ENERGY SAVINGS PLAN FOR ESIP

Swedesboro Woolwich School District, NJ

August 24, 2022

PREPARED FOR

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Honeywell

HONEYWELL PROPRIETARY

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SECTION A
EXECUTIVE SUMMARY

Section A – Executive Summary

Honeywell is pleased to submit this Energy Savings Plan (ESP) for the Swedesboro Woolwich School District (the District). During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit of the Swedesboro Woolwich School District buildings and grounds. Based on the audit findings and Honeywell's extensive experience in working with schools, we can confidently state that we can deliver a financially viable, comprehensive solution to address the District's facility concerns and goals. Our Energy Savings Plan includes projects that achieve energy and operational efficiencies, create a more comfortable and productive environment and are actionable via the New Jersey Energy Savings Improvement Program (NJ ESIP) in accordance with NJ PL2012, c.55.

The Energy Savings Plan is the core of the NJ ESIP process. It describes the energy conservation measures that are planned and the cost calculations that support how the plan will pay for itself through the resulting energy savings. Under the law, the Energy Savings Plan must address the following elements:

- The results of the energy audit.
- A description of the energy conservation measures (ECMs) that will comprise the program.
- An estimate of greenhouse gas reductions resulting from those energy savings.
- Identification of all design and compliance issues and identification of who will provide these services.
- An assessment of risks involved in the successful implementation of the plan.
- Identify the eligibility for, and costs and revenues associated with, the PJM Independent System Operator for demand response and curtail-able service activities.
- Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings.
- Maintenance requirements necessary to ensure continued energy savings, and describe how they will be provided; and
- If developed by an ESCO, a description of, and cost estimates of a proposed energy savings guarantee.

The purpose of this document is to provide all the information required for the Swedesboro Woolwich School District to determine the best path forward in the implementation of a New Jersey Energy Savings Improvement Program (ESIP). It is important to note that the Energy Savings Plan provides a comprehensive evaluation of ALL potential ECMs within the Swedesboro Woolwich School District. This is not meant to infer that all the ECMs identified can be implemented. However, if the ECM is part of this plan, it may be implemented later as additional funding becomes available or technology changes to provide for an improved financial return.

Our Energy Savings Plan is structured to clearly demonstrate compliance with the NJ ESIP law, while also presenting the information in an organized manner which allows for informed decisions to be made. The information is divided into the following sections:

A. **Executive Summary** (This Section)

B. **Preliminary Utility Analysis** – The Preliminary Utility Analysis (PUA) defines the utility baseline for the Swedesboro Woolwich School District buildings included in the Energy Savings Plan. It provides an overview of the current usage and a cost per square foot by building of utility expenses. The report also compares the Swedesboro Woolwich School District utility consumption to that of others in the same region on a per square foot basis.

C. **Energy Conservation Measures** – This section includes a detailed description of the ECMs we have selected and identified for your School. It is specific to your facilities in scope, savings methodology and environmental impact. It is intended to provide a basis of design for each measure in narrative form. It is not intended to be a detailed specification for construction. ALL potential ECMs for the Swedesboro Woolwich School District are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined by the Swedesboro Woolwich School District in conjunction with Honeywell during the project development phase of the NJ ESIP process.

D. **Technical and Financial Summary** – This section includes an accounting of all technical and financial outcomes associated with the ECMs as presented on the New Jersey Board of Public Utilities Forms II through V. Information detailed on the forms includes projected implementation hard costs, projected energy savings, projected operational savings and projected environmental impact. Form VI: Annual Cash Flow Analysis provides a “rolled-up” view of the overall project financials, inclusive of financing costs, on an annual basis as well as over the entire 15 or 20-year term of the agreement.

E. **Measurement & Verification and Maintenance Plan** – This section identifies the intended methods of verification and measurement for calculating energy savings. These methods are compliant with the International Measurement and Verification Protocols (IMVP), as well as other protocols previously approved by the Board of Public Utilities (BPU) in New Jersey. This section also includes the recommended maintenance requirements for each type of equipment. Consistent maintenance is essential to achieving the energy savings projected in this plan.

F. **Design Approach** – This section includes a summary of Honeywell’s best practices for the successful implementation of a NJ ESIP project. It includes a project specific Safety Management Plan and provides an overview of our project management procedure, construction management and a sample schedule for the overall completion of the project. Within the schedule, we clearly define the tasks directed towards compliance with architectural, engineering and bidding procedures in accordance with New Jersey Public Contracts Law.

G. **Appendices 1 to 4** – Please refer to the Teams room for the following documents:

- Honeywell – Appendix 1 — LOCAL GOVERNMENT ENERGY AUDITS
- Honeywell – Appendix 2 — ECM CALCULATIONS
- Honeywell – Appendix 3 — EQUIPMENT CUT SHEETS
- Honeywell – Appendix 4 — LIGHTING LINE BY LINES

Benefits

The measures investigated in this Energy Savings Plan could result in an annual utility savings of 1,668,369 kWh of electricity and save 9,255 therms of natural gas. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the district's carbon footprint by 545 MTE of CO2 annually. This is equivalent to removing 115 cars from the road annually and /or 516 forested acres per year. All these savings are achieved while improving the classroom environment and renewing many items that have been in service beyond useful life expectancy.

In accordance with the NJ ESIP process, the next step in the project development phase is for Honeywell to provide our recommendations and for the Swedesboro Woolwich School District to select the desired content of the project based upon the Swedesboro Woolwich School District unique goals and objectives. The selections will consider the projected costs, projected energy and operational savings, available financing options at the time of the agreement, interest rates, length of term and Swedesboro Woolwich School District priorities, which will all play a part in the final selection and cash flow of ECMs. The definitive requirement under NJ PL2012, c.55 is that the project is self-funding within the 15 or 20-year term as outlined in the legislation.

Overall, it is evident that the Swedesboro Woolwich School District is well positioned to implement a program that will upgrade your facilities, while funding itself within the requirements of the law and with zero impact on your taxpayer base. We welcome this opportunity to partner with the Swedesboro Woolwich School District to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan.

Sincerely,

Caroline Jackson,

Senior Business Consultant

SECTION B
PRELIMINARY UTILITY ANALYSIS

Section B — Preliminary Utility Analysis

Honeywell

Preliminary Utility Analysis

Swedesboro Woolwich SD
Swedesboro, NJ

Helping customers manage energy resources to improve financial performance

Executive Summary

Honeywell would like to thank you for the opportunity of providing you with this Preliminary Utility Analysis. A one year detailed billing analysis was completed for all utility data provided by your staff. The facility's electric and gas consumption were compared to a benchmark of typical facilities of similar use and location. It should be noted however, that some of Buildings which make up the benchmarking standards are not equipped with mechanical cooling (air conditioning). Therefore, these buildings may unjustly appear to be less efficient in comparison.

Through our Energy Services offerings, Honeywell's goal is to form a long term partnership for the purpose of meeting your current infrastructure needs by focusing to:

- Improve Operational Cost Structures
- Ensure Satisfaction
- Upgrade Infrastructure While Reducing Costs
- Meet Strategic Initiatives
- Leverage Teamwork
- Pursue Mutual Interests
- Provide Financing Options

How does it work?

Under an energy retrofit solution, Honeywell installs new, energy efficient equipment and optimizes your facility, as part of a multi-year service contract. Most of these improvements are cost-justified by energy and operational savings. Some of the energy conservation measures provide for a quick payback, and as such, would help offset other capital intensive energy conservation measures such as, boilers, package rooftop units, domestic hot water heaters, etc. The objective is to provide you with reduced operating costs, increased equipment reliability, optimized equipment use, and improved occupant comfort.

After review of the utility analysis, you can authorize Honeywell to proceed with the development of a detailed engineering report. The report development phase allows Honeywell to prepare an acceptable list of proposed energy conservation measures, which are specific to the selected facility. Some examples of typical Energy Conservation Measures include:

- Lighting
- Control Systems
- Boilers
- AC Units/Condensers
- Building Enevelope
- Package Rooftop Units
- Domestic Hot Water Heaters
- Plug Load Management

Why Honeywell?

- Honeywell is one of the world leaders in providing infrastructure improvements
- With Honeywell as your building partner, you gain the advantage of more than 115 years of leadership in building services
- Honeywell has the infrastructure and manpower in place to manage and successfully implement your project
- Honeywell has over 30 years experience in the energy retrofit marketplace with over $5 Billion in customer energy savings
- Honeywell provides you with "Single Source Responsibility" - from Engineering to Implementation, Servicing and Financing (if desired)

Energy Benchmarking

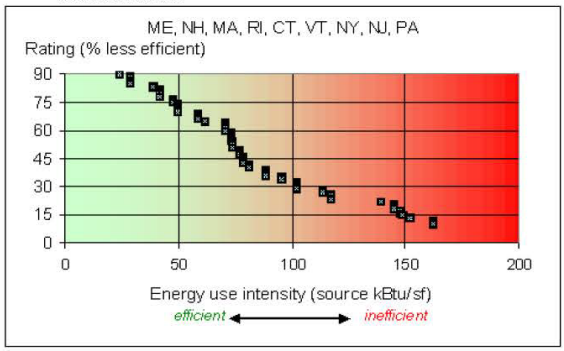
The calculation of EUI (Energy Use Intensity) is shown below. EUI, expressed in kBtu/sf, is normalized for floor area, the most dominant influence on energy use in most buildings. Its use usually provides a good approximation of how your building's energy performance compares to others. Site EUI indicates the rate at which energy is used at your building (the point of use). Source EUI indicates the rate at which energy is used at the generation sources serving your building (the point of source) and indicates the societal energy penalty due to your building The lower the EUI, the higher the rating, indicating that the building is more efficient than other buildings. The greater the EUI, the lower the rating, indicating that there is an opportunity for higher potential benefits from operational improvements.

The Source EUI below has been applied to a Department of Energy statistical model from the Oak Ridge National Laboratory. The Department of Energy has estimated energy use and cost reductions for building source EUI ratings (percentiles) in the table below. Please see the DOE Regional Source EUI Comparison graph below to rate your building in relation to the regional distribution of similar type buildings. (Note: The Source EUI includes the inefficiencies of electrical generation and transmission. A reduction in 'electrical' source EUI includes a benefit in terms of reduction of air pollution emissions and green house gases, and is thus an indicator of societal benefit.)

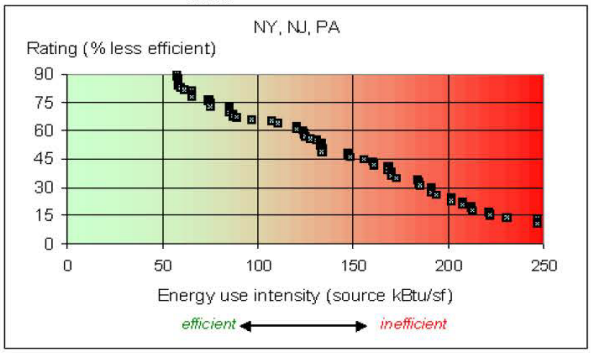
Source EUI Rating for your Building	Energy use and cost reduction potential (%)	Walk-thru energy assessment recommended?
above 60%	below 25%	No
40 to 60%	20 to 35%	Maybe
20 to 40%	35 to 50%	Yes
Below 20%	above 50%	Definitely

Site EUI Rank		Annual Total Electrical Use (kWh)	Annual Total Non-Electrical Fuel Use (Therms)	Building Gross Floor Area (sq-ft)	Site EUI Rating	Source EUI: Annual Total Source Energy Use per Sq-Ft (kBtu/sf)	Rating (Regional Source EUI Comparison)
1	Charles G. Harker School	848,882	29,612	100,748	58	117	25%
2	Gov. Charles C. Stratton School	742,879	16,800	90,274	47	104	28%
3	Margaret C. Clifford School	452,709	9,392	45,424	55	124	20%
4	Walter Hill School	567,786	11,378	71,374	43	98	30%
		2,612,256					

School Facilities



Offices



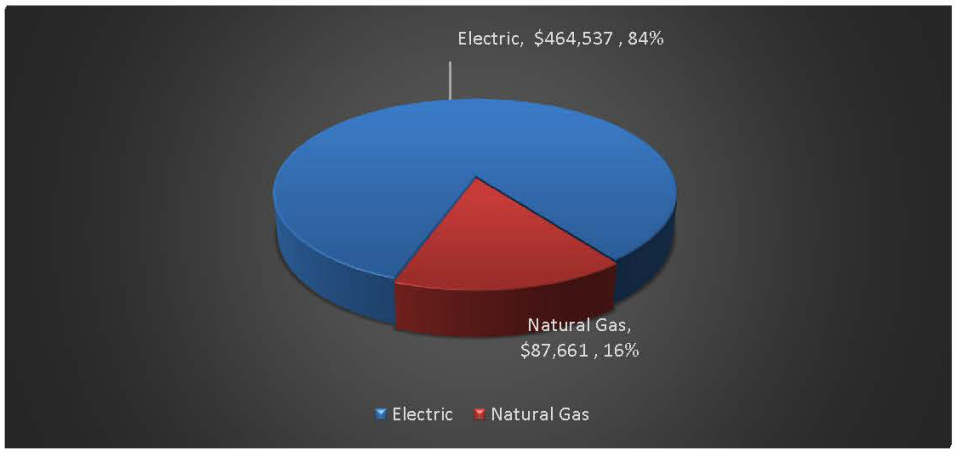
Historical Summary

Utility Analysis Period:
September 2020 - August 2021

	Electric	Natural Gas
Utility Costs*	$464,537	$87,661
Utility Usage (kWh, Therms)	2,612,256	67,182
$ Cost/Unit (kWh, Therms)	$0.17783	$1.305
Annual Electric Demand (kW)	12,181	

* Costs include energy and demand components, as well as taxes, surcharges, etc.

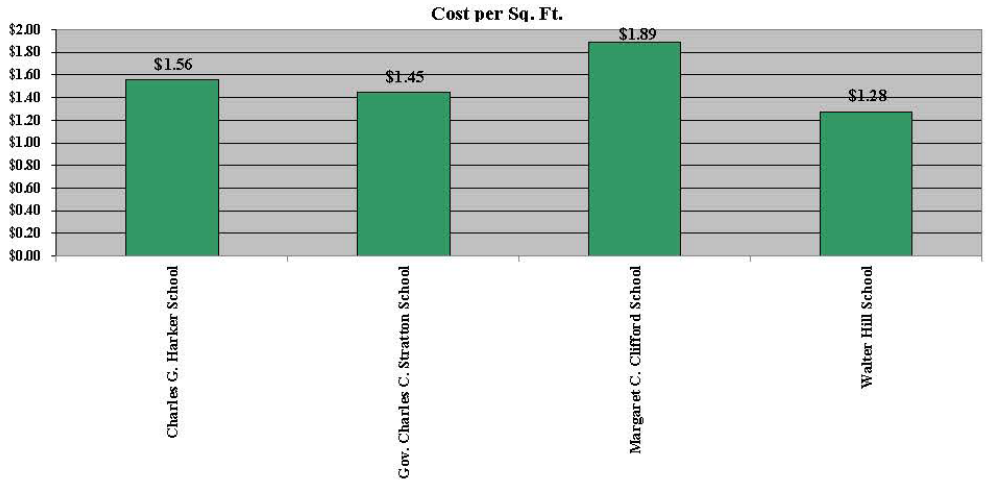
Actual Cost by Utility
September 2020 - August 2021

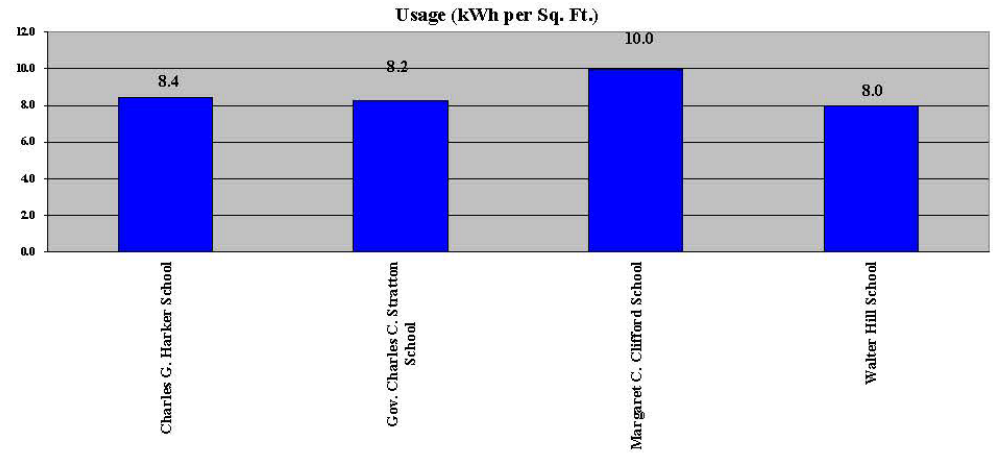


Total Cost
$552,198

Utility Analysis
Electric

Square Footage Analysis

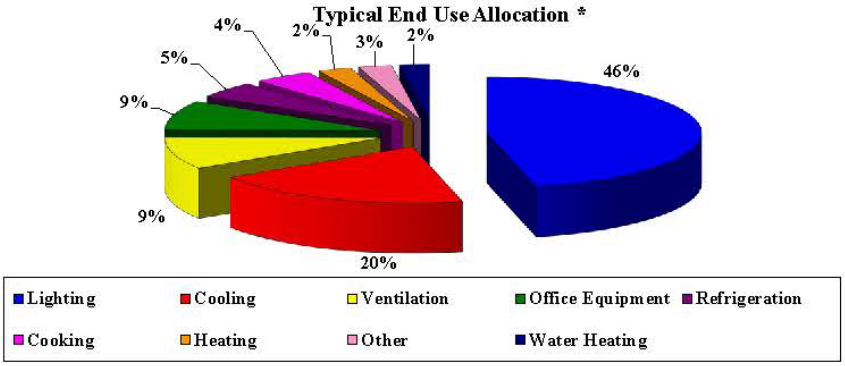




Note: Average kWh/SF for School buildings in this climate zone is 9.0

Electric

Sources of Electric Consumption

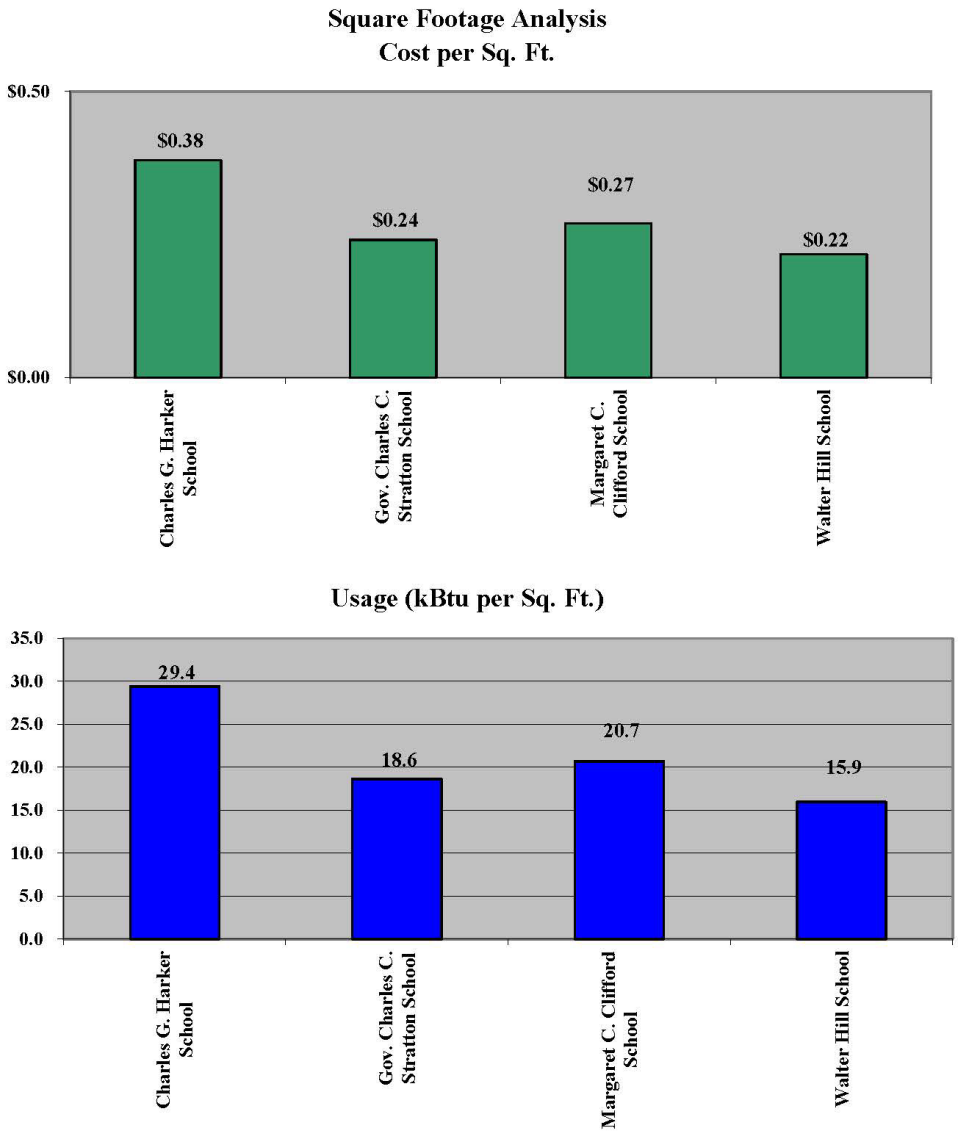


**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

	Lighting	$215,081
	Cooling	$91,049
	Ventilation	$42,737
	Office Equipment	$39,950
	Refrigeration	$21,833
	Cooking	$20,440
	Heating	$11,613
	Other	$11,613
	Water Heating	$10,220
Your Total Cost	**September 2020 - August 2021**	**$464,537**

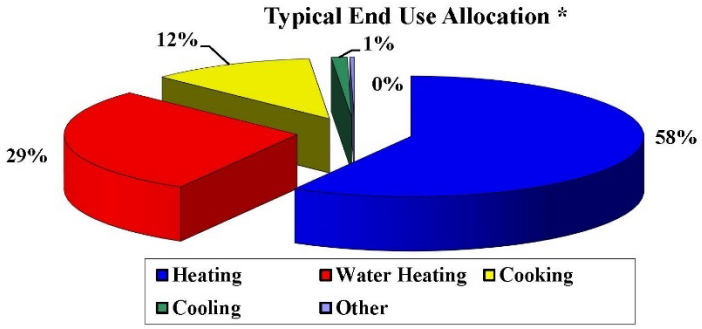
Utility Analysis
Natural Gas



Note: Average kBTU/SF for School buildings in this climate zone is 46.1

Utility Analysis
Natural Gas

Sources of Usage
Natural Gas



**This allocation is generic and is not a representation of the actual end use in your buildings included in this rep

Typical Allocation Applied to Your Cost**
Natural Gas

Heating	$51,106
Water Heating	$25,334
Cooking	$9,993
Cooling	$964
Other	$263
Your Total Cost September 2020 - August 2021	**$87,661**

Annual Emissions & Environmental Impact

Swedesboro Woolwich SD

September 2020 - August 2021

Based on the US Environmental Protection Agency -
Greenhouse Gas Equivalencies Calculator
http://www.epa.gov/cleanenergy/energy-resources/calculator.html

The following energy usage, cost and pollution have been quantified:

Total Annual Electric usage	2,612,256	kWh
Annual Natural Gas usage	67,182	Therms

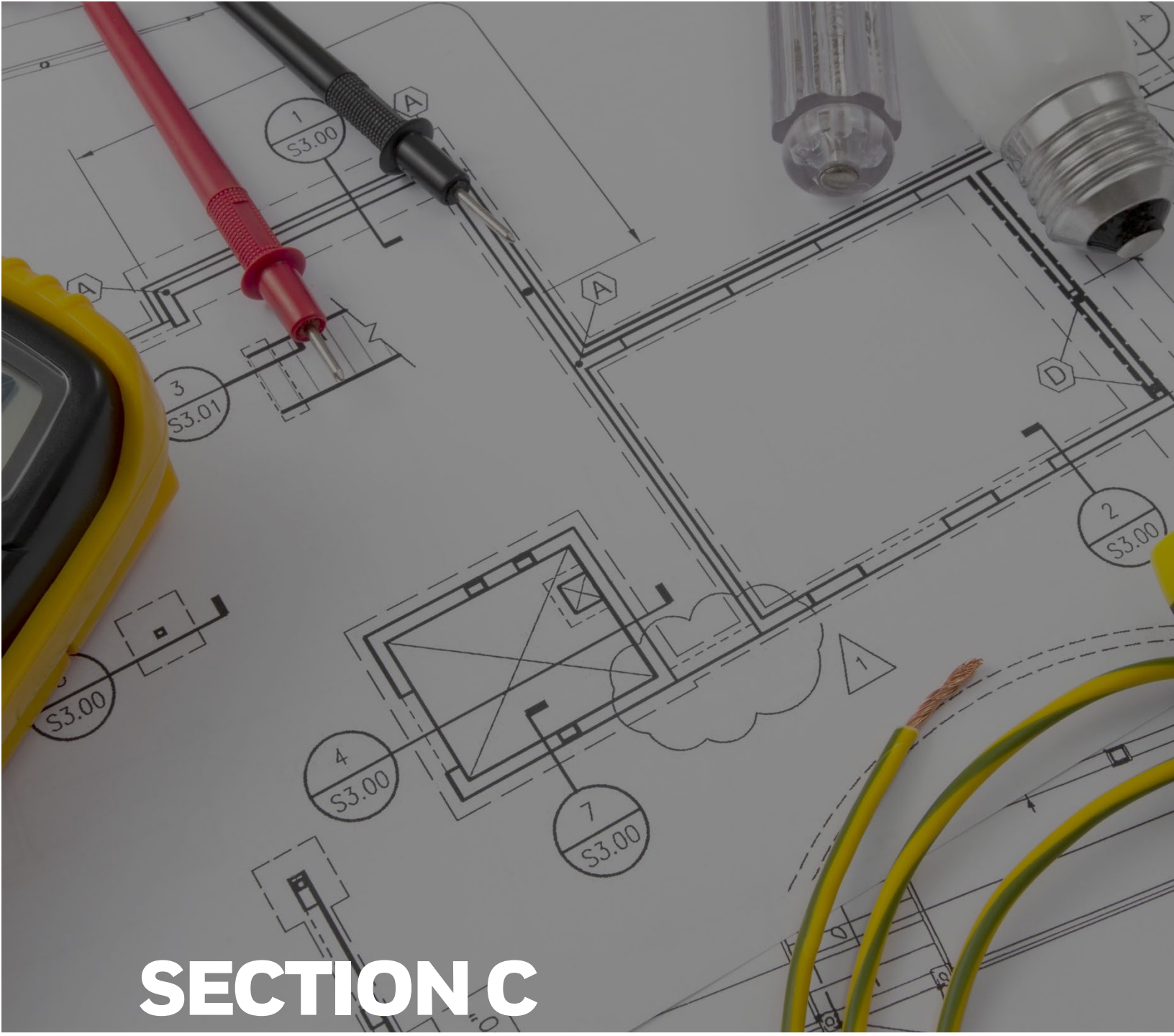
Electric Emissions	
0.00070742	$MTeCO_2$ per kWh saved
Natural Gas Emissions	
0.05302541	$MTeCO_2$ per MMBtu saved
Equillivent Cars	
0.214132762	Cars/ 1MTeCO2
Forrested Acres	
1.3063142	Forested Acres Factor/ 1MTeCO2

Annual Greenhouse Gas Emissions (Metric tons of equivalent of CO2)		
eCO2 (Electric)	1,848	MT
eCO2 (Gas)	354	MT
Total eCO2	2,202.197	MT

This is equivalent to one of the following:	
475	No. of passenger vehicles - annual greenhouse gas emissions
2877	No. of acres of U.S. forests - carbon sequestered annually

Potential Retrofits

Retrofit Description	Utility/Fuel Type	Common Recommendations for Action
Lighting Retrofit and Motion Sensors	Electric/Natural Gas	Upgrade lighting and lighting controls
De-Stratification Fans	Electric/Natural Gas	Redistribution of Conditioned Air
Boiler Replacement	Natural Gas	Install high efficient, modular, condensing boilers
DHW Boiler/Tank Replacements	Electric/Natural Gas	Higher Efficiency Units
RTU Replacements	Electric/Natural Gas	Higher Efficiency Units
Building Management System Upgrades	Electric/Natural Gas	Reduce equipment run-time and provide better comfort
Building Envelope Improvements	Electric/Natural Gas	Reduce building leakage
Roof Replacements	Electric/Natural Gas	Reduce building leakage
Computer Controllers	Electric	Put computers to sleep when building is unoccupied
Install Premium Efficient Motors/Variable Frequency Drives	Electric	Provide more efficient motors and variable frequency drives
Transformer Replacements	Electric	Provide more efficient transformers with reduced amounts of excess heat to the spaces
Water Thermal Conservation	Natural Gas	Lower water thermal consumption



SECTION C
ENERGY CONSERVATION MEASURES

Section C — Energy Conservation Measures

Introduction

The information used to develop this section was obtained through the independent energy audit building surveys to collect equipment information, interviews with operators and end users, and an understanding of the components to the systems at the sites. The information obtained includes nameplate data, equipment age, condition, the system's design and actual load, operational practices and schedules, and operations and maintenance history. Honeywell has done a review of the Energy Conservation Measures (ECMs) which would provide energy and cost savings the District. This report aims to be an assessment of the feasibility and cost effectiveness of such measures, and an indication of the potential for their implementation. The ECMs listed below have been reviewed throughout your facilities for consideration within a complete Energy Savings Plan. What follows is a general description of the energy auditing process and the detailed descriptions of the ECMs for your facilities.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
1A LED Lighting Upgrades	■	■	■	■
1B De-Stratification Fans w/ UV Disinfection	■	■	■	■
1C Vending Misers & Plug Loads	■	■	■	■
2A Boiler Replacements		■	■	■
2B Multipurpose Room Floor Replacement		■		■
2C Domestic Hot Water Heater Replacement	■	■		■
2D Rooftop Unit Replacement	■	■		■
2E Cooling Tower Replacements		■		■
2F Heat Pump Replacement		■	■	■
2G Premium Efficiency Motors and VFDs	■	■	■	■
2H Kitchen Hood Efficiency Improvements	■	■	■	■
2I Walk-In Compressor Controls	■	■	■	■
3A Building Management System Upgrades	■	■	■	■
3B BMS Dashboard - Energy Optimization	■	■	■	■
4A Building Envelope Improvements	■	■	■	■
4B Roofing Upgrades	■	■	■	■
5A Permanent Load Reduction	■	■	■	■
6A Transformer Replacement		■	■	■
7A Cogeneration CHP	■			
8A Solar PPA	■	■	■	■
9A Energy Education	■	■	■	■
10A Sustainable Transportation - EV Chargers	■	■	■	■
11A Digital School Kiosks	■	■	■	■

ECM 1A LED Lighting Upgrades

The key benefits of this ECM include:

- **Energy Savings** from reducing total energy consumption with more efficient, state of the art technology. Today's most efficient way of illumination and lighting has an estimated energy efficiency of 80%-90% when compared to traditional lighting and conventional light bulbs. Lighting controls reduce or eliminate reliance on occupants or staff to turn lights off when spaces are unoccupied by automatically turning lighting fixtures off thereby reducing electrical energy consumption.
- **Improved Teacher And Student Performance** from enhanced lighting quality that translates to an enhanced learning working environment.
- **Improved Equipment Longevity** by reducing amount of light usage and extending the useful life of your lighting system. LED bulbs and diodes have an outstanding operational lifetime expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. Operational savings in terms of bulb and ballast replacement are significant based on this technology.
- **Reduced Maintenance And Operational Costs** by modernizing your lighting system, reducing the runtime of lighting system and components, and providing for longer lasting and technologically advanced lights, without the need to address deficient or bad ballasts.
- **Ecologically Friendly** LED lights are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a multitude of materials like mercury that are dangerous for the environment. LED lights contain no toxic materials and are 100% recyclable and will help to reduce carbon footprint by up to a third. The long operational lifetime span mentioned above means also that one LED light bulb can save material and production of 25 incandescent light bulbs. A big step towards a greener future!

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
1A LED Lighting Upgrades	■	■	■	■

EXISTING CONDITIONS

Indoor lighting predominantly consists of fluorescent T-8 lamps, with a smaller quantity of other fixtures such as compact fluorescent lamps (CFLs), incandescent bulbs, and high-intensity discharge (HID) lighting.

SCOPE OF WORK

The proposed lighting system is based on the recent investment grade lighting system audit where existing lighting systems were analyzed and inventoried. Honeywell proposes to retrofit all existing fluorescent fixtures with high efficiency Light Emitting Diode (LED) lamps.

The district will receive many benefits from the lighting system upgrade.

Existing Lighting at Walter Hill School

Existing Lighting at Charles G. Harker School

LED OUTDOOR LIGHTING UPGRADES

EXISTING CONDITIONS

The District has various types of High Intensity Discharge (HID) light fixtures and older LED fixtures, which are not as efficient as modern LED types. Parking lot and building exterior lights consist of pole mounted shoe-box type and wall pack HID fixtures.

SCOPE OF WORK

The exterior wall-packs and pole-mounted shoebox fixtures are currently high wattage HID lamps. These will be replaced with lower wattage LED fixtures. The LED technologies offer significant advantages such as extended lamp life, minimal lumen depreciation, “instant on” and very high energy conversion efficiency. These fixtures will provide substantial maintenance savings via the new 100,000-hour LED lamp life versus the 20,000 hours of the existing metal halide lamps.

CHANGES IN INFRASTRUCTURE

New LED lamps and fixtures will be installed as part of this ECM. Existing poles and shoe box fixtures will be utilized where possible.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage. A slight increase in heating energy is resultant from the reduced heat output of more efficient lamps.
Waste Production	All lamps and ballasts that are removed will be properly disposed.
Environmental Regulations	No environmental impact is expected.

ECM 1B De-Stratification Fans w/ UV Disinfection

The key benefits of this ECM include:

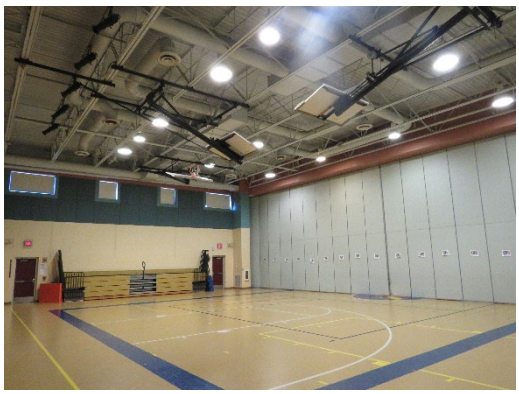
- **Improved Efficiency And Energy Savings** through more equal distribution of conditioned air space.
- **Equipment Longevity** due to lower utilization of equipment to condition air.
- **Increased Comfort** of students and teachers.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
1B De-Stratification Fans w/ UV Disinfection	■	■	■	■

EXISTING CONDITIONS

Warm air stratifies close to the ceiling in high ceiling areas such as in a gymnasium or auditorium. Elevated levels of heat transfer through the high walls and roof causes elevated heat loss.

Charles G. Harker School Gym



Governor Charles C. Stratton School Multi-purpose Room

PROPOSED SOLUTION

In areas with 20+ foot ceiling heights, there is approximately a 15°F+ temperature difference between the floor and the ceiling. With higher ceilings, it is even greater. That means to generate the heat necessary to maintain a comfortable 70°F temperature at the floor level, where student activities occur, the ceiling could be 85°F or higher.

De-stratification fans even out the air temperature to a zero to 3°F differential from floor to ceiling and wall to wall. This will allow HVAC systems to run for a shorter duration because of the absence of extreme temperatures to heat or cool, thus allowing the local thermostats to be satisfied for longer periods of time.

Systems Evaluation and Selection

An energy-efficient motor drives a near-silent fan that forces a column of hotter air from the ceiling to the cooler floor below. As this column of warm air nears the floor, it begins to flare out in a circular pattern and rise again creating a torus. While doing so, it warms the cooler air and mixes with air near the floor, increasing the temperature and comfort of occupants. Through a natural law of physics, this torus will continue to re-circulate air, mixing warmer air from the ceiling with cooler air near the floor until the ceiling and air temperatures are nearly equal. As this happens, it will require less and less energy to comfortably heat the work area, allowing thermostats to be lowered and energy savings to be realized. Once started, the entire process of "thermal equalization" will take on average less than 24 hours.

Airius PureAir Series is an air purification and airflow circulation fan system, incorporating the latest in PHI (Photohydroionization) Cell technology to efficiently and effectively neutralize up to 99% of all harmful germs, bacteria, viruses, mold and other contaminants in any internal environment. The PHI Cell emits 'Ionized Hydroperoxides', a naturally occurring cleaning agent, which are circulated throughout spaces via the fan. As the fans continue to circulate internal atmosphere, the PHI circulates its neutralizing Ionized Hydroperoxides, providing 24/7 continuous Air Purification. The PureAir also provides all the features and benefits of the world's most popular destratification and airflow circulation fan, balancing temperatures, improving comfort, reducing heating and cooling costs and reducing carbon emissions.

Based on preliminary site investigation conducted by our staff, we propose to install the de-stratification fans as indicated in the table below.

Table 1. Proposed De-Stratification Fans

Building	Location	Airius Model	Qty Pure Air	Qty Air Pear
Charles G. Harker School	Cafetorium	(3) S-25-SP-SH-120-W & (3) S-25-SP-SH-120-W-PHI	3	3
Governor Charles C. Stratton School	Multipurpose Room	(4) A-25-SP-STD-120-W & (3) A-25-SP-STD-120-W-PHI	3	4
Margaret C. Clifford School	Multipurpose Room	(2) A-45-P4-STD-120-w & (1) A-45-P4-STD-120-W-PHI	1	2
Walter Hill School	Multipurpose Room	(3) A-25-SP-STD-120-W & (3) A-25-SP-STD-120-W-PHI	3	3
Charles G. Harker School	Gym	(4) A-25-SP-STD-120-W & (3) A-25-SP-STD-120-W-PHI	3	4
TOTAL			**13**	**16**

SCOPE OF WORK

Per De-Stratification Fan:

- Shut off the main electric power to the area in which the unit(s) will be installed.
- Install new de-stratification fan and wiring.
- Re-energize.
- Inspect unit operation by performing electrical and harmonics testing.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New de-stratification fans will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced thermal energy usage. A slight increase in electrical energy is resultant from the operation of the fan motors.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1C Vending Misers & Plug Loads

The key benefits of this ECM include:

- **Energy Savings** by better managing the power consumption of electrical equipment.
- **Longer Equipment Life** thanks to reduced usage.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
1C Vending Misers & Plug Loads	■	■	■	■

EXISTING CONDITIONS

Multiple vending machines were observed in various buildings. As such, Honeywell has investigated the use of vending machine misers for these areas. Vending machines are located throughout multiple buildings offering soft drinks and snacks to the occupants. A typical cold drink machine consumes over 5,000 kWh annually.

Vending Machines at Charles G. Harker School

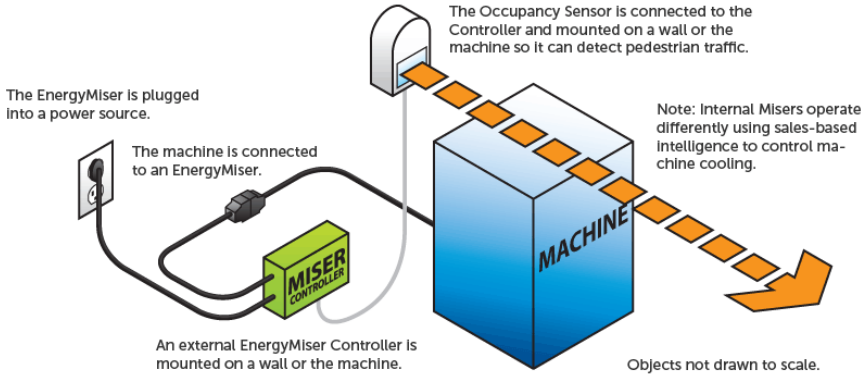
Vending Machines at Walter Hill School

PROPOSED SOLUTION

During the site visit, Honeywell noted vending machines providing an opportunity for energy savings by shutting off non-critical loads during the non-occupied periods.

The Vending Miser Occupancy Control (VMOC) also monitors electrical current used by the vending machine. This ensures that the unit will never power down a vending machine while the compressor is running, so a high head pressure start never occurs. In addition, the current sensor ensures that every time the vending machine is powered up, the cooling cycle is run to completion before again powering down the vending machine. The Coca Cola Company and Pepsi Corporation approve the proposed controller for use on their machines.

Vending Miser Controller



Vending Miser Operation

Table 2. Proposed Vending Machines for Vending Miser Controls

Building	Type	Manufacturer	Qty
Governor Charles C. Stratton School	Break Room	Cold Beverage	1
Governor Charles C. Stratton School	Break Room	Snack	1
Charles G. Harker School	Break Room	Cold Beverage	1
Charles G. Harker School	Break Room	Snack	1
Margaret C. Clifford School	Lounge	Snack	1
Walter Hill School	Lobby	Cold Beverage	1
Walter Hill School	Lobby	Snack	1
TOTAL			**7**

SCOPE OF WORK

Interface with Existing Equipment. All the VMOC devices are easily installed. The vending machine controllers are installed separately from the machine, and implementation will occur during working hours. A period of three (3) weeks will be required to verify proper calibration of the sensors. With respect to the vending machines in the various buildings, Honeywell has estimated the number and types of vending machines based on our site tour. During the implementation phase, Honeywell will check with the vendor about the type and specification of the vending machines as it relates to any internal time clocks which may exist inside the machine. Should this be the case, the savings and cost will be adjusted accordingly.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New vending machine controls will be installed as part of this ECM

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 2A Boiler Replacements

The key benefits of this ECM include:

- **Reduced Energy Usage** from improved boiler efficiency resulting from replacement of older equipment, and in certain instances, oversized boilers.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2A Boiler Replacements		■	■	■

EXISTING CONDITIONS

Some boilers within the Swedesboro Woolwich School District are near or past the end of their useful life and are less efficient compared to new boilers. Some existing boilers can be replaced with high efficiency condensing boilers.

Governor Charles C. Stratton School - Boiler

Margaret C. Clifford School - Boiler

EXISTING BOILERS TO BE REPLACED

Table 3. Existing Boilers

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Governor Charles C. Stratton School	Hot Water	Smith	28A-S/W-10	2,498	NG	2
Margaret C. Clifford School	Hot Water	P-K Thermific	N-1500-2	1,275	NG	2
Walter Hill School	Hot Water	Smith	28A-S/W-07	1,699	NG	2

PROPOSED SOLUTION

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency as provided in table below. New condensing hot water boilers have thermal efficiencies that range from 88% – 95% depending on the return hot water temperature from the heating loop. With proper design, it is typical to see thermal efficiencies of around 92%. Thermal efficiency is only one part of the equation that makes up the seasonal efficiency of a boiler.

New boiler sizes and quantities will be based on the heat load of the building with redundancy, taking into account the existing system sizing and level of redundancy.

Table 4. Proposed Boilers

Building	Type	Manufacturer	Model	Capacity (MBH)	Fuel	Qty
Governor Charles C. Stratton School	Hot Water	AERCO	BMK-1000	1,000	NG	3
Margaret C. Clifford School	Hot Water	AERCO	BMK-1500	1,500	NG	2
Walter Hill School	Hot Water	AERCO	BMK-1000	1,000	NG	3

SCOPE OF WORK

The following outlines the boiler replacement:

1. Disconnect gas back to shutoff valve and electric back to source panelboard.
2. Remove existing boilers.
3. Install new boilers.
4. Connect gas and heating hot water appurtenances to new boilers.
5. Terminate and power new boiler electric circuiting.
6. Start up, commissioning, and operator training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Existing Boiler Efficiency	= Existing Heat Production/ Existing Fuel Input
Proposed Boiler Efficiency	= Proposed Heat Production/ Proposed Fuel Input
Energy Savings $	= Heating Production (Proposed Efficiency – Existing Efficiency)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

ECM 2B Multipurpose Room Floor Replacement

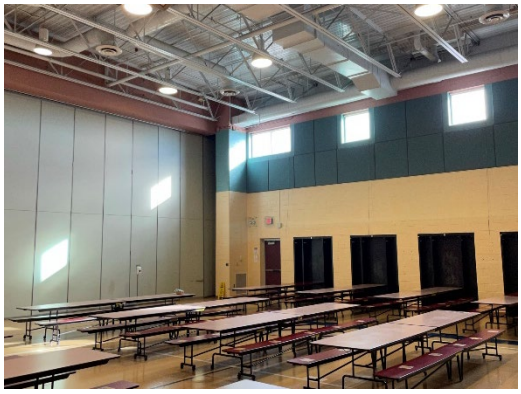
The key benefits of this ECM include:

- **Improve Air Quality** by optimizing the amount of fresh air supply to create a healthier building environment.
- **Operational Efficiency** resulting from more precise control and reduced outside air intake.
- **Energy Savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy Comfort and Productivity** by way of enhanced temperature and humidity control throughout your buildings.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2B Multipurpose Room Floor Replacement		■		■

EXISTING CONDITIONS

HVAC equipment serving the multi-purpose rooms at two schools are operated to supply outside air to the spaces continually to minimize the impact on indoor air quality from the flooring materials. Most of the time these spaces are not fully occupied, which increase energy demand for heating and cooling of excessive amount of outside air.



Governor Charles C. Stratton School - Multi-purpose Room

Walter Hill School – Multi-purpose Room

PROPOSED SOLUTION

Honeywell will replace the flooring in these spaces and install CO2 sensors connected to the HVAC equipment. The CO2 sensors will provide the control signal for the HVAC equipment to optimize the quantity of fresh air required, no longer needing to ventilate these spaces 24/7. The installation of CO2 sensors will read the levels of CO2 in the space and ensure that only the required outside air is supplied and heated to meet the minimum outdoor air requirements. This control strategy will reduce the amount of outside air intake and thus reduce the heating energy used by the HVAC units and electric energy used by the motors. Based on this fact, there are reduced requirements for outside air to the spaces.

Table 5. Floor Replacements

Building	Area Served	Floor Area SF
Governor Charles C. Stratton School	Multipurpose Room	7,490
Walter Hill School	Multipurpose Room	6,674

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy that needs to pre-heat or cool the outside air. The savings are generally calculated as:

Existing Heating BTU &	*= Metered data from existing meter readings*
Cost per BTU	
Cost of Existing Heating	*= Average site data $/CCF or $/Gallon*
Reduction in Heating/Cooling BTU	*= Reduction in outside air CFM x 1.08 x Delta T x Operating Hours*
Cost of Proposed Heating/Cooling	*= Reduced BTU x Cost per BTU*
Energy Savings $	*= Existing Costs – Proposed Costs*

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

Flooring will be replaced in these spaces.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced excess outdoor air.
Waste Production	Any removed parts will be disposed of properly.

CHANGES IN INFRASTRUCTURE

New boilers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

O&M IMPACT

The new boilers will decrease the O&M cost for maintaining the boilers.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ENVIRONMENTAL ISSUES

Resource Use	Annual savings will result from greater combustion efficiency, reduced maintenance costs, and better control and setback.
Waste Production	Existing boilers scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected; all regulations will be adhered to in accordance with EPA and local code requirements.

ECM 2C Domestic Water Heater Replacement

The key benefits of this ECM include:

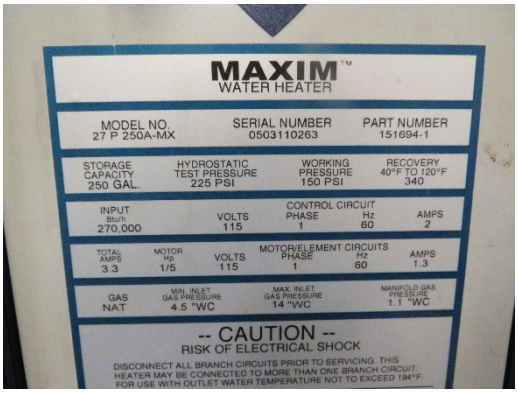
- **Reduced Energy Usage** from improved efficiency resulting from replacement of older equipment.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2C Domestic Hot Water Heater Replacement	■	■		■

EXISTING CONDITIONS

The existing Domestic Hot Water (DHW) heaters are of varying age and condition. Some of the units are not high-efficiency units.

Governor Charles C. Stratton School – Water Heater



Governor Charles C. Stratton School – Water Heater Name Plate

EXISTING WATER HEATERS TO BE REPLACED

Table 6. Existing Water Heaters

Building	Manufacturer	Model	Capacity (MBH)	Storage (Gal)	Fuel	Qty
Governor Charles C. Stratton School	PVI	27 P 250A-MX	216	250	NG	2
Charles G. Harker School	Lochinvar	AWN500	450	-	NG	1
Walter Hill School	Bradford White	D100T1993N	160	98	NG	2

PROPOSED SOLUTION

Honeywell proposes replacing the existing DHW heaters at the above locations with highly efficient condensing DHW heaters. New condensing DHW heaters have efficiencies between 97% - 98%. They provide better control with capabilities as night setback, temperature adjustments and demand control hot water.

Table 7. Proposed Water Heaters

Building	Manufacturer	Model	Capacity (MBH)	Storage (Gal)	Fuel	Qty
Governor Charles C. Stratton School	Bradford White	EF-100T-199E-3N(A)	199	100	NG	2
Charles G. Harker School	Bradford White	EF-120T-400-3N(A)	400	119	NG	1
Walter Hill School	Bradford White	EF-100T-199E-3N(A)	199	100	NG	2

SCOPE OF WORK

The following outlines the boiler replacement:

1. Demolish and remove old water heaters.
2. Furnish and install condensing gas fired domestic hot water heaters as specified in the table above.
3. Install all required piping, controls, and breeching as needed.
4. Install mixing valve.
5. Install circulators where needed for building use and kitchen supply.
6. Test and commission.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings are calculated from the domestic hot water heater efficiency differences.

Existing Boiler Efficiency	= Existing Boiler Efficiency + Existing Heat Exchanger Efficiency
Proposed Boiler Efficiency	= Efficiency of the New Domestic Hot Water Heater
Energy Savings $	= DHW Load x (Existing Equipment Efficiency – New Equipment Efficiency)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
Equipment Identification	As part of the measure design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

A new controller for each DHW heater will be installed and programmed. In addition to the controllers, training for maintenance personnel will be required.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from improved thermal efficiency.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 2D Roof Top Unit Replacements

The key benefits of this ECM include:

- **Reduced Energy Usage** from improved efficiency resulting from replacement of older equipment.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2D Rooftop Unit Replacement	■	■		■

EXISTING CONDITIONS

Some Rooftop Units (RTUs) serving the locations photographed below are inefficient or past their useful lives. Replacing these units with new, high efficiency units will save energy costs over the long term while reducing repair costs that would otherwise have been necessary to keep the old RTUs in operation.

Governor Charles C. Stratton School - RTU

Walter Hill School - RTU

EXISTING ROOFTOP UNITS TO BE REPLACED

Table 8. Existing Rooftop Units

Building	Location Served	Manufacturer	Model	Tons	Qty
Governor Charles C. Stratton School	Stage/Storage	AAON	RK-07-3-E0-32M	7.0	1
Governor Charles C. Stratton School	Multi-Purpose Room	AAON	RK-08-3-E0-31M	8.0	1
Governor Charles C. Stratton School	Multi-Purpose Room	AAON	RK-08-3-E0-31M	8.0	1
Governor Charles C. Stratton School	Multi-Purpose Room	AAON	RK-08-3-E0-31M	8.0	1
Governor Charles C. Stratton School	Multi-Purpose Room	AAON	RK-08-3-E0-31M	8.0	1
Governor Charles C. Stratton School	Faculty Dinning	AAON	RK-04-3-E0-32M	4.0	1
Governor Charles C. Stratton School	Kitchen	AAON	RK-10-3-E0-32M	10.0	1

Building	Location Served	Manufacturer	Model	Tons	Qty
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 1	AAON	RK-26-3-E0-31M	26.0	1
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 2	AAON	RK-30-3-E0-31M	30.0	1
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 3	AAON	RK-08-3-E0-31M	8.0	1
Walter Hill School	Multi-Purpose Room	AAON	RK-10-3-E0-31M	10.0	4
Walter Hill School	Stage Storage	AAON	RK-05-3-E0-322	5.0	1
Walter Hill School	Kitchen	AAON	RK-08-3-E0-31M	8.0	1
Walter Hill School	Offices Hallway	AAON	RK-04-3-E0-32M	4.0	1
Charles G. Harker School	Offices	York	DR120N20Q4KZZ30003D	10.0	1

PROPOSED SOLUTION

Honeywell proposes replacing the existing rooftop units in the above table. The new units will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new units. The new units will be equipped with factory-installed microprocessor controls that improve unit efficiency. The units will also communicate with the building management system.

Table 9. Proposed Rooftop Units

Building	Location Served	Manufacturer	Model	Tons	Qty
Governor Charles C. Stratton School	Stage/Storage	Trane	YHC092F4RZA	7.5	1
Governor Charles C. Stratton School	Multi-Purpose Room	Trane	YHC102F4RZA	8.5	1
Governor Charles C. Stratton School	Multi-Purpose Room	Trane	YHC102F4RZA	8.5	1
Governor Charles C. Stratton School	Multi-Purpose Room	Trane	YHC102F4RZA	8.5	1
Governor Charles C. Stratton School	Multi-Purpose Room	Trane	YHC102F4RZA	8.5	1
Governor Charles C. Stratton School	Faculty Dinning	Trane	YHC048F4RZA	4.0	1
Governor Charles C. Stratton School	Kitchen	Trane	YHC120F4RZA	10.0	1
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 1	Trane	OAK/N K360	26.0	1
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 2	Trane	OAK/N540	30.0	1
Governor Charles C. Stratton School	Heat Pump Ventilation Air Part 3	Trane	OAB/G B108	8.0	1
Walter Hill School	Multi-Purpose Room	Trane	YHC120F4RZA	10.0	4
Walter Hill School	Stage Storage	Trane	YHC092F4RZA	5.0	1
Walter Hill School	Kitchen	Trane	YHC102F4RZA	8.5	1
Walter Hill School	Offices Hallway	Trane	YHC048F4RZA	4.0	1
Charles G. Harker School	Offices	Trane	YHC120F4RZA	10.0	1

SCOPE OF WORK

The following outlines the scope of work to install the rooftop units stated in the above table:

1. Disconnect existing RTU electric connections.
2. Disconnect piping and air ducts from the unit.
3. Remove unit from the base.
4. Modify base for new unit if necessary.
5. Rig and set new unit at the base.
6. Inspect piping and air ducts before reconnecting them to the unit.
7. Reconnect piping and air ducts.
8. Repair duct and piping insulation.
9. Connect electric power.
10. Start up and commissioning of new unit.
11. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy savings	*= Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New rooftop units will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2E Cooling Tower Replacements

The key benefits of this ECM include:

- **Reduced Energy Usage** from improved efficiency due to replacement of older equipment.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2E Cooling Tower Replacements		■		■

EXISTING CONDITIONS

Cooling tower units serving the building has gone beyond its useful life and is inefficient, have exceeded their expected useful service lives, and are costly to maintain. Replacing this with new, high efficiency unit will save energy costs over the long term while reducing repair costs that would otherwise have been necessary to keep the old units in operation.

Governor Charles C. Stratton School – Cooling Tower

Walter Hill School – Cooling Tower

Table 10. Existing Cooling Towers

Building	Make	Model	Qty.	Tons
Governor Charles C. Stratton School	BAC	VFL-072-32N/DHX	2	250
Walter Hill School	BAC	FXV-443-DX	1	150

PROPOSED SOLUTION

Honeywell proposes replacing the existing cooling tower unit in the table above. The new unit will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new motors. The units will communicate with the existing or enhanced BMS.

Table 11. Proposed Cooling Towers

Building	Make	Model	Qty.	Tons
Governor Charles C. Stratton School	BAC	VFL-072-32N	2	250
Walter Hill School	BAC	FXV-0812A-20D-L	1	150

SCOPE OF WORK

The following outlines the scope of work to install the cooling tower units listed in the table above.

1. Disconnect existing electric connections.
2. Disconnect piping from the unit.
3. Remove existing unit.
4. Rig and set new unit.
5. Inspect piping before reconnecting them to the unit.
6. Reconnect piping.
7. Repair piping insulation.
8. Connect electric power.
9. Start up and commissioning of new unit.
10. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy Savings	*Existing unit energy consumption (kW/ton) – replacement unit energy consumption (kW/ton*

EQUIPMENT INFORMATION

Manufacturer and Type	Honeywell and the customer will determine final selections.
Equipment Identification	Product cut sheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2F Heat Pump Replacement

The key benefits of this ECM include:

- **Reduced Energy Usage** from improved efficiency resulting from replacement of older equipment.
- **Lower Operational Costs** through less frequent maintenance and operational issues.
- **Equipment Longevity Improvement** due to improved efficiency and less wasteful equipment utilization.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2F Heat Pump Replacement		■	■	■

EXISTING CONDITIONS

Honeywell identified existing heat pumps as having exceeded their useful service life. Replacing these units with new, high efficiency units will save energy costs over the long term, while reducing repair costs that would otherwise have been necessary to keep the old units in operation.

Margaret C. Clifford School – Heat Pump

Margaret C. Clifford School – Heat Pump

EXISTING HEAT PUMPS TO BE UPGRADED

Table 12. Existing Heat Pumps

Building	Manufacturer	Model	Qty	BTU Heating	BTU Cooling
Governor Charles C. Stratton School	Trane	GEVA006	2	18,200	14,000
Governor Charles C. Stratton School	Trane	GEVA012	5	69,000	59,500
Governor Charles C. Stratton School	Trane	GEVA015	1	17,500	13,600
Governor Charles C. Stratton School	Trane	GEVA018	1	21,900	17,900
Governor Charles C. Stratton School	Trane	GEVA018	4	90,000	73,600
Governor Charles C. Stratton School	Trane	GEVA018	5	112,500	94,000

Building	Manufacturer	Model	Qty	BTU Heating	BTU Cooling
Governor Charles C. Stratton School	Trane	GEVA024	6	186,000	147,600
Governor Charles C. Stratton School	Trane	GEVA024	2	62,000	49,000
Governor Charles C. Stratton School	Trane	GEVA030	26	871,000	720,200
Governor Charles C. Stratton School	Trane	GEVA030	2	67,000	55,400
Governor Charles C. Stratton School	Trane	GEVA036	3	132,000	120,900
Governor Charles C. Stratton School	Trane	GEVA042	1	47,800	37,900
Governor Charles C. Stratton School	Trane	GEVA048	2	114,000	92,000
Governor Charles C. Stratton School	Trane	GEVA060	3	222,300	171,300
Governor Charles C. Stratton School	Trane	GEVA100	1	124,000	104,100
Walter Hill School	Trane	GEVA006	2	18,400	14,000
Walter Hill School	Trane	GEVA009	1	10,650	8,100
Walter Hill School	Trane	GEVA012	3	41,400	35,700
Walter Hill School	Trane	GEVA018	2	33,800	26,200
Walter Hill School	Trane	GEVA024	3	66,600	54,900
Walter Hill School	Trane	GEVA030	9	272,700	214,200
Walter Hill School	Trane	GEVA042	6	192,000	157,200
Walter Hill School	Trane	GEVA006	2	93,200	74,080
Walter Hill School	Trane	GEVA006	10	80,000	70,000
Walter Hill School	Trane	GEVA006	2	16,000	14,480
Walter Hill School	Trane	GEVA006	3	22,200	19,800
Walter Hill School	Trane	GEVA009	3	31,500	24,600
Walter Hill School	Trane	GEVA012	1	13,600	11,900
Walter Hill School	Trane	GEVA015	2	34,000	26,200
Walter Hill School	Trane	GEVA048	1	57,700	47,720
Walter Hill School	Trane	GEVA048	2	116,400	91,400
Walter Hill School	Trane	GEVA060	1	75,600	56,600
Walter Hill School	Trane	GEVA036	1	43,100	34,000
Walter Hill School	HEATEX	RHXC-1A/SP-7500-HP-1-D	1	301,000	272,000
Walter Hill School	HEATEX	RHXC-1A/SP-4200-HP-1-G	1	350,000	298,000
Walter Hill School	HEATEX	RHXC-1A/SP-5000-HP-1-A	1	138,000	123,000
Walter Hill School	HEATEX	RHXC-1A/SP-2900-HP-1-D	1	170,000	175,000

Building	Manufacturer	Model	Qty	BTU Heating	BTU Cooling
Margaret C. Clifford School	Trane	GEVB048	6	54,600	288,000
Margaret C. Clifford School	Trane	GEVB036	3	26,700	108,000
Margaret C. Clifford School	Trane	GEVB036	1	5,100	36,000
Margaret C. Clifford School	Trane	GEVA048	22	149,600	1,056,000

PROPOSED SOLUTION

Honeywell proposes to replace existing heat pumps with new units. New units will be equipped with open protocol factory mounted controls which can be tied into existing BMS system.

Building	Manufacturer	Model	Qty	BTU Heating	BTU Cooling
Governor Charles C. Stratton School	Trane	GEVA006	2	18,200	14,000
Governor Charles C. Stratton School	Trane	GEVG012	5	69,000	59,500
Governor Charles C. Stratton School	Trane	GEVG015	1	17,500	13,600
Governor Charles C. Stratton School	Trane	GEVG018	1	21,900	17,900
Governor Charles C. Stratton School	Trane	GEVG018	4	90,000	73,600
Governor Charles C. Stratton School	Trane	GEVG018	5	112,500	94,000
Governor Charles C. Stratton School	Trane	GEVG024	6	186,000	147,600
Governor Charles C. Stratton School	Trane	GEVG024	2	62,000	49,000
Governor Charles C. Stratton School	Trane	GEVG030	26	871,000	720,200
Governor Charles C. Stratton School	Trane	GEVG030	2	67,000	55,400
Governor Charles C. Stratton School	Trane	GEVG036	3	132,000	120,900
Governor Charles C. Stratton School	Trane	GEVG042	1	47,800	37,900
Governor Charles C. Stratton School	Trane	GEVG048	2	114,000	92,000
Governor Charles C. Stratton School	Trane	GEVG060	3	222,300	171,300
Governor Charles C. Stratton School	Trane	GEVG100	1	124,000	104,100
Walter Hill School	Trane	GEVG006	2	18,400	14,000
Walter Hill School	Trane	GEVG009	1	10,650	8,100
Walter Hill School	Trane	GEVG012	3	41,400	35,700
Walter Hill School	Trane	GEVG018	2	33,800	26,200

Building	Manufacturer	Model	Qty	BTU Heating	BTU Cooling
Walter Hill School	Trane	GEVG024	3	66,600	54,900
Walter Hill School	Trane	GEVG030	9	272,700	214,200
Walter Hill School	Trane	GEVG042	6	192,000	157,200
Walter Hill School	Trane	GEVG006	2	93,200	74,080
Walter Hill School	Trane	GEVG006	10	80,000	70,000
Walter Hill School	Trane	GEVG006	2	16,000	14,480
Walter Hill School	Trane	GEVG006	3	22,200	19,800
Walter Hill School	Trane	GEVG009	3	31,500	24,600
Walter Hill School	Trane	GEVG012	1	13,600	11,900
Walter Hill School	Trane	GEVG015	2	34,000	26,200
Walter Hill School	Trane	GEVG048	1	57,700	47,720
Walter Hill School	Trane	GEVG048	2	116,400	91,400
Walter Hill School	Trane	GEVG060	1	75,600	56,600
Walter Hill School	Trane	GEVG036	1	43,100	34,000
Walter Hill School	HEATEX	RHXC-1A/SP-7500-HP-1-D	1	301,000	272,000
Walter Hill School	HEATEX	RHXC-1A/SP-4200-HP-1-G	1	350,000	298,000
Walter Hill School	HEATEX	RHXC-1A/SP-5000-HP-1-A	1	138,000	123,000
Walter Hill School	HEATEX	RHXC-1A/SP-2900-HP-1-D	1	170,000	175,000
Margaret C. Clifford School	Trane	GEVG048	6	54,600	288,000
Margaret C. Clifford School	Trane	GEVG036	3	26,700	108,000
Margaret C. Clifford School	Trane	GEVG036	1	5,100	36,000
Margaret C. Clifford School	Trane	GEVG048	22	149,600	1,056,000

SCOPE OF WORK

The following outlines the heat pump replacements:

1. Disconnect existing electric connections.
2. Disconnect piping from the unit.
3. Rig and set new unit.
4. Inspect piping and air ducts before reconnecting them to the unit.
5. Reconnect piping and air ducts.
6. Repair duct and piping insulation.
7. Connect electric power.
8. Start up and commissioning of new unit.
9. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Electric Energy savings	*Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	Product cut sheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing condensing units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2G Premium Efficiency Motors and VFDs

The key benefits of this ECM include:

- **Energy Savings** from reduced run hours and reduced motor speeds.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization and reduced startup wear.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2G Premium Efficiency Motors and VFDs	■	■	■	■

EXISTING CONDITIONS

Honeywell has identified standard efficiency electric motors on several pumps. Energy savings can be obtained by replacing the standard efficiency motors with premium efficiency motors as well as by installing VFDs on systems that have two-way control valves.

Margaret C. Clifford School – Motor

Charles G. Harker School – Motor

EXISTING MOTORS TO BE REPLACED

Table 13. Existing Motors

Building	Equipment Description	Qty.	Motor HP	Existing Efficiency	Replace Motor	Add VFD
Charles G. Harker School	CHW Return	3	15.0	92.0%	Y	Y
Governor Charles C. Stratton School	CT 1-2 Fan	2	25.0	91.0%	Y	Y
Margaret C. Clifford School	Loop Water System Pump	2	15.0	89.5%	Y	Y
Margaret C. Clifford School	CT 1 Fan	1	15.0	91.0%	Y	Y
Margaret C. Clifford School	Tower Pump	2	10.0	89.5%	Y	Y
Margaret C. Clifford School	CHW Pump	2	7.5	91.0%	Y	Y
Margaret C. Clifford School	HW Pump	2	7.5	85.5%	Y	Y
Walter Hill School	CW Pump	2	10.0	91.7%	Y	Y

Building	Equipment Description	Qty.	Motor HP	Existing Efficiency	Replace Motor	Add VFD
Walter Hill School	CT 1 Fan	2	7.5	88.5%	Y	Y

PROPOSED SOLUTION

Honeywell observed that several motors and pumps that are sized to meet peak heating or cooling conditions. However, we've learned that most operating hours occur during conditions that require less than peak loads.

Honeywell proposes replacement of all above-mentioned single speed standard efficiency motors (that do not have VFDs) with new premium efficiency motors and installing new couplings where applicable. In addition, Honeywell recommends installing VFDs on these pumps. Energy used by the motor can be reduced by varying the flow in response to varying loads in the space. Motor speed may be controlled either based on the pressure in the distribution system or based on time of day.

Honeywell recommends fitting unit ventilators with two-way valves (provided that unit ventilators located at end of piping branches are fitted with three-way valves to keep hot water moving through the distribution piping at all times).

Honeywell also recommends installing VFDs on the heating hot water pumps and chilled water pumps to better match pumping output to system requirements and reduce energy waste. Each motor will be equipped with new selector relays that will allow one drive to operate per pump with the VFD drive. Honeywell also recommends installation of new differential pressure sensors and tying them to the control system to allow you to regulate the speed of the pump per load requirements. Lastly, we recommend installation of VFDs on the cooling system pump motors that have higher horsepower. VFDs will maintain temperatures in the unit by adjusting the speed of both the motor and the pump, and can be connected to your BMS.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy consumed by electric motors varies inversely with the cube of the motor speed. Variable frequency drives reduce motor speed (in response to load) thus reducing energy consumption exponentially.

CHANGES IN INFRASTRUCTURE

New motors will be installed in place of the old motors. No expansion of the facilities will be necessary.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will also be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reducing electrical usage by operating higher efficiency motors for the same horsepower output. The equipment uses no other resources.
Waste Production	This measure will produce waste by-products. Old motors shall be disposed of in accordance with all federal, state, and local codes.
Environmental Regulations	No environmental impact is expected.

ECM 2H Kitchen Hood Efficiency Improvements

The key benefits of this ECM include:

- **Reduced Energy Usage** from improved equipment control and reduced exhaust of conditioned air.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2H Kitchen Hood Efficiency Improvements	■	■	■	■

EXISTING CONDITIONS

Honeywell observed that the kitchens utilize a constant volume kitchen exhaust hood system. This system operates at full load, even when there is no activity in the kitchen. It also requires operating the exhaust fan at full load. This wastes both fan energy and heating energy. When the hood is not utilized, an opportunity exists to reduce airflow and conserve energy.

Margaret C. Clifford School - Kitchen Hood

Charles G. Harker School - Kitchen Hood

PROPOSED SOLUTION

Honeywell recommends installing a microprocessor-based controls system whose sensors automatically regulate fan speed based on cooking load, time of day and hood temperature while minimizing energy usage. The system includes a temperature sensor installed in the hood exhaust collar, IP sensors on the ends of the hood that detect the presence of smoke or cooking effluent and VFD that control the speed of the fans. This will result in energy and cost savings, noise reduction, longer equipment life and reduction in cleaning costs.

Table 14. Existing Kitchen Hoods to Receive Controls

Building	Kitchen Hood (sq. ft.)	Make	Type	Add VFD	Qty
Charles G. Harker School	65	Melink	Intelli-Hood	Y	1
Governor Charles C. Stratton School	70	Melink	Intelli-Hood	Y	1
Margaret C. Clifford School	96	Melink	Intelli-Hood	Y	1
Walter Hill School	70	Melink	Intelli-Hood	Y	1

SCOPE OF WORK

1. Install a temperature sensor in the hood to monitor temperature of the exhaust gas.
2. Install a set of two photo sensors on the sides to monitor smoke density across the hood.
3. Install a control panel with a small point controller and a set of relays in the kitchen close to the hood.
4. Provide electric wiring from the new panel to the sensors, exhaust fan motor as well as to the closest electric panel for power supply.
5. Provide connection to the BMS system for remote monitoring, control, and alarming. This system could also be stand-alone to save on cost.
6. Commission control components and sequences and calibrate control loops.

Sequence of operation will enable the exhaust fans when either temperature or smoke density in the range hoods is above a pre-set value. Time delays between start and stop will be programmed to prevent motor short cycling. Schedule programming could be implemented as well.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of conditioned air that is being exhausted when there is no cooking taking place.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

There will be improvements in HVAC equipment and controls for not operating fans continuously.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2I Walk-In Compressor Controls

The key benefits of this ECM include:

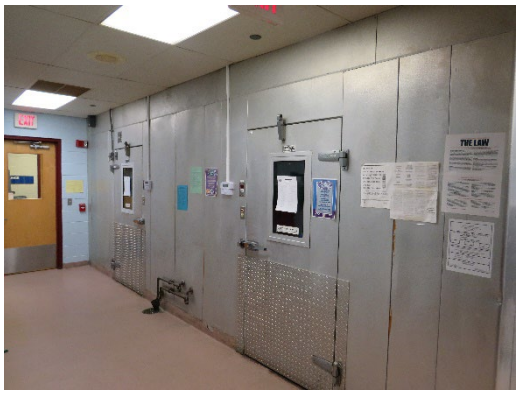
- **Energy Savings** from reducing equipment runtime.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization.
- **Operational Savings** from less frequent need to repair or replace equipment thanks to less frequent equipment use.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
2I Walk-In Compressor Controls	■	■	■	■

EXISTING CONDITIONS

In many refrigeration, walk-in freezers and coolers, the compressor is oversized and cycles on/off frequently. This compressor cycling results in higher energy consumption and may reduce the life of the compressor.

Charles G. Harker School – Walk-In Ref./Frz.



Margaret C. Clifford Schooll – Walk-In Ref./Frz.

EXISTING WALK-IN REFRIGERATOR/FREEZERS TO RECEIVE CONTROLS

Table 15. Existing Walk-In Refrigerator/Freezers

Building	Location	Walk-In Refrigerators	Walk-In Freezers	Type
Governor Charles C. Stratton School	Kitchen	1	1	Intellidyne
Charles G. Harker School	Kitchen	1	1	Intellidyne
Margaret C. Clifford School	Kitchen	1	1	Intellidyne
Walter Hill School	Kitchen	1	1	Intellidyne

PROPOSED SOLUTION

Honeywell will install a controller manufactured by Intellidyne at the above-mentioned buildings to reduce the compressor cycles of the kitchen walk-in coolers and freezers. The installation of this ECM will have no negative impact on system operation or freezing of food products. By reducing the cycling, the sensor will improve operating efficiency and reduce the electric consumption by 10% to 20%.

This control enhancement will save energy through the reduced compressor cycling in the kitchen walk-in coolers and freezers and will extend the operating life of the compressor. Consequently, the compressor will not have to be replaced as often.

Intellidyne Sensor Features

- Automatic restart on power failure.
- Surge protection incorporated into circuitry.
- Fully compatible with all energy management systems.
- UL listed.
- Maintenance free.

Intellidyne Sensor Benefits

- Patented process reduces air conditioning electric consumption typically 10% to 20%.
- Increased savings without replacing or upgrading costly system components.
- “State-of-the-art” microcomputer controller – LED indicators show operating modes.
- Protects compressor against momentary power outages and short cycling.
- Simple 15-minute installation by qualified installer.
- No programming or follow-up visits required.
- Maximum year-round efficiency.
- Reduces maintenance and extends compressor life.
- Fail-safe operation.
- Guaranteed to save energy.
- UL listed, “Energy Management Equipment”.

Intellidyne’s patented process determines the cooling demand and thermal characteristics of the entire air conditioning system by analyzing the compressor’s cycle pattern, and dynamically modifies that cycle pattern to provide the required amount of cooling in the most efficient manner. This is accomplished in real-time by delaying the start of the next compressor “on” cycle, by an amount determined by the cooling demand analysis. These new patterns also result in less frequent and more efficient compressor cycles.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM is realized by the reduction in run time of the compressors and fan motors in the freezers/refrigerators.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from the reduced electrical consumption of the compressor.
Waste Production	Any removed parts will be disposed of properly
Environmental Regulations	No environmental impact is expected.

ECM 3A Building Management System Upgrades

The key benefits of this ECM include:

- **Improve Air Quality** by more precise control of air filtration, air composition and ultra-violet cleaning to create a healthier school building environment.
- **Operational Efficiency** resulting from better control and system wide visibility.
- **Remote Operation** of HVAC systems via mobile phone or off-site computer.
- **Energy Savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Occupancy Comfort and Productivity** resulting from enhanced temperature and humidity control throughout your buildings.
- **Deliver a Comprehensive Open Protocol Building Management System**. Verify design is customized for each building yet uniform throughout the district. Assure longevity of control system with proper commissioning and training.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
3A Building Management System Upgrades	■	■	■	■

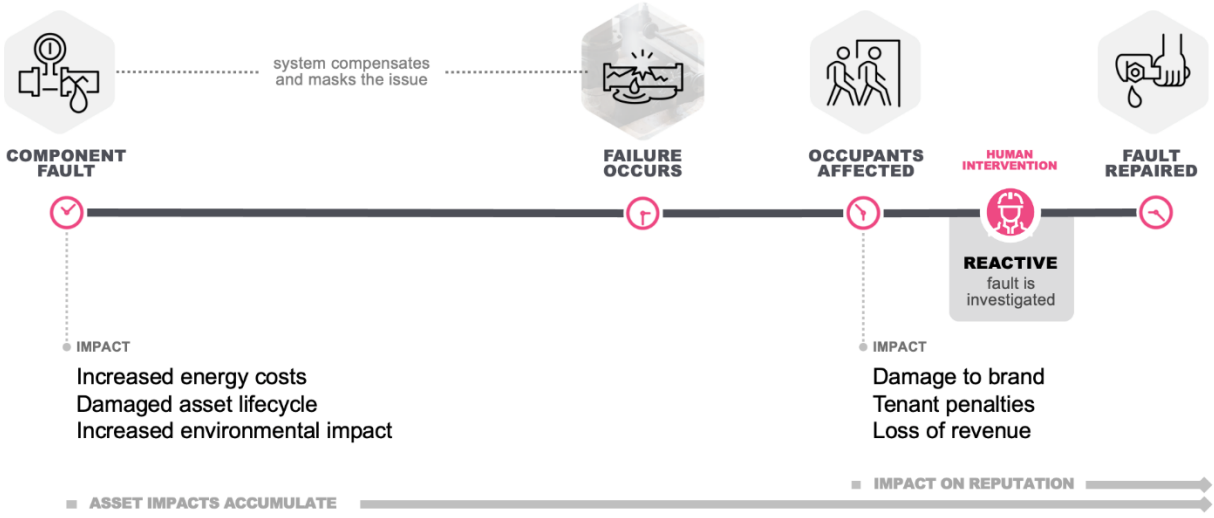
Swedesboro Woolwich School District Building Management System Overview

The Swedesboro Woolwich School District currently used three different Building Management Systems (BMS) to control the various HVAC equipment. A Johnson Controls Metasys BMS is used to control the General Charles G. Harker Elementary School equipment. A Trane Tracer Summit BMS is used to control the equipment at Governor Charles C. Stratton School and the Walter Hill School. A new Trane Tracer Synchrony BMS is used to control the equipment at the Margaret C. Clifford School. Each of these systems can be accessed at front end terminals at each school but require separate login credentials. As a result of having three separate BMS solutions, there is significant variation in everyday operation, including different graphical interfaces, setpoint adjustment and overrides, occupancy scheduling, etc.

The current facility maintenance and control service teams utilizes a traditional scheduled preventative and reactive maintenance approach which is not an effective way to deliver the kind of resiliency that a manufacturing facility requires to maintain competitive advantage and ensure productivity due to the following challenges:

- Inefficient Planned Maintenance – Scheduled and routine maintenance plans spend too much time inspecting and maintaining assets that are not broken.
- Poor Asset Performance Visibility - Break fix and scheduled maintenance make it difficult to track and validate asset optimization and vendors costs.
- Low Vendor Accountability - Lack of transparency makes it difficult to measure vendor compliance and ROI.
- Aging, Shrinking Workforce - Large groups of maintenance staff are approaching retirement age, with a smaller, less skilled workforce to replace them.
- Complex Vendor Management - Building operators have to maintain several contracts with multiple vendors, making it difficult and costly to manage.

Deferred, or Reactive Maintenance



EXISTING CONDITIONS

Table 16. Existing Building Management Controls

Building	Existing Building Management System
Governor Charles C. Stratton School	Trane
Charles G. Harker School	JCI
Margaret C. Clifford School	Trane
Walter Hill School	Trane

Margaret C. Clifford School

The Clifford School's Trane Tracer Synchrony BMS is the most up-to-date controls installation in the District. In order to bring the building into the new BMS solution, a new Trane SC+ building network controller has been installed as an overlay to the existing Trane Tracer Summit BCU and field controllers. This has provided the facility personnel with a web-based graphical interface, while retaining the existing equipment-level control infrastructure. Facility maintenance personnel have indicated that the Trane BCU network controllers are in need of replacement.

This system provides Direct Digital Control (DDC) for two boilers, the cooling tower, the dual temp plant, AHU-1, MAU-1, 34 heat pumps, five supply fans, one exhaust fan, and miscellaneous hallway cabinet unit heaters. The equipment is running on various occupancy schedules and setpoints that are not standardized. Weekday occupied start times range from 5AM to 7:15AM and end times range from 1:30PM to 9PM. The space temperatures range from 69 to 75 degrees, with active setpoint varying greatly from 65 to 85 degrees. Many of the equipment graphic screens appear to be remnants of the previous BMS and are not intuitive to navigate or adjust control parameters.

Governor Charles C. Stratton School

The Stratton School control system is part of the legacy Trane Tracer Summit BMS. A single Trane BCU network controller is connected to the various Trane Tracer Summit field controllers so that they can be displayed on the Tracer Summit BMS software installed on the operator workstation PC. This system provides DDC for the boiler plant, cooling tower, dual temp plant, seven rooftop AC units, three rooftop makeup air units, 12 exhaust fans, and 68 heat pumps. The equipment is running on various occupancy schedules and setpoints that are not standardized. Weekday occupied start times range from 4AM to 6:30AM and end times range from 4PM to 7PM. The gym equipment is currently set to run 24/7 in order to reduce mercury content in the air. The space temperatures range from 69 to 74 degrees, with active setpoint varying greatly from 65 to 80 degrees. Several of the equipment graphic screens are showing points that are not reading properly. This indicates that the field controllers are not communicating properly and are in need of repair or replacement.

Walter Hill School

The Walter Hill School control system is part of the legacy Trane Tracer Summit BMS. A single Trane BCU network controller is connected to the various Trane Tracer Summit field controllers so that they can be displayed on the Tracer Summit BMS software installed on the operator workstation PC. This system provides DDC for the boiler plant, cooling tower, dual temp plant, seven rooftop AC units, one VAV box, four rooftop makeup air units, 12 exhaust fans, and 64 heat pumps. The equipment is running on various occupancy schedules and setpoints that are not standardized. Weekday occupied start times range from 4AM to 8AM and end times range from 1:30PM to 6PM. The space temperatures range from 66 to 78 degrees, with active setpoint varying greatly from 60 to 74 degrees. Several of the equipment graphic screens are showing points that are not reading properly. This indicates that the field controllers are not communicating properly and are in need of repair or replacement.

General Charles G. Harker School

The Harker School control system is part of the Johnson Metasys BMS. Two NAE network controllers are used to connect the various Metasys controllers so that they can be displayed on the Metasys Site Management Portal (SMP) software that is installed on the operator workstation PC. This system provides DDC for the hot water boiler plant, the chilled water plant, two McQuay Chillers, five air handling units, eight packaged rooftop units, one makeup air unit, five reheat coils, 16 VAV units, 40 unit ventilators, three fan coil units, 11 cabinet heaters, two electric unit heaters, three ductless split systems, and 15 exhaust fans. The equipment is running on various occupancy schedules and setpoints that are not standardized. Weekday occupied start times range from 5:30AM to 6:30AM and end times range from 2:30PM to 6PM. The space temperatures range from 67 to 76 degrees. Several of the equipment graphic screens are showing points that are not reading properly. This indicates that the field controllers are not communicating properly and are in need of repair or replacement.

PROPOSED CONDITIONS

Overview

- The Swedesboro Woolwich School District will be responsible to provide and terminate all new LAN connections in each building, as required, which will be used to connect a new or existing supervisory controller to the Customer LAN.
- Existing panels, transformers, power supplies, relays, conduit, wiring, and sensors will be reused if found to be functional. Warranty components as new.
- All control wiring will be run in conduit in mechanical rooms. Wire mold is acceptable in exposed areas. Plenum rated wiring can be run above drop ceilings.

- All newly installed field controllers will be open source BACnet or Lon Direct Digital Controls. The preferred communication protocol shall be BACnet. All new DDC field controllers shall be BACnet unless there is an existing LON communication trunk nearby in the same MER, or existing LON controllers are replaced with new controllers. The existing LON trunk can be reused if it is tested for integrity.
- OPEN NIC STATEMENTS - All Niagara 4 software licenses shall have the following NiCS: "accept.station.in=*"; "accept.station.out=*"and "accept.wb.in=*"and "accept.wb.out=*". All open NIC statements shall follow Niagara Open NIC specifications.
- All control devices furnished within this scope of work shall be programmable directly from the Niagara 4 Workbench embedded toolset upon completion of this project. The use of configurable or programmable controllers that require additional software tools or tools that require a specific Niagara 4 license brand to operate for post-installation maintenance shall not be acceptable.

District-Wide Tridium Niagara 4 Supervisor

Provide and install a new Tridium N4 supervisor on a customer provided virtual server and connect new and existing controls for each building listed herein. Provide new graphics for each piece of equipment, new floor plan graphics, alarms, and trending. Graphics, alarming, and trending for all buildings will reside in the new district wide BMS supervisor.

Additional Scope Details:

- Provide on-site training for facility personnel.
- Provide updated occupied schedules and occupied/unoccupied setpoint changes in the existing BMS to reflect the values in Exhibit D1-D2 of the Agreement.

Margaret C. Clifford School

Install New Supervisory Controller

Furnish and install one new Niagara N4 JACE-8000 network controller. Integrate all existing Trane DDC control points into the District-Wide N4 Supervisor.

Additional Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide onsite training for facility personnel.

Integration of Existing DDC Controllers

Integrate existing Trane DDC field controllers into the BMS and provide new graphics, trending, scheduling, occ/unocc setpoints, etc. The existing DDC field controllers include the following but are not limited to:

- 2 boilers
- 1 cooling tower
- Dual temp plant
- AHU-1
- MAU-1
- 34 heat pumps
- 5 supply fans
- 1 exhaust fan

Retro-Commission Existing DDC Controls

Provide point-to-point checkout and functional testing for existing DDC equipment as per the existing sequence of operation. Provide modifications to control sequences as needed to accomplish energy strategies listed herein. Repair defective control components as needed to provide a complete functioning system. Add any issues to the mechanical equipment deficiency list. Repairing or replacing mechanical equipment on the deficiency list is not Honeywell's responsibility.

- 2 Boilers
- 1 Cooling Tower
- Dual Temp Plant
- AHU-1
- MAU-1
- 34 Heat Pumps
- 5 Supply Fans
- 1 Exhaust Fan

Additional Scope Details:

- Provide and install new outside air relative humidity sensor.
- Resolve communication issues for HP-10 and HP-16
- Provide programming to implement the following sequence of operation strategies:
  - Dual Temperature Plant
    - Updated HW/CHW OAT Reset Parameters
    - Unoccupied Offset of HW/CHW Setpoint
    - Unoccupied OAT Lockout
    - Morning Warmup / Cooldown
  - Air Handling Units - AHU-1
    - Demand Control Ventilation – Furnish and install new CO2 sensor
    - Discharge Air Temperature Reset

Governor Charles C. Stratton School

Install New Supervisory Controller

Furnish and install one new Niagara N4 JACE-8000 network controller. Integrate all existing Trane DDC control points into the District-Wide N4 Supervisor.

Additional Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide onsite training for facility personnel.

Integration of Existing DDC Controllers

Integrate existing Trane DDC field controllers into the BMS and provide new graphics, trending, scheduling, occ/unocc setpoints, etc. The existing DDC field controllers include the following but are not limited to:

- 2 Boilers
- 1 Cooling Tower

- Dual Temp Plant
- 7 RTUs
- 3 MAUs
- 68 Heat Pumps
- 12 Exhaust Fans

Retro-Commission Existing DDC Controls

Provide point-to-point checkout and functional testing for existing DDC equipment as per the existing sequence of operation. Provide modifications to control sequences as needed to accomplish energy strategies listed herein. Repair defective control components as needed to provide a complete functioning system. Add any issues to the mechanical equipment deficiency list. Repairing or replacing mechanical equipment on the deficiency list is not Honeywell's responsibility.

- 2 Boilers
- 1 Cooling Tower
- Dual Temp Plant
- 7 RTUs
- 3 MAUs
- 68 Heat Pumps
- 12 Exhaust Fans

Additional Scope Details:

- Resolve communication issues for Rooms 2129 and 2213, Gym AC-5, and MUA-2
- Provide programming to implement the following sequence of operation strategies:
  - Dual Temperature Plant
    - Updated HW/CHW OAT Reset Parameters
    - Unoccupied Offset of HW/CHW Setpoint
    - Unoccupied OAT Lockout
    - Morning Warmup / Cooldown
  - Air Handling Units – AC-1-7
    - Demand Control Ventilation – Furnish and install new CO2 sensor
    - Discharge Air Temperature Reset
    - Standardize economizer sequence and parameters

Walter Hill School

Install New Supervisory Controller

Furnish and install one new Niagara N4 JACE-8000 network controller. Integrate all existing Trane DDC control points into the District-Wide N4 Supervisor.

Additional Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide onsite training for facility personnel.

Integration of Existing DDC Controllers

Integrate existing Trane DDC field controllers into the BMS and provide new graphics, trending, scheduling, occ/unocc setpoints, etc. The existing DDC field controllers include the following but are not limited to:

- 2 Boilers
- 1 Cooling Tower
- Dual Temp Plant
- 7 RTUs
- 4 MAUs
- 1 VAV Box
- 64 Heat Pumps
- 12 Exhaust Fans

Retro-Commission Existing DDC Controls

Provide point-to-point checkout and functional testing for existing DDC equipment as per the existing sequence of operation. Provide modifications to control sequences as needed to accomplish energy strategies listed herein. Repair defective control components as needed to provide a complete functioning system. Add any issues to the mechanical equipment deficiency list. Repairing or replacing mechanical equipment on the deficiency list is not Honeywell's responsibility.

- 2 Boilers
- 1 Cooling Tower
- Dual Temp Plant
- 7 RTUs
- 4 MAUs
- 1 VAV Box
- 64 Heat Pumps
- 12 Exhaust Fans

Additional Scope Details:

- Resolve communication issues for Hallway unit 201
- Provide programming to implement the following sequence of operation strategies:
  - Dual Temperature Plant
    - Updated HW/CHW OAT Reset Parameters
    - Unoccupied Offset of HW/CHW Setpoint
    - Unoccupied OAT Lockout
    - Morning Warmup / Cooldown
  - Air Handling Units – RTU-1-7
    - Demand Control Ventilation – Furnish and install new CO2 sensor
    - Discharge Air Temperature Reset
    - Standardize economizer sequence and parameters

General Charles G. Harker School
Install New Supervisory Controller
Furnish and install one new Niagara N4 JACE-8000 network controller. Integrate all existing Trane DDC control points into the District-Wide N4 Supervisor.

Additional Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide onsite training for facility personnel.

Integration of Existing DDC Controllers
Integrate existing Trane DDC field controllers into the BMS and provide new graphics, trending, scheduling, occ/unocc setpoints, etc. The existing DDC field controllers include the following but are not limited to:

- Hot Water Plant
- Chilled Water Plant
- 5 AHUs
- 8 RTUs
- 1 MAU
- 5 Reheat Coils
- 16 VAV Boxes
- 40 Unit Ventilators
- 3 Fan Coil Units
- 11 Cabinet Unit Heaters
- 2 Electric Unit Heaters
- 3 Ductless Split Systems
- 15 Exhaust Fans

Retro-Commission Existing DDC Controls
Provide point-to-point checkout and functional testing for existing DDC equipment as per the existing sequence of operation. Provide modifications to control sequences as needed to accomplish energy strategies listed herein. Repair defective control components as needed to provide a complete functioning system. Add any issues to the mechanical equipment deficiency list. Repairing or replacing mechanical equipment on the deficiency list is not Honeywell's responsibility.

- Hot Water Plant
- Chilled Water Plant
- 5 AHUs
- 8 RTUs
- 1 MAU
- 5 Reheat Coils
- 16 VAV Boxes
- 40 Unit Ventilators
- 3 Fan Coil Units

- 11 Cabinet Unit Heaters
- 2 Electric Unit Heaters
- 3 Ductless Split Systems
- 15 Exhaust Fans

Additional Scope Details:

- Resolve communication issues for HC-05
- Provide programming to implement the following sequence of operation strategies:
  - Hot Water Plant
    - Updated HW OAT Reset Parameters
    - Unoccupied Offset of HW Setpoint
    - Unoccupied OAT Lockout
    - Morning Warmup
  - Chilled Water Plant
    - Updated CHW OAT Reset Parameters
    - Unoccupied Offset of CHW Setpoint
    - Unoccupied OAT Lockout
    - Morning / Cooldown
  - Air Handling Units – AHU 1-5 and RTU 1-7
    - Demand Control Ventilation – Furnish and install new CO2 sensor
    - Discharge Air Temperature Reset
    - Standardize economizer sequence and parameters

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy that needs to pre-heat or cool the outside air. The savings are generally calculated as:

Existing Heating BTU & Cost per BTU	*= Metered data from existing meter readings*
Cost of Existing Heating	*= Average site data $/CCF or $/Gallon*
Reduction in Heating/Cooling BTU	*= Reduction in outside air CFM x 1.08 x Delta T x Operating Hours*
	= Reduced BTU x Cost per BTU
Cost of Proposed Heating/Cooling	*= Existing Costs – Proposed Costs*
Energy Savings $	

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3B BMS Dashboard - Energy Optimization

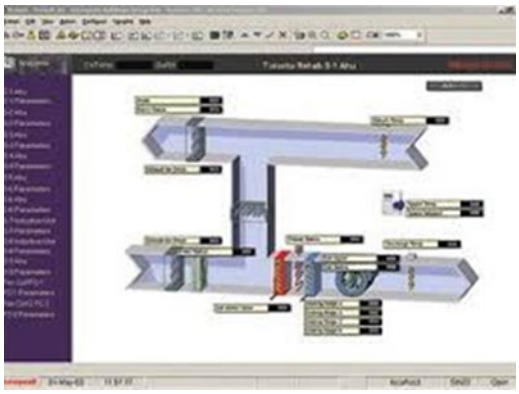
The key benefits of this ECM include:

- **Energy Savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Cloud-Based Solution** that connects to a building's existing systems - without the need for capital investment - and optimizes energy consumption to drive up savings.
- **Monitor Energy Consumption** savings and zone comfort levels for any duration of time.
- **Reduced Maintenance and Operational Costs** by reducing the runtime of HVAC systems.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
3B BMS Dashboard - Energy Optimization	■	■	■	■

EXISTING CONDITIONS

HVAC Systems are the biggest consumer of energy in commercial facilities, and most rely on conservative and inefficient control strategies. Manual or scheduled set-point adjustment strategies simply can't account for the complexity of a building's dynamic occupancy and weather conditions – while maintaining comfort levels.



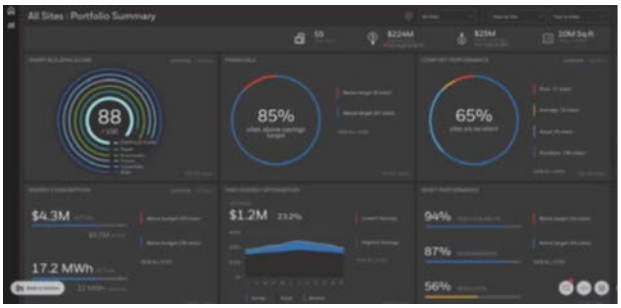
HVAC Equipment Control

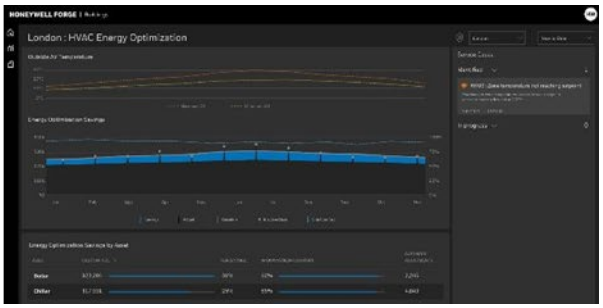
HVAC Equipment Control

PROPOSED SOLUTION

BUILDING ANALYTICS closed-loop solution operates without the need for customer intervention by regularly analyzing real-time conditions data – weather and occupancy - with predictive, machine learning models that compute and adjust set points automatically over a facility's entire HVAC distribution system. These machine learning models work best with hot water, chilled water, and variable air volume HVAC systems, constantly performing adjustments that District staff already completes on a manual basis.

The solution performs these calculations and adjustments in continuous, 15-minute intervals to ensure peak efficiency around the clock, and customers are able to monitor energy consumption, energy savings and zone comfort levels for any duration of time.





District-Wide Honeywell Forge Predictive Maintenance Solution

We propose to deploy Honeywell Forge Predictive Maintenance, an application that automates the detection of faults and anomalies in the operation of building heating, ventilation, and air conditioning (HVAC) systems which impact building comfort, energy consumption or the life cycle of the assets. Faults are raised in the way of service cases containing actionable recommendations about how to address the fault and are presented to the building operator via the enterprise dashboards. By adopting a Predictive Maintenance program, building operators can transition from costly preventative and reactive maintenance programs to a pro-active or just-in-time maintenance program. The benefits of a Predictive Maintenance program include:

- Reduced labor/subcontract cost associated with performing preventative maintenance activities.
- Reduced labor/subcontract cost by identification of Service Case root cause with recommended actions to resolve the fault.
- Reduced energy cost by immediately identifying and addressing anomalies which impact energy consumption.
- Increased occupant productivity by immediately identifying and addressing anomalies which impact occupant comfort.
- Reduced capital and operational expenses by identifying and addressing anomalies which impact the life cycle of equipment and components.
- Boost operational continuity by reducing equipment failures and reactive activity.

SCOPE OF WORK

System Agnostic

Works with the existing BMS system using the open integration power of Niagara ®.

Safe & Secured

Built-in safety features ensure HVAC systems are always controlled – even during unexpected disturbances.

Autonomous Control

No need for customer intervention or expertise through this closed loop, continuously monitored solution.

Real-Time Intelligence

Advanced machine learning calculates occupancy and weather data to optimize set-points every 15-minutes.

Domain Expertise

A solution built on over one-hundred years of experience in building technologies.

Smart Visualization

Solution identifies pre-existing faults and delivers real-time energy, savings and comfort metrics.

Energy needs fluctuate based on seasons, weather, occupancy and usage. With Energy Optimization we have demonstrated that we can use the latest self-learning algorithms to optimize building operation.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

None.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from optimized building operation.
Waste Production	No waste will be generated as a result of this ECM.
Environmental Regulations	No environmental impact is expected.

ECM 4A Building Envelope Improvements

The key benefits of this ECM include:

- **Energy Savings** from reducing unwanted outside air infiltration.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy Comfort and Productivity** by way of enhanced temperature and humidity control throughout your buildings.
- **Improved Building Envelope** from addressing building gaps that allow unconditioned air penetration.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
4A Building Envelope Improvements	■	■	■	■

EXISTING CONDITIONS

Heat loss due to infiltration is a common problem, particularly in places with long and cold winter seasons such as NJ. This problem has been shown to represent the single largest source of heat loss or gain through the building envelopes of nearly all types of buildings. Our work has found 30% to 50% of heat loss attributable to air leaks in buildings.

Honeywell uncovered several leaks that allow for heat loss to occur during the winter season and unwanted heat gains during the summer season. These problems include door gaps, exhaust fans in poor condition, open windows or windows in poor condition, lack of air sealing, and insulation.

Typical Building Envelope

Governor Charles C. Stratton School - Building Envelope

Honeywell has helped customers like you to address these problems with a comprehensive and thorough building envelope solution that seals up your buildings to improve occupancy comfort and help eliminate unwanted energy waste. We propose to conduct a comprehensive weatherization job to weatherproof doors and windows, caulk and seal leaks, and install spray foam and rigid foam boards to stop unwanted air movement and provide a thermal barrier between spaces. Part of this process may include decoupling floor-to-floor and compartmentalizing of components of the building to equalize pressure differences.

PROPOSED SOLUTION

Building	Door - Install Jamb Spacer (Units)	Door Weather Striping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Overhang Air Sealing (LF)	Roof-Wall Intersection Air Sealing (LF)
Governor Charles C. Stratton School	10	9	6		974
Charles G. Harker School	26	18	8	109	1943
Margaret C. Clifford School	3	6	7		
Walter Hill School	2	5	16	60	359
Total Quantity	**41**	**38**	**37**	**169**	**3276**

Roof-Wall Joints

- **Existing** – Buildings throughout Swedesboro Schools were found to require roof-wall joint air sealing.
- **Proposed** – Honeywell recommends using a high-performance sealant. In some buildings, two-component foam will be used. Any cantilevers off the buildings will be sealed with backer rod and sealant. Finally, the inside vestibule corners should be sealed with backer rod and sealant.

Roof Overhangs

- **Existing** – We found that roof overhangs at exterior doors are open to the drop ceilings, providing a pathway allowing heated and cooled air to escape between the interior and exterior of the building.
- **Proposed** – Honeywell proposes to install rigid foam boards and seal the perimeter and any penetrations with spray foam to prevent air leak and provide a sufficient thermal barrier between the spaces.

Doors

- **Existing** – Doors in this facility need full weather-stripping replacement and/or door sweeps.
- **Proposed** – Honeywell recommends new weather stripping and door sweeps to be installed where needed.

Benefits

This work will allow for more efficient operation of your buildings by reducing heating and cooling losses throughout the year. In addition, the draftiness of the buildings and hot and cold spots will be significantly reduced. A reduction in air infiltration will also minimize potential concerns for dirt infiltration or indoor air quality concerns including allergies.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved building envelope will limit conditioned air infiltration through openings in the building air barrier. Less infiltration means less heating required by the heating system.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

Building envelope will be improved with little or no noticeable changes.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minimal coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Some existing caulking and weather-stripping will be removed and disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 4B Roofing Upgrades

The key benefits of this ECM include:

- **Energy Savings** from reducing unwanted outside air infiltration.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy Comfort and Productivity** thanks to a tighter and more efficient building envelope.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
4B Roofing Upgrades	■	■	■	■

EXISTING CONDITIONS

The existing roof warranties are due to expire in the near future. The heat loss and heat gains occurring due to low R-value of the existing roof insulation can be improved through sealing. Additionally, roofs in poor condition can lead to water migration and future building envelope problems. Potential problematic leakage areas can be around perimeters and equipment curbing. The following building roofs will be sealed to the extent needed to meet the maximum permissible solar installation.

Walter Hill School – Roof Replacement

Governor Charles C. Stratton School – Roof Replacement

PROPOSED SOLUTION

Honeywell proposes the installation of a new silicone coating or spray foam for the existing roofs in order to extend the roof warranty, provide resistance to water intrusion, UV exposure and natural weathering. The new sealing will allow for less infiltration through the roof and air conditioning units to work less.

EPDM vs Spray Foam

EPDM Single-ply roof with an initial R-Value of 18 will have a 15%+ loss in thermal resistance due to thermal shorts of steel fasteners. It will also have 10% increase in thermal transmittance when using single layer of insulation board. Finally, R-value and Air permeability of a deck, insulation and membrane has a major impact on System R-value. This will equate to a final overall System R-value equal to approximately 2.42.

An SPF roof has an R Value of approximately 6 per one (1) inch foam (R –Value 6) If three inches of SPF Foam where applied one monolithic, self-flashing system with air barrier – no loss of effective R-value would have an overall System R-value: 18

Durability

Single-ply EPDM roof will have a 45 mil water proofing layer, but will also have major fail points such as flashing, seams, fasteners and single-ply punctures. In contrast the SPF roof will not only have a top coat plus SPF insulation which is all water proofing, meaning even damaging top coat will not create leak.

Sustainability

Commercial buildings can have a maximum of 2 roofs in place. In traditional roofing, when a "third" roof is required, a partial or full tear-off is also required. This adds increased cost for tear-off, increased cost for disposal and a negative impact on the environment

With SPF roofing, the top coat is the only part that needs to be re-applied after the warranty period. There is no "tear-off" required or disposal concerns. A quality applied SPF roof should last the life of the building

Table 17. Existing Roof Area to replace

Building	Approximate Roof Square Footage
Charles G. Harker School	44,800
Governor Charles C. Stratton School	18,500
Margaret C. Clifford School	98,000
Walter Hill School	7,400

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved roof will limit conditioned air infiltration through openings in the building air barrier. Less infiltration means less heating and cooling required by HVAC systems.

Following approach is used to determine savings for this specific measure:

Existing Roof Efficiency	*= Existing U + Existing Infiltration Rate*
Proposed Roof Efficiency	*= Proposed U + Proposed Infiltration Rate*
Energy Savings $	*= UAdTproposed – UAdTexisting*
Winter Savings (Therms)	*= Energy Savings/Boiler Eff./100,000*
Summer Savings (Tons Cooling)	*= Energy Savings/12,000 Btu/Ton*

INTERFACE WITH BUILDING

The new roof sealing will be constructed to match existing, maintaining contours of the existing building.

CHANGES IN INFRASTRUCTURE

The existing roofing will be sealed at the above referenced roof locations.

SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Existing roof material will be removed and disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 5A Permanent Load Reduction

The key benefits of this ECM include:

- **Reduced utility costs**.
- **Reduced energy usage** from improved efficiency resulting from replacement of older equipment.
- **Lower Operational Costs** through less frequent maintenance and operational issues.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
5A Permanent Load Reduction	■	■	■	■

ECM OVERVIEW

This measure evaluates the savings from the decrease in power (KW) usage and the rebates associated with that reduction through the PJM Permanent Reduction Program. Honeywell proposes to continue to utilize a registered Demand Response Curtailment Service Provider (CSP) to provide energy response services to the School District. Through the CSP, the School District will participate in the PJM Capacity Market Program and PJM Energy Efficiency Program. These programs are offered through the PJM Regional Transmission Organization (RTO), and Independent System Operator (ISO). The Capacity Market Program allows PJM customers the ability to respond to capacity emergencies when called upon by PJM, and the energy efficiency program pays PJM customers for implementing Energy Conservation measures (ECMs) that result in permanent load reductions during defined hours.

Margaret C. Clifford School - Electric Meter

Governor Charles C. Stratton School – Switchboard

PJM CAPACITY MARKET PROGRAM

Capacity represents the need to have adequate resources to ensure that the demand for electricity can be met at all times. For PJM, that means that a utility or other electricity supplier, load serving entity, is required to have the resources to meet its consumers' demand plus a reserve amount. Electricity suppliers, load serving entities, can meet that requirement by owning and operating generation capacity, by purchasing capacity from others or by obtaining capacity through PJM's capacity market auctions.

Table 18. Permanent Load Reduction KW per Building

Building	Permanent Load Reduction (KW)
Charles G. Harker School	68
Governor Charles C. Stratton School	45
Margaret C. Clifford School	25
Walter Hill School	37
TOTAL	**175**

PJM operates a capacity market, called the Reliability Pricing Model (RPM). It is designed to ensure that adequate resources are available to meet the demand for electricity at all times. In the RPM, those resources include not only generating stations, but also demand response actions and energy efficiency measures by consumers to reduce their demand for electricity.

PJM must keep the electric grid operating in balance by ensuring there is adequate generation of electricity to satisfy the demand for electricity at every location in the region both now and in the future. PJM's markets for energy and ancillary services help maintain the balance now while the PJM market for capacity aims to keep the system in balance in the future. Resources, even if they operate infrequently, must receive enough revenue to cover their costs. Payments for capacity provide a revenue stream to maintain and keep current resources operating and to develop new resources. Investors need sufficient long-term price signals to encourage the maintenance and development of generation, transmission and demand-side resources. The RPM, based on making capacity commitments in advance of the energy need, creates a long-term price signal to attract needed investments for reliability in the PJM region.

PROPOSED SOLUTION

Honeywell proposes to work with a PJM Regional Transmission Organization (RTO), CSR to implement a Demand Response energy curtailment program which will generate revenue streams for the School District. Honeywell's Demand Response agent acting as the CSP will notify the district prior to potential events in order to advise and coordinate load curtailment participation in accordance with RTO program requirements and will work with the School District to benefit from energy efficiency improvements.

The PJM Markets are further described below.

The PJM Energy Efficiency Program

Energy efficiency measures consist of installing more efficient devices or implementing more efficient processes/systems that exceed then-current building codes or other relevant standards. An energy efficiency resource must achieve a permanent, continuous reduction in demand for electricity. Energy efficiency measures are fully implemented throughout the delivery year without any requirement of notice, dispatch, or operator intervention. A demand response resource can reduce its demand for electricity when instructed; this means PJM considers it a "dispatchable resource". A demand response resource can participate in the RPM market for as long as its ability to reduce its demand continues. A demand response resource must be willing to reduce demand for electricity up to 10 times each year when called for a reduction. In a year without any reduction calls, the demand response resource is required to demonstrate the ability to reduce demand for electricity during a test of reduction capability.

Data will be submitted by the demand response resource to prove compliance with reductions from actual calls or reductions from capability tests. An energy efficiency resource is one that reduced their demand for electricity through an energy efficiency measure that does not require any additional action by the consumer.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Revenue is generated through participation in the PJM DR program.

CHANGES IN INFRASTRUCTURE

None

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Initiation of demand response curtailment will be required.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	This measure will produce no waste by-products.
Environmental Regulations	None.

ECM 6A Transformer Replacements

The key benefits of this ECM include:

- **Guaranteed Energy Savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Equipment Longevity** due to more efficient and less wasteful equipment utilization.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
6A Transformer Replacement		■	■	■

EXISTING CONDITIONS

The transformers in locations within the electrical distribution systems in the City consist of 480 Volts. Distribution transformers are installed in the boiler rooms and in various electrical and utility closets to step down the voltage to 120-208 Volts. Typically, an electrical distribution system has some losses associated with the electrical system and a considerable portion of these losses are associated with distribution transformers.

Margaret C. Clifford School - Transformer

Governor Charles C. Stratton School - Transformer

Systems Evaluation and Selection

Typical transformers are not designed to handle harmonic loads of today's modern facilities, and suffer significant losses, even if the transformer is relatively new. Typically, conventional transformer losses, which are non-linear, increase by 2.7 times when feeding computer loads. The nonlinear load loss multiplier reflects this increase in heat loss, which decreases the net transformer efficiency. Also, unlike most substation transformers that are vented to the exterior, building transformers are ventilated within the building they are located, and their heat losses therefore add to the cooling load.

Based on site investigation conducted by our staff, we identified the following transformers that we propose to replace with energy efficient replacements at a size matching the existing loads as indicated in the table below.

EXISTING TRANSFORMERS TO BE REPLACED

Table 19. Existing Transformers to replace

Building	Location	kVA	Qty
Margaret C. Clifford School	Boiler Room	75	1
Margaret C. Clifford School	Mechanical Room (Orange Hall)	45	1
Margaret C. Clifford School	Storage Room (Yellow)	45	1
Walter Hill School	Main Electrical Room	150	1
Governor Charles C. Stratton School	1347 Mechanical Room	225	1
Governor Charles C. Stratton School	Boiler Room	300	1
Governor Charles C. Stratton School	Old Learning Cottage	225	1

PROPOSED SOLUTION

The proposed transformers will be Power Smiths High Efficiency K-Star Harmonic Mitigating units. They are Energy-Star rated and meet the new TP1 Law requiring replacement of transformers of 600 volts or under.

SCOPE OF WORK

Remove and install new E-saver transformers.
Per Transformer Unit:

- Shut off the main electric power to the transformer to be replaced.
- Disconnect the existing transformer and install replacement unit.
- Turn power back on.
- Inspect unit operation by performing electrical and harmonics testing.
- Dispose of old transformers properly.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized by reduction in electric energy lost in the existing transformers as a result of the higher efficiency of the new transformers.

CHANGES IN INFRASTRUCTURE

New transformers where indicated.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of services for the affected areas.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from increased voltage conversion efficiency.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 7A CHP (Cogeneration)

The key benefits of this ECM include:

- **Energy Savings** from utilizing a Combined Heat and Power (CHP) system to supplement the existing heating system.
- **Operational Savings** resulting from improved operational efficiencies unique to CHP technology.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
7A Cogeneration CHP	■			

EXISTING CONDITIONS

No Combined Heat and Power (i.e. cogeneration) units are currently located within the Swedesboro Woolwich School District.

Cogeneration Configuration

Ecopower CHP

PROPOSED SOLUTION

Honeywell recommends the installation of the ecopower micro-cogeneration system provides heat and electrical power in a cost effective and environmentally friendly manner. Using a natural gas or propane fueled Marathon Engine, the system captures thermal energy for space heating or domestic hot water. The mCHP uses heat generated by an internal combustion engine to produce between 13,000 - 47,000 BTU of heat per hour while simultaneously co-generating 1.2 - 4.4kW of electricity per hour. The system is thermally driven. The ecopower will anticipate the heat demand from sensors located in the house, buffer tank or outside and varies its output to satisfy the demand. It will modulate (slow down or speed up) to run at a level to maintain a constant heat requirement in order to keep the engine running as long as possible, ensuring maximum electrical generation.

SCOPE OF WORK

Table 20. Proposed Cogeneration Units

Building	Type	Manufacturer	KW	Model
Charles G. Harker School	Axiom	Ecopower	4.4	1

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on energy conversion of natural gas to thermal and electrical energy.

EQUIPMENT INFORMATION

Manufacturer and Type	Axiom Ecopower, Electrical Output 1.2-4.4 kW, Thermal Output 13,000 -47,000 Btu/hr., Overall efficiency 93%
Equipment Identification	Product cut sheets and specifications for generally used are available upon request. As part of the measure design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

The proposed micro-generator unit would reside in or near the boiler room.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. The customer and Honeywell will decide upon the exact location of the CHP installation.

ENVIRONMENTAL ISSUES

Resource Use	Energy will be generated to supplement energy purchased from the electrical utility.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	Aside from the environmental benefits from on-site energy generation, no other environmental impact is expected.

ECM 8A Solar PPA

The key benefits of this ECM include:

- **Reduced Utility cost**s.
- **Guaranteed Utility Rates** for 15 years to provide a valuable hedge against future price volatility and deliver greater budgetary certainty utilizing clean electricity.
- **Additional Savings** from solar can provide the Swedesboro Woolwich with more potential ESIP funding to expand the overall project scope and include additional projects.
- **Educational Asset** to provide additional tools for teachers to engage students on sustainability and the environment.
- **Low Risk** given that maintenance is provided by the 3rd party system owner.
- **No Upfront Costs**.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
8A Solar PPA	▪	▪	▪	▪

ECM OVERVIEW

Honeywell recommends that the District further assess the feasibility of a solar photovoltaic system on District owned roofs to generate on-site renewable electricity. This could be provided at no upfront cost via a Power Purchase Agreement (PPA). A PPA is a public-private partnership financial arrangement in which a third-party solar company owns, operates, and maintains your photovoltaic system, while the host customer agrees to provide the site for the system on its property. The solar system's power production is purchased by you for a predetermined price ($/kWh) and for a predetermined period. This stable price for electricity will be lower than the utilities and third-party suppliers, thereby allowing you to benefit from lower electricity prices, on-site renewable energy generation, a reduction in greenhouse gas emissions and a powerful educational tool for your teachers and students. Meanwhile, the system will not add any additional maintenance costs since it is owned by the third-party solar company. One of the more significant benefits of this potential ECM is that it will provide for a rate change, helping to deliver greater savings within your ESIP project to help fund other measures

Typical Rooftop Solar Array

Typical Parking Lot Solar Array

Honeywell will oversee the design and construction of the system. We will assist in the feasibility study during your IGA, in conjunction with your technical consultant and legal team, to provide RFP development, solicitation, and oversight of the installation of a solar photovoltaic system.

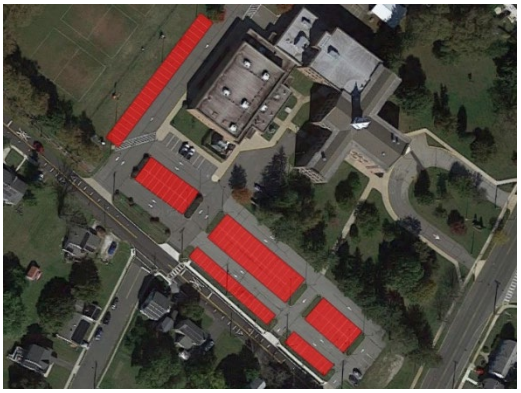
PROPOSED SOLUTION

Honeywell proposes to install the solar PPA system at the potential buildings listed in the chart below.

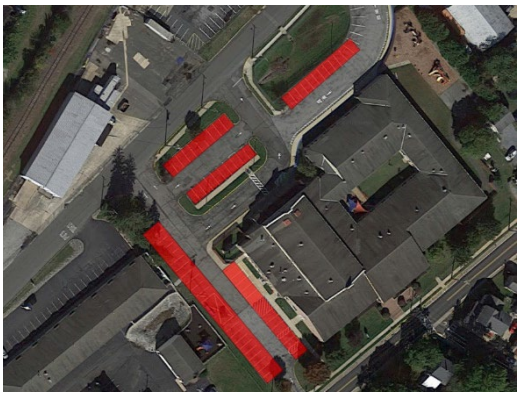
Table 21. Proposed Solar PPA System

Building	Type	KW DC	kWh AC Generated
Charles G. Harker School	PPA	290.7	420,181
Governor Charles C. Stratton School	PPA	290.7	420,181
Margaret C. Clifford School	PPA	239.8	346,612
Walter Hill School	PPA	243.0	351,237
Total		**1064.2**	**1,538,211**

Potential Solar Arrays – Governor Charles C. Stratton School



Potential Solar Arrays - Walter Hill School



Potential Solar Arrays - Margaret C. Clifford School

Potential Solar Arrays - Charles G. Harker School

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the difference in kWh price between the PPA and the District's current electrical supplier.

CHANGES IN INFRASTRUCTURE

The proposed solar array would be roof-mounted only.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

ECM 9A Energy Education

The key benefits of this ECM include:

- **Energy Education** through instructional opportunities during the Energy Savings Plan development and after ESIP project implementation.
- **Energy Conservation** by encouraging energy efficiency among teachers, students, and staff.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
9A Energy Education	■	■	■	■

ECM OVERVIEW

Putting Energy into Education and the Community

Honeywell offers to enhance the District's capability to provide comprehensive energy education to a select portion of its students. The goal of this ECM is to enable a realistic student understanding of the scientific, economic and environmental impacts of energy through the National Energy Education Development (NEED) Project, a 501(c)(3) nonprofit education association.

The NEED Project includes innovative educational materials, teacher and resident training programs, evaluation, and recognition. NEED materials and training conferences are designed to provide objective comprehensive information about energy sources, production, and consumption in addition to their impact on the environment, economy, and society. The program emphasizes the development of critical thinking and problem-solving skills using inquiry activities that encourage students to consider the trade-offs inherent in energy decisions.

Existing NEED curriculum materials are reviewed annually by energy advisors and teachers alike. NEED's Teacher Advisory Board and state NEED Teacher Advisory Boards review the materials for objectivity, applicability and content. NEED materials are currently divided into four levels: Primary K-2, Elementary 3-5, Intermediate 6-8, and Secondary 9-12. NEED encourages teachers to review the materials to be certain the materials they request are at the appropriate reading level for their residents. All materials are easily reproducible and carry waivers for reproduction for classroom use. All materials are updated for data each year – always providing educators the most recently available data collected by the Energy Information Administration.

NEED has over 130 teacher and resident guides for teaching the science of energy, sources of energy, electricity and transportation, and efficiency and conservation. The proposed program will include NEED's hands-on kits including:

Curriculum

Curriculum Packet – Each workshop attended will receive a NEED curriculum packet, estimated forty (40) workshop attendees. The NEED basic curriculum packet is provided to educators attending one day training events. This packet contains a planning guide, copies of the Energy Info books and select curriculum pieces for teachers to implement in their classroom. For the 2021-2022 school year, the packet includes new lessons on energy storage and energy careers as well as a sampling of creative arts connections. Feedback from workshop attendees consistently identifies this packet as their "go to" for energy lessons when returning to the classroom.

Energy Efficiency & Conservation Kits (Elementary, Intermediate, Secondary) – Energy Efficiency & Conservation twenty (20) kits will be provided to each teacher/school that attends the workshop. After reviewing the materials, teachers will be able to choose the level of kit that best suits their residents' needs. These kits include tools for measuring school energy use at the appropriate grade levels – residents perform school energy audits and monitoring activities to assist in the reduction of school energy use and preparation of a school energy management plan. The kits come with one (1) Teacher Guide and a class-set of thirty (30) Resident Guides and the materials necessary to conduct the activities with multiple classes.

Science of Energy – One (1) Science of Energy kits will be provided to each District school that participates in the workshop. This curriculum assists teachers to teach specific energy standards in the science education standards and make the connection between those standards and the energy we use today. The unit provides background information and hands-on experiments to explore the different forms of energy and how energy is transformed from one form to another. The Science of Energy kit includes teacher guides written at three levels – Elementary, Intermediate, and Secondary as well as the materials necessary to conduct the activities.

Training

All training programs will include certification of professional development hours for teachers to use for professional development requirements where allowed by the state. It should be noted that each of the training programs include evaluation.

Energy Efficiency Teacher Workshops –This one-day workshop for forty (40) District educators provides background information and the opportunity to walk-through classroom activities with an experienced facilitator. The workshop will cover curriculum materials and resources focused on energy efficiency and electricity. NEED recommends scheduling training on previously planned professional development days to minimize training costs. Workshops will be held at District facilities. If space/time is unavailable during professional development days, workshops can also be held on Saturdays, providing stipends to attending teachers. Continental breakfast and lunch are included as well.

NEED will fully implement the workshops. NEED staff will work with the District and Honeywell to establish a workshop date, engage with District personnel on workshop location and logistics, secure catering, run online registration, and provide recruitment materials. A NEED trainer will facilitate the workshops and NEED will provide Honeywell with evaluation data.

ECM 10A Sustainable Transportation – EV Chargers

The key benefits of this ECM include:

- **Increased Sustainability** from encouraging the use of pollution-free transportation.
- **Tangible Learning Experience** by integrating educational materials with on-site student experience

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
10A Sustainable Transportation - EV Chargers	▪	▪	▪	▪

ECM OVERVIEW

Honeywell will seek to increase the availability of eco-friendly transportation options for staff and parents by providing Electric Vehicle charging stations at each of your schools.

EXISTING CONDITIONS

There are currently no EV Charging Stations located at the District facilities.

Sample Level 2 EV Chargers

Sample Level 2 EV Chargers

PROPOSED SOLUTION

Honeywell proposes to install multiple Level 2 EV Chargers at the locations outlined below. These chargers are capable of increasing the battery charge of electric vehicles by up to 25 miles (of range) per hour. With a five-year prepaid ChargePoint cloud plan, the District can operate and customize charging stations to meet specific requirements. Some of the most widely used features include:

1. Set the price that drivers pay to use charging stations based on energy cost, duration, time of use, session length, or driver group. Funds collected from drivers are electronically transferred to a designated bank account. For example, staff who work for the District may be allowed to use the chargers for free, while visitors may be charged for a certain price per kWh. This can help generate revenue for the District.
2. Advanced access controls manage which drivers can access stations and when. The chargers may be set available for staff and students only during school hours, and open for public after school hours.

3. Waitlist makes charging more convenient by notifying drivers when a charging spot becomes available for them and holding it until they can plug in their vehicle.

With new state-wide incentives available towards the installation of up to six chargers per site, this can be a cost-effective way to integrate the future of transportation into your District's buildings.

Table 22. Proposed EV Charging Stations

Location	Make	Model	Qty	# of Ports
Charles G. Harker School	ChargePointe	CT4021	1	2
Governor Charles C. Stratton School	ChargePointe	CT4021	1	2
Margaret C. Clifford School	ChargePointe	CT4021	1	2
Walter Hill School	ChargePointe	CT4021	1	2
Total			**4**	**8**

CHANGES IN INFRASTRUCTURE

New EV Chargers will be installed as part of this measure.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	An increase in electrical use may occur due to this ECM, offset by revenue generated from charging stations.
Waste Production	Any discarded components will be disposed of properly.
Environmental Regulations	Reduced pollution from staff and parent vehicles is expected.

ECM 11A Digital School Kiosks

The key benefits of this ECM include:

- **Improved Awareness** from replacing existing signage for better communication.
- **Increased School Spirit** by utilizing new technology during school events.

ECM Description	Charles G. Harker School	Governor Charles C. Stratton School	Margaret C. Clifford School	Walter Hill School
11A Digital School Kiosks	■	■	■	■

EXISTING CONDITIONS

Honeywell observed a mix of both lit and unlit traditional, non-digital signs at the various schools in the District. These signs have limited functionality due to their poor visibility and need for manual changes in messaging.

Existing Sign at Clifford

Sample Digital Signage

PROPOSED SOLUTION

Honeywell proposes to install a new digital kiosk at each school to improve functionality, readability, and ease of use over the existing signage. These new digital signs will allow each school to convey encouragement, updates, school spirit, and important news to students, parents, teachers, and the surrounding community. With countless options and variations of signs available, Honeywell will work with the District to determine a selection bet fit for each school.

Table 23. Proposed Digital School Kiosks

Building	Qty
Charles G. Harker School	1
Governor Charles C. Stratton School	1
Margaret C. Clifford School	1
Walter Hill School	1
Totals	**4**

CHANGES IN INFRASTRUCTURE

New digital signs will be installed at each school.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	New signs may increase electricity usage, depending on existing conditions.
Waste Production	Old components will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

SECTION D
TECHNICAL & FINANCIAL SUMMARY

Section D — Technical & Financial Summary

1. Recommended ESIP Project

Recommended ESIP Project

Value of Project	$3,055,877
Term of Repayment	15 Years
Projected Savings Over Term	$4,205,411
Projected NJ Rebates & Incentives	$117,745
Projected Interest Rate	3.5%

2. Recommended Project Technical and Financial Summary Documents

Form II: Energy Conservation Measures (ECMs) Summary Form

FORM II-3

ESCO's ENERGY SAVINGS PLAN (ESP):
ENERGY CONSERVATION MEASURES (ECMs) SUMMARY FORM
SWEDESBORO WOOLWICH SCHOOL DISTRICT
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: Honeywell International

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
1A LED Lighting Upgrades	$ 880,559	$ 128,547	6.85
2A Boiler Replacements	$ 670,877	$ 15,850	42.33
2D Rooftop Unit Replacement	$ 614,297	$ 11,129	55.20
3B BMS Dashboard - Energy Optimization	$ 148,800	$ 19,272	7.72
4A Building Envelope Improvements	$ 190,630	$ 11,923	15.99
5A Permanent Load Reduction	$ -	$ -	-
6A Transformer Replacement	$ 146,261	$ 9,781	14.95
8A Solar PPA	$ 27,498	$ 93,622	0.29
Add additional lines as needed* **Project Summary:**	$ 2,678,922	$ 290,124	9.23

Optional ECMs Considered, but not included with base project at this time	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
1B De-Stratification Fans w/ UV Disinfection	$ 183,813	$ 5,737	32.04
1C Vending Misers & Plug Loads	$ 7,197	$ 386	18.62
2B Multipurpose Room Floor Replacement	$ 925,930	$ 27,252	33.98
2C Domestic Hot Water Heater Replacement	$ 58,741	$ 85	690.60
2E Cooling Tower Replacement	$ 290,329	$ 1,066	272.41
2F Heat Pump Replacement	$ 4,208,073	$ 49,772	84.55
2G Premium Efficiency Motors and VFDs	$ 380,370	$ 21,731	17.50
2H Kitchen Hood Efficiency Improvements	$ 156,116	$ 4,549	34.32
2I Walk In Compressor Controls	$ 47,841	$ 1,095	43.69
3A Building Management System Upgrades	$ 281,773	$ 6,875	40.99
4B Roofing Upgrades	$ 243,256	$ 551	441.41
7A Cogeneration CHP	$ 110,206	$ 847	130.12
9A Energy Education	$ 8,343	$ -	-
10A Sustainable Transportation - EV Chargers	$ 132,839	$ (7,227)	(18.38)

Add additional lines as needed*

(1) The total value of Hard Costs is defined in accordance with standard AIA definitions that include: Labor Costs, Subcontractor Costs, Cost of Materials & Equipment, Temporary Facilities and Related Items, and Miscellaneous Costs such as Permits, Bonds Taxes, Insurance, Mark-ups, Overhead, Profit, etc.

Form III: Projected Annual Energy Savings Data Form

FORM III-3

ESCO's ENERGY SAVINGS PLAN (ESP)
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
SWEDESBORO WOOLWICH SCHOOL DISTRICT
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual savings for each fuel type MUST be completed using the following format. Data should be given in the form of fuel units that appear in the utility bills.

Energy/Water	ESCO Developed Baseline (Units)	ESCO Developed Baseline (Costs $)	Proposed Annual Savings (Units)	Proposed Annual Savings (Costs $)
Electric Demand (KW)	12,181	$182,983	2,437	$36,676
Electric Energy (KWH)	2,612,256	$464,537	1,768,468	$191,600
Natural Gas (therms)	67,182	$87,661	9,107	$11,955
Fuel Oil (Gal)	0	$0	0	$0
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	1,552			
SO2	1,185			
CO2	1,265,604			

(1) ESCOs are to use the rates provided as part of this RFP to calculate Avoided Emissions. Calculation for all project energy savings and greenhouse gas reductions will be conducted in accordance with adopted NJBPU protocols

(2) "ESCOs Developed Baseline": Board's current annual usages and costs as determined by the proposing ESCO; based off Board's utility information as provided to proposing ESCO.

(3) "Proposed Annual Savings": ESCOs proposed annual savings resulting from the Board's implementation of the proposed ESP, as based upon "ESCOs Developed Baseline".

Form IV: Projected Annual Energy Savings Data Form in MMBTUs

FORM IV

ESCO's ENERGY SAVINGS PLAN (ESP):
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs
SWEDESBORO WOOLWICH SCHOOL DISTRICT
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual energy savings for each fuel type MUST be completed using the following format. Data should be given in equivalent MMBTUs.

ENERGY	ESCO Developed Baseline	ESCO Proposed Savings Annual	Comments
Electric Energy (MMBTUs)	8,913	6,034	
Natural Gas (MMBTUs)	6,718	911	
Fuel Oil (MMBTUs)	0	0	
Steam (MMBTUs)			
Other (Specify) (MMBTUs)			
Other (Specify)			

NOTE: MMBTU Defined: A standard unit of measurement used to denote both the amount of heat energy in fuels and the ability of appliances and air conditioning systems to produce heating or cooling.

Form V: ESCOs Proposed Final Project Cost Form

FORM V

ESCO's ENERGY SAVINGS PLAN (ESP):
ESCOs PROPOSED FINAL PROJECT COST FORM FOR BASE CASE PROJECT
SWEDESBORO WOOLWICH SCHOOL DISTRICT
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **HONEYWELL INTERNATIONAL**

PROPOSED CONSTRUCTION FEES

Fee Category	Fees [1] Dollar ($) Value	Percentage of Hard Costs
Estimated Value of Hard Costs [2]:	$2,678,922	
Project Service Fees		
Investment Grade Energy Audit	$104,478	3.90%
Design Engineering Fees	$80,368	3.00%
Construction Management & Project Administration	$133,946	5.00%
System Commissioning	$13,395	0.50%
Equipment Initial Training Fees	$13,395	0.50%
ESCO Overhead	$241,103	9.00%
ESCO Profit	$80,368	3.00%
Project Service Fees Sub Total	$345,581	12.90%
TOTAL FINANCED PROJECT COSTS:	$3,345,974	24.90%
ESCO Termination Fee (To be paid only if the Board decides not to proceed beyond the ESP)	$0.00	0.00%

PROPOSED ANNUAL SERVICE FEES

First Year Annual Service Fees	Fees [1] Dollar ($) Value	Percentage of Hard Costs
SAVINGS GUARANTEE (OPTION)	$0	0.00%
Measurement and Verification (Associated w/ Savings Guarantee Option)	$12,000	Flat Fee
ENERGY STAR™ Services (optional)	Included	0.00%
Post Construction Services (If applicable)	N/A	-
Performance Monitoring	Included	-
On-going Training Services	N/A	-
Verification Reports	Included	-
TOTAL FIRST YEAR ANNUAL SERVICES	$12,000	Flat Fee

NOTES:
(1) Fees should include all mark-ups, overhead, and profit. Figures stated as a range will NOT be accepted.
(2) The total value of Hard Costs is defined in accordance with standard AIA definitions that include:

Labor Costs, Subcontractor Costs, Cost of Materials and Equipment, Temporary Facilities and Related Items, and Miscellaneous Costs such as Permits, Bonds Taxes, Insurance, Mark-ups, Overhead and Profit, etc.
ESCO's proposed interest rate at the time of submission: 5% TO BE USED BY ALLRESPONDING ESCOs FOR

*Annual Service only applies if customer accepts energy guarantee.

Form VI: ESCOs Preliminary Annual Cash Flow Analysis Form

FORM VI
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
SWEDESBORO WOOLWICH SCHOOL DISTRICT
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

Note: Proposers must use the following assumptions in all financial calculations:
(a) The cost of all types of energy should be assumed to inflate at: **2.4%** gas, **2.2%** electric per year

1. Term of Agreement: **15** (Years) (Months)
2. Construction Period [2] (months): **12**
3. Cash Flow Analysis Format:

Form V Project Cost [3]:	$	3,345,974
	$	-
ESIP Contract Value:	$	3,345,974
Additional Capital	$	-
Professional Fees:	$	25,000
Lease Issuance Fees:	$	10,000
Total Project Cost [1]:	**$**	**3,380,974**

Interest Rate to Be Used for Proposal Purposes: **3.50%**

Year	Annual Energy Savings	Solar Savings	Annual Operational Savings	Energy Rebates/Incentives [5]	Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs [4]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ 43,983				$ 43,983	$ -	$ -	$ -	$ 43,983	$ 43,983
1	$ 146,610	$ 93,622	$ 49,893	$ 119,102	$ 409,226	$ (408,576)	$ (420,576)	$ (12,000)	$ 650	$ 44,633
2	$ 149,859	$ 95,203	$ 49,893	$ 3,503	$ 298,458	$ (297,808)	$ (297,808)	$ -	$ 650	$ 45,283
3	$ 153,180	$ 96,811	$ 20,385	$ 3,503	$ 273,880	$ (273,230)	$ (273,230)	$ -	$ 650	$ 45,933
4	$ 156,575	$ 98,446	$ 20,385	$ 3,503	$ 278,910	$ (278,260)	$ (278,260)	$ -	$ 650	$ 46,583
5	$ 160,046	$ 100,109	$ 20,385		$ 280,540	$ (279,890)	$ (279,890)	$ -	$ 650	$ 47,233
6	$ 163,593	$ 101,800			$ 265,393	$ (264,743)	$ (264,743)	$ -	$ 650	$ 47,883
7	$ 167,219	$ 103,519			$ 270,738	$ (270,088)	$ (270,088)	$ -	$ 650	$ 48,533
8	$ 170,925	$ 105,268			$ 276,193	$ (275,543)	$ (275,543)	$ -	$ 650	$ 49,183
9	$ 174,714	$ 107,046			$ 281,759	$ (281,109)	$ (281,109)	$ -	$ 650	$ 49,833
10	$ 178,586	$ 108,854			$ 287,440	$ (286,790)	$ (286,790)	$ -	$ 650	$ 50,483
11	$ 182,545	$ 110,692			$ 293,237	$ (292,587)	$ (292,587)	$ -	$ 650	$ 51,133
12	$ 186,591	$ 112,562			$ 299,153	$ (298,503)	$ (298,503)	$ -	$ 650	$ 51,783
13	$ 190,727	$ 114,463			$ 305,190	$ (304,540)	$ (304,540)	$ -	$ 650	$ 52,433
14	$ 194,955	$ 116,396			$ 311,351	$ (310,701)	$ (310,701)	$ -	$ 650	$ 53,083
15	$ 199,277	$ 118,362			$ 317,639	$ (316,949)	$ (316,949)	$ -	$ 690	$ 53,773
Totals	$ 2,619,384	$ 1,583,152	$ 160,941	$ 129,612	$ 4,493,090	$ (4,439,317)	$ (4,451,317)	$ (12,000)	$ 53,773	**$ 53,773**

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by SWEDESBORO WOOLWICH SCHOOL DISTRICT during the construction period.
(3) This figure should equal the value indicated on the ESCO's PROPOSED "FORM V". DO NOT include in the Financed Project Costs.
(4) Annual Service only applies if customer accepts energy guarantee.
(5) As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance

Honeywell is not acting as a municipal advisor of fiduciary on your behalf. Any municiapl securities or financial products information provided is for general information and educational purposes only and you should obtain the advice of a licensed and qualified financial advisor regarding such information.

Note: To see the source of named ranges, use the dropdown menu to the left of the formula bar.

Building-by-Building Simple Payback Summary (Hard Costs Only)

A simple payback summary broken down by building by ECM has been provided for the Swedesboro Woolwich School District use in reviewing available scope combinations and options.

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Charles G. Harker School	**$ 62,199**	**$ 13,736**	**$ 3,439**	**$ -**	**$ 88,910**	**$ 9,535**	**$ 400,082**	**4.5**
1A LED Lighting Upgrades	$ 28,089	$ 13,736	$ (1,968)	$ -	$ 46,992	$ 7,135	$ 303,545	6.5
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2D Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
5A Permanent Load Reduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 1,367	$ -	$ 4,134	$ -	$ 5,501	$ -	$ 50,170	9.1
6A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
8A Solar PPA	$ 30,647	$ -	$ -	$ -	$ 30,647	$ -	$ 9,166	0.3
3B BMS Dashboard - Energy Optimization	$ 2,097	$ -	$ 1,273	$ -	$ 5,770	$ 2,400	$ 37,200	6.4
Governor Charles C. Stratton School	**$ 65,517**	**$ 10,023**	**$ 4,532**	**$ -**	**$ 93,577**	**$ 13,505**	**$ 717,439**	**7.7**
1A LED Lighting Upgrades	$ 22,899	$ 9,060	$ (1,686)	$ -	$ 36,378	$ 6,105	$ 240,906	6.6
2A Boiler Replacements	$ -	$ -	$ 3,365	$ -	$ 8,365	$ 5,000	$ 324,939	38.8
2D Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
5A Permanent Load Reduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 768	$ -	$ 2,131	$ -	$ 2,899	$ -	$ 26,842	9.3
6A Transformer Replacement	$ 5,208	$ 963	$ -	$ -	$ 6,172	$ -	$ 78,387	12.7
8A Solar PPA	$ 34,636	$ -	$ -	$ -	$ 34,636	$ -	$ 9,166	0.3
3B BMS Dashboard - Energy Optimization	$ 2,005	$ -	$ 723	$ -	$ 5,128	$ 2,400	$ 37,200	7.3
Margaret C. Clifford School	**$ 44,395**	**$ 5,210**	**$ 34**	**$ -**	**$ 55,074**	**$ 5,435**	**$ 200,532**	**3.6**
1A LED Lighting Upgrades	$ 12,858	$ 4,883	$ (887)	$ -	$ 19,888	$ 3,035	$ 111,353	5.6
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2D Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
5A Permanent Load Reduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 161	$ -	$ 514	$ -	$ 675	$ -	$ 5,883	8.7
6A Transformer Replacement	$ 1,823	$ 328	$ -	$ -	$ 2,151	$ -	$ 36,930	17.2
8A Solar PPA	$ 28,339	$ -	$ -	$ -	$ 28,339	$ -	$ 9,166	0.3
3B BMS Dashboard - Energy Optimization	$ 1,214	$ -	$ 407	$ -	$ 4,021	$ 2,400	$ 37,200	9.3
Walter Hill School	**$ 19,489**	**$ 7,706**	**$ 3,950**	**$ -**	**$ 52,563**	**$ 21,418**	**$ 1,245,270**	**23.7**
1A LED Lighting Upgrades	$ 14,937	$ 7,467	$ (1,226)	$ -	$ 25,289	$ 4,110	$ 160,007	6.3
2A Boiler Replacements	$ -	$ -	$ 2,485	$ -	$ 7,485	$ 5,000	$ 324,939	43.4
2D Rooftop Unit Replacement	$ 1,221	$ -	$ -	$ -	$ 11,129	$ 9,908	$ 611,732	55.0
5A Permanent Load Reduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 670	$ -	$ 2,179	$ -	$ 2,848	$ -	$ 92,316	32.4
6A Transformer Replacement	$ 1,219	$ 239	$ -	$ -	$ 1,458	$ -	$ 19,077	13.1
8A Solar PPA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3B BMS Dashboard - Energy Optimization	$ 1,441	$ -	$ 512	$ -	$ 4,353	$ 2,400	$ 37,200	8.5
Project Total	**$ 191,600**	**$ 36,676**	**$ 11,955**	**$ -**	**$ 290,124**	**$ 49,893**	**$ 2,563,324**	**8.8**

3. Utility and Other Rebates & Incentives

New Jersey Department of Clean Energy

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

As part of this statewide undertaking, the Clean Energy Act required New Jersey's investor-owned gas and electric utility companies to reduce their customers' use of gas and electricity by set percentages over time. To help reach these targets, the New Jersey Board of Public Utilities approved a comprehensive suite of efficiency programs that would transition the state to some of the highest energy savings in the country.

These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). While NJCEP will continue to offer some energy efficiency programs, all of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs directly to their customers.

Incentives, Rebates and Grants Summary

Honeywell has a great deal of experience in applying for, and successfully securing, all available incentives, rebates and grants for our clients. We have been approved and allocated for over $9M of incentives on behalf of our New Jersey customers alone since the introduction of the Energy Savings Improvement Program legislation in 2009. The New Jersey programs employed included primarily the Office of Clean Energy's Direct Install, Prescriptive Rebate Program and Cogeneration Incentives as applicable. All of these programs are available through your local utility company. Through this ESIP program, Honeywell will coordinate all activities with achieving the highest rebate amount available to support the financials of the overall project

ENERGY STAR Portfolio Manager

Honeywell will also utilize the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

Atlantic Electric Prescriptive and Custom Programs

The Atlantic Electric Prescriptive and Custom Incentive Program provides comprehensive energy efficiency services to municipalities, universities, schools, hospitals and other healthcare facilities, non-profit entities, and multi-family facilities.

By participating in the Programs, your organization can enjoy:

- Reduced energy and maintenance costs
- Project planning assistance
- Increased comfort
- Extended equipment life

Honeywell has determined that the Swedesboro Woolwich School District is eligible for $117,745 in estimated total incentives for the projects included in the Prescriptive Lighting, Prescriptive and Custom Measures (Boilers and Building Envelope) and Permanent Load Reduction Programs Please refer to the tables on below for a breakdown of Swedesboro Woolwich School District incentive levels on a building by building basis for each type of incentive.

Rebates and Incentives

Location	Prescriptive Lighting	Prescriptive Measures	Custom Measures	Permanent Load Reduction
Charles G. Harker School	$25,730		$7,242	$1,366
Governor Charles C. Stratton School	$17,864	$10,500	$11,139	$897
Margaret C. Clifford School	$8,097		$3,471	$500
Walter Hill School	$13,058	$13,065	$5,434	$740
Totals	**$64,748**	**$23,565**	**$27,285**	**$3,503**

Total Rebates and Incentives

Year	Prescriptive Lighting	Prescriptive Rebates	Custom Measures	Permanent Load Reduction	Total Incentives
Installation					
Year 1	$64,748	$23,565	$27,285	$3,503	$119,102
Year 2				$3,503	$3,503
Year 3				$3,503	$3,503
Year 4				$3,503	$3,503
Totals	**$64,748**	**$23,565**	**$27,285**	**$14,014**	**$129,612**

4. Financing the ESIP

In accordance with P.L.2012, c.55 an ESIP can be financed through energy savings obligations. The term refers to the two primary financing tools, debt and lease-purchase instruments. Each of these options is discussed below.

Energy savings obligations shall not be used to finance maintenance, guarantees, or the required third-party verification of energy conservation measures guarantees. Energy saving obligations, however, may include the costs of an energy audit and the cost of verification of energy savings as part of adopting an energy savings plan or upon commissioning. While the audit and verification costs may be financed, they are not to be considered in the energy savings plan as a cost to be offset with savings.

In all cases, maturity schedules of lease-purchase agreements or energy savings obligations shall not exceed the estimated average useful life of the energy conservation measures.

An ESIP can also include installation of renewable energy facilities, such as solar panels. Under an energy savings plan, solar panels can be installed, and the reduced cost of energy reflected as savings.

The law also provides that the cost of energy saving obligations may be treated as an element of the local unit's utility budget, as it replaces energy costs.

Debt Issuance

The law specifically authorizes municipalities, school districts, cities, counties, and fire districts to issue refunding bonds as a general obligation, backed with full faith and credit of the local unit to finance the ESIP. Because an ESIP does not effectively authorize new costs or taxpayer obligations, the refunding bond is appropriate, as it does not affect debt limits, or in the case of a board of education, require voter approval. The routine procedures for refunding bonds found in the Local Bond Law and Public-School Bond Law would be followed for issuance of debt, along with any required Bond Anticipation Notes as authorized pursuant to law.

Regarding bonds for public schools, the Department of Education (DOE) has concluded that debt financed ESIP projects are not covered by State aid for debt service or a "Section 15 EFFCA Grant" as there is no new local debt being authorized.

Tax-Exempt Lease Purchase Financing

The tax-exempt lease is a common form of financing for ESIP projects. Tax-exempt leasing is a tool that meets the basic objectives of debt, spreading the cost of financing over the life of an asset, while avoiding constitutional or statutory limitations on issuing public debt. If structured properly, by including non-appropriation language in the financing documents, the tax-exempt lease will not be considered debt for state law purposes but will be considered debt for federal income tax purposes. Thus, for federal purposes, the interest component of the lease payment is tax-exempt.

Under the New Jersey Energy Savings Improvement Program (ESIP), the Swedesboro Woolwich School District may authorize a lease purchase agreement between the District and a financier. Ownership of the equipment or improved facilities will pass to the Swedesboro Woolwich School District when all the lease payments have been made. There are legal expenses and other minimal closing costs associated with this type of structure. The lease purchase agreement may not exceed 15 years (commencing upon completion of the construction work), or 20 years where a combined heat and power or cogeneration plant is included in the project. The primary benefits of a lease are lower rates and the acquisition of essential use property without creating debt.

Under a lease there is typically a single investor. The lease may have non-appropriation language that allows the District to access low tax-exempt rates. Some previous customers have chosen to remove the non-appropriation language which has resulted in lower competitive rates.

Repayment of the lease payments is tailored to meet the requirements of the Swedesboro Woolwich School District. Payments are typically scheduled to commence after the construction is complete and acceptance of the project has been received by the District. Typically, payment terms are structured so there is no up-front capital expense to the Swedesboro Woolwich School District and payments are aligned within your cash flow and fiscal limits.

Certificates of Participation (COP's)

Certificates of Participation are another form of a lease purchase agreement with the differentiating factor being that there are multiple investors participating in the purchase of the lease. COP's require financial disclosure and are typically utilized on higher value projects where one investor doesn't have the capacity to hold a high value lease for a single customer.

Energy Savings Obligations

Energy Savings Obligations can be issued as refunding bonds in accordance with the requirements of N.J.S.A 40A:11-4.6(c)(3). These bonds may be funded through appropriation for the utility services in the annual budget of the contract unit and may be issued as refunding bonds pursuant to N.J.S.40A:2-52 et seq., including the issuance of bond anticipation notes as may be necessary, provided that all such bonds and notes mature within the periods authorized for such energy savings obligations. Energy savings obligations may be issued either through the contracting unit or another public agency authorized to undertake financing on behalf of the unit but does not require bond referendum.

SECTION E
MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

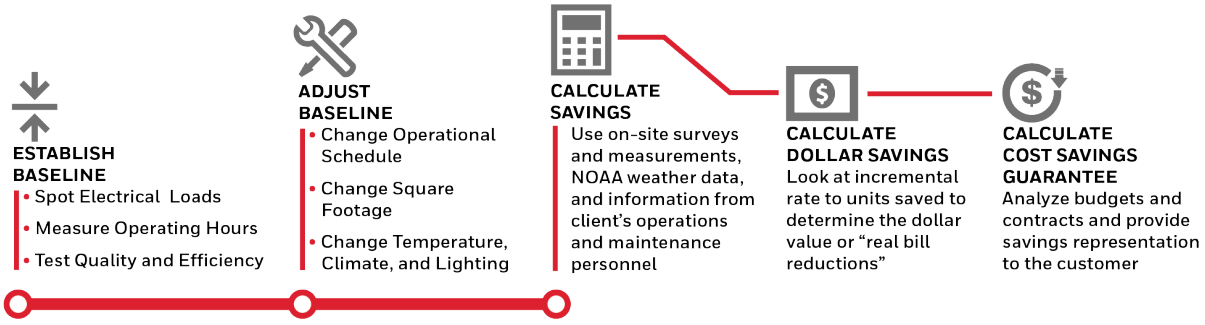
Section E — Measurement & Verification and Maintenance Plan

1. Baseline

The purpose for establishing a baseline for an energy performance project is to accurately predict what the energy consumption and costs would have been as if the energy project was never completed. The baseline can then be used to measure the improvement in efficiency and determine the overall energy savings of the project. Since the energy consumption of all facilities is somewhat affected by variable weather conditions, a baseline for heating and cooling systems is typically dependent on degree-days or outside temperature. A baseline also needs to incorporate changes in facility use, such as a change in hours of operation or increased levels of outside air. Once again, if these changes would have occurred in the absence of the energy project, they should be incorporated into the project's baseline.

Honeywell will calculate the baseline based on the systems and operating conditions as they currently exist. Honeywell finds baseline development most accurate if specific measurements are taken on equipment over a period of time (early in the audit phase) to determine actual kW, kWh, oil and gas consumption, cfm, gpm, hours of use, etc. A summary of some of the methods, which will be used by Honeywell to establish baselines and support, calculated savings are listed below.

1. Spot measurements of electrical loads such as lighting, fan and pump motors, chillers, electric heat, etc.
2. Measurement of equipment operating hours using electric data recorders.
3. Measurement of existing operating conditions using data recorders for space temperature and humidity, air handler temperatures (mixed, return, cooling and heating coil discharges), and space occupancy using lighting loggers.



4. Spot measurement for boiler efficiencies, water use.
5. Running measurements of chiller operation, including simultaneous measurement of input kWh or steam flow, and chilled water supply and return temperatures and flow (gpm).
6. Records of operating conditions from building management systems and utility-grade meters.

The data from the above is used to calculate existing energy use, which is then reconciled with current facility utility bills, and adjusted as required to provide a mutually agreed baseline.

To provide valid savings evaluations, Honeywell's maintains a significant inventory of metering equipment utilized by its auditors and Energy Engineers to ascertain critical data about the operation of the facility.

Typically, Honeywell's auditors use the following equipment for their onsite measurements:

- Recording and instantaneous power and harmonic analyzers.
- Data loggers for pressures, temperatures, flow rates, humidity and CO2.
- Lighting level and recording profile/run-hour and occupancy meters.
- Multimeters, handheld kW meters.
- Combustion analyzers.
- Ultrasonic flow meters.
- Infrared thermometers

The ECMs installed in many projects allow for energy savings to be identified by direct metering or a combination of metering and calculations with accepted assumptions. In the case of lighting, for example, it is relatively easy to meter representative samples of unique fixture types, both before and after a retrofit, to determine the power consumption difference in Watts. When multiplied by the quantity of each fixture type, the total connected load reduction can be derived. In combination with run time assumptions, or meters, the electrical reduction can be accurately determined. Where possible, direct measurement of ECMs during construction (before and after the retrofit) coupled with energy savings calculations is a method the Honeywell finds to be very accurate and cost-effective.

Due to the nature of some ECMs, or when a combination of ECMs is installed, individual (discrete) metering may not be either possible or able to fully document a baseline and calculate savings. Many of these situations can be handled by combining results from metering along with either engineering-based calculations or output from nationally recognized building simulation programs such as DOE II, ASEAM, TRACE or HAP. This method would be used for ECMs such as night setback, and where no other ECMs have significant interaction with the setback measure.

Formulas exercised in energy savings calculations follow the laws of physics, and many are included in the ASHRAE Handbook of Fundamentals. However, such calculations (i.e. equipment operation profiles) must be tempered by experience, past retrofit practice, and expectations of future operating conditions to arrive at achievable values in practice. Honeywell always reviews each and every project, in detail, for the anticipated savings and never hesitates to reduce the anticipated energy calculations where experience dictates necessary. The final result is a coupled project where the final savings are equal to or greater than anticipated.

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell and the Swedesboro Woolwich School District will establish the base rates that will act as "floor" rates in calculating the savings as agreed to by both parties.

2. Adjustment to Baseline Methodology

Honeywell's methodology0F for establishing and adjusting the baseline is determined by the characteristics of the facility, the conservation technology being installed, the technology being replaced, the type of measurement and verification the Swedesboro Woolwich School District requires and the needs of the Swedesboro Woolwich School District for future changes in facility use.

The purpose of this flexible approach is to make the most accurate possible measurement of the changes in energy uses that are specifically attributable to Honeywell installed ECMs. This creates the ability over

the life of the contract to continue measuring only savings achieved by Honeywell and leaves the Swedesboro Woolwich School District free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for making adjustments to the baseline.

Modifications to the energy baseline or savings will be made for any of the following:

1. Changes in the number of days in the annual review cycle.
2. Changes in the square footage of the facilities.
3. Changes in the operational schedules of the facilities.
4. Changes in facility indoor temperatures.
5. Significant changes in climate.
6. Significant changes in the amount of equipment or lighting utilized in the facility.

Examples of situations where the baseline needs to be adjusted are: **i)** changes in the amount of space being air conditioned, **ii)** changes in auxiliary systems (towers, pumps, etc.) and **iii)** changes in occupancy or schedule.

If the baseline conditions for these factors are not well documented it becomes difficult, if not impossible, to properly adjust them when they change and require changes to payment calculations. To compensate for any addition and deletion of buildings and impact on the baseline model, Honeywell will use sound technical methodologies to adjust the baseline. An example would be to add or delete building energy impact via the calculated cooling load in tons as a percentage of the existing campus tonnage baseline or use indices like W/ft2 and Btu/ft2 to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

3. Energy Savings Calculations

In calculating energy savings, Honeywell's highly experienced audit staff uses onsite surveys and measurements, National Oceanic and Atmospheric Administration weather data, detailed discussions with the client's operations and maintenance personnel and engineers, utility records, and other sources to ensure accurate energy, water and O&M savings.

Typically, the following data is gathered:

- Local weather data.
- Utility bills and sub-metered consumption trends.
- Utility rate structure.
- Facility use and occupancy data.
- Internal equipment loads.
- Interviews of operations and maintenance staff and management.
- Building construction, age, use and layout.
- Schematics of energy and water distribution systems.
- Identification and inventory of HVAC equipment.
- Identification and inventory of process equipment.
- Design, configuration, and operating characteristics of HVAC systems.
- Design, configuration, and operating characteristics of process systems.

- Control strategies and sequences of operation for HVAC and other process equipment.
- Identification and count of all lighting fixtures and determination of power consumption for each type.
- Identification and inventory of lighting control methods.
- Measurement of foot-candle levels at sample locations.
- Power quality and harmonics, power factor.
- Indoor air quality issues.

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell and the Swedesboro Woolwich School District will establish the base rates that will act as "floor" rates in calculating the savings. These are usually the rates that are in effect at the time of the start of the contract or rates used for audit estimated savings.

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell and the Swedesboro Woolwich School District will establish the base rates that will act as "floor" rates in calculating the savings. These are usually the rates that are in effect at the time of the start of the contract or rates used for audit estimated savings.

The equation below will be used to calculate the annual savings in dollars.

$$\text{Annual Savings (\$)} = \sum_{m=1}^{12} \{(Rate_{kWH,Base} \times kWH_{saved,m}) + (Rate_{fuel\ oil,\ Base} \times Fuel\ Oil_{saved,\ gal,\ m}) + (Rate_{Steam,\ Base} \times Steam_{Saved,\ klbs,\ m}) + (Rate_{NG} \times NG_{Saved,\ MCF,\ m})\} + (Agreed\ (\$))$$

Where

$Rate_{kWH,Base}$= defined base rate for kWh consumption
$kWh_{saved,m}$= calculated kWh savings for month *m*

$Rate_{Fuel\ Oil\ Base}$= defined base rate for fuel Oil Savings (XX/gal.)
$Fuel\ Oil_{saved,m}$= calculated chilled water savings in gal. for month *m*

$Rate_{Steam,\ Base}$= defined base rate for steam consumption ($XX/MMBtu.)
$Steam_{saved,m}$= calculated steam savings in MMBtu. for month *m*

$Rate_{NG,\ Base}$= defined base rate for natural gas consumption ($XX/Therm)
$NG_{saved,m}$= calculated natural gas savings in Therms for month *m*

Agreed($)= Annual savings in dollars (water, sewer, maintenance, etc.)

Honeywell assigns dollar values to the true incremental value of savings for energy and water. In other words, we do not combine for example, demand and consumptions numbers so that there is an average value to savings. Honeywell looks at each incremental rate to units saved to properly determine the value (dollar) to the District or “real bill reductions”. As noted in the RFP energy escalation rates will be established in accordance with New Jersey Board of Public Utility guidelines.

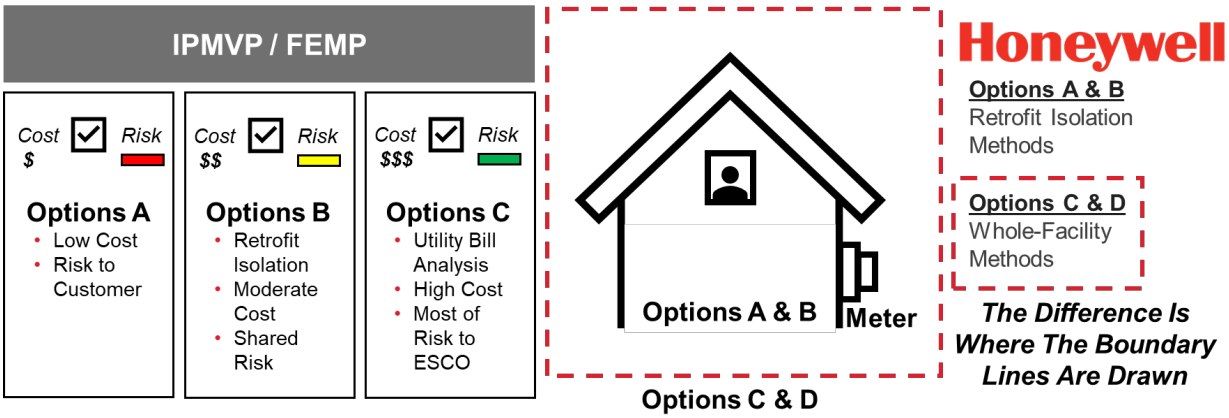
Based on this, Honeywell will review all utility bills (hourly data), tariffs, special contracts and commodity contracts to develop the incremental value (costs) of each utility.

The O&M savings is typically a function of existing the District's budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell will analyze the information to provide a conservative savings representation for the Swedesboro Woolwich School District review and acceptance. The information will include all calculations and assumptions.

4. Measurement & Verification

The purpose of performing any monitoring and verification is to establish an agreed upon process that provides the customer both a level of satisfaction that the improvements have been delivered and ongoing information as to their operation and performance. Additionally, this effort will be used to assess the actual dollars of savings versus the guarantee level.

It is essential for the success of this program that Honeywell and the District agree on a mutually acceptable methodology for measuring and verifying energy savings that are attributable to the energy conservation measures (ECMs) Honeywell installs. This M&V plan provides the procedures to document the energy and cost savings of each of the proposed ECMs.



The plan for monitoring and verifying energy savings for the proposed ECMs is based on the methods described in the ***International Performance Measurement and Verification Protocol (IPMVP)***[1]. Our approach to M&V is directly consistent with, and in compliance with, the IPMVP. This protocol provides a framework for the most widely accepted and used M&V methods by the industry.

Engineering calculations of energy and cost savings for the project are based on operating parameters (such as weather, temperature settings, run hours, occupancy patterns, and space usage) and equipment performance characteristics. The M&V plan uses the operating parameters established in the baseline for all savings calculations during the term of the project. The intent of the M&V plan is to verify that the ECMs installed by Honeywell will provide the expected energy savings. Therefore, Honeywell will collect data and relative information during the post-retrofit period to demonstrate that the installed equipment is performing at expected levels. It is assumed that the Swedesboro Woolwich School District will continue to be a dynamic institution adding or renovating buildings and desiring to retain the right to set comfort and operating characteristics. To accommodate this, Honeywell will develop its M&V plan in a way that

[1] www.ipmvp.org.

allows the District to adapt to the demands of future campus growth and changes without the need for Swedesboro Woolwich School District and Honeywell to negotiate energy baseline adjustments.

Our typical M&V plan will utilize broadband Internet access to the appropriate the Swedesboro Woolwich School District control interfaces to both confirm operating status and to download trend data to verify proper equipment maintenance.

One year after the commencement date of the ECMs, Honeywell will submit a report verifying and calculating the energy and cost savings for the first year. This report will be submitted for facility review and approval. For the remaining contract term, Honeywell will provide annual reports. These reports will include results of inspections of the installed equipment/systems, energy and cost savings, and recommendations to provide optimum energy performance.

All permanent measurement equipment will be purchased new with a calibration certificate from the manufacturer. The power multi-meter and the TSI multi-meter will be calibrated annually before using them in the annual inspection.

General Approach to M&V

Energy and water savings are determined by comparing the energy and water use associated with a facility or certain systems within a facility before and after the installation of an ECM or other measure. The “before” case is the baseline. The “after” case is the post-installation or performance period. Baseline and post-installation energy use measurements or estimates can be constructed using the methods associated with M&V options A, B, C, and D, as described in the IPMVP. The challenge of M&V is to balance M&V costs, accuracy, and repeatability with the value of the ECM(s) or systems being evaluated, and to increase the potential for greater savings by careful monitoring and reporting.

M&V Options

The IPMVP guidelines classify the M&V procedures into four categories, Options A, B, C and D. As shown in the table below, these options differ in their approach to the level of complexity of the M&V procedures.

M&V Option	Performance Verification Techniques
Option A Verifying that the measure has the potential to perform and to generate savings.	**Option A** is appropriate for ECMs that have energy use that can be readily quantified, such as the use of high efficiency lighting fixtures, high efficiency constant speed motors, and other standard engineering calculations. Engineering calculations before and after installation spot measurements and use of EMS data points with stipulated values.
Option B Verifying that the measure has the potential to perform and verifying actual performance by end use.	**Option B** is appropriate for ECMs that require periodic or on-going measurements to quantify energy use; such as the use of variable frequency drives on pump or fan motors. Engineering calculations with metering and monitoring strategy throughout term of the contract.
Option C Verifying that the measure has the potential to perform and verifying actual performance (whole building analysis.)	**Option C** is used for ECMs for which the energy use or energy savings cannot be measured directly, such as building envelope modifications. Option C is based on the use of utility meters to quantify building energy use. Utility meter billing analysis-using techniques from simple comparison to multivariable regression analysis.

M&V Option	Performance Verification Techniques
Option D Verifying actual performance and savings through simulation of facility components and/or the whole facility	**Option D** is used for ECMs for which the energy use or energy savings cannot be measured directly, or savings for individual ECMs are heavily interdependent. Calibrated building simulation is used to separate the energy savings attributable to each ECM. Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering.

In general,

> *ECM Energy Savings = Baseline Energy Use - Post-Installation Energy Use*
>
> And
>
> *Energy Cost savings ($) = Total Energy Savings x Contractual Energy Rates*

Exceptions to this simple equation are as follows:

Projects where an on/off M&V method is used. For example, after a new energy management system is installed, control features are turned off for a set period of time to recreate baseline conditions. Thus, savings are determined after installation by comparing energy use with and without the control features activated.

Since energy use at a facility is rarely, if ever, constant, another way to define M&V is as a comparison of a facility's post-installation energy use with its usage if the ECM or system had not been installed. This takes into account situations in which baseline energy use must be adjusted to account for changing conditions, such as changes in facility operation, occupancy, or use or external factors such as weather.

Post-Retrofit M&V Activities

There are two components associated with M&V of performance contract projects:

- Verifying the potential of the ECM to generate savings also stated as confirming that the proper equipment/systems were installed, are performing to specification and have the potential to generate the predicted savings.
- Determining/verify energy savings achieved by the installed ECM(s).

Verifying the Potential to Generate Savings

Verifying baseline and post-installation conditions involves inspections (or observations), spot measurements, and/or commissioning activities. Commissioning includes the following activities:

- Documentation of ECM or system design assumptions
- Documentation of the ECM or system design intent for use by contractors, agencies and operators
- Functional performance testing and documentation necessary for evaluating the ECM or system for acceptance
- Adjusting the ECM or system to meet actual needs within the capability of the system

Post-Installation Verification

Post-installation M&V verification will be conducted by both Honeywell and the Client to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and/or spot or short-term metering.

Regular Interval Post-Installation Verification

At least annually, Honeywell will verify that the installed equipment/systems have been properly maintained, continue to operate correctly, and continue to have the potential to generate the predicted savings. Savings report for all the installed ECMs will be submitted each year after the acceptance date of the work performed by Honeywell.

Computation of Energy Savings

After the ECMs are installed, energy and cost savings will be determined annually by Honeywell in accordance with an agreed-upon M&V approach, as defined in a project-specific M&V plan.

Construction/Interim Savings

Construction or Interim savings are usually measured by using the same methodology as described in the detail M&V plan for each ECM. The start and the completion time for each ECM must be agreed to between Honeywell and the Swedesboro Woolwich School District.

Electricity and thermal savings from the ECMs where no detailed long-term data is required to be collected will be stipulated and will be based on the starting and the final completion dates and verification of the operation of the ECMs. For other ECMs where long-term data collection is required by the M&V plan, data will be used to calculate the savings using the same equations as described in the detail plan. For example, to calculate electricity savings for the installation of a VFD, the kW is spot measured at a set speed for selected motors through a sampling plan. The measured kW is subtracted from the baseline kW to calculating the savings. Thermal savings are tied to the electrical savings in the manner described in the detail M&V plan. The results are extrapolated to cover all the VFDs installed by Honeywell.

The savings for each of the monitored VFD is calculated on an interval basis as follows:

> kWSaved = (kWBase – kWSpot Measured)
>
> kWhSaved = Estimated operating hours during the interim period * kWSaved
>
> The total kWh savings is the sum of the kWhSaved for all the installed VFDs.

5. Site-Specific M&V Plan

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
1A LED Lighting	▪ Upgrade Lighting systems: – Re-lamp/Re-ballast T8/T12 to LED, – Incandescent to LED – Metal Halide and Sodium Vapor to LED High Bays	**Option A** ▪ Pre and Post measurements ▪ Line by Line scope and engineering calculations	▪ **Pre-M&V**: Measurement of kW for 5% sample fixtures in each category ▪ Data log usage hours ▪ Data Log occupancy schedules ▪ Update Line by Line scope with measured kW and usage hours ▪ **Post M&V**: Measurement of kW for 5% sample fixtures in each category ▪ Usage Hours to remain same ▪ Occupancy schedules to remain same ▪ Energy Savings: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
1B De-Stratification Fans & Disinfection	▪ Install De-Stratification fans in Gymnasiums to minimize stratification of hot air and maintain hot air flow below the fan level	**Option A** ▪ Electric energy savings - Engineering calculations based on programmed parameters. **Option C** ▪ Fuel Savings - Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions ▪ Electric Energy: Verify savings based on programmed parameters and engineering calculations ▪ Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
1C Vending Misers	▪ Install Vending machine energy management devices	**Option A** ▪ Pre and Post measurements ▪ Line by Line scope and engineering calculations	▪ **Pre-M&V**: Measurement of kW for 5% sample machines in each category ▪ Data log usage hours ▪ Data Log occupancy schedules ▪ Update Line by Line scope with measured kW and usage hours ▪ **Post M&V**: Measurement of kW for 5% sample machines in each category ▪ Usage Hours to remain same ▪ Energy Savings scope with measured kW and usage hours and compare to pre-retrofit calculated savings

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2A Boiler Replacements	▪ Replace boilers in select locations to handle base load	**Option C** ▪ Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days ▪ Perform combustion efficiency test on boilers ▪ **Post M&V**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days ▪ Perform efficiency test on replaced boilers to ensure operating conditions are maintained
2B Multipurpose Room Floor Replacement	▪ Replace selected flooring at Governor Charles C. Stratton School and Walter Hill School	**Option A** ▪ Electric energy savings - Engineering calculations based on programmed parameters **Option C** ▪ Fuel Savings - Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions ▪ Electric Energy: Verify savings based on programmed parameters and engineering calculations ▪ Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
2C Domestic Hot Water Heater Replacement	▪ Replace heater in select locations to handle base load	**Option C** ▪ Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days ▪ Perform combustion efficiency test on boilers ▪ **Post M&V**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days ▪ Perform efficiency test on replaced boilers to ensure operating conditions are maintained
2D Rooftop Unit Replacement	▪ Replace antiquated Roof Top Units with new high efficiency Rooftop Units	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units	▪ **Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (EER) ▪ **Post M&V**: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2E Cooling Tower Replacement	▪ Replace existing Cooling Towers with new higher efficiency units	**Option A** ▪ Electric energy savings - Engineering calculations based on material specifications.	▪ **Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (kW/ton) ▪ **Post M&V**: Verify manufacturer provided data for new unit (kW/ton) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2F Heat Pump Replacement	▪ Replace existing Heat Pumps with new high efficiency units	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units	▪ **Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (EER) ▪ **Post M&V**: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2G Premium Efficiency Motors and VFDs	▪ Install VFDs on select pumps to operate the pump motors in response to the system load. Replace motors with new premium efficiency motors	**Option A** ▪ Engineering calculations for VFDs following pump affinity laws. ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement motors	▪ **Pre-M&V**: Verify manufacturer provided data for the pump performance data and motor efficiencies. ▪ **Post M&V**: Obtain trend data for VFD operation from the BMS system to verify baseline calculation assumptions on system loads ▪ Verify efficiency of new motors ▪ Verify manufacturer provided data for new VFDs – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2H Kitchen Hood Efficiency Improvements	▪ Install control devices on the Kitchen hoods to control exhaust air in response to the cooking load. Replace fan motors with new premium efficiency motors and VFD drives	**Option A** ▪ Energy savings - Engineering calculations based on programmed parameters.	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions
2I Walk-In Compressor Controls	▪ Install control device on walk-in freezer and refrigerator evaporators to shut down the fan motor when the compressor is off on duty cycle	**Option A** ▪ Stipulated Engineering calculations based on case studies for the Intellidyne control	▪ **Pre-M&V**: None ▪ **Post M&V**: Savings stipulated based on engineering calculations for the term of contract

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
3A Building Management Controls	▪ Upgrade Building Management Systems to DDC and integrate all systems to a central platform	**Option A** ▪ Electric energy savings - Engineering calculations based on programmed parameters. **Option C** ▪ Fuel Savings - Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions ▪ **Electric Energy**: Verify savings based on programmed parameters and engineering calculations ▪ **Fuel**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
3B BMS Dashboard - Energy Optimization	▪ Install Forge Energy Optimization system	**Option A** ▪ Electric energy savings - Engineering calculations based on programmed parameters. **Option C** ▪ Fuel Savings - Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions ▪ **Electric Energy**: Verify savings based on programmed parameters and engineering calculations ▪ **Fuel**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4A Building Envelope Improvements	▪ Install weather stripping on doors, seal roof wall joints and roof penetrations	**Option A** ▪ Electric energy savings - Engineering calculations based on nameplate and manufacturer supplied data **Option C:** ▪ Fuel Savings - Utility Bill Comparison for all fuel related measures	▪ **Pre-M&V:** Verify parameters used in engineering calculations with site conditions ▪ **Post M&V:** ▪ **Fuel:** Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4B Roofing Upgrades	▪ Install new high efficiency roofs on select areas/buildings	**Option A** ▪ Electric energy savings - Engineering calculations based on programmed parameters. **Option C** ▪ Fuel Savings - Utility Bill Comparison for fuel related measures	▪ **Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions ▪ **Post M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
5A Permanent Load Reduction	▪ Rebates for Load Reduction (KW)	N/A	N/A
6A Transformer Replacement	▪ Replace existing secondary transformers with high efficiency equivalents	**Option A** ▪ Engineering calculations based on increase in transformer efficiency	▪ **Pre-M&V**: Measure typical existing transformer (typical one for each size) input and output kW to establish transformer losses
7A Cogeneration CHP	▪ Install Cogeneration units	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units	▪ **Pre-M&V**: Verify manufacturer provided data for existing units efficiency ▪ **Post M&V**: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
8A Solar PPA	▪ Install Solar Power using Power Purchase Agreement	N/A	▪ **Pre-M&V**: N/A ▪ **Post M&V**: N/A
9A Energy Education	▪ Institute an Energy Awareness and Saving program to Educate Students, Faculty and Staff	N/A	▪ **Pre-M&V**: N/A ▪ **Post M&V**: N/A
10A Sustainable Transportation - EV Chargers	▪ Install EV charging stations on select areas/buildings	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data	▪ **Pre-M&V**: Verify existing conditions ▪ **Post M&V**: Visual inspection per scope of work
11A Digital School Kiosks	▪ Install new digital kiosks at each school	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data	▪ **Pre-M&V:** Verify existing conditions ▪ **Post M&V**: Visual inspection per scope of work

SECTION F
DESIGN APPROACH

Section F – Design Approach

In accordance with the ESIP PL 2012, c.55 as part of the implementation process, an agreement between the Swedesboro Woolwich School District and Honeywell will determine the energy conservation measures (ECM's) to be implemented. The services of a NJ Licensed Engineering firm and / or Architectural firm shall then be secured to properly comply with local building codes, compliance issues and NJ Public contracts law. Specifications will be designed and developed to exact standards as recommended by Honeywell to achieve all savings outlined in this Energy Savings Plan (ESP). Once specifications are completed, Honeywell will publicly solicit contractors capable of meeting the requirements of the specification for each trade. However, even before the completion of the bidding process, Honeywell project management will be engaged to maintain the overall project schedule and ensure the District's expectations are met. An overview of these activities and functions are detailed below.

1. Safety Management Plan

All of Honeywell's Project Management Plans begin with safety. By integrating health, safety and environmental considerations into all aspects of our business, we protect our customers, our people and the environment, achieve sustainable growth and accelerated productivity, drive compliance with all applicable regulations and develop the technologies that expand the sustainable capacity of our world. Our health, safety and environment management systems reflect our values and help us meet our customer's needs and our business objectives.

Honeywell's Safety Management Plan will be provided at the start of construction.

2. Project Management Process

Honeywell approaches any ESIP project with a systematic, tested and proven delivery process based upon industry best practices including strong project management, open and collaborative communication, superior technical design and state of the art technologies. We go above and beyond, with multiple NJ delivery teams to ensure sufficient resources, meticulous and thorough training and commissioning, and robust maintenance planning that goes the extra mile for the long term. Honeywell excels at project delivery because of our experience in New Jersey delivering ESIP projects with results that meet or exceed expectations.

Honeywell will demonstrate our partnership-based commitment to Swedesboro Woolwich School District throughout the development and delivery of your ESIP project, as we have done for dozens of other public entities throughout New Jersey under the ESIP Law. Our approach is backed by our references and track record and highly experienced engineering resources, which will be fully utilized to help you achieve your unique project goals and requirements.

Honeywell prescribes four phases in the ESIP Process that constitutes your project, including:

- **Phase 1**: Investment Grade Energy Audit (IGEA)
- **Phase 2**: Project Implementation
- **Phase 3**: Commissioning and Training
- **Phase 4**: Energy Savings Guarantee Period

The IGEA will commence with a kickoff meeting between key project stakeholders of the Swedesboro Woolwich School District and Honeywell to review the ESIP Process, including the expectations of both parties during the IGEA, audit parameters, reporting methods, building access protocols, availability of utility and building data, et cetera. Phase 2 will commence after our kickoff meeting has concluded with agreed upon next steps.

Honeywell takes a holistic approach in development of a comprehensive solution that is customized to meet your operational and facility needs and project goals. Our integrated project delivery approach supports continuous and collaborative communication between key stakeholders throughout the process. Our IGEA development process includes the following steps:

IGA Development Process

Step 1 - Discovery

- Ascertain your goals and expectations to define project requirements
- Involve key decision makers to prioritize
- Aggregate utility and building data to benchmark energy consumption
- Ensure site access for energy audits and site measurements to complete survey work
- Inventory of equipment

Step 2 – Identify and Develop Project

- Complete ECM list focused on your requirements
- Coordinated development effort to refine project scope
- Conceptual scopes of work to further define project
- Determine modeling approach and M&V methodology

Step 3 – Cost and Savings Forecasting

- Calculate energy and cost savings
- Identify utility rebates
- Detailed scopes of work
- Operating strategies and equipment performance data

Step 4 – Deliver Solution

- Deliver final IGA Report and contract
- Finalize scope of work
- Secure financing
- Deliver positive cash flow
- Finalize savings guarantee
- Commissioning, M&V and training program

A. Honeywell Performance Contracting

Honeywell is the undisputed performance contracting market leader in the Northeast. Honeywell's Guaranteed Performance Contracting, which we pioneered in the early 1980's, has surpassed the $2 billion mark in cumulative sales. Our performance contracting business features specialized and dedicated resources, including people with expertise specifically to address the needs of our customers. Our portfolio of business experience in the region is over 400 projects and over $500 million in project investment.

B. Honeywell's Commitment to Health, Safety, the Environment and School

All of Honeywell's Project Management Plans begin with safety. By integrating health, safety and environmental considerations into all aspects of our business, we protect our customers, our people and the environment, achieve sustainable growth and accelerated productivity, drive compliance with all applicable regulations and develop the technologies that expand the sustainable capacity of our world. Our health, safety and environment management systems reflect our values and help us meet our customer's needs and our business objectives.

Our Safety Commitment to the Swedesboro Woolwich School District

In today's world, nothing is more important than safeguarding our families at home, at work and at school. Through Honeywell's safety awareness process, we commit to our customers to protect and safeguard our construction sites, our employees, sub-contractors, and your staff.

Our projects all begin with the following steps:

- Safety Training for Employee's and Sub-contractors
- Detailed Work Schedules around the day
- Detailed Background Checks of Personnel
- Detail Logs of Sub Contractor Personnel
- On-Site Logs of Time Sheets, Contact Information for All Personnel
- Clearly Displayed Identification Badges of All Construction Personnel
- On-Site Daily Supervision of All Sub-contractors
- Detailed and Weekly Reviews of Accident Reports and Remediation Strategy

We protect the safety and health of our customers and employees through prevention of illness, injury and pollution.

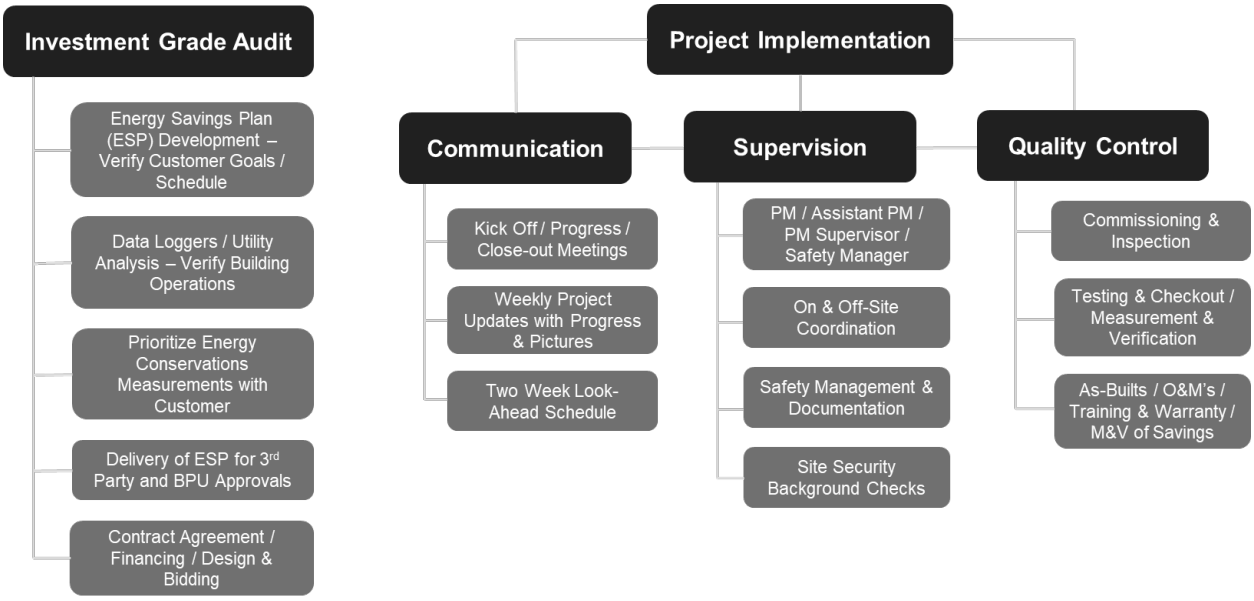
- We actively promote and develop opportunities for expanding sustainable capacity by increasing fuel efficiency, improving security and safety, and reducing emissions of harmful pollutants.
- We are committed to compliance with all of our health, safety, environmental and legal requirements everywhere we operate
- Our commitment to health, safety and the environment is an integral aspect of our design of products, processes and services, and of the lifecycle management of our products.
- Our management systems apply a global standard that provides protection of both human health and the environment during normal and emergency situations
- We identify, control and endeavor to reduce emissions, waste and inefficient use of resources and energy.
- We abide by the company's own strict standards in cases where local laws are less stringent.
- Our senior leadership and individual employees are accountable for their role in meeting our commitments.
- We measure and periodically review our progress and strive for continuous improvement.
- These are our commitments to health, safety, and the environment, and to creating a safe, clean environment everywhere we operate.

C. Project Management Process

The project management process applies technical knowledge, people and communication skills, and management talent in an on-site, pro-active manner to ensure that our contract commitments are met on time, within budget, and at the quality you expect.

A Honeywell Project Management Plan defines plans and controls the tasks that must be completed for your project. But more than task administration, our project management process oversees the efficient allocation of resources to complete those tasks.

Each project and each customer's requirements are unique. At Honeywell, we address customer needs through a formal communication process. This begins by designating one of our project managers to be responsible for keeping the customer abreast of the status of the project.



As the facilities improvements portion of the partnership begins, the Project Manager serves as a single focal point of responsibility for all aspects of the partnership. The Project Manager monitors labor, material, and project modifications related to the Swedesboro Woolwich School District/Honeywell partnership and makes changes to ensure achievement of performance requirements in the facilities modernization component. The Project Manager regularly reviews the on-going process of the project with the customers.

The Project Manager will develop and maintain effective on-going contact with the District and all other project participants to resolve issues and update project status.

There are several challenges in this position. The Project Manager must staff the project and create a work force capable of handling the technologies associated with the project (pneumatic or electric/electronic controls, mechanical systems, etc.), and plan for and use these personnel to achieve optimum results focused on occupant comfort and guarantee requirements.

3. Construction Management

Prior to any work in the buildings, our Project Manager will sit down with your administrative and building staff to outline the energy conservation upgrades that we will be installing in their building. We will discuss proper contractor protocol of checking in and out of the buildings on a daily basis, wearing identifiable shirts, identification badges, and checking in with your facilities staff. We will coordinate certain projects for different times of the day, so we do not interrupt the building and learning environments. Our staff will work a combination of first and second shifts to accomplish the pre-set implementation schedule.

Communication is the key success factor in any construction management plan, and our project manager will be the key focal point during the installation process.

Our team will prevent schedule slippages by continuously tracking the location of all equipment and components required for the project. We make sure all equipment and components will be delivered on time prior to the scheduled date of delivery. Our thorough survey, evaluation and analysis of existing conditions, performed prior to the commencement of construction, will also prevent schedule slippages.

Honeywell is required to subcontract various portions of our projects to contractors. Within the Swedesboro Woolwich School District project, all subcontractors will be selected in accordance with New Jersey public contracts law. Typical areas that are subcontracted are as follows:

- Electrical Installation
- Lighting Retrofits
- HVAC Installation (depends upon the project size and scope)
- Associated General Contracting specialty items to support the project etc., (ceilings, windows, concrete, structural steel, roofing, demolition and removal of equipment, painting and rigging)

Where possible under New Jersey public contracts law, Honeywell uses the following guidelines in hiring subcontractors to perform work on our projects.

- Local Presence in the Community (Customer Recommendations)
- Firm's Qualifications and WBE/MBE Status
- Firm's Financial Stability
- Ability to perform the work within the project timeline
- Price
- Ability to provide service on the equipment or materials installed over a long period of time.

Approval of subcontractors that Honeywell proposes to use lies with the Swedesboro Woolwich School District.

4. Commissioning

Honeywell provides full commissioning of energy conservation measures (ECM's) as part of our responsibility on this project. We will customize this process based on the complexity of ECMs. Specifically, Honeywell will be responsible for start-up and commissioning of the new equipment and systems to be installed during the project. This will include verifying that the installed equipment meets specifications, is installed and started up in accordance with manufacturer's recommendations and operates as intended. A commissioning plan will be prepared that describes the functional tests to be performed on the equipment and the acceptance criteria.

Prior to customer acceptance of the project, Honeywell submits the final commissioning report containing signed acceptance sheets for each ECM. Signed acceptance sheets are obtained upon demonstrating the functionality of each ECM to Swedesboro Woolwich School District appointed representative.

Additionally, Honeywell provides training for facility operators and personnel as needed when each ECM is completed and placed into service. All training is documented in the final commissioning report.

After the completion of the Honeywell commissioning effort, in accordance with New Jersey ESIP legislation, the District will be required to secure the services of a 3rd party independent firm to verify that the new equipment and systems meet the standards set forth in the Energy Savings Plan. To maintain the independence of this review, these costs must be born directly by the Swedesboro Woolwich School District. However, at the option of the Swedesboro Woolwich School District, these services can be financed as a portion of the total project cost.

5. Installation Standards

When Honeywell designs a solution, we consider current and future operations. For any upgrades, we install, we follow building codes/standards, which dictate certain standards for energy or building improvements. Listed in tables following this section are standards for building design. During the life of the agreement, there is a partnership approach to maintaining these standards for reasons of comfort and reliability. For lighting our standard is to meet or exceed Illuminating Engineering Society (IES) light level requirements, achieving the relevant standards wherever possible.

In the case of fluorescent lighting upgrades, we recommend that a group re-lamping of lamps be done approximately five years after the initial installation depending upon run times. Your building facility staff, on an as needed basis, can complete normal routine maintenance of lamps and ballasts. This maintains the quality of the lighting levels, and color rendering qualities of the lamps.

Space temperatures will be set by the energy management system and local building controls and will be maintained on an annual basis. Flexibility will be maintained to regulate space temperatures as required to accommodate building occupant needs.

Your facility staff and building personnel will operate the energy management system with ongoing training and support from Honeywell. Therefore, the District and Honeywell will maintain the standards of comfort. The comfort standards will be maintained throughout the life of the agreement through sound maintenance planning and services recommended as part of this ESP.

Regarding ventilation, Honeywell will upgrade ventilation to meet current standards in those areas where our scope of work involves upgrades to or replacement of systems providing building ventilation. We generally will not upgrade ventilation in those areas where our work doesn't involve the upgrade or replacement of systems or equipment providing ventilation to a building or facility.

Heating and Cooling Standards

Heating Temperatures	Cooling Temperatures	Unoccupied Temperatures
70-72° F	72-74° F	58-62° F

Honeywell uses a variety of in-house labor as well as subcontractors to install the energy conservation measures. We have on staff trained professionals in fire, security, energy management systems, all temperature control systems, and HVAC. However, per the ESIP law, all trades will be publicly bid except for specific controls applications. Listed below is a sampling of some of the disciplines that would apply to the Swedesboro Woolwich School District:

Improvements	Honeywell	Subcontractor
Engineering Design/Analysis	■	
Technical Audit	■	
Construction Administration/Management	■	
On-Site Construction Supervision	■	
Installation of Energy Management System	■	■
Manufacturer of Energy Management Equipment	■	■
Installation of HVAC/Mechanical Equipment		■
Installation of Renewable Technology		■
Installation of Building Envelope		■
Energy Supply Management Analysis/Implementation	■	
Installation of Boilers		■
Maintenance of Energy Management Equipment	■	■
Manufacturer/Installation of Temperature Controls	■	■
Monitoring/Verification Guarantee	■	
Training of Owner Staff	■	
Financial Responsibility for Energy Guarantees	■	

Hazardous Waste Disposal or Recycling

Honeywell disposes of all PCB ballasts or mercury containing materials removed as part of the project per EPA guidelines. Honeywell will complete all the required paperwork on behalf of the Swedesboro Woolwich School District. Honeywell will work with the District to review your hazardous material reports and will identify the areas where work will be completed so that the District can contract to have any necessary material abatement completed.

Honeywell can help schedule or coordinate waste removal, but does not contract for, or assume responsibility for, the abatement work. Honeywell also has the capabilities to assist the Swedesboro Woolwich School District in working with the EPA under compliance management issues. We also develop and manufacture automated systems to track and report a wide variety of environmental factors.

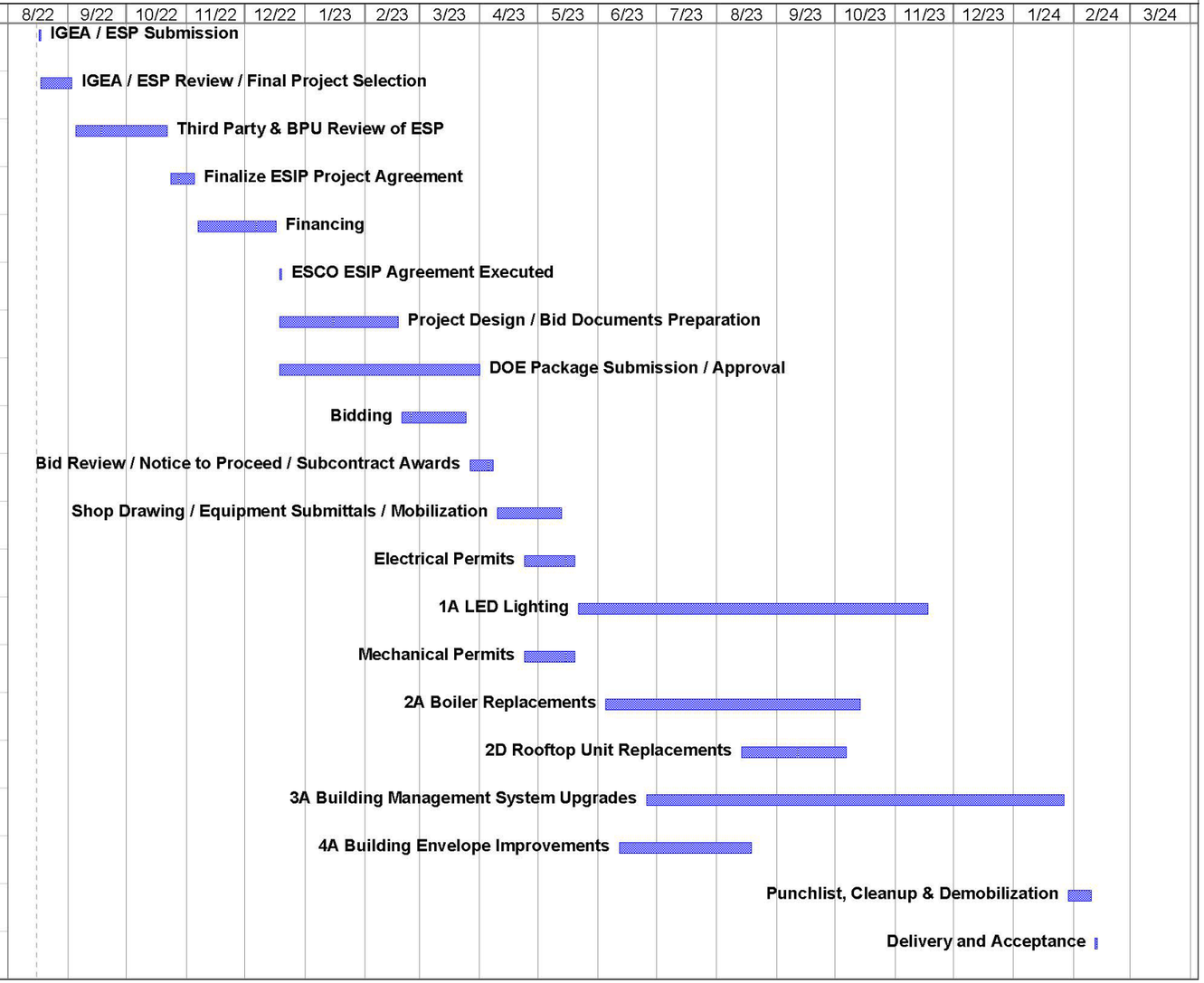
6. Implementation Schedule

Below is a sample schedule for construction and completion of the Project.

Swedesboro-Woolwich School District
Energy Savings Plan
Estimated Construction Schedule

Honeywell

ID	Task Name	Start	Finish
1	IGEA / ESP Submission	Wed 8/17/22	Wed 8/17/22
2	IGEA / ESP Review / Final Project Selection	Thu 8/18/22	Fri 9/2/22
3	Third Party & BPU Review of ESP	Mon 9/5/22	Fri 10/21/22
4	Finalize ESIP Project Agreement	Mon 10/24/22	Fri 11/4/22
5	Financing	Mon 11/7/22	Fri 12/16/22
6	ESCO ESIP Agreement Executed	Mon 12/19/22	Mon 12/19/22
7	Project Design / Bid Documents Preparation	Mon 12/19/22	Fri 2/17/23
8	DOE Package Submission / Approval	Mon 12/19/22	Fri 3/31/23
9	Bidding	Mon 2/20/23	Fri 3/24/23
10	Bid Review / Notice to Proceed / Subcontract Awards	Mon 3/27/23	Fri 4/7/23
11	Shop Drawing / Equipment Submittals / Mobilization	Mon 4/10/23	Fri 5/12/23
12	Electrical Permits	Mon 4/24/23	Fri 5/19/23
13	1A LED Lighting	Mon 5/22/23	Fri 11/17/23
14	Mechanical Permits	Mon 4/24/23	Fri 5/19/23
15	2A Boiler Replacements	Mon 6/5/23	Fri 10/13/23
16	2D Rooftop Unit Replacements	Mon 8/14/23	Fri 10/6/23
17	3A Building Management System Upgrades	Mon 6/26/23	Fri 1/26/24
18	4A Building Envelope Improvements	Mon 6/12/23	Fri 8/18/23
19	Punchlist, Cleanup & Demobilization	Mon 1/29/24	Fri 2/9/24
20	Delivery and Acceptance	Mon 2/12/24	Mon 2/12/24



APPENDICES

Section G – Appendices

Please see appropriate folders in Teams room provided as follows:

- Honeywell – Appendix 1 — LOCAL GOVERNMENT ENERGY AUDITS
- Honeywell – Appendix 2 — ECM CALCULATIONS
- Honeywell – Appendix 3 — EQUIPMENT CUT SHEETS
- Honeywell – Appendix 4 — LIGHTING LINE BY LINES

Thank you and We look forward to working with you in the future.