMAX NT	GAS-FIRED POOL HEATER	200 - 400 MBH INPUT	82%	POOL WATER	MECH ROOM	0	
-	FRIGIDAIRE	-	WINDOW AC UNIT	1/2 TON		OFFICE	OFFICE	-	
UH	REZNOR	FE-50	GAS-FIRED HORIZONTAL UNIT HEATER	50 MBH INPUT	80%	MECH ROOM	MECH ROOM	0	
EH-1	GENERIC	-	ELECTRIC WALL HEATER	4 KW	100%	LOBBY'	LOBBY	0	
EH-2 (2)	GENERIC	-	ELECTRIC WALL HEATER	2 KW	100%	MENS & WOMENS LOCKERS	MENS & WOMENS LOCKERS	0	QUANITY - 2
EF-1 (2)	PENN VENT	DOMEX	ROOFTOP EXHAUST FAN	165 CFM, 1/20 HP	-	SHOWERS	ROOF	5	QUANITY - 2
EF-2	PENN VENT	DOMEX	ROOFTOP EXHAUST FAN	900 CFN, 1/4 HP	-	TOILET ROOMS	ROOF	5	
SF-3	PENN VENT	P-18K	BELT DRIVEN PROPELLER WALL FAN	1/4 HP MOTOR	-	MECH ROOM	WALL	0	COMBUSTION AIR & VENTLATION
EF-4 (2)	PENN VENT	BBK-42	BELT DRIVENPROPELLER WALL FAN	5 HP MOTOR	-	POOL	REAR WALL	0	QUANITY - 2
HWH-1	RUUD	RO65-360A	GAS-FIRED HOT WATER HEATER	360 MBH INPUT, 65 GALLONS	80%	ENTIRE BUILDING	MECH ROOM	0	
ST-1	AO SMITH	T 350 A	DOMESTIC HW STORAGE TANK	350 GALLONS	-	ENTIRE BUILDING	MECH ROOM	-	PART OF HWH-1 SYSTEM

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Von Savage Memorial Pool

Building ID: 1854394
For 12-month Period Ending: August 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: September 24, 2009

Facility
Von Savage Memorial Pool
8800 New Jersey Avenue
Wildwood Crest, NJ 08260

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1992
Gross Floor Area (ft²): 8,290

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,418,427
Natural Gas (kBtu)[4]	855,781
Total Energy (kBtu)	2,274,208

Energy Intensity[5]

Site (kBtu/ft²/yr)	274
Source (kBtu/ft²/yr)	680

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	262

Electric Distribution Utility
Atlantic City Electric Co

National Average Comparison

National Average Site EUI	65
National Average Source EUI	136
% Difference from National Average Source EUI	400%
Building Type	Recreation

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.

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Von Savage Memorial Pool	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Recreation	Is this an accurate description of the space in question?		☐
Location	8800 New Jersey Avenue, Wildwood Crest, NJ 08260	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Admin Office (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	190 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	60 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	2	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	2	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Mechanical / Storage (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑

Gross Floor Area	300 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	40 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	0 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

Natatorium (Other)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	6,200 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	80 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

Pool Locker Rooms / Lobby (Other)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	1,600 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	0 (Optional)	Is this the number of personal computers in the space?		☐

Weekly operating hours	80 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	1 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐
Von Savage Memorial Pool (Swimming Pool)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Pool Size	Short Course (25 yards x 20 yards)	Is this the correct size of the swimming pool?		☐
Indoor Outdoor	Indoor	Is the pool located inside or outside the building?		☐
Months in Use	12 (Optional)	Is this the total months out of the year that the pool is open for use?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Atlantic City Electric Co

Fuel Type: Electricity

Meter: Electricity (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
07/05/2009	08/04/2009	13,960.00
06/05/2009	07/04/2009	20,320.00
05/05/2009	06/04/2009	28,920.00
04/05/2009	05/04/2009	39,920.00
03/05/2009	04/04/2009	49,440.00
02/05/2009	03/04/2009	62,360.00
01/05/2009	02/04/2009	66,320.00
12/05/2008	01/04/2009	48,920.00
11/05/2008	12/04/2008	38,560.00
10/05/2008	11/04/2008	19,600.00
09/05/2008	10/04/2008	15,560.00
Electricity Consumption (kWh (thousand Watt-hours))		**403,880.00**
Electricity Consumption (kBtu (thousand Btu))		**1,378,038.56**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,378,038.56**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
07/05/2009	08/04/2009	186.30
06/05/2009	07/04/2009	366.39
05/05/2009	06/04/2009	969.99
04/05/2009	05/04/2009	1,158.84
03/05/2009	04/04/2009	1,183.70
02/05/2009	03/04/2009	1,047.40
01/05/2009	02/04/2009	1,158.41
12/05/2008	01/04/2009	902.36
11/05/2008	12/04/2008	694.54
10/05/2008	11/04/2008	414.40
09/05/2008	10/04/2008	269.34

Gas Consumption (therms)	**8,351.67**
Gas Consumption (kBtu (thousand Btu))	**835,167.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**835,167.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Von Savage Memorial Pool
8800 New Jersey Avenue
Wildwood Crest, NJ 08260

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Von Savage Memorial Pool	
Gross Floor Area Excluding Parking: (ft^2)	8,290
Year Built	1992
For 12-month Evaluation Period Ending Date:	August 31, 2009

Facility Space Use Summary

Admin Office	
Space Type	Office
Gross Floor Area(ft^2)	190
Weekly operating hours	60
Workers on Main Shift	2
Number of PCs	2
Percent Cooled	50% or more
Percent Heated	50% or more

Mechanical / Storage	
Space Type	Other - Other
Gross Floor Area(ft^2)	300
Number of PCs°	0
Weekly operating hours°	40
Workers on Main Shift°	0

Natatorium	
Space Type	Other - Recreation
Gross Floor Area(ft^2)	6,200
Number of PCs°	0
Weekly operating hours°	80
Workers on Main Shift°	1

Pool Locker Rooms / Lobby	
Space Type	Other - Recreation
Gross Floor Area(ft^2)	1,600
Number of PCs°	0
Weekly operating hours°	80
Workers on Main Shift°	1

Von Savage Memorial Pool	
Space Type	Swimming Pool
Pool Size	Short Course (25 yards x 20 yards)
Indoor Outdoor	Indoor
Months in Use°	12

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 08/31/2009)	**Baseline** (Ending Date 08/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	274	274	128	N/A	65
Source (kBtu/ft^2)	680	680	317	N/A	136
Energy Cost					
$/year	$ 70,122.65	$ 70,122.65	$ 32,685.39	N/A	$ 16,614.92
$/$ft^2$/year	$ 8.46	$ 8.46	$ 3.94	N/A	$ 2.00
Greenhouse Gas Emissions					
$MtCO_2e$/year	262	262	122	N/A	62
$kgCO_2e/ft^2$/year	32	32	15	N/A	8

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

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

Von Savage Memorial Pool

CEG Project #: BS09-012
Project Name : Wildwood Crest - Von Savage Memorial Pool
Address: 8800 New Jersey Avenue
City, State: Wildwood Crest, NJ 08260
Building SF: 8290

Date 09/23/09
kWh Cost $0.14

	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
Fixture Location	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**	**Ltg Control Description**	***Energy Savings kWh/Yr**	**Savings/ Yr $**	****Unit Cost, Total**	**Simple Payback, Yrs**
First Floor																				
Pool Area	900	10	(1)400w Metal Halide Lamp. Pendant Mounted Fixture - 460w	4600	$575.46	10	Existing to Remain	4600	0	0	$0.00		$0.00	$0.00	$0.00					
		12	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	660	$82.57	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Mechanical Room	300	3	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	165	$6.88	3	Existing to Remain	165	0	0	$0.00		$0.00	$0.00	$0.00					
Storage Room	300	1	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	55	$2.29	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Men's Toilet Room	1200	6	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	330	$55.04	6	Existing to Remain	330	0	0	$0.00		$0.00	$0.00	$0.00					
Women's Toilet Room	1200	6	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	330	$55.04	6	Existing to Remain	330	0	0	$0.00		$0.00	$0.00	$0.00					
Toilet Room	1200	1	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	55	$9.17	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Storage Closet	300	1	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	55	$2.29	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Office	1750	4	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	220	$53.52	4	Existing to Remain	220	0	0	$0.00		$0.00	$0.00	$0.00					
Kitchen	1200	3	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	165	$27.52	3	Existing to Remain	165	0	0	$0.00		$0.00	$0.00	$0.00					
Entry	1750	1	(2)32w T8 Lamps. 4' Linear Fixture w/Elec. Ballast-55w	55	$13.38	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
First Floor Summary		**48**		**6690**	**$883**	**48**		**6690**	**0**	**0**	**$0**			**$0**	**$0**		**0**	**$0**	**$0**	
	Totals:	**48**		**6690**	**$883**	**48**		**6690**	**0**	**0**	**$0**			**$0**	**$0**		**0**	**$0**	**$0**	

COMMENTS:

Von Savage Memorial Pool – Wildwood Crest
8800 New Jersey Avenue
Wildwood Crest, NJ 08260

↑ **NORTH**