ENERGY SAVINGS PLAN THROUGH AN ENERGY SAVINGS IMPROVEMENT PROGRAM

MONROE TOWNSHIP PUBLIC SCHOOL DISTRICT

DECEMBER 23, 2024

PREPARED FOR:

Mr. Jerry Tague
Director Facilities & Grounds
732-521-1500
gerald.tague@monroe.k12.nj.us

PREPARED BY:

Caroline Jackson
Senior Business Consultant
Honeywell Energy Services Group
534 Fellowship Rd.
Mt. Laurel, NJ 08054
Office: 856.437.1856
Mobile: 610.247.8126
caroline.jackson@honeywell.com

Honeywell

HONEYWELL PROPRIETARY

Non-Disclosure Statement

This proposal or qualification data includes data that shall not be disclosed outside **Monroe Township Public Schools** ("**the District**") and shall not be duplicated, used or disclosed — in whole or part — for any purposed other than to evaluate this proposal or quotation. If, however, a contract is awarded to this Offeror as a result of — or in connection with — the submission of this data, **the District** shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit **the District's** right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in all sheets.

Right to Negotiate

Honeywell has reviewed the Request for Proposals and, if selected, reserves the right to negotiate mutually acceptable terms and conditions of any resulting contract.

Budgetary Proposal

Notwithstanding any other provision of this document, this budgetary proposal is provided for information and planning purposes only, is non-binding, and does not constitute an offer capable of acceptance. Honeywell will be pleased to provide a firm price proposal upon request, subject to its internal approval requirements.

Honeywell reserves the right, in its discretion, to increase the price(s) set forth in this Proposal in the event that tariffs (or similar governmental charges) imposed by the United States or other countries result in any increase in the costs that Honeywell used to determine such price(s).

Equitable Extension of Time

Notwithstanding anything to the contrary, in light of the COVID-19 pandemic, the effects of which cannot be foreseen, the parties agree that Honeywell shall be entitled to an equitable extension of time to deliver or perform its work and appropriate additional compensation to the extent Honeywell's delivery or performance, or the delivery or performance of its suppliers and/or subcontractors, is in any way delayed, hindered or otherwise affected by the COVID-19 pandemic.

General Disclaimer about Pre-Contract Information

HONEYWELL MAKES NO REPRESENTATION OR WARRANTY REGARDING ANY FINANCIAL PROJECTIONS, DATA OR INFORMATION PROVIDED, EXCEPT AS MAY BE EXPRESSLY SET FORTH IN A DEFINITIVE AGREEMENT.

Municipal Advisor Disclaimer

HONEYWELL BUILDING SOLUTIONS, A STRATEGIC BUSINESS UNIT OF HONEYWELL INTERNATIONAL INC. ("HONEYWELL"), IS NOT A MUNICIPAL ADVISOR AND CANNOT GIVE ADVICE WITH RESPECT TO MUNICIPAL SECURITIES OR MUNICIPAL FINANCIAL PRODUCTS TO YOU ABSENT YOUR BEING REPRESENTED BY, AND RELYING UPON THE ADVICE OF, AN INDEPENDENT REGISTERED MUNICIPAL ADVISOR. HONEYWELL IS NOT SUBJECT TO A FIDUCIARY DUTY WITH REGARD TO YOU OR THE PROVISION OF INFORMATION TO YOU. INFORMATION ABOUT MUNICIPAL SECURITIES AND/OR MUNICIPAL FINANCIAL PRODUCTS, IF ANY, IS PROVIDED FOR EDUCATIONAL PURPOSES ABOUT POSSIBLE FINANCING OPTIONS AND IS NOT THE PROVISION OF ADVICE OR A RECOMMENDATION TO PURSUE ANY PARTICULAR FINANCING OPTION. CONSULT WITH YOUR INDEPENDENT REGISTERED MUNICIPAL ADVISOR ABOUT THE FINANCING OPTION APPROPRIATE FOR YOUR SITUATION.

To ensure compliance with requirements imposed by the IRS under Circular 230, we inform you that any U.S. federal tax advice contained in this communication (including any attachments), unless otherwise specifically stated, was not intended or written to be used, and cannot be used, for the purpose of (1) avoiding penalties under the Internal Revenue Code or (2) promoting, marketing or recommending to another party any matters addressed herein. The information contained herein is general in nature and based on authorities that are subject to change. Honeywell Building Solutions, a strategic business unit of Honeywell International Inc., recommends that you consult your tax adviser to understand its applicability to specific situations.

TABLE OF CONTENTS

SECTION A
EXECUTIVE SUMMARY

SECTION A — EXECUTIVE SUMMARY

Thank you for choosing to engage Honeywell to develop an Energy Savings Plan for the Monroe Township Public School District (the District).via you Omnia Co-op Membership.

It is understood that in order to remain compliant with the services of the COOP for the Monroe Township Public School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc.

During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit of the Monroe Township Public buildings and grounds. Based on the audit findings and Honeywell's extensive experience in working with school districts, we can confidently state this plan can identify a project that is financially viable in a comprehensive manner to address the District's facility concerns and goals.

This 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.

ESIP Project Specifics

- Preliminary Energy Audit: Tri State Light & Energy
- Model type: ESCO Model
- Architect of Record: DI Group Architecture
- Financial Advisor: Phoenix Advisors, LLC
- Independent Auditor of the ESP: Johnson Urban, LLC
- Bond Counsel: *Mc Carter English, LLP*

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:

- 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

Additionally, the use of Omnia Cooperative in the selection of Honeywell is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- An organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use."
- In the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit's bid threshold."
- The national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires that if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires that a contracting unit can use national cooperatives only when the contracting unit determines "that the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered."
- The LFN states that if using an online ordering system, local officials must put "appropriate internal controls" in place to ensure that purchases are documented and that an audit trail exists
- Per the LFN, the Monroe Township BOE must verify that the selected vendor complies with applicable New Jersey procurement documentation requirements. The following required and other forms can be found in Appendix 5 of this document:
  - New Jersey Business Registration Certificate for the contractor and any subcontractors (i.e., copy of certificate)
  - Statement of Corporate Ownership (an original form prepared for the contracting agency awarding the contract)
  - Public Contract EEO Compliance (Employee Information Report form or proof of participation in a federally approved affirmative action program)
  - Non-collusion Affidavit

The purpose of this document is to provide all the information required for the Monroe Township Public School District to determine the best path forward in the implementation of a District-Wide NJ ESIP Project. It is important to note that the Energy Savings Plan provides a comprehensive evaluation of ALL potential ECMs within the 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.

This 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 Monroe Township Public 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 Monroe Township Public School District's utility consumption to that of other districts 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 identified for your School District. 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 Monroe Township Public School District are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined solely by the Monroe Township Public School District and the financial goals outlined within the ESIP program to be self-funding within existing budget guidelines. The sample ECM selections and preliminary financials are based on the selections noted in Form II in the Technical and financial summary.

D. Technical and Financial Summary – This section includes an accounting of all technical and financial outcomes associated with the ECMs as presented. The 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 19-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.

Appendices 1-6 – The following files have been uploaded to a Teams Folder once reviewed will be provided on a USB drive to be included with our final submission:

- Appendix 1 —School Independent Energy Audit
- Appendix 2— ECM Calculations
- Appendix 3— Equipment Cut Sheets
- Appendix 4— Lighting Line By Line
- Appendix 5— Required Forms & Omnia Cooperative / NJ Procurement Documentation

BENEFITS

The measures investigated in this Energy Savings Plan could result in an annual utility savings of 5,422,532 kWh of electricity and 17,455 therms. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the school district's carbon footprint by 1,705 MTE of CO2 annually. This is equivalent to removing 360 cars from the road annually and /or 1,614 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.

Overall, it is evident that the Monroe Township Public 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 appreciate the opportunity to provide the District with this guideline to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan should the District decide to move forward with a project.

SECTION B
UTILITY DASHBOARDS BY SCHOOL BUILDING & PRELIMINARY UTILITY ANALYSIS (PUA)

SECTION B — PRELIMINARY UTILITY ANALYSIS (PUA)

Honeywell

Preliminary Utility Analysis

Monroe Township Schools
Monroe Township, 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

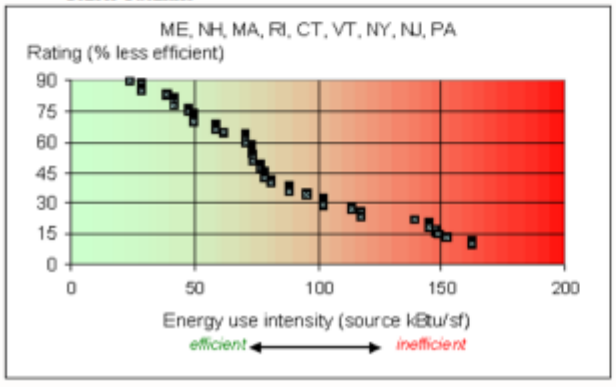
The calculation of EUI (Energy Use Intensity) is shown below. EUI, expressed in kBtu/sf, is normalized for floor area, the most dominant influence on energy use in most buildings. Its use usually provides a good approximation of how your building's energy performance compares to others. Site EUI indicates 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.)

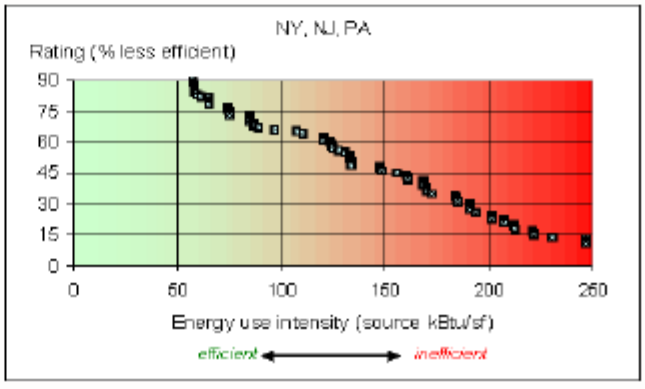
Source EUI Rating for your Building	Energy use and cost reduction potential (%)	Walk-thru energy assessment recommended?
above 60%	below 25%	No
40 to 60%	20 to 35%	Maybe
20 to 40%	35 to 50%	Yes
Below 20%	above 50%	Definitely

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	Monroe Twp. High School	4,939,274	62,820	382,699	60	150	15%
2	Monroe Twp. Middle School	2,340,266	52,327	187,332	71	157	15%
3	Applegarth School	503,440	21,478	50,429	77	146	15%
4	Woodland School	585,300	20,715	60,419	67	134	20%
5	Mill Lake School Complex	745,000	20,250	79,312	58	123	20%
6	Brookside School	499,600	16,756	60,662	56	113	30%
7	Barclay Brook School	483,360	18,475	49,453	71	138	20%
8	Oak Tree School	571,200	19,891	82,270	48	96	15%
9	Administration Building	118,220	1,157	6,600	79	203	20%
10	Transportation Building	51,708	0	5,856	30	91	30%
11	Sports Field	165,754	0	252,000	2	7	NA
		11,003,122					

School Facilities



Offices



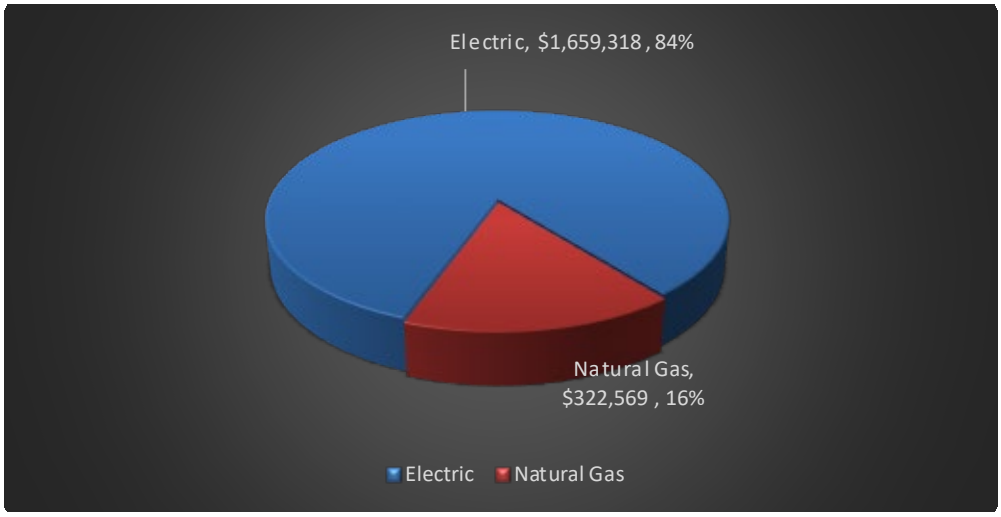
Historical Summary

Utility Analysis Period:
May 2022 - Apr 2023

	Electric	Natural Gas
Utility Costs*	$1,659,318	$322,569
Utility Usage (kWh, Therms)	11,003,122	233,870
$ Cost/Unit (kWh, Therms)	$0.15080	$1.379
Annual Electric Demand (kW)	46,279	

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

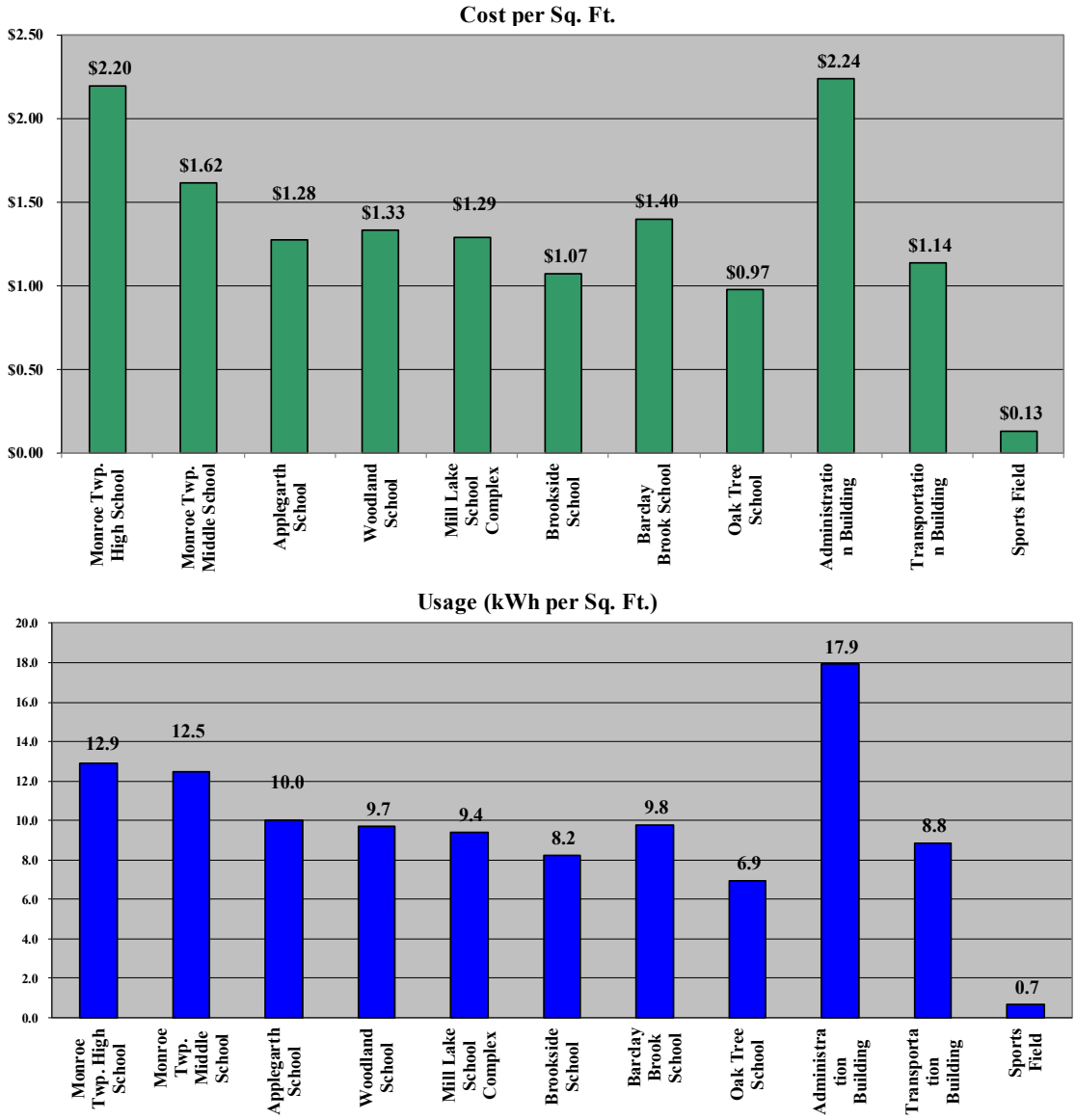
Actual Cost by Utility
May 2022 - Apr 2023



Total Cost
$1,981,887

Utility Analysis
Electric

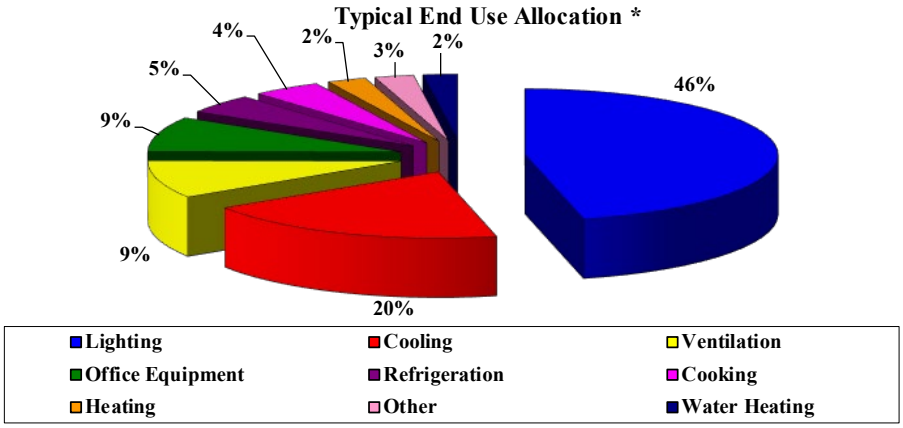
Square Footage Analysis



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

Electric

Sources of Electric Consumption

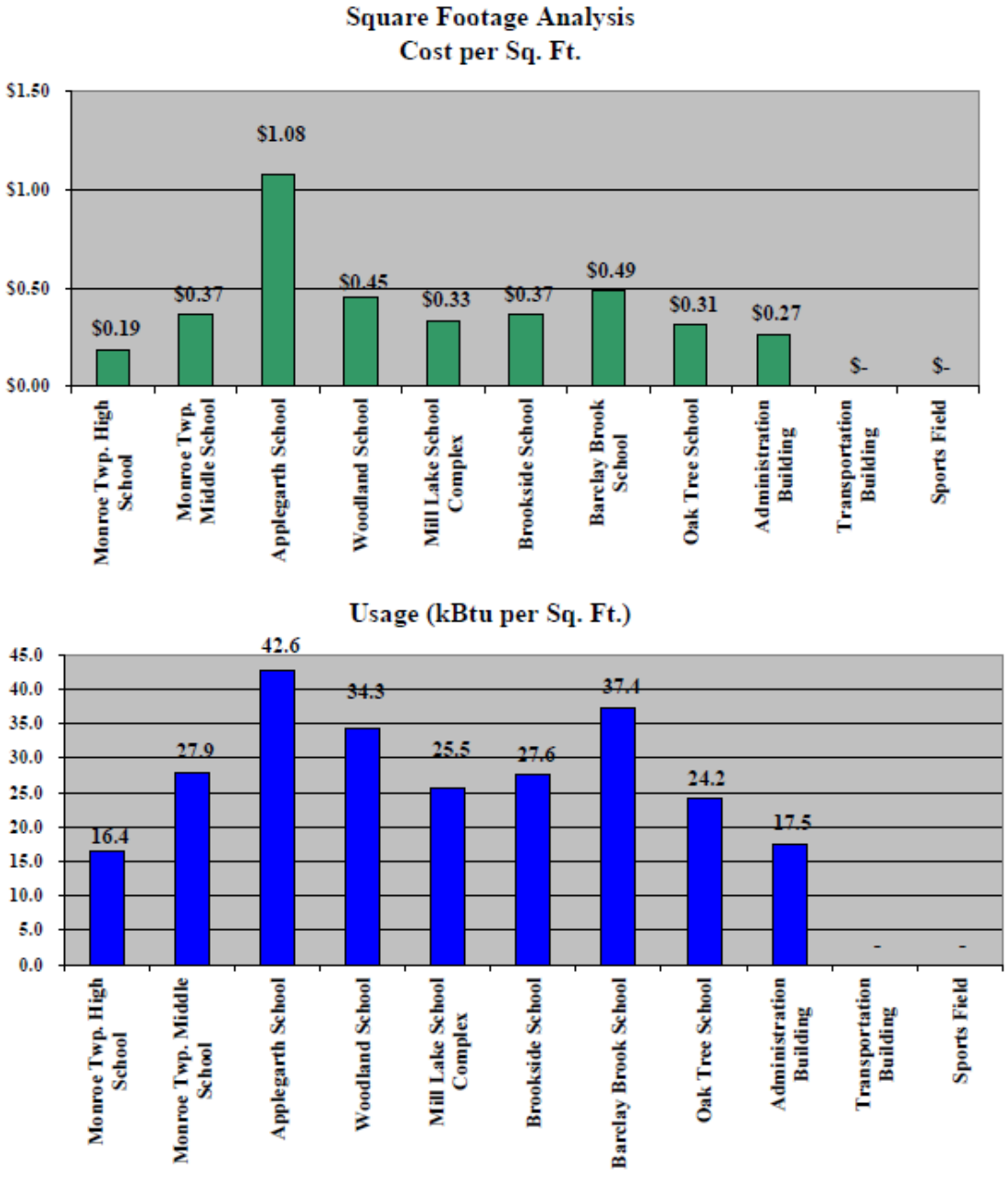


**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

Lighting	$768,264
Cooling	$325,226
Ventilation	$152,657
Office Equipment	$142,701
Refrigeration	$77,988
Cooking	$73,010
Heating	$41,483
Other	$41,483
Water Heating	$36,505
Your Total Cost May 2022 - Apr 2023	**$1,659,318**

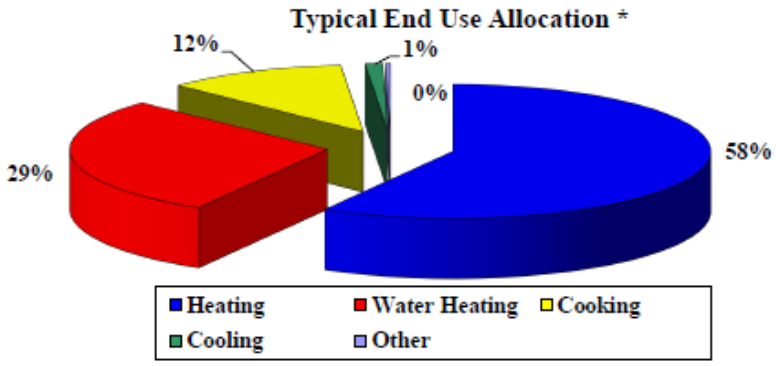
Utility Analysis
Natural Gas & Fuel Oil



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

Utility Analysis
Natural Gas & Fuel Oil

Sources of Usage
Natural Gas & Fuel Oil



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

Typical Allocation Applied to Your Cost**
Natural Gas & Fuel Oil

Heating	$188,058
Water Heating	$93,223
Cooking	$36,773
Cooling	$3,548
Other	$968
Your Total Cost May 2022 - Apr 2023	**$322,569**

Annual Emissions & Environmental Impact

Monroe Township Schools

May 2022 - Apr 2023

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	11,003,122	kWh
Annual Natural Gas usage	233,870	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)	7,784	MT
eCO2 (Gas)	1,238	MT
Total eCO2	9,021.935	MT

This is equivalent to one of the following:	
1935	No. of passenger vehicles - annual greenhouse gas emissions
11785	No. of acres of U.S. forests - carbon sequestered annually

SECTION C
ENERGY CONSERVATION MEASURES

SECTION C — PRELIMINARY ENERGY SAVINGS PLAN: ENERGY CONSERVATION MEASURES (ECMS)

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.

***ECMs included in Recommended Project are highlighted in green.**

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
1A LED Lighting	●	●	●	●	●	●	●	●	●	●	
1B Stadium Lights											●
1C Destratification Fans	●	●	●	●	●	●	●	●			
2A Boiler Replacements		●	●	●	●		●	●			
2B Domestic Water Heater Replacements	●			●							
2C Roof Top Unit Upgrades		●		●	●		●		●		
2D Split System Upgrades					●						
2E Premium Efficiency Motors and VFDs		●									
2F Chiller Replacements				●			●	●			
2G Unit Ventilator Replacements		●		●	●	●	●				
2H AHU Replacements		●		●			●				

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
3A Building Management Controls	●	●	●	●	●	●	●	●	●	●	
3B Building Sustainability Manager HBSM	●	●	●	●	●	●	●	●	●	●	
4A Building Envelope Improvements	●	●	●	●	●	●	●	●	●	●	
4B Roof Replacements		●	●		●	●			●		
5A Cogeneration CHP	●										
6A Solar PPA	●	●	●	●	●		●	●	●	●	
6B Community Solar	●	●	●	●	●	●	●	●	●	●	
6C Solar PV	●	●	●	●	●		●	●	●	●	
7A Transformer Replacements		●		●	●	●	●				

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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
1A LED Lighting	●	●	●	●	●	●	●	●	●	●	

EXISTING CONDITIONS

Indoor lighting predominantly consists of T-8 lamps, with a small quantity of T-12 and compact fluorescent lamps (CFLs) along with incandescent bulbs. In general, lighting is operated on switches.

Lighting at Mill Lake School

Lighting at Brookside School

SCOPE OF WORK

The proposed lighting system is based on the most recent lighting system audit where existing lighting systems were analyzed and inventoried. Honeywell proposes to retrofit all existing T-8 and T-12 fixtures with high efficiency Light Emitting Diode (LED) lamps. The District will receive many benefits from the lighting system upgrade.

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 Stadium Lighting

The key benefits of this ECM include:

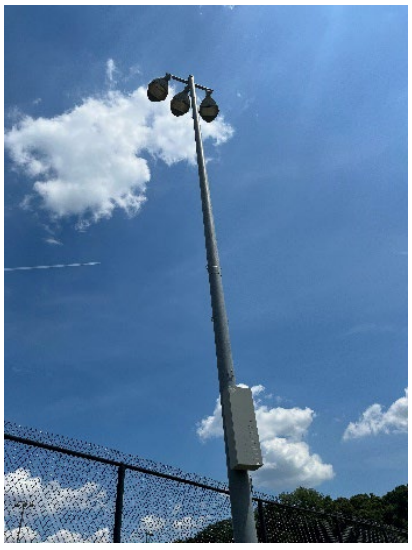
- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology. New stadium lighting will reduce energy and maintenance costs over typical high intensity discharge (HID) equipment.
- **Reduced maintenance and operational costs** by reducing the runtime of lighting system and components.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
1B Stadium Lights											●

EXISTING CONDITIONS

Bell Stadium has existing 1650-Watt HID equipment. HID lamps have a lifespan of approximately 2,000 hours. HIDs are responsible for producing glares and do not provide instant light when turned on, they need time to warm-up.

Sports Field – Stadium Lighting



Sports Field - Stadium Lighting

PROPOSED SOLUTION

Honeywell proposes the installation of new LED field lighting. The new lighting system can be controlled manually at the field or with wireless communication system, which includes remote programming for up to eight dynamic lighting scenes and user training.

Table 1B.1 Proposed Stadium Lighting

Building	Manufacture	Model	Watts	Qty
Sports Field	Musco	TLC-LED-1000	1000	6
Sports Field	Musco	TLC-LED-1500	1500	130
Total				**136**

SCOPE OF WORK

New lighting will be installed. Lower energy cost by adjusting light levels by occupancy, turning lights off when not needed.

CHANGES IN INFRASTRUCTURE

New LED lighting 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 electric energy usage.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1C De-Stratification Fans

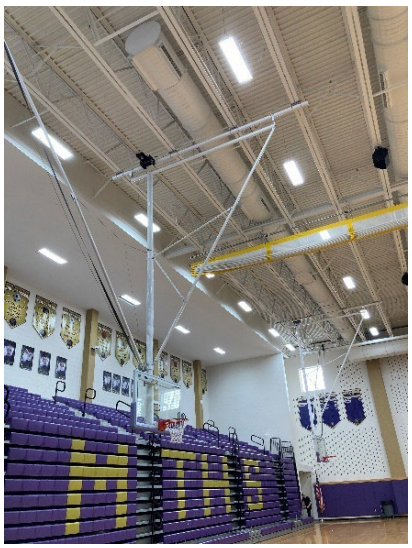
The key benefits of this ECM include:

- **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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
1C Destratification Fans	●	●	●	●	●	●	●	●			

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.



Monroe Twp. High School - Gym

Monroe Twp. Middle School - Gym

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 1C.1 Proposed De-Stratification Fans

Building	Location	Airius Model	Qty PureAir	Qty AirPear	Qty Designer Series
Monroe Twp. High School	Aux Gym	(6) A-45-P4-STD-120-W		6	
Monroe Twp. High School	Gym	(12) A-45-P4-STD-120-W		12	
Monroe Twp. High School	Art Room - H103	D-25-SP-STD-120-W			1
Monroe Twp. High School	Wrestling/ Aerobics	(2) A-25-SP-STD-120-W-PHI (1) A-25-SP-STD-120-W	2	1	
Monroe Twp. Middle School	Aux Gym	(2) A-25-SP-STD-120-W-PHI (1) A-25-SP-STD-120-W	2	1	
Monroe Twp. Middle School	Gym	(4) A-25-SP-STD-120-W-PHI (4) A-25-SP-STD-120-W	4	4	
Applegarth School	Gym	(4) A-25-SP-STD-120-W-PHI	4	3	

Building	Location	Airius Model	Qty PureAir	Qty AirPear	Qty Designer Series
		(3) A-25-SP-STD-120-W			
Woodland School	Gym	(3) A-25-SP-STD-120-W-PHI (3) A-25-SP-STD-120-W	3	3	
Woodland School	Cafeteria	(2) A-25-SP-STD-120-W-PHI (1) A-25-SP-STD-120-W	2	1	
Mill Lake School Complex	Gym	(3) A-25-SP-STD-120-W-PHI (3) A-25-SP-STD-120-W	3	3	
Mill Lake School Complex	Cafeteria	(2) A-25-SP-STD-120-W-PHI (1) A-25-SP-STD-120-W	2	1	
Brookside School	Gym	(3) A-25-SP-STD-120-W-PHI (2) A-25-SP-STD-120-W	3	2	
Barclay Brook School	Gym	(3) A-25-SP-STD-120-W-PHI (2) A-25-SP-STD-120-W	3	2	
Barclay Brook School	Cafeteria	(1) A-25-SP-STD-120-W-PHI (1) A-25-SP-STD-120-W	1	1	
Oak Tree School	Cafetorium	(3) A-45-P4-STD-120-W		3	
Oak Tree School	Gym	(5) A-45-P4-STD-120-W		5	
Total			**29**	**48**	**1**

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 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2A Boiler Replacements		●	●	●	●		●	●			

EXISTING CONDITIONS

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

Oak Tree School - Boilers

Barclay Brook School - Boilers

EXISTING BOILERS TO BE REPLACED

Table 2A.1 Existing Boilers

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Applegarth School	Steam	Powermaster	3LS	2,206	Fuel Oil #2	1
Applegarth School	Hot Water	Weil Mclain	PL-586-EF	940	Fuel Oil #2	2
Barclay Brook School	Hot Water	Aerco	BMK 2.0	1,840	Natural Gas	3
Mill Lake School Complex	Hot Water	Aerco	BMK 2.0	1,840.0	Natural Gas	3
Woodland School	Hot Water	Aerco	BMK 2.0	1,840.0	Natural Gas	3
Monroe Twp. Middle School	Hot Water	Aerco	BMK 2.0	1,840.0	Natural Gas	8
Oak Tree School	Hot Water	Aerco	BMK 2.0	1,840.0	Natural Gas	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 2A.2 Proposed Boilers

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Applegarth School	Steam	HB Smith	28HE-S-6	1,110	Natural Gas	2
Applegarth School	Hot Water	Aerco	BMK 1500	1,500	Natural Gas	2
Barclay Brook School	Hot Water	Aerco	BMK 2000	2,000	Natural Gas	3
Mill Lake School Complex	Hot Water	Aerco	BMK 2000	2,000	Natural Gas	3
Woodland School	Hot Water	Aerco	BMK 2000	2,000	Natural Gas	3
Monroe Twp. Middle School	Hot Water	Aerco	BMK 2000	2,000	Natural Gas	8
Oak Tree School	Hot Water	Aerco	BMK 2000	2,000	Natural Gas	2

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)*

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 2B 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2B Domestic Water Heater Replacements	●			●							

EXISTING CONDITIONS

Existing Domestic Hot Water (DHW) heater has past the end of its useful life.

Monroe Twp. High School – Water Heater

Woodland School – Water Heater

EXISTING HOT WATER HEATER TO BE REPLACED

Table 2B.1 Existing Water Heaters

Building	Manufacturer	Model	Output (MBH)	Storage	Fuel	Qty
Monroe Twp. High School	PVI	1400 N 250A-PV	750	250	NG	4
Woodland School	PVI	20N125A-MX	199	125	NG	1

PROPOSED SOLUTION

Honeywell proposes replacing the existing DHW heater 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 2B.2 Proposed Water Heaters

Building	Manufacturer	Model	Output (MBH)	Storage	Fuel	Qty
Monroe Twp. High School	Aerco	AM1000	1,000	200	NG	3
Woodland School	AO Smith	BTH-199A 300	199	100	NG	1

SCOPE OF WORK

The following outlines the Domestic Hot Water Heater 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 Efficiency	*= Existing Efficiency + Existing Heat Exchanger Efficiency*
Proposed 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 2C Roof Top Unit Upgrades

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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2C Roof Top Unit Upgrades		●		●	●		●		●		

EXISTING CONDITIONS

Some Roof Top Units serving the buildings 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.

Monroe Twp. Middle School - RTU

Mill Lake School Complex - RTU

EXISTING ROOFTOP UNITS TO BE REPLACED

Table 2C.1 Existing RTUs

Building	Location Served	Manufacturer	Model	Tons	Qty
Monroe Twp. Middle School	Rm 159	Adison	DFC094M-4F-05	8.0	1
Monroe Twp. Middle School	Room 150, 151	Adison	DFC124L-4F-05	10.0	1
Monroe Twp. Middle School	Rm 160 Area	McQuay	RCS0300YY	30.0	1
Woodland School	Main Office	Carrier	50HJ-006---6211	5.0	1
Woodland School	Guidance	Carrier	50GX-024---301--	2.0	1
Woodland School	Nurse	Carrier	50GX-030---301	2.5	1
Barclay Brook School	Rm 111-115	AAON	RK-08-3-F0-750	8.0	1
Mill Lake School Complex	Cafeteria	McQuay	RPS020CSW	20.0	1
Mill Lake School Complex	Gym	McQuay	RPS018CSW	18.0	1
Mill Lake School Complex	Gym	McQuay	RPS018CSW	18.0	1
Mill Lake School Complex	501-504	AAON	RK-13-3-F0-000	13.0	1
Mill Lake School Complex	514	AAON	RK-05-3-F0-750	5.0	1
Mill Lake School Complex	300 Wing	McQuay	RPS030CLW	30.0	1
Mill Lake School Complex	200 Wing	McQuay	RPS030CLW	30.0	1
Mill Lake School Complex	00 Wing	McQuay	RPS030CLW	30.0	1
Mill Lake School Complex	100 Wing	McQuay	RPS030CLW	30.0	1
Mill Lake School Complex	401, 405, 407	AAON	RK-05-3-F0-000	5.0	1
Mill Lake School Complex	408, 410, 402	AAON	RK-13-3-F0-750	13.0	1
Administration Building	Ground Floor	York	DL-07N18ATAAA3C	7.5	1
Administration Building	Ground Floor	York	DM090N15N2AAA1A	7.5	1

PROPOSED SOLUTION

Honeywell proposes replacing the existing RTU units in the above table. 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 2C.2 Proposed RTUs

Building	Location Served	Manufacturer	Model	Tons	Qty
Monroe Twp. Middle School	Rm 159	Daikin	MPSH08	8.0	1
Monroe Twp. Middle School	Room 150, 151	Daikin	MPSH10	10.0	1
Monroe Twp. Middle School	Rm 160 Area	Daikin	DPSA030	30.0	1
Woodland School	Main Office	Lennox	KGB060	5.0	1
Woodland School	Guidance	Lennox	KGB024	2.0	1
Woodland School	Nurse	Lennox	KGB030	2.5	1
Barclay Brook School	Rm 111-115	Daikin	MPSH08	8.0	1
Mill Lake School Complex	Cafeteria	Daikin	MPSH020	20.0	1
Mill Lake School Complex	Gym	Daikin	MPSH018	18.0	1
Mill Lake School Complex	Gym	Daikin	MPSH018	18.0	1
Mill Lake School Complex	501-504	Daikin	MPSH013	13.0	1
Mill Lake School Complex	514	Daikin	MPSA005	5.0	1
Mill Lake School Complex	300 Wing	Daikin	MPSH030	30.0	1
Mill Lake School Complex	200 Wing	Daikin	MPSH030	30.0	1
Mill Lake School Complex	00 Wing	Daikin	MPSH030	30.0	1
Mill Lake School Complex	100 Wing	Daikin	MPSH030	30.0	1
Mill Lake School Complex	401, 405, 407	Daikin	MPSA005	5.0	1
Mill Lake School Complex	408, 410, 402	Daikin	MPSH013	13.0	1
Administration Building	Ground Floor	Daikin	MPSH07	7.5	1
Administration Building	Ground Floor	Daikin	MPSH07	7.5	1

SCOPE OF WORK

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

1. Disconnect existing 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 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 2D Split System Replacements

The key benefits of this ECM include:

- **Reduced energy usage** from improved unit efficiency resulting from replacement of older equipment, and in certain instances, oversized units.
- **Lower operational costs** through less frequent maintenance and operational issues.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2D Split System Upgrades					●						

EXISTING CONDITIONS

Honeywell identified some split systems as being inefficient and having exceeded their useful service life. Replacing old 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.

Mill Lake School Complex – Split System

Mill Lake School Complex – Split System

EXISTING SPLIT SYSTEMS TO BE REPLACED

Table 2D.1 Existing Split Systems

Building	Area Served	Manufacturer	Model	Tons	Qty
Mill Lake School Complex	702	Trane	2TTA2036A3	3.0	1
Mill Lake School Complex	703	Trane	2TTA2036A3	3.0	1
Mill Lake School Complex	701	Trane	2TTA2036A3	3.0	1
Mill Lake School Complex	704	Mammoth	?	3.0	1
Mill Lake School Complex	705	Trane	2TTA2036A3	3.0	1
Mill Lake School Complex	706	Thermal Zone	TZAB-336-2N	3.0	1

PROPOSED SOLUTION

Honeywell proposes replacing both the existing condensing units and air handling units in the table above with new units. The new units will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new motors. The new units will be equipped with factory-installed microprocessor controls that improve unit efficiency. The units will also communicate with the existing or enhanced BMS.

Table 2D.2 Proposed Split Systems

Building	Area Served	Manufacturer	Model	Tons	Qty
Mill Lake School Complex	702	Daikin	GSXC703610	3.0	1
Mill Lake School Complex	703	Daikin	GSXC703610	3.0	1
Mill Lake School Complex	701	Daikin	GSXC703610	3.0	1
Mill Lake School Complex	704	Daikin	GSXC703610	3.0	1
Mill Lake School Complex	705	Daikin	GSXC703610	3.0	1
Mill Lake School Complex	706	Daikin	GSXC703610	3.0	1

SCOPE OF WORK

The following outlines the scope of work to install the condensing units listed in the Proposed Split Systems table above.

1. Disconnect existing electric connections.
2. Disconnect piping 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. 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 split systems 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 condensing units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2E Premium Efficiency Motors, Pumps 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2E 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.

Monroe Twp. Middle School – Motor

Monroe Twp. Middle School – Motor

EXISTING MOTORS TO BE REPLACED

Table 2E.1 Existing Motors

Building	Type	Qty	Motor HP	Existing Efficiency	Add VFD
Monroe Twp. Middle School	CHW Pump	2	20.0	91.7%	Y
Monroe Twp. Middle School	CHW Pump	2	20.0	91.7%	Y
Monroe Twp. Middle School	HW Pump	2	10.0	89.5%	Y
Monroe Twp. Middle School	HW Pump	2	25.0	91.7%	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 2F Chiller 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2F Chiller Replacements				●			●	●			

EXISTING CONDITIONS

Chillers serving some schools is near the end of its useful life and is costly to maintain. Replacing 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.

Oak Tree School - Chiller

Barclay Brook School – Chiller

EXISTING CHILLER UNITS

Table 2F.1 - Existing Air-Cooled Chillers

Building	Location Served	Manufacturer	Model	Tons	Qty
Woodland School	Building	McQuay	ALS204BS27-ER10	204.0	1
Barclay Brook School	Building	McQuay	ALS155BS27-ER10	155.0	1
Oak Tree School	Building	Carrier	30RBA11064-5B-73	110.0	2

PROPOSED SOLUTION

Honeywell proposes replacing the existing chillers in the table above. Existing electrical power supply will be reconnected to the new units. The unit will communicate with the existing or enhanced BMS.

Table 2F.2 – Proposed Air-Cooled Chillers

Building	Location Served	Manufacturer	Model	Tons	Qty
Woodland School	Building	Daikin	AWV204	204.0	1
Barclay Brook School	Building	Daikin	AWV155	155.0	1
Oak Tree School	Building	Daikin	AWV110	110.0	2

SCOPE OF WORK

The following outlines the scope of work to install the chiller unit 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 (kWh) – replacement unit energy consumption (kWh)*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
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 chillers 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 units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2G Unit Ventilator 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2G Unit Ventilator Replacements		●		●	●	●	●				

EXISTING CONDITIONS

Honeywell observed that some of the existing unit ventilators are beyond the useful life and being inoperable or unrepairable.

Mill Lake School – Unit Ventilator

Woodland School – Unit Ventilator

Table 2G.1 – Existing Unit Ventilators

Building	Type	Location	Make	Model	Qty
Monroe Twp. Middle School	HW	Classrooms	AAF	VUV*100	39
Monroe Twp. Middle School	HW	Classrooms	AAF	VUV*125	4
Woodland School	HW	Classrooms	AAF	VUV*100	18
Woodland School	HW	Classrooms	AAF	VUV*125	4
Brookside School	HW	Classrooms	AAF	VUV*100	25
Brookside School	HW	Classrooms	AAF	VUV*075	1

Building	Type	Location	Make	Model	Qty
Barclay Brook School	HW	Classrooms	AAF	VUV*100	17
Barclay Brook School	HW	Classrooms	AAF	VUV*075	1
Barclay Brook School	HW	Classrooms	AAF	VUV*125	4
Mill Lake School Complex	HW	Classrooms	AAF	VUV*100	6

PROPOSED SOLUTION

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

Table 2G.2 – Proposed Unit Ventilators

Building	Type	Location	Make	Model	Qty
Monroe Twp. Middle School	HW	Classrooms	AAF	VUV*100	39
Monroe Twp. Middle School	HW	Classrooms	AAF	VUV*125	4
Woodland School	HW	Classrooms	AAF	VUV*100	18
Woodland School	HW	Classrooms	AAF	VUV*125	4
Brookside School	HW	Classrooms	AAF	VUV*100	25
Brookside School	HW	Classrooms	AAF	VUV*075	1
Barclay Brook School	HW	Classrooms	AAF	VUV*100	17
Barclay Brook School	HW	Classrooms	AAF	VUV*075	1
Barclay Brook School	HW	Classrooms	AAF	VUV*125	4
Mill Lake School Complex	HW	Classrooms	AAF	VUV*100	6

SCOPE OF WORK

The following outlines the unit ventilator replacements:

- Disconnect electrical and steam from existing units.
- Install new unit vents and reconnect, steam and electric.
- 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 Univent Efficiency	*= Heat Input x Existing Efficiency*
Proposed Univent Efficiency	*= Heat Input x New Efficiency*
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.

CHANGES IN INFRASTRUCTURE

New unit ventilators will be installed and programmed in the locations listed above; in addition, training for maintenance personnel will be required as well as on-going, annual preventive maintenance.

O&M IMPACT

The new unit ventilators will decrease the O&M cost for maintaining the equipment .

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	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ECM 2H Air Handling Unit (AHU) 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2H AHU Replacements		●		●			●				

EXISTING CONDITIONS

Some Air Handling Units serving the buildings 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 AHUs in operation.

Barclay Brook School - AHU

Monroe Twp. Middle School - AHU

EXISTING ROOFTOP UNITS TO BE REPLACED

Table 2H.1 Existing AHUs

Building	Location Served	Manufacturer	Model	Tons	Qty
Barclay Brook School	Cafeteria	McQuay	RDS800CYY	40.0	1
Barclay Brook School	Gym	McQuay	RDS800CYY	40.0	1
Barclay Brook School	Gym	McQuay	RDS800CYY	40.0	1
Barclay Brook School	Rm 301-304, 311-313	McQuay	RDS802CYY	50.0	1
Monroe Twp. Middle School	Cafeteria	McQuay	RSD800CYW	40.0	1
Monroe Twp. Middle School	Cafeteria	McQuay	RSDS800CYW	40.0	1
Monroe Twp. Middle School	Gym	McQuay	RAH047CSY	25.0	1
Monroe Twp. Middle School	Rm 207	Addison	RC104-4E	10.0	1
Monroe Twp. Middle School	Rm 210	AAON	RK-20-3-40-750	20.0	1
Monroe Twp. Middle School	Rm 214, 216, 217	McQuay	RDS708BY	20.0	1
Monroe Twp. Middle School	Rm 223	AAON	RK-16-3-40-750	16.0	1
Monroe Twp. Middle School	Rm 221, 209	McQuay	RDS708BY	20.0	1
Woodland School	Music 111	McQuay	RDS800CYY	30.0	1
Woodland School	112, Conference Rooms 105-106	McQuay	RAH047CSW	40.0	1
Woodland School	Cafeteria/Stage	McQuay	RDS800CYY	40.0	1
Woodland School	Gym	McQuay	RDS800CYY	40.0	1
Woodland School	Gym	McQuay	RDS800CYY	40.0	1

PROPOSED SOLUTION

Honeywell proposes replacing the existing AHU units in the above table. 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 2H.2 Proposed AHUs

Building	Location Served	Manufacturer	Model	Tons	Qty
Barclay Brook School	Cafeteria	Daikin	RDS800CYY	40.0	1
Barclay Brook School	Gym	Daikin	RDS800CYY	40.0	1
Barclay Brook School	Gym	Daikin	RDS800CYY	40.0	1

Building	Location Served	Manufacturer	Model	Tons	Qty
Barclay Brook School	Rm 301-304, 311-313	Daikin	RDS802CYY	50.0	1
Monroe Twp. Middle School	Cafeteria	Daikin	RSD800CYW	40.0	1
Monroe Twp. Middle School	Cafeteria	Daikin	RSDS800CYW	40.0	1
Monroe Twp. Middle School	Gym	Daikin	RAH047CSY	25.0	1
Monroe Twp. Middle School	Rm 207	Daikin	RC104-4E	10.0	1
Monroe Twp. Middle School	Rm 210	Daikin	RK-20-3-40-750	20.0	1
Monroe Twp. Middle School	Rm 214, 216, 217	Daikin	RDS708BY	20.0	1
Monroe Twp. Middle School	Rm 223	Daikin	RK-16-3-40-750	16.0	1
Monroe Twp. Middle School	Rm 221, 209	Daikin	RDS708BY	20.0	1
Woodland School	Music 111	Daikin	RDS800CYY	30.0	1
Woodland School	112, Conference Rooms 105-106	Daikin	RAH047CSW	40.0	1
Woodland School	Cafeteria/Stage	Daikin	RDS800CYY	40.0	1
Woodland School	Gym	Daikin	RDS800CYY	40.0	1
Woodland School	Gym	Daikin	RDS800CYY	40.0	1

SCOPE OF WORK

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

- Disconnect existing electric connections.
- Disconnect piping and air ducts from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rig and set new unit at the base.
- Inspect piping and air ducts before reconnecting them to the unit.
- Reconnect piping and air ducts.
- Repair duct and piping insulation.
- Connect electric power.
- Start up and commissioning of new unit.
- 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 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 2I Electrification of Applegarth School

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.
- **Decarbonize** the building by electrifying equipment.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
2I Electrification for Applegarth School			●								

EXISTING CONDITIONS

Applegarth School is served by fuel oil steam and hot water boilers. There are 30 univentilators that provide heating only to the classrooms. Larger spaces such as gymnasium, library, and offices are served by roof top units and split systems. Most equipment is older and beyond the useful life.

Applegarth School – Roof Top Unit

Applegarth School – Steam Boiler

PROPOSED SOLUTION

The District decided to electrify the whole building by a new Variable Refrigerant Flow (VRF) Heat Recovery system with new classroom unit ventilators for heating and cooling. Outside Air will be provided with a direct outside air (DOAS) system. Corridors, offices and core spaces will be served by RTU tied into the new VRF System.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

Energy Savings $	*= Existing energy consumption – Proposed energy consumption*

CHANGES IN INFRASTRUCTURE

New VRF system will be installed.

O&M IMPACT

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Support will be required for the interruption of utilities during tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Support will be required for the interruption of utilities during tie-in periods.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3A Building Management Controls

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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
3A Building Management Controls	●	●	●	●	●	●	●	●	●	●	

ECM OVERVIEW

Honeywell has performed a survey of the existing temperature controls throughout the School District. Upon inspection, it was noted that the level of controls technology varies throughout the District. However, regardless of the systems in place, the building control systems can benefit from upgrades and implementing energy conservation enhancements.

EXISTING CONDITIONS

DISTRICT DESCRIPTION

The Monroe Township School District buildings use a wide variety of building control strategies that vary significantly in age and complexity. Many of these systems are passed their useful life, including original pneumatics, standalone electric thermostats, and legacy electronic controllers. Only a limited number of systems utilize new, modern Direct Digital Control (DDC) that can be reused. Although each of these systems have been installed at different times by different controls contractors, Energy For America (EFA) has been providing its services to operate and maintain the control systems to the best of their ability.

There is currently no central supervisory building automation system that connects all District buildings. Many of the buildings are limited to a command line interfaces that can only be accessed by EFA technicians. There is no use of advanced analytics, including fault detection / diagnostics, smart alerts, and setpoint optimization.

Monroe Twp. High School

The Monroe High School currently utilizes a Johnson Controls Metasys building management system that is accessed from the desktop PC in the head custodian's office. This system provides control of all building HVAC systems, including: the hot water boiler plant, 29 rooftop units, ~280 VAV boxes, and miscellaneous units.

High School Metasys Front End

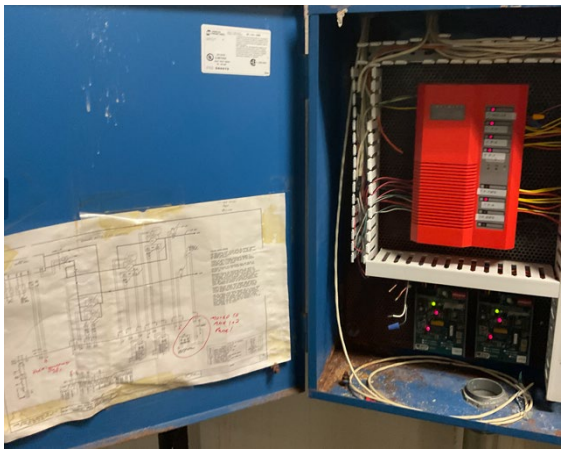
A review of the graphics revealed a large number of problems that are affecting building comfort and energy. These include, but are not limited to non-communication controllers, points reading incorrectly, temperature setpoints not maintained, non-standardized setpoints, and operating schedules not matching the actual occupancy. Most of the schedules were set to occupied from 4am until 7pm, which is likely causing a large excess in energy usage.

These controls are approximately 15-20 years old and should be considered for re-commissioning and/or replacement. New energy-focused sequences of operation should be implemented wherever possible, including optimized start/stop, demand control ventilations, discharge pressure reset, and more.

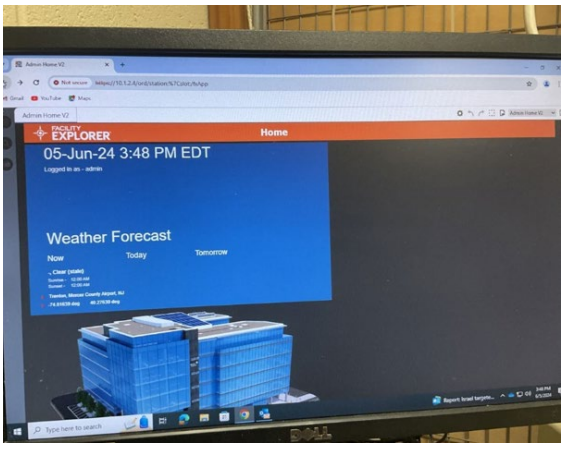
Monroe Twp. Middle School

The Middle School temperature controls consist of several different systems that vary widely in age, manufacturer, and complexity. The majority of the building systems are controlled by legacy Andover Infinity DDC controls that were install approximately 25 years ago by Jersey State Controls. This system is passed its useful life and many of the control components do not appear to be functioning. The district

has installed new JCI Facility Explorer controls in the new Performance Arts Center wing and has begun replacing the Andover controls starting with the chilled water system. This new Niagara-based system was installed by ATC Controls in multiple phases that were as recent as May 2024. We were unable to access the user interface during the site survey and could not confirm the schedule, setpoints, or functionality of these control systems in real time. EFA has reported occupied schedules that appear to closely match the actual occupancy and setpoints that are already aggressively set. Due to the age of these systems, many of the control components are likely failed and unable to accurately maintain setpoints.



Andover Infinity Legacy Controller



New JCI Niagara Front End

In addition to the DDC systems, there are several systems that are equipped with standalone electric thermostats and cannot provide remote control or automatic night setback.

Applegarth School

The Applegarth School control system is original to the building and is in the process of being completely renovated.

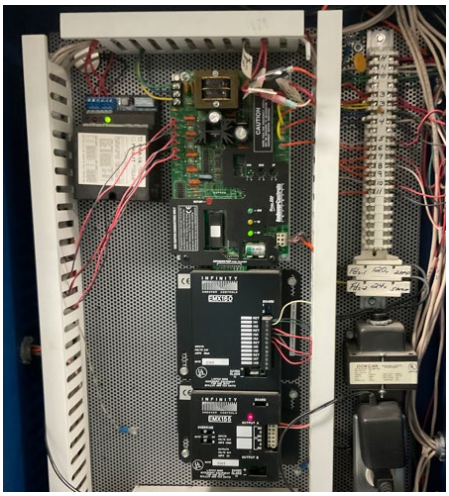
Woodland School

The Woodland School control system is an Andover Infinity control system that was installed in 2000. Many of the HVAC systems managed by these controllers have a limited number of control points available and can only be adjusted through a command line interface. We were unable to access this user interface during the site survey and could not confirm the schedule, setpoints, or functionality of the components in real time. EFA has reported occupied schedules that appear to closely match the actual occupancy and setpoints that are already aggressively set. Due to the age of these systems, many of the control components are likely failed and unable to accurately maintain setpoints. No advanced sequences of operation are possible with this system. This legacy control system is approximately nine years passed its useful life and should be considered for replacement.

Mill Lake School

The Mill Lake School control system is an Andover Infinity control system that was installed in 2000. Many of the HVAC systems managed by these controllers have a limited number of control points available and can only be adjusted through a command line interface. We were unable to access this user interface during the site survey and could not confirm the schedule, setpoints, or functionality of the components in real time. EFA has reported occupied schedules that appear to closely match the actual occupancy and

setpoints that are already aggressively set. Due to the age of these systems, many of the control components are likely failed and unable to accurately maintain setpoints. No advanced sequences of operation are possible with this system. This legacy control system is approximately nine years passed its useful life and should be considered for replacement.



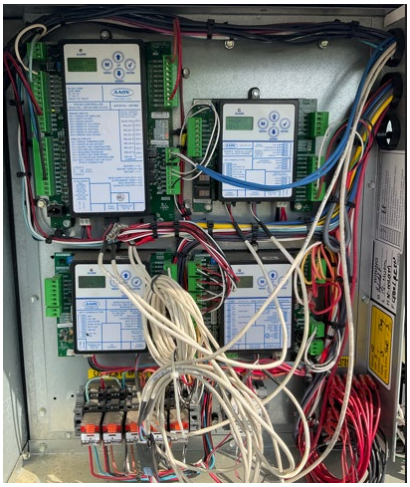
Andover Infinity Legacy Controller

Typical VAV Box with DDC

Brookside School

The Brookside School control system is a new Distech DDC system that is based on the Niagara open BAS platform. This system includes all HVAC systems and employees modern energy-saving sequences of operation. This system is monitored and operated by EFA. At approximately six years of age, the control components associated with this system should be in good working order. EFA has reported occupied schedules that appear to closely match the actual occupancy and setpoints that are already aggressively set. Minor adjustments to the setpoints, schedules, and sequences may provide a limited amount of energy savings.

Distech (Niagara) N4 JACE Controller



Typical RTU Controller

Barclay Brook School

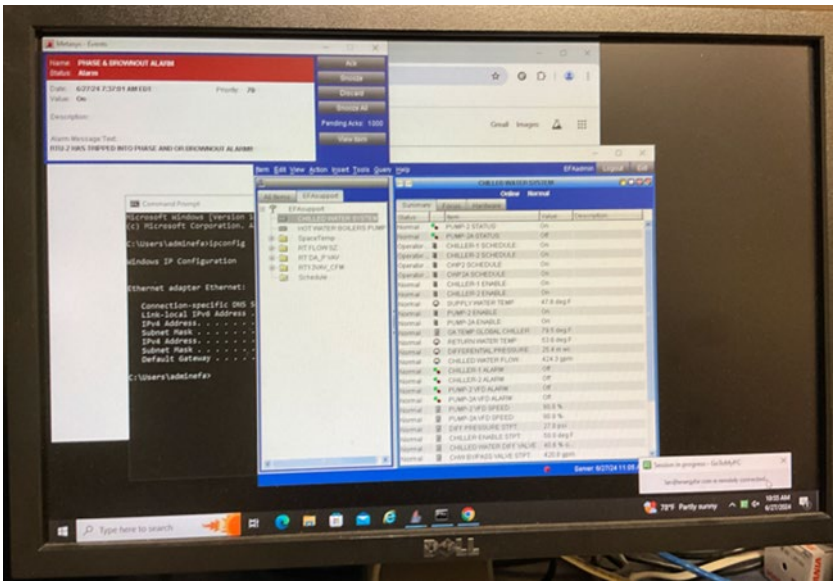
The Barclay Brook School control system is an Andover Infinity control system that was installed in 2001. Many of the HVAC systems managed by these controllers have a limited number of control points available and can only be adjusted through a command line interface. We were unable to access this user interface during the site survey and could not confirm the schedule, setpoints, or functionality of the components in real time. EFA has reported occupied schedules that appear to closely match the actual occupancy and setpoints that are already aggressively set. Due to the age of these systems, many of the control components are likely failed and unable to accurately maintain setpoints. No advanced sequences of operation are possible with this system. This legacy control system is approximately eight years passed its useful life and should be considered for replacement.

Andover Infinity Legacy Controller

Typical Andover RTU Controller

Oak Tree School

The Oak Tree School currently utilizes a Johnson Controls Metasys building management system that is accessed from the desktop PC in the head custodian's office. This system provides control of all building HVAC systems, including: the hot water boiler plant, chilled water plant, 14 rooftop units, and ~60 VAV boxes.



Oak Tree Metasys Front End

A review of the graphics revealed a large number of problems that are affecting building comfort and energy. These include, but are not limited to non-communication controllers, points reading incorrectly, temperature setpoints not maintained, and non-standardized setpoints. EFA has reported occupied schedules that appear to closely match the actual occupancy and setpoints that are already aggressively set.

These controls are approximately 15-20 years old and should be considered for re-commissioning and/or replacement. New energy-focused sequences of operation should be implemented wherever possible, including optimized start/stop, demand control ventilations, discharge pressure reset, and more.

Administration Building

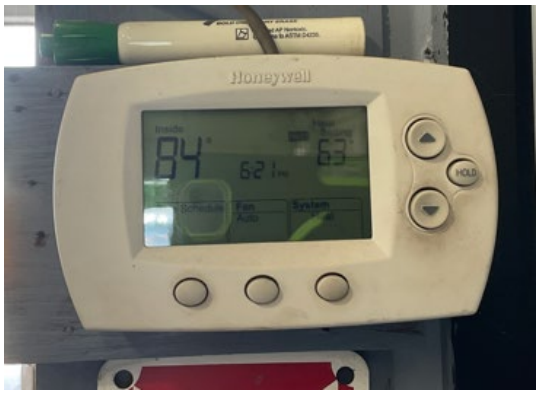
The Monroe Administration Building currently utilizes several types of standalone controls to maintain building temperatures. Programmable thermostats are controlling the three air handling units that serve the interior sections of the building. Although these thermostats are capable of adjusting setpoints based on an occupancy schedule, this feature does not appear to be in use. The exterior offices have additional cooling in the form of window A/C and mini-split A/C units. These units are using integral temperature controls and likely operate based on a single setpoint.

Programmable Thermostat (AHU)

Programmable Thermostat (AHU)

Transportation Building

The Transportation Building currently utilizes several types of standalone controls to maintain building temperatures. Non-programmable electric thermostats are controlling the air handling unit that serve the interior section of the building and five-unit heaters serving the garages. These thermostats do not provide the ability to remotely monitor the conditions of the space and cannot provide night setback.



Garage Thermostat (AHU)

Office Thermostat (AHU)

PROPOSED SOLUTION

Monroe Twp. High School

Setpoint and Schedule Adjustment

Provide adjustments to the existing JCI control system to implement new setpoints and schedules that more closely reflect the building's requirements. Honeywell shall meet with building operators and key stakeholders to determine areas of the building that would benefit from zone scheduling.

Monroe Twp. Middle School

Building Network Controller

Furnish and install new JACE network controllers as needed to integrate the new controls that shall be installed as part of this project. Include LAN drop wiring from the nearest network switch to new JACE panel. Provide new graphics, scheduling, and point trending.

Install New DDC

Furnish and install new controls for the following systems to replace the existing Andover Infinity DDC. New network controllers shall be installed as needed to expand the existing BMS. New valve assemblies will be installed where applicable. Existing wiring shall be reused where possible.

- Hot Water Boiler Plant
- 17 Air Handling Units
- 45 VAV Boxes
- 49 Unit Ventilators
- 13 Electric Reheat Coils
- 3 Hot Water Reheat Coils

The following energy saving sequences of operation shall be implemented:

- *Optimized Start / Stop*
  - Predictive algorithm that dynamically sets building start times based on weather forecasting and historical warm up durations.
- *Hot Water Outside Air Reset*
  - Dynamically sets the hot water supply setpoint based on the outside air temperature.
- *Unoccupied Hot Water Setpoint Offset*
  - When heating is called during the unoccupied schedule, the reset schedule is offset to be 20 degrees lower.
- *Hot Water Morning Boost*
  - During morning warm-up mode, the hot water supply temperature will be set to it's maximum temperature setpoint in order to reduce the warm-up period.
- *Demand Control Ventilation*
  - Outdoor air damper positions are reduced to a lower minimum while space CO2 setpoints are satisfied.
- *Economizer Mode*
  - When environmental conditions are favorable, the outdoor air dampers will be opened to take advantage of free cooling.
- *Air Handling Unit Morning Warm-up / Cool-Down*
  - Upon startup, outdoor air dampers shall remain closed to reduce unnecessary conditioning of outdoor air.

Applegarth School

There is no proposed scope at this building.

Woodland School

Building Network Controller

Furnish and install new JACE network controllers as needed to integrate the new controls that shall be installed as part of this project. Include LAN drop wiring from the nearest network switch to new JACE panel. Provide new graphics, scheduling, and point trending.

Install New DDC

Furnish and install new controls for the following systems to replace the existing Andover Infinity DDC. New network controllers shall be installed as needed to expand the existing BMS. New valve assemblies will be installed where applicable. Existing wiring shall be reused where possible.

- Boiler Plant
- Chilled Water Plant
- 8 Air Handling Units
- 23 VAV Boxes
- 4 Reheat Coils
- 22 Unit Ventilators
- 4 Fan Coil Units

The following energy saving sequences of operation shall be implemented:

- *Optimized Start / Stop*
  - Predictive algorithm that dynamically sets building start times based on weather forecasting and historical warm up durations.
- *Hot Water Outside Air Reset*
  - Dynamically sets the hot water supply setpoint based on the outside air temperature.
- *Unoccupied Hot Water Setpoint Offset*
  - When heating is called during the unoccupied schedule, the reset schedule is offset to be 20 degrees lower.
- *Hot Water Morning Boost*
  - During morning warm-up mode, the hot water supply temperature will be set to it's maximum temperature setpoint in order to reduce the warm-up period.
- *Demand Control Ventilation*
  - Outdoor air damper positions are reduced to a lower minimum while space CO2 setpoints are satisfied.
- *Economizer Mode*
  - When environmental conditions are favorable, the outdoor air dampers will be opened to take advantage of free cooling.
- *Air Handling Unit Morning Warm-up / Cool-Down*
  - Upon startup, outdoor air dampers shall remain closed to reduce unnecessary conditioning of outdoor air.

Mill Lake School

There is no proposed scope at this building.

Brookside School

There is no proposed scope at this building.

Barclay Brook School

There is no proposed scope at this building.

Oak Tree School

There is no proposed scope at this building.

Administration Building

Install Smart Thermostats

Furnish and install three new Wi-Fi thermostats to replace the existing programmable thermostats. Configure mobile app for customer use and implement scheduling and setpoint control.

Transportation Building

Install Smart Thermostats

Furnish and install three new Wi-Fi thermostats to replace the existing thermostats. Configure mobile app for customer use and implement scheduling and setpoint control.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

Existing Heating BTU and 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*
Cost of Proposed Heating/Cooling	*= Reduced BTU x Cost per BTU*
Energy Savings $	*= Existing Costs – Proposed Costs*

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 Honeywell Building Sustainability Manager (HBSM)

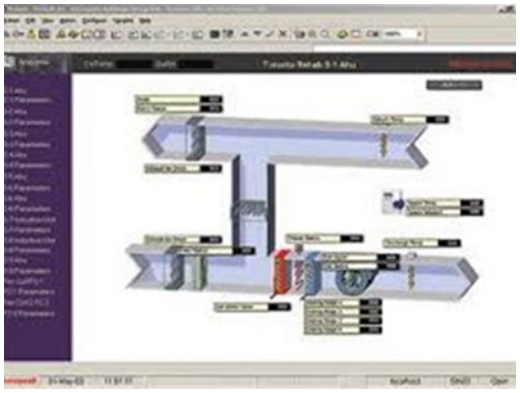
The key benefits of this ECM include:

- **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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
3B Building Sustainability Manager HBSM	●	●	●	●	●	●	●	●	●	●	

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

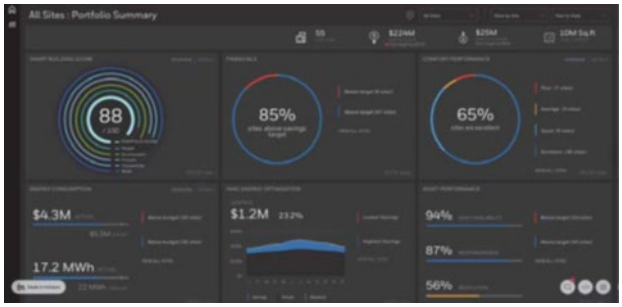
PROPOSED SOLUTION

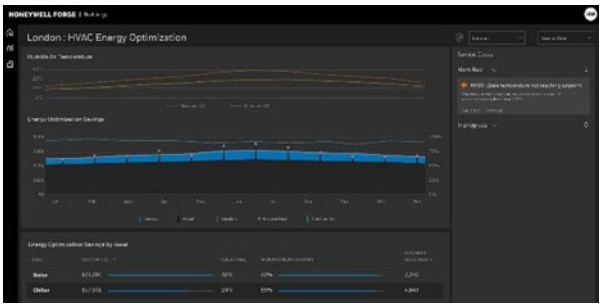
We propose to deploy Honeywell Forge Predictive Maintenance, an application that automates the detection of faults and anomalies in the operation of building heating, ventilation, and air conditioning

(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

Healthy Buildings Technologies provide a set of tools to help building operators optimize the health of their building environments, operate more cleanly and safely, comply with social distancing policies, and reassure occupants as part of a return-to-business strategy. Honeywell Forge integrates building controls, air quality sensors, video feeds and secure access points then applies advanced analytics to calculate a simple, real-time Healthy Building Score. Site-level performance scores are aggregated for comparison and benchmarking across your portfolio to inform your strategic plan. The package provides insights and analytics to improve indoor environment, highlight proactive actions and automate incident response standards to manage and respond to alerts, anytime, anywhere.





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:

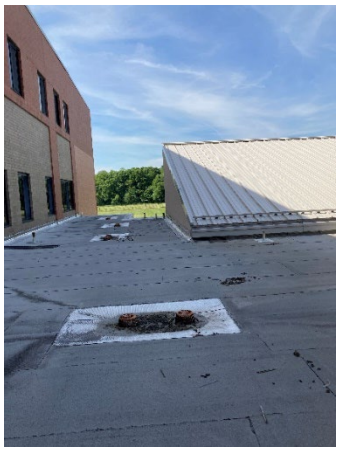
- **Energy savings** from reducing unwanted outside air infiltration.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy comfort and productivity** by way of enhanced temperature and humidity control throughout your buildings.
- **Improved building envelope** from addressing building gaps that allow unconditioned air penetration.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
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.



Monroe Twp. High School - Building Envelope

Woodland 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

Table 4A.1 Proposed Building Envelope Scope

Building	Attic Bypass Air Sealing (SF)	Attic Flat Insulation (SF)	Caulking (LF)	Door - Install Jamb Spacer (Units)	Door Weather Striping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Insulation Soffit Baffles (UT)	Overhead Door Weather Stripping (Units)	Penetration Air Sealing (Units)	Retrofit Pull Down Stairs (Units)	Roll-Up Door Weather Stripping (Units)	Roof-Wall Intersection Air Sealing (LF)	Roof-Wall Intersection Air Sealing (Units)	Wall Air Sealing (LF)	Window Weatherization (Units)
Administration Building					2	2				1					
Applegarth School			68	1	8	12						1,140	11		
Barclay Brook School	6,410	6,410	68	12	11	11	249					745			2
Brookside School			51	6	11	7									
Mill Lake School Complex				35	16	19	0	0	0	0	0	1,880	0	0	0
Monroe Township High School			1,292		44	30			1		5			545	
Monroe Township Middle School			580	9	26	21						2,861			
Oak Tree School			340		19	3						1,784		16	
Transportation Building						1		5							
Woodland School			540	18	13	11						922			
Total Quantity	**6,410**	**6,410**	**2,939**	**81**	**150**	**117**	**249**	**5**	**1**	**1**	**5**	**9,332**	**11**	**561**	**2**

Roof-Wall Joints

- Existing – Buildings throughout the School District 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 Penetrations

- Existing - There are many roof top exhaust fans that require damper cleaning, lubrication, and inspection for proper operation and to seal the roof deck to prevent penetration. Some units may be deemed to be too oversized for this service. Some buildings have roof-top AHUs with ducts that may show air leak during an IGA.
- Proposed – Honeywell recommends if there is leak, these duct penetrations will be sealed with two-component polyurethane foam. Skylights will also be sealed. Sealant will be injected behind the drip cap to eliminate airflow.

Roof Overhangs

- Existing – 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 the district need 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 Roof Replacements

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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
4B Roof Replacements		●	●		●	●			●		

EXISTING CONDITIONS

Some of the roofs have no warranties or 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.

Mill Lake School Complex– Existing Roof

Brookside School – Existing Roof

PROPOSED SOLUTION

Honeywell proposes replacing existing roofs and installing a new roofing system in order to provide resistance to water intrusion, UV exposure and natural weathering. The roof upgrade will allow for less infiltration through the roof and air conditioning units to work less.

Table 4B.1 Existing Roof Area to Upgrade

Building	Approximate Roof Square Footage to Upgrade
Applegarth School	57,200
Monroe Twp. Middle School	12,200
Brookside School	12,650
Mill Lake School	84,100
Board Office	7,500
Total	**173,650**

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 Cogeneration - Combined Heat and Power (CHP)

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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
5A Cogeneration CHP	●										

EXISTING CONDITIONS

No Combined Heat and Power (i.e. cogeneration) units are currently located within the 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 micro-CHP 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 5A.1 Proposed Cogeneration Units

Building	Manufacturer	Model	kW	Qty.
Monroe Twp. High 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 6A Solar Power Purchase Agreement (PPA)

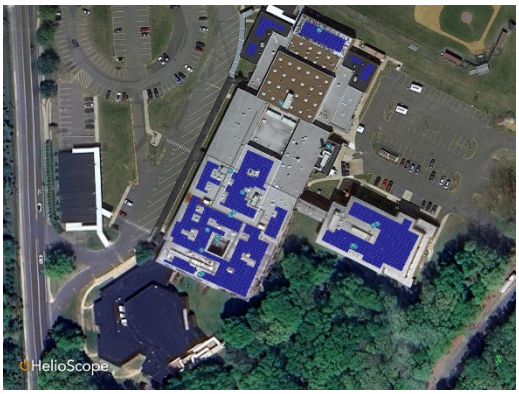
The key benefits of this ECM include:

- **Reduced utility costs**.
- **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 schools 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
6A Solar PPA	●	●	●	●	●		●	●	●	●	

ECM OVERVIEW

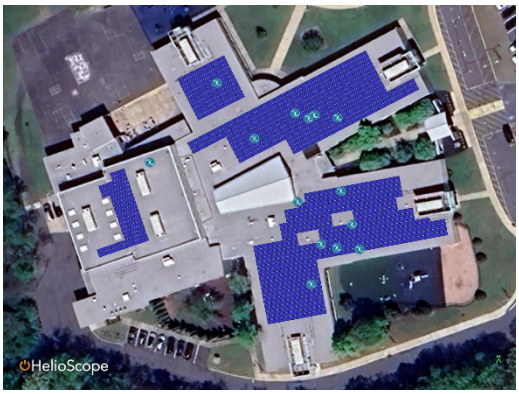
Honeywell recommends that the District further assess the feasibility of a solar photovoltaic system on District owned roofs to generate on-site renewable electricity. This could be provided at no upfront cost via a PPA. A PPA is a public-private partnership financial arrangement in which a third-party 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



Potential Roof Mount Solar - Monroe Twp. Middle School

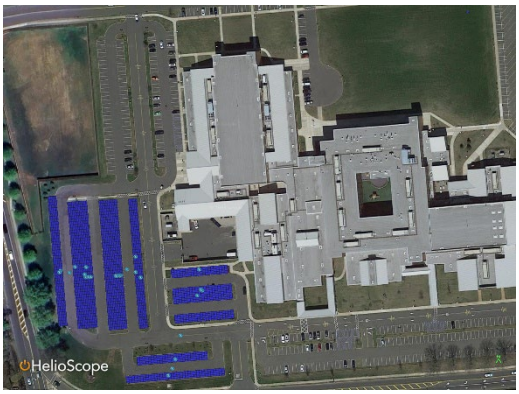
Potential Ground Mount Solar – Applegarth School

Potential Roof Mount Solar - Woodland School

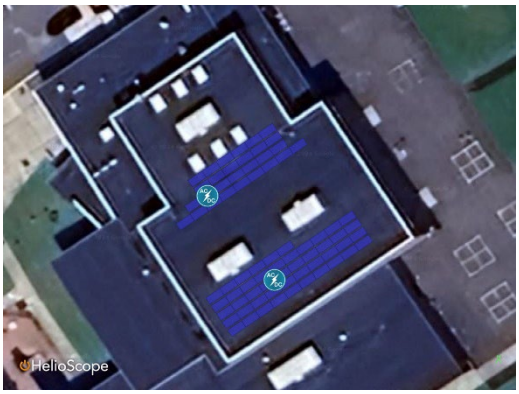


Potential Roof Mount Solar – Mill Lake School

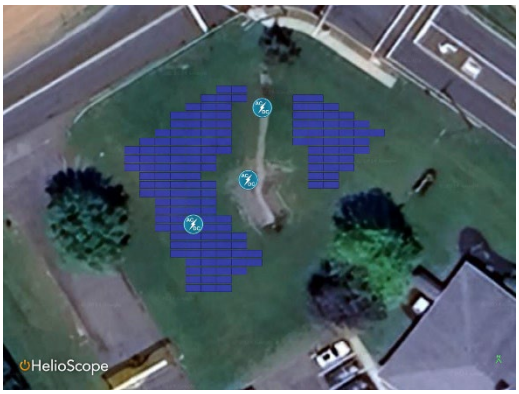
Potential Roof Mount Solar - Oak Tree School



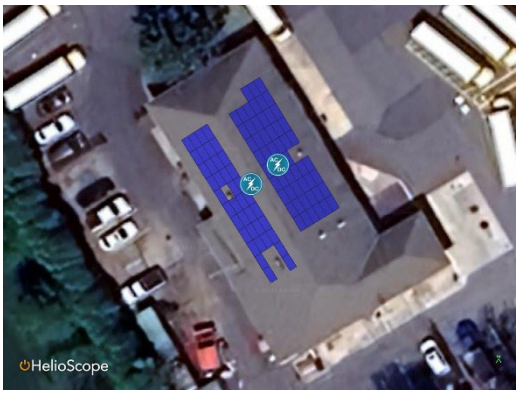
Potential Solar Canopy - High School



Potential Roof Mount Solar - Barclay Brook School



Potential Ground Mount Solar - Admin



Potential Ground Mount Solar Transportation

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 a new roof mount solar PPA system. The system will provide power to the potential buildings listed in the chart below.

Table 6A.1 Proposed Solar PPA System

Building	Type	kW DC	kWh AC Generated
Oak Tree School	Ground Mount	92.9	127,625
Applegarth School	Ground Mount	927.5	1,274,320
Monroe Twp. Middle School	Roof Mount	531.1	729,694
Woodland School	Roof Mount	224.7	308,772
Barclay Brook School	Roof Mount	35.5	48,775
Mill Lake School Complex	Roof Mount	320.4	440,207
Transportation Building	Ground Mount	26.4	36,203
Administration Building	Ground Mount	56.7	77,902

Building	Type	kW DC	kWh AC Generated
Monroe Twp. High School	Canopy	2314.6	3,180,030
Total			**6,223,528**

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 6B Remote Solar - Net Metering

The key benefits of this ECM include:

- **Reduced utility costs**.
- **Additional savings** from solar can provide the District 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.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
6B Remote Solar	●	●	●	●	●	●	●	●	●	●	

ECM OVERVIEW

Similar to Solar PPA, customers who are unable to install solar system on their site due to shading, interconnection, roof conditions and other factors can install Remote Solar. This solution is especially important for end users whose ability to install solar on the premises is limited.

With Remote Solar, the solar system is developed in a geographic location within the end user's utility territory through a Power Purchase agreement. Solar energy is obligated by the customer and transferred thereto in the form of utility credits as if solar were connected at their facilities.

Honeywell 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 Remote Solar Net Metering Program.

Honeywell will solicit proposals from qualified providers who are able to provide this solution within a 24- to 36-month window from time of engagement.

PROPOSED SOLUTION

Honeywell proposes the District to install Remote Solar Net Metering in order to reduce utility costs.

Table 6B.1 Potential Solar Energy Purchased from Remote Solar Program

Building	kWh Purchased
Monroe Twp. High School	2,302,268
Monroe Twp. Middle School	748,526
Applegarth School	155,497
Woodland School	132,554

Building	kWh Purchased
Mill Lake School Complex	282,197
Brookside School	258,954
Barclay Brook School	108,416
Oak Tree School	101,486
Administration Building	59,526
Transportation Building	30,133
Total	**4,179,555**

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the difference in kWh price between the Remote Solar rate and the District's current electrical rate.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

None.

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 6C Solar Photo-Voltaic (PV) Purchase

The key benefits of this ECM include:

- **Reduced utility costs**.
- **Additional savings** from solar can provide the schools 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.

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
6C Solar PV	●	●	●	●	●		●	●	●	●	

ECM OVERVIEW

Similar to Solar PPA, another option is a self-owned solar project. Energy storage projects were previously ineligible for tax credits unless they were connected directly to solar power projects.

The Inflation Reduction Act removes these requirements and allows energy storage projects to receive the same 30% tax credit, even if they are stand-alone facilities. Batteries connected to a solar power project will continue to qualify for the credit, even if they are no longer being charged by solar power. Solar power projects eligible for the full 30% tax credit can increase their tax credit by an additional 10% – to 40% in total – by purchasing domestically produced hardware. Per the document, 100% of steel and iron must be US manufactured in the United States. For manufactured goods – like solar panels, inverters, and electrical gear – the goods must initially be 40% US manufactured, though this percentage will increase in the future.

Historically, the federal solar tax credit has only been available to for-profit businesses that pay taxes. Because of this, solar ownership has been less viable for tax-exempt organizations, and power purchase agreements have been the only real option.

Thanks to the Inflation Reduction Act, tax-exempt organizations can now receive a direct payment worth 30% of their solar installation costs, making solar installation and ownership a more viable option for public schools, government buildings, and non-profit organizations.

Honeywell will evaluate the two methods of Solar Procurement for the District to further assess the feasibility of a solar photovoltaic system on District owned roofs to generate on-site renewable electricity.

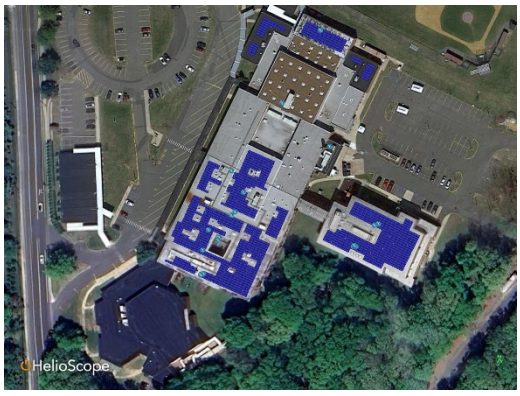
Honeywell will oversee the design and construction of the system. We will assist in the feasibility study during your IGA, in conjunction with your technical consultant and legal team, to provide RFP development, solicitation, and oversight of the installation of a solar photovoltaic system.

PROPOSED SOLUTION

Honeywell proposes to install a new solar PV system at the potential buildings listed in the chart below.

Table 6C.1 Proposed Solar PV System

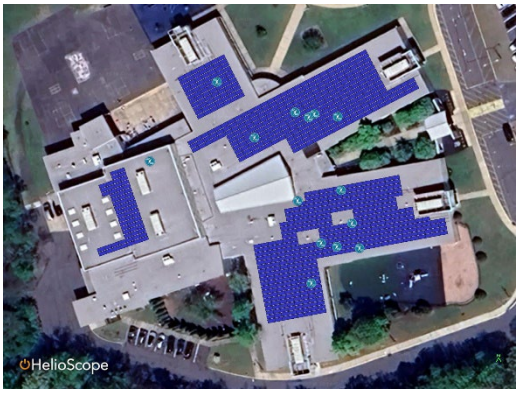
Building	Type	kW DC	kWh AC Generated
Oak Tree School	Ground Mount	92.9	127,625
Applegarth School	Ground Mount	927.5	1,274,320
Monroe Twp. Middle School	Roof Mount	531.1	729,694
Woodland School	Roof Mount	224.7	308,772
Barclay Brook School	Roof Mount	35.5	48,775
Mill Lake School Complex	Roof Mount	320.4	440,207
Transportation Building	Ground Mount	26.4	36,203
Administration Building	Ground Mount	56.7	77,902
Monroe Twp. High School	Canopy	2314.6	3,180,030
Total			**6,223,528**



Potential Roof Mount Solar - Monroe Twp. Middle School

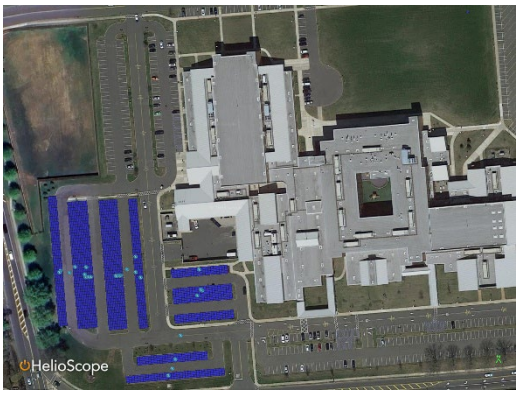
Potential Ground Mount Solar – Applegarth School

Potential Roof Mount Solar - Woodland School

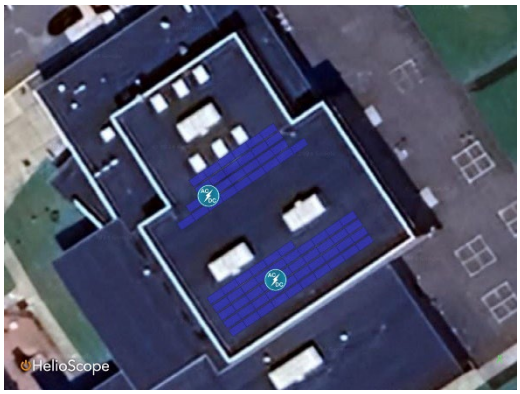


Potential Roof Mount Solar – Mill Lake School

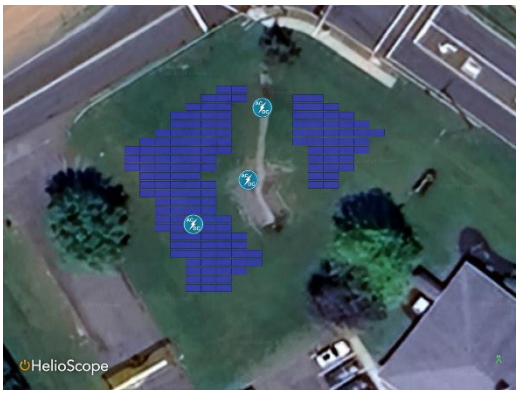
Potential Roof Mount Solar - Oak Tree School



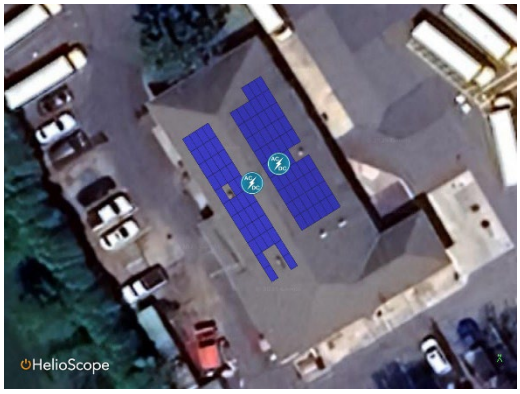
Potential Solar Canopy - High School



Potential Roof Mount Solar - Barclay Brook School



Potential Ground Mount Solar - Admin



ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the current District's kWh price. A 0.83 DC to AC safety factor is assumed base on efficiency of DC to AC invertors.

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 7A 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	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
7A Transformer Replacements		●		●	●	●	●				

EXISTING CONDITIONS

The transformers in locations within the electrical distribution systems 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.

Barclay Brook School - Transformer

Mill Lake School Complex- 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 7A.1 Existing Transformers to replace

Building	Location	kVA	Qty
Barclay Brook School	Storage by 116	45.0	1
Barclay Brook School	303 Electric room	75.0	1
Barclay Brook School	303 Electric room	225.0	1
Barclay Brook School	310 mech	75.0	1
Barclay Brook School	Kitchen	45.0	1
Barclay Brook School	120 main Electric room	112.5	1
Brookside School	Cafe	45.0	1
Brookside School	Cafe	75.0	1
Brookside School	50 Electric room	45.0	1
Brookside School	50 Electric room	45.0	1
Brookside School	15 Electric room	45.0	1
Brookside School	Bouler room	30.0	1
Mill Lake School Complex	Boiler	45.0	1
Mill Lake School Complex	Boiler	45.0	1
Mill Lake School Complex	416	45.0	1
Mill Lake School Complex	416	75.0	1
Mill Lake School Complex	211	45.0	1
Mill Lake School Complex	211	75.0	1
Monroe Twp. Middle School	Storage room by boiler rm	150.0	1
Monroe Twp. Middle School	Boiler room	75.0	1
Monroe Twp. Middle School	Maintenance room	300.0	1
Monroe Twp. Middle School	135 Electric room	150.0	1
Monroe Twp. Middle School	100 Electric room	45.0	1
Monroe Twp. Middle School	100D	45.0	1
Monroe Twp. Middle School	250b gym	30.0	1
Monroe Twp. Middle School	250b gym	9.0	1
Monroe Twp. Middle School	144b gym	30.0	1

Building	Location	kVA	Qty
Monroe Twp. Middle School	208a	30.0	1
Monroe Twp. Middle School	208	45.0	1
Monroe Twp. Middle School	248	45.0	1
Monroe Twp. Middle School	248	30.0	1
Monroe Twp. Middle School	250 2nd floor	45.0	1
Monroe Twp. Middle School	UDF 232	150.0	1
Woodland School	Kitchen Electric room	112.5	1
Woodland School	104 Electric room	112.5	1
Woodland School	129	75.0	1
Woodland School	129	45.0	1
Woodland School	111 Electric room	75.0	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.

SECTION D
TECHNICAL & FINANCIAL SUMMARY

SECTION D — TECHNICAL & FINANCIAL SUMMARY

1. RECOMMENDED ESIP PROJECT

Form II: Recommended Project — Energy Conservation Measures (ECMs) Summary Form

FORM II
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ENERGY CONSERVATION MEASUREs (ECMs) SUMMARY FORM
MONROE TOWNSHIP SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: Honeywell International

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Costs $	Estimated Annual Savings $	Estimated Simple Payback (years)
1A LED Lighting	$ 4,022,786	$ 628,312	6.40
1C Destratification Fans	$ 8,588	$ 140	61.49
2A Boiler Replacements	$ 2,878,169	$ 22,665	126.98
2C Roof Top Unit Upgrades	$ 762,780	$ 10,150	75.15
2E Premium Efficiency Motors and VFDs	$ 326,729	$ 2,791	117.08
2F Chiller Replacements	$ 1,284,496	$ 30,499	42.12
3A Building Management Controls	$ 1,958,276	$ 131,104	14.94
4A Building Envelope Improvements	$ 620,105	$ 32,493	19.08
5A Cogeneration CHP	$ 200,312	$ 1,347	148.66
6A Solar PPA	$ 37,759	$ 153,872	0.25
Add additional lines as needed* **Project Summary:**	$ 12,100,000	$ 1,013,373	11.94

Optional ECMs Considered, but not included with base project at this time	Estimated Costs $	Estimated Annual Savings $	Estimated Simple Payback (years)
1B Stadium Lights	$ 1,236,416	$ 22,653	54.58
2B Domestic Water Heater Replacements	$ 566,324	$ 742	763.68
2D Split System Upgrades	$ 389,007	$ 10,317	37.71
2G Unitventilator Replacements	$ 6,167,274	$ 33,041	186.66
2H AHU Replacements	$ 5,386,006	$ 17,723	303.90
2I Electrification for Applegarth School	$ 0	$ -	-
3B Building Sustainability Manager HBSM	$ 407,203	$ 12,217	33.33
4B Roof Replacements	$ 1,692,632	$ 10,115	167.35
6B Community Solar	$ 0	$ 173,677	0.00
6C Solar PV	$ 6,795,442	$ 297,413	22.85
7A Transformer Replacements	$ 853,776	$ 27,659	30.87

Form III: Recommended Project — Projected Annual Energy Savings Data Form

FORM III
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP)
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
MONROE TOWNSHIP SCHOOLS
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)	46,279	$297,788	10,573	$69,278
Electric Energy (KWH)	11,003,122	$1,659,318	5,422,532	$630,253
Natural Gas (therms)	212,393	$268,223	17,455	$17,221
Fuel Oil (Gal)	15,508	$54,348	467	$1,638
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	4,661			
SO2	3,633			
CO2	4,841,475			

(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: Recommended Project — Projected Annual Energy Savings Data Form in MMBTUs

FORM IV

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs
MONROE TOWNSHIP SCHOOLS
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)	37,543	18,502	
Natural Gas (MMBTUs)	21,239	1,746	
Fuel Oil (MMBTUs)	2,171	65	
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 VI: Recommended Project — Preliminary Annual Cash Flow Analysis Forms

*Form VI does not include optional ECMs in Form II.

Budgetay FORM VI
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
MONROE TOWNSHIP SCHOOLS
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: **20** (Years) (Months)
2. Construction Period [2] (months): **18**
3. Cash Flow Analysis Format:

Capital Project	$	12,100,000
BPU Required Energy Audit	$	97,777
Technical Energy Audit	$	97,026
Project Costs [1]	$	12,294,803
Capital Contribution	$	-
Bond Counsel Muni Advisor Budget	$	150,000
Contingency/Rounding		
Financed Value:	$	**12,444,803**

Interest Rate to Be Used for Proposal Purposes: **4.00%**

Year	Annual Energy Savings [5]	Solar Savings	Annual Operational Savings	Energy Rebates/Incentives [4]		Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs [3]	Net Cash-Flow to Client	Cumulative Cash Flow
				Value	Utility						
Installation	$ 169,381					$ 169,381	$ -	$ -	$ -	$ 169,381	$ 169,381
1	$ 564,603	$ 153,872	$ 294,982	$ 286,343	JCPL / PSEG	$ 1,299,800	$ (1,464,181)	$ (1,464,181)	$ -	$ (164,381)	$ 5,000
2	$ 577,023	$ 157,257	$ 294,982	$ 308,152	JCPL / PSEG	$ 1,337,414	$ (1,332,414)	$ (1,332,414)	$ -	$ 5,000	$ 10,000
3	$ 589,717	$ 160,717	$ 169,982			$ 920,416	$ (915,416)	$ (915,416)	$ -	$ 5,000	$ 15,000
4	$ 602,691	$ 164,253	$ 169,982			$ 936,926	$ (931,926)	$ (931,926)	$ -	$ 5,000	$ 20,000
5	$ 615,951	$ 167,866	$ 169,982			$ 953,799	$ (948,799)	$ (948,799)	$ -	$ 5,000	$ 25,000
6	$ 629,504	$ 171,559				$ 801,063	$ (796,063)	$ (796,063)	$ -	$ 5,000	$ 30,000
7	$ 643,356	$ 175,333				$ 818,690	$ (813,690)	$ (813,690)	$ -	$ 5,000	$ 35,000
8	$ 657,514	$ 179,191				$ 836,705	$ (831,705)	$ (831,705)	$ -	$ 5,000	$ 40,000
9	$ 671,984	$ 183,133				$ 855,117	$ (850,117)	$ (850,117)	$ -	$ 5,000	$ 45,000
10	$ 686,774	$ 187,162				$ 873,936	$ (868,936)	$ (868,936)	$ -	$ 5,000	$ 50,000
11	$ 701,889	$ 191,279				$ 893,169	$ (888,169)	$ (888,169)	$ -	$ 5,000	$ 55,000
12	$ 717,339	$ 195,488				$ 912,826	$ (907,826)	$ (907,826)	$ -	$ 5,000	$ 60,000
13	$ 733,129	$ 199,788				$ 932,918	$ (927,918)	$ (927,918)	$ -	$ 5,000	$ 65,000
14	$ 749,268	$ 204,184				$ 953,452	$ (948,452)	$ (948,452)	$ -	$ 5,000	$ 70,000
15	$ 765,763	$ 208,676				$ 974,439	$ (969,439)	$ (969,439)	$ -	$ 5,000	$ 75,000
16	$ 782,622	$ -				$ 782,622	$ (777,622)	$ (777,622)	$ -	$ 5,000	$ 80,000
17	$ 799,853	$ -				$ 799,853	$ (794,853)	$ (794,853)	$ -	$ 5,000	$ 85,000
18	$ 817,464	$ -				$ 817,464	$ (812,464)	$ (812,464)	$ -	$ 5,000	$ 90,000
19	$ 835,464	$ -				$ 835,464	$ (830,464)	$ (830,464)	$ -	$ 5,000	$ 95,000
20	$ 853,861	$ -				$ 853,861	$ (846,337)	$ (846,337)	$ -	$ 7,524	$ 102,524
Totals	$ 14,165,153	$ 2,699,757	$ 1,099,910	$ 594,494		$ 18,559,314	$ (18,456,790)	$ (18,456,790)	$ -	$ 102,524	$ 102,524

HONEYWELL IS NOT ACTING AS A MUNICIPAL ADVISOR OR FIDUCIARY ON YOUR BEHALF. ANY MUNICIPAL SECURITIES OR FINANCIAL PRODUCTS INFORMATION PROVIDED IS FOR GENERAL INFORMATIONAL AND EDUCATIONAL PURPOSES ONLY AND YOU SHOULD OBTAIN THE ADVICE OF A LICENSED AND QUALIFIED FINANCIAL ADVISOR REGARDING SUCH INFORMATION.

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by 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) 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
(5) Installation Savings is included in year 1.

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

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Estimated Costs ($)	Simple Payback
Administration Building	**$ 4,235**	**$ 506**	**$ 461**	**$ -**	**$ -**	**$ 21,637**	**$ 16,435**	**$ 50,469**	**1.6**
1A LED Lighting	$ 2,838	$ 506	$ (219)	$ -	$ -	$ 4,560	$ 1,435	$ 34,610	5.1
3A Building Management Controls	$ 1,359	$ -	$ 528	$ -	$ -	$ 16,887	$ 15,000	$ 11,106	0.4
4A Building Envelope Improvements	$ 38	$ -	$ 152	$ -	$ -	$ 190	$ -	$ 4,754	16.9
Applegarth School	**$ 105,576**	**$ 5,113**	**$ -**	**$ 1,638**	**$ -**	**$ 122,377**	**$ 10,049**	**$ 292,426**	**1.6**
1A LED Lighting	$ 23,914	$ 5,113	$ -	$ (4,297)	$ -	$ 34,779	$ 10,049	$ 226,974	4.4
4A Building Envelope Improvements	$ 744	$ -	$ -	$ 5,935	$ -	$ 6,679	$ -	$ 57,901	5.9
6A Solar PPA	$ 80,919	$ -	$ -	$ -	$ -	$ 80,919	$ -	$ 7,552	0.1
Barclay Brook School	**$ 22,454**	**$ 3,377**	**$ 1,514**	**$ -**	**$ -**	**$ 59,836**	**$ 32,491**	**$ 1,670,860**	**18.9**
1A LED Lighting	$ 19,409	$ 3,377	$ (1,039)	$ -	$ -	$ 34,237	$ 12,491	$ 242,172	4.8
2A Boiler Replacements	$ -	$ -	$ 677	$ -	$ -	$ 10,677	$ 10,000	$ 779,676	49.3
2F Chiller Replacements	$ 2,460	$ -	$ -	$ -	$ -	$ 12,460	$ 10,000	$ 559,081	30.3
4A Building Envelope Improvements	$ 586	$ -	$ 1,876	$ -	$ -	$ 2,462	$ -	$ 89,931	24.7
Brookside School	**$ 10,845**	**$ 2,659**	**$ (51)**	**$ -**	**$ -**	**$ 19,206**	**$ 5,753**	**$ 159,294**	**5.6**
1A LED Lighting	$ 10,682	$ 2,659	$ (734)	$ -	$ -	$ 18,361	$ 5,753	$ 142,253	5.2
4A Building Envelope Improvements	$ 163	$ -	$ 683	$ -	$ -	$ 845	$ -	$ 17,041	13.6
Mill Lake School Complex	**$ 28,775**	**$ 6,120**	**$ 1,878**	**$ -**	**$ -**	**$ 55,123**	**$ 18,349**	**$ 473,788**	**5.8**
1A LED Lighting	$ 27,720	$ 6,120	$ (1,470)	$ -	$ -	$ 50,720	$ 18,349	$ 372,986	5.0
4A Building Envelope Improvements	$ 1,055	$ -	$ 3,348	$ -	$ -	$ 4,404	$ -	$ 93,250	14.3
6A Solar PPA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,552	-
Monroe Twp. High School	**$ 236,464**	**$ 24,027**	**$ 7,840**	**$ -**	**$ -**	**$ 342,210**	**$ 73,879**	**$ 1,823,128**	**3.6**
1A LED Lighting	$ 194,465	$ 23,876	$ (6,938)	$ -	$ -	$ 270,283	$ 58,879	$ 1,522,912	3.8
1C Destratification Fans	$ (41)	$ -	$ 180	$ -	$ -	$ 140	$ -	$ 8,588	41.5
3A Building Management Controls	$ 38,863	$ -	$ 12,305	$ -	$ -	$ 66,167	$ 15,000	$ 4,442	0.0
4A Building Envelope Improvements	$ 1,363	$ -	$ 2,910	$ -	$ -	$ 4,273	$ -	$ 86,874	13.7
5A Cogeneration CHP	$ 1,813	$ 151	$ (617)	$ -	$ -	$ 1,347	$ -	$ 200,312	100.4
Monroe Twp. Middle School	**$ 131,715**	**$ 16,130**	**$ 3,765**	**$ -**	**$ -**	**$ 224,433**	**$ 72,823**	**$ 5,472,338**	**16.5**
1A LED Lighting	$ 75,079	$ 16,103	$ (4,148)	$ -	$ -	$ 124,857	$ 37,823	$ 908,445	4.9
2A Boiler Replacements	$ -	$ -	$ 1,988	$ -	$ -	$ 11,988	$ 10,000	$ 2,098,493	118.2
2C Roof Top Unit Upgrades	$ 150	$ -	$ -	$ -	$ -	$ 10,150	$ 10,000	$ 762,780	50.8
2E Premium Efficiency Motors and VFDs	$ 2,764	$ 27	$ -	$ -	$ -	$ 2,791	$ -	$ 326,729	79.1
2F Chiller Replacements	$ 5,081	$ -	$ -	$ -	$ -	$ 5,081	$ -	$ 0	0.0
3A Building Management Controls	$ 1,511	$ -	$ 287	$ -	$ -	$ 16,797	$ 15,000	$ 1,238,785	49.8
4A Building Envelope Improvements	$ 1,706	$ -	$ 5,638	$ -	$ -	$ 7,344	$ -	$ 129,554	11.9
6A Solar PPA	$ 45,425	$ -	$ -	$ -	$ -	$ 45,425	$ -	$ 7,552	0.1
Oak Tree School	**$ 42,176**	**$ 7,504**	**$ 816**	**$ -**	**$ -**	**$ 62,781**	**$ 12,285**	**$ 394,185**	**4.2**
1A LED Lighting	$ 33,358	$ 7,504	$ (1,794)	$ -	$ -	$ 51,353	$ 12,285	$ 308,121	4.1
4A Building Envelope Improvements	$ 811	$ -	$ 2,610	$ -	$ -	$ 3,421	$ -	$ 78,513	15.5
6A Solar PPA	$ 8,006	$ -	$ -	$ -	$ -	$ 8,006	$ -	$ 7,552	0.6
Transportation Building	**$ 1,567**	**$ 78**	**$ -**	**$ -**	**$ -**	**$ 17,048**	**$ 15,403**	**$ 28,129**	**1.1**
1A LED Lighting	$ 786	$ 78	$ -	$ -	$ -	$ 1,267	$ 403	$ 8,160	4.3
3A Building Management Controls	$ 687	$ -	$ -	$ -	$ -	$ 15,687	$ 15,000	$ 11,106	0.5
4A Building Envelope Improvements	$ 93	$ -	$ -	$ -	$ -	$ 93	$ -	$ 8,863	64.5
Woodland School	**$ 46,447**	**$ 3,763**	**$ 998**	**$ -**	**$ -**	**$ 88,723**	**$ 37,515**	**$ 1,735,383**	**13.2**
1A LED Lighting	$ 22,846	$ 3,763	$ (1,229)	$ -	$ -	$ 37,896	$ 12,515	$ 256,154	4.6
2F Chiller Replacements	$ 2,959	$ -	$ -	$ -	$ -	$ 12,959	$ 10,000	$ 725,415	37.8
3A Building Management Controls	$ 461	$ -	$ 104	$ -	$ -	$ 15,565	$ 15,000	$ 692,837	30.1
4A Building Envelope Improvements	$ 659	$ -	$ 2,122	$ -	$ -	$ 2,782	$ -	$ 53,425	13.0
6A Solar PPA	$ 19,522	$ -	$ -	$ -	$ -	$ 19,522	$ -	$ 7,552	0.3
Project Total	**$ 630,253**	**$ 69,278**	**$ 17,221**	**$ 1,638**	**$ -**	**$ 1,013,373**	**$ 294,982**	**$ 12,100,000**	**8.1**

2. UTILITY AND OTHER REBATES & INCENTIVES

Summary of Total Rebates and Incentives

Year	Prescriptive Lighting	Prescriptive & Custom HVAC	Total Incentives
Installation			
Year 1	$286,343		$286,343
Year 2		$308,152	$308,152
Year 3			
Year 4			
Year 5			
Totals	**$286,343**	**$308,152**	**$594,495**

Incentives, Rebates and Grants

Honeywell has determined that the District is eligible for **$594,494** in estimated total incentives for the projects included in the Prescriptive Lighting and Prescriptive & Custom HVAC Programs. Please refer to the tables on below for a breakdown of the District's incentive levels on a building-by-building basis for each type of incentive.

REBATES AND INCENTIVES

Location	Prescriptive Lighting	Prescriptive & Custom HVAC
Monroe Twp. High School	$91,295	$16,589
Monroe Twp. Middle School	$65,552	$185,433
Applegarth School	$21,018	$11,168
Woodland School	$20,933	$29,124
Mill Lake School Complex	$28,960	$15,717
Brookside School	$9,620	$2,482
Barclay Brook School	$20,706	$25,999
Oak Tree School	$25,119	$12,271
Administration Building	$2,408	$6,176
Transportation Building	$732	$3,195
Totals	**$286,343**	**$308,152**

3. OPERATIONAL SAVINGS

Summary of Total Operational Savings

Year	Lighting Operation Savings	Controls Maintenance Cost Savings	Total Operational Savings
Installation			
Year 1	$169,982	$125,000	$294,982
Year 2	$169,982	$125,000	$294,982
Year 3	$169,982		$169,982
Year 4	$169,982		$169,982
Year 5	$169,982		$169,982

Lighting Energy Savings (5 Years)

This Lighting Operational Savings category calculates the existing material costs for lamps and ballasts considering failure rate and average costs and compares to the reduced maintenance costs with all new LEDs to establish the operational savings.

School	Average Annual Maintenance Savings
Monroe Twp. High School	$58,879
Monroe Twp. Middle School	$37,823
Applegarth School	$10,049
Woodland School	$12,515
Mill Lake School Complex	$18,349
Brookside School	$5,753
Barclay Brook School	$12,491
Oak Tree School	$12,285
Administration Building	$1,435
Transportation Building	$403
Total:	**$169,982**

Mechanical and Controls Maintenance Cost Savings (2 Years)

This Mechanical and Controls Operational Savings category calculates the existing material costs for repairs, based on the mechanical material and replacement costs from recent bills in the equipment being selected for savings the district is allocating $125,000 per year for Operational cost savings in year one and two. The following schools have been included in this sample project:

School	Annual Maintenance Savings Allocation
Monroe Twp. High School	$15,000
Monroe Twp. Middle School	$35,000
Applegarth School	
Woodland School	$25,000
Mill Lake School Complex	
Brookside School	
Barclay Brook School	$20,000
Oak Tree School	
Administration Building	$15,000
Transportation Building	$15,000
Total:	**$125,000**

4. HONEYWELL TECHNICAL ENERGY AUDIT & PROJECT DEVELOPMENT – SEE FORM VI

The key benefits of this work include:

- Identify potential improvement and energy conservation measures
- Identify baseline energy use
- Identify preliminary costs and savings

ECM Description	Monroe Twp. High School	Monroe Twp. Middle School	Applegarth School	Woodland School	Mill Lake School Complex	Brookside School	Barclay Brook School	Oak Tree School	Administration Building	Transportation Building	Sports Field
Technical Energy Audit	●	●	●	●	●	●	●	●	●	●	

The District has completed a Local Government Energy Audit as per ESIP Law. The preliminary audit is equivalent to ASHRAE Level II overall and Level III for Lighting (included in Appendix 1). This report is the Energy Savings Plan which is required to move forward with an Energy Savings Improvement Program.

Proposed Solution

The Technical Energy Audit, or Energy Savings Plan (ESP) is the cornerstone of the ESIP program. It lays out what measures will be implemented to save energy, the expected payback period, and how it fits into the overall plan to reduce consumption. The ESP gives a snapshot of the project financial structure. Furthermore, the ESP must be approved by the Board and remain cash flow positive throughout the term of the project. These plans have a lifespan of 15 to 20 years depending on the ECMs being installed.

Process

Honeywell's approach to the engineering portion of an ESPC is detailed below and will be led by identified engineering team member. A technically sound solution that addresses the District's current needs and future goals is the cornerstone to a successful Energy Savings Improvement Program.

Preliminary And Investment Grade Audit

PRELIMINARY ENERGY AUDIT PROCEDURE

- This phase begins the process of identifying possible energy saving measures and infrastructure improvements at the facilities. All possible opportunities will be explored at this stage. These will be evaluated both technically and financially. We also begin to examine the current maintenance procedures taking place at the facility during this audit. The preliminary audit follows the steps below to get to the 30% review with the district.
- Conduct an initial walk-through inspection to become familiar with the buildings, systems equipment, maintenance, operation status, etc.

- Study the plans and specifications and become familiar with the buildings, systems, capacities, equipment, etc.
- Talk with the key decision makers within the District, building operating personnel, occupants, etc. about energy efficiency goals, sustainability goals, HVAC systems, comfort, problems, etc.
- Examine the overall building energy consumption history from the District. Compile a complete energy consumption history on gas, oil, electrical, etc., from utility companies and fuel suppliers. Compare the BTU consumption per square foot per year with other similar buildings and determine degree of variance.
- Evaluate current maintenance procedures. Examine future maintenance associated with additional equipment that may be installed.
- Develop a list of existing energy savings opportunities.
- Further develop the most promising energy improvements, based on success criteria.
- Perform preliminary energy savings calculations for the various energy improvements, estimate retrofit costs and calculate estimated paybacks.
- Complete energy baseline analysis for all utilities using the past year of utility data.
- Jointly select with the District at the 30% review which improvements to proceed with and assign priorities. Properly engineer retrofit work and proceed.

Upon completion of this phase of the audit process we will review our findings with the District personnel. Candidate measures will be reviewed on the basis of energy, financial and operational impact. Together with your personnel, we will prioritize facility improvements and energy conservation measures. This is the 30% review identified in the diagram above. Based on the 30% review, a final list of energy conservation measures will then be developed for the in-depth energy audit. Typical financial payback periods are used in this step for the process and are refined as the audit progresses.

Investment Grade Audit Procedures to Final Design

During the investment grade audit phase, we conduct a thorough evaluation of the list of improvements and energy conservation measures that have been mutually agreed upon between Honeywell and the District. This is done to verify project goal requirements along with savings figures, project costs, and maintenance requirements . This process comprises five major categories of activity, shown below.

Field Surveys

1. Make a thorough inspection of building systems and equipment and become thoroughly familiar with them. Check out operations, performance, maintenance, malfunctions, comfort, problems, etc.
2. Check nameplate data on equipment.
3. Conduct in-depth interviews with building personnel. Review maintenance, scheduling, performance, comfort, and problems of building, equipment, and systems.
4. Become familiar with actual hours of operation of systems and equipment, and the hours of occupancy of the personnel.

Energy History

1. Field Tests
2. Take test readings of actual flows, temperatures, pressures, rpm's, amps, volts, etc. at HVAC equipment.

3. Monitor readings over a period of time with test and recording equipment (data loggers) where appropriate.
4. Check lighting levels.

Evaluation of Improvements

1. List all project opportunities within the buildings, systems, and equipment.
2. Investigate/apply any applicable grants, incentives, rebates.
3. Develop potential improvements and develop those with most potential in full cooperation with the District write out list of improvements.
4. Calculate the potential energy savings in terms of BTU's and kWh and in cost, using current utility rate structures.
5. Calculate paybacks and return on investments using +/- 10% costs of work data and estimates.

Evaluation of Ongoing Service Needs

1. Review existing maintenance being performed at the facilities.
2. Discuss any gaps in existing equipment maintenance.

Review and Decisions

1. Review with the District. This is the 60% review indicated in the above diagram.
2. Costs of improvements/Improvement Options
3. Energy improvement options
4. Reaffirm Financial Payback Criteria
5. Return on investment
6. Potential savings
7. Select, with the District approval, improvements to proceed with and assign priorities. These final selections will be the outcome of the 90% review described in the diagram above. At the 90% review, final estimated costs will be developed.

After all the technical and financial parameters of the program are identified and the responsibilities of Honeywell and the District are clearly delineated, the contract would be offered to the District. It is structured such that the annual energy cost reductions will, at a minimum, equal or as in most cases, exceed the amortized implementation costs.

5. 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 departments 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 District may authorize a lease purchase agreement between the District and a financier. Ownership of the equipment or improved facilities will pass to the 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 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 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 does not 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

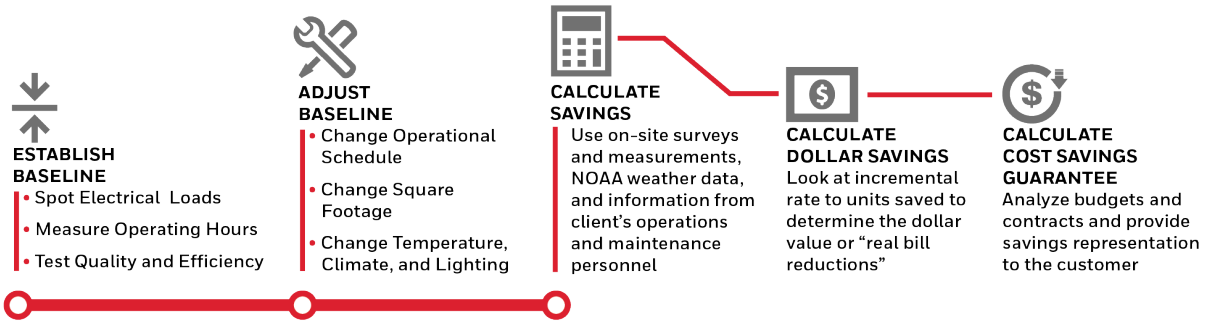
SECTION E — MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

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 calculated the baseline based on the systems and operating conditions. The baseline was established from 5/2022-4/2023 in accordance with BPU guidelines. Baseline development is 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 was 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, auditors use the following equipment for their onsite measurements:

1. Recording and instantaneous power and harmonic analyzers.
2. Data loggers for pressures, temperatures, flow rates, humidity, and CO2.
3. Lighting level and recording profile/run-hour and occupancy meters.
4. Multimeters, handheld kW meters.
5. Combustion analyzers.
6. Ultrasonic flow meters.
7. 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 considered 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. The result is a coupled project where the final savings are equal to or greater than anticipated.

2. ADJUSTMENT TO BASELINE METHODOLOGY

The methodology 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 District requires and the needs of the 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 the installed ECMs. This creates the ability over the life of the contract to continue measuring only savings achieved by the ECM and leaves the District free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for adjusting the baseline.

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

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 has established 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 cash flow, energy escalation rates will be established in accordance with New Jersey Board of Public Utility guidelines.

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

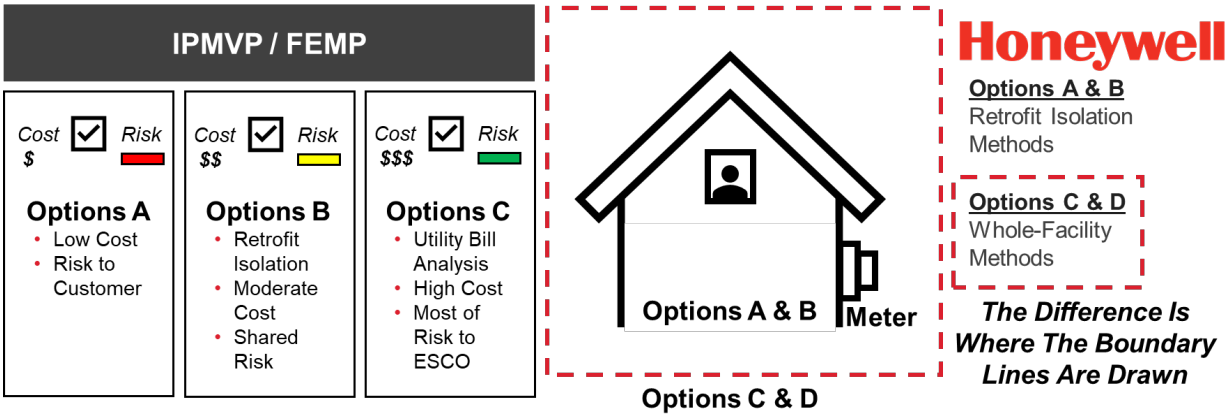
The O&M savings is typically a function of existing the District’s budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell has analyzed the information to provide a conservative savings representation for the _____’s review and acceptance. The information 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 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 allows the District to adapt to the demands of future campus growth and changes without the need for the District and Honeywell to negotiate energy baseline adjustments.

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

[1] www.ipmvp.org.

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.

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.
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 considers 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:

1. 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.
2. 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 District to ensure 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 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:

> $kW_{Saved} = (kW_{Base} – kW_{Spot\ Measured})$
>
> kWh_{Saved} = Estimated operating hours during the interim period * kW_{Saved}
>
> The total kWh savings is the sum of the kWh_{Saved} for all the installed VFDs.

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, An M&V report should 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.

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 Upgrades	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 Stadium Lighting	Upgrade Stadium lighting	**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
1C De-Stratification Fans	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

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 Domestic Hot Water Heater Replacements	Replace heaters 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
2C RTU Upgrades	Replace antiquated Roof Top Units with new high efficiency Units.	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units **Option C** ▪ Fuel Savings Utility Bill Comparison for all fuel related measures	▪ 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 ▪ 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
2D Split System Upgrades	Replace select split systems 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 split system unit (EER) – 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
2E 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
2F Chiller Replacements	Replace antiquated Chiller with new efficient unit.	**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
2G Unit ventilator Replacements	Replace antiquated Unit Ventilators with new units.	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units **Option C** ▪ Fuel Savings Utility Bill Comparison for all fuel related measures	▪ 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 ▪ 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
2H AHU Replacements	Replace antiquated Air Handling Units with new high efficiency Units.	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units **Option C** ▪ Fuel Savings Utility Bill Comparison for all fuel related measures	▪ 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 ▪ 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
2H Electrification of Applegarth	Replace existing HVAC units with new VRF system.	▪ N/A	▪ Pre-M&V: N/A ▪ Post M&V: N/A

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. Retro-commissioning existing control systems.	**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 Building Sustainability Manager HBSM	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** ▪ Engineering calculations based on nameplate and manufacturer supplied data **Option C** ▪ Utility Bill Comparison for fuel related measures	▪ Pre-M&V: Verify existing conditions ▪ Post M&V: Visual inspection per scope of work
4B Roof Replacements	Replace existing roofs.	**Option A** ▪ Engineering calculations based on nameplate and manufacturer supplied data **Option C** ▪ Utility Bill Comparison for fuel related measures	▪ Pre-M&V: Verify existing conditions ▪ Post M&V: Visual inspection per scope of work
5A Cogeneration CHP	Install Cogeneration units	**Option A** Engineering calculations based on nameplate and manufacturer supplied data for the new unit.	▪ 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

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
6A Solar PPA	Install Solar Power using Power Purchase Agreement	N/A	▪ Pre-M&V: N/A ▪ Post M&V: N/A
6B Remote Solar	Purchase solar energy virtually from the Community Solar Program	N/A	▪ Pre-M&V: N/A ▪ Post M&V: N/A
6B Solar PV	Install Solar Power owned by District	N/A	▪ Pre-M&V: N/A ▪ Post M&V: N/A
7A Transformer Replacements	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 ▪ Post M&V: Measure input and output kW for new transformer (typical one for each size) ▪ Verify savings with engineering calculations

6. RECOMMENDED PREVENTIVE MAINTENANCE SERVICES

Per the NJ ESIP program, all services are required to be bid by the District for services as desired. Based on Honeywell's vast service organization, we are uniquely qualified to develop design specification for the public bidding per NJ Law.

Honeywell strongly believes that the long-term success of any conservation program is equally dependent upon the appropriate application of energy savings technologies, as well as solid fundamental maintenance and support. One of the primary contributors to energy waste and premature physical plant deterioration is the lack of operations, personnel training, and equipment maintenance.

Honeywell recommends routine maintenance on the following systems throughout the District for the duration of an energy guarantee of savings.

Maintenance, Repair and Retrofit Services

- Mechanical Systems
- Building Automation Systems
- Temperature Control Systems
- Air Filtration

Honeywell will work with the District to evaluate current maintenance practices and procedures. This information will be the basis of a preventive maintenance and performance management plan designed to maximize building operating efficiencies, extend the useful life of your equipment, and support the designed Energy Savings Plan.

At a minimum, we recommend the following tasks be performed on a quarterly basis with the District wide Building Management System.

SYSTEM SUPPORT SERVICES

1. Review recent mechanical system operation and issues with customer primary contact, on a monthly basis.
2. Review online automation system operation and event history logs and provide summary status to the customer primary contact. Identify systemic or commonly re-occurring events.
3. Check with customer primary contact and logbook to verify that all software programs are operating correctly.
4. Identify issues and prioritize maintenance requests as required.
5. Provide technical support services for trouble shooting and problem solving as required during scheduled visits.
6. Provide ongoing system review and operations training support; including two semi-annual lunches and learn sessions.
7. Establish dedicated, site-specific emergency stock of spare parts to ensure prompt replacement of critical components. These will be stored in a secure location with controlled access.

CONFIGURATION MANAGEMENT

1. Update documentation and software archives with any minor changes to software made during maintenance work.
2. Verify and record operating systems and databases.

3. Record system software revisions and update levels.
4. Archive software in designated offsite Honeywell storage facility, on an annual basis.
5. Provide offline software imaging for disaster recovery procedures, updated on a regular basis.

FRONT END / PC SERVICE

1. Verify operation of personal computer and software:
2. Check for PC errors on boot up
3. Check for Windows errors on boot up
4. Check for software operations and performance, responsiveness of system, speed of software
5. Routinely backup system files, on an annual basis:
6. Trend data, alarm information and operator activity data
7. Custom graphics and other information
8. Ensure disaster recovery procedures are updated with current files
9. Clean drives and PC housing, on an annual basis:
10. Open PC and remove dust and dirt from fans and surfaces
11. Open PC interface assemblies and remove dust and dirt
12. Clean and verify operation of monitors.
13. Verify printer operation, check ribbon or ink.
14. Initiate and check log printing functions.
15. Verify modem operation (if applicable).
16. Review IVR schedule for alarms and review (if applicable).

TEMPERATURE CONTROLS

Unit Vents

Services Performed

Annual Inspection

1. Inspect motor and lubricate.
2. Lubricate fan bearings.
3. Inspect coil(s) for leaks.
4. Vacuum interior.
5. Test operation of unit controls.

Pumps

Services Performed

Preseason Inspection

1. Tighten loose nuts and bolts.
2. Check motor mounts and vibration pads.
3. Inspect electrical connections and contactors.

Seasonal Start-up

1. Lubricate pump and motor bearings per manufacturer's recommendations.
2. Visually check pump alignment and coupling.
3. Check motor operating conditions.

4. Inspect mechanical seals or pump packing.
5. Check hand valves.

Mid-season Inspection

1. Lubricate pump and motor bearings as required.
2. Inspect mechanical seals or pump packing.
3. Ascertain proper functioning.

Seasonal Shut-down

1. Switch off pump.
2. Verify position of hand valves.
3. Note repairs required during shutdown.

Packaged Air-Conditioning Systems

Services Performed

Preseason Inspection

1. Energize crankcase heater.
2. Lubricate fan and motor bearings per manufacturer's recommendations.
3. Check belts and sheaves. Adjust as required.
4. Lubricate and adjust dampers and linkages.
5. Check condensate pan.

Seasonal Start-up

1. Check crankcase heater operation.
2. Check compressor oil level.
3. Inspect electrical connections, contactors, relays, operating and safety controls.
4. Start compressor and check operating conditions. Adjust as required.
5. Check refrigerant charge.
6. Check motor operating conditions.
7. Inspect and calibrate temperature, safety, and operational controls, as required.
8. Secure unit panels.
9. Pressure-wash all evaporator and condenser coils (if applicable).
10. Log all operating data.

Mid-season Inspection

1. Lubricate fan and motor bearings per manufacturer's recommendations.
2. Check belts and sheaves. Adjust as required.
3. Check condensate pan and drain.
4. Check operating conditions. Adjust as required.
5. Log all operating data.

Seasonal Shut-down *

1. Shut down per manufacturer's recommendations.

* If no Shut-down is required then (2) Mid-season Inspections are performed

Boilers

Services Performed

Preseason Inspection

1. Inspect fireside of boiler and record condition.
2. Brush and vacuum soot and dirt from flues (not chimneys) and combustion chamber.
3. Inspect firebrick and refractory for defects.
4. Visually inspect boiler pressure vessel for possible leaks and record condition.
5. Disassemble, inspect, and clean low-water cutoff.
6. Check hand valves and automatic feed equipment. Repack and adjust as required.
7. Inspect, clean, and lubricate the burner and combustion control equipment.
8. Reassemble boiler.
9. Check burner sequence of operation and combustion air equipment.
10. Check fuel piping for leaks and proper support.
11. Review manufacturer's recommendations for boiler and burner start-up.
12. Check fuel supply.
13. Check auxiliary equipment operation.

Seasonal Start-up

1. Inspect burner, boiler, and controls prior to start-up.
2. Start burner and check operating controls.
3. Test safety controls and pressure relief valve.
4. Perform combustion analysis.
5. Make required control adjustments.
6. Log all operating conditions.
7. Review operating procedures and owner's log with boiler operator.

Mid-season Inspection

1. Review operator's log.
2. Check system operation.
3. Perform combustion analysis.
4. Make required control adjustments.
5. Log all operating conditions.
6. Review operating procedures and log with boiler operator.

Seasonal Shut-down

1. Review operator's log.
2. Note repairs required.

APPENDICES

APPENDICES

APPENDIX 1: SCHOOL INDEPENDENT ENERGY AUDIT

Please see Appendix 1 provided as a separate accompaniment to this document entitled:
Appendix 1 - School Independent Energy Audit

APPENDIX 2: ECM CALCULATIONS

Please see Appendix 2 provided as a separate accompaniment to this document entitled:
Appendix 2: ECM Calculations

APPENDIX 3: EQUIPMENT CUT SHEETS

Please see Appendix 3 provided as a separate accompaniment to this document entitled:
Appendix 3 - Equipment Cut Sheets

APPENDIX 4: LIGHTING LINE BY LINE

Please see Appendix 4 provided as a separate accompaniment to this document entitled:
Appendix 4 - Lighting Line by Line

APPENDIX 5: REQUIRED FORMS COOPERATIVE / NJ PROCUREMENT DOCUMENTATION

Per the LFN, the District must verify the selected vendor complies with applicable New Jersey procurement documentation requirements by submitting the following required forms.

The following forms are included:

- **New Jersey Business Registration Certificate** for the contractor and any subcontractors (i.e., copy of certificate)
- **Public Works Contractor Registration**
- **DPMC Notice of Classification**
- **Statement of Corporate Ownership** (an original form prepared for the contracting agency awarding the contract)
- **Public Contract EEO Compliance** (Employee Information Report form or proof of participation in a federally approved affirmative action program)
- **Non-Collusion Affidavit**
- **Certificate of Insurance**
- **Honeywell W-9**

New Jersey Business Registration Certificate

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Taxpayer Name:	HONEYWELL INTERNATIONAL INC.
Trade Name:	ADI GLOBAL DISTRIBUTION
Address:	101 COLUMBIA RD MORRISTOWN, NJ 07960-4640
Certificate Number:	0073401
Effective Date:	August 19, 1985
Date of Issuance:	August 25, 2021

For Office Use Only:

20210825150427681

Public Works Contractor Registration Act

Certificate Number
604863

Registration Date: 08/02/2024
Expiration Date: 08/01/2025

State of New Jersey

Department of Labor and Workforce Development

Division of Wage and Hour Compliance

Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

Honeywell International Inc

2024

Responsible Representative(s):
Darius Adamczyk, President
Sudhakar Janakiraman, Vice-President

Responsible Representative(s):
Billal Hammoud, President

Robert Asaro-Angelo, Commissioner
Department of Labor and Workforce Development

NON TRANSFERABLE

This certificate may not be transferred or assigned and may be revoked for cause by the Commissioner of Labor and Workforce Development.

NJ DPMC Notice of Classification Act

HONEYWELL INTERNATIONAL INC
115 TABOR ROAD
MORRIS PLAINS, NJ 07950

State of New Jersey

DEPARTMENT OF THE TREASURY
DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION
33 WEST STATE STREET - P.O. BOX 034
TRENTON, NEW JERSEY 08625-0034

NOTICE OF CLASSIFICATION

In accordance with N.J.S.A. 18A:18A-27 et seq (Department of Education) and N.J.S.A. 52:35-1 (Department of the Treasury) and any rules and regulations issued pursuant hereto, you are hereby notified of your classification to do State work for the Department (s) as previously noted.

Aggregate Amount	Trade(s) & License(s)	Effective Date	Expiration Date
Unlimited	C043 -CONTROL SYSTEMS	04/01/2023	03/31/2025
	C098 -ENERGY MANAGEMENT SYSTEMS	04/01/2023	
	C036 -ENERGY SERVICES/ESCO	04/01/2023	
	C049 -FIRE ALARM/SIGNAL SYSTEMS	04/01/2023	
	license #: 34BF00009500		
	C032 -HVACR	04/01/2023	
	license #: 19HC00404900		
	C050 -SECURITY/INTRUSION ALARMS	04/01/2023	

- Licenses associated with certain trades are on file with the Division of Property Management & Construction (DPMC).
- Current license information must be verified prior to bid award.
- A copy of the DPMC 701 Form (Total Amount of Uncompleted Projects) may be accessed from the DPMC website at https://www.nj.gov/treasury/dpmc/Assets/Files/DPMC701.pdf.

ANY ATTEMPT BY A CONTRACTOR TO ALTER OR MISREPRESENT ANY INFORMATION CONTAINED IN THIS FORM MAY RESULT IN PROSECUTION AND/OR DEBARMENT, SUSPENSION OR DISQUALIFICATION. INFORMATION ON AGGREGATE AMOUNTS CAN BE VERIFIED ON THE DPMC WEB SITE.

Statement of Corporate Ownership

EXHIBIT B:

OWNERSHIP DISCLOSURE CERTIFICATION TO BE SUBMITTED WITH PROPOSAL

In order to conform with N.J.S.A.52:25-24.2, all corporations or partnerships shall provide the following information:

1. Name of Firm: Caroline Jackson, Sr. Business Consultant
2. Type of Business Organization (Check appropriate type)

Partnership____ ✕Corporation ____ Sole Proprietorship ____
Limited Partnership_____ Limited Liability Corporation _____ Limited Liability Partnership ____
Subchapter S Corporation _____

3. Name of State in which Incorporated: _____

The following individuals own ten percent (10%) or more of any class stock in the corporation or are ten percent (10%) or more Partners in the Firm:

NAME	ADDRESS	TITLE	PERCENTAGE
Honeywell is an international publice operation and no one individual owns more that 10 %.			

Or, I certify that no one stockholder or partner owns 10% or more of the issued and outstanding stock or interest in the business entity.

IF ANY OF THE AFOREMENTIONED STOCKHOLDERS ARE A CORPORATION, WHEREBY THEY HOLD 10% (TEN PERCENT) OR MORE OF ANY CLASS STOCK IN BIDDING CORPORATION, THEY SHALL ALSO PROVIDE THE INFORMATION REQUESTED ABOVE.

The above information is true and correct to the best of my knowledge.

(Signature) Caroline Jackson

(Name) Caroline Jackson

(Title) Sr Business Consultant

(Address) _____

Subscribed and sworn to before me
This 18 day of Nov, 20 24.
(Seal) Notary Public of New Jersey/
Specify Other State
My commission Expires 12/22, 2025
Cathleen A Foote

NJ ESIP RFP Education Template: rev 7.1.22

CATHLEEN A. FOOTE
NOTARY PUBLIC OF NEW JERSEY
Commission # 2269845
My Commission Expires 12/22/2025

Page 49

Employee Information Report

Certification **137**

CERTIFICATE OF EMPLOYEE INFORMATION REPORT **RENEWAL**

This is to certify that the contractor listed below has submitted an Employee Information Report pursuant to N.J.A.C. 17:27-1.1 et. seq. and the State Treasurer has approved said report. This approval will remain in effect for the period of **15-Jun-2024** to **15-Jun-2027**

HONEYWELL INTERNATIONAL INC.
115 TABOR ROAD
MORRISPLAINS NJ 07950

ELIZABETH MAHER MUOIO
State Treasurer

State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF THE TREASURY
DIVISION OF PURCHASE AND PROPERTY
CONTRACT COMPLIANCE & AUDIT UNIT
EEO MONITORING PROGRAM
33 WEST STATE STREET
P. O. BOX 206
TRENTON, NEW JERSEY 08625-0206

ELIZABETH MAHER MUOIO
State Treasurer

MAURICE A. GRIFFIN
Acting Director

RENEWAL NOTICE

The Certificate of Employee Information Report (hereinafter referred to as the "State Certificate") issued by this Division is due to expire within the next 90 days. In order for your firm to continue to provide a current State Certificate for public contract awards, you must apply for renewal by properly completing the following renewal documents:

1. The Employee Information Report Form AA-302 for the facility indicated on the "State Certificate" and any additional New Jersey facilities, with a check in the amount of **$150.00** payable to **"the Treasurer, State of New Jersey" (fee is non-refundable)** and

2. The Vendor Activity Summary Report forms, one for each of the four (4) personnel activities noted (new hires, promotions, transfers and terminations etc.) for the previous "State Certificate" period, or

3. If you are operating under a federally approved affirmative action plan, a photocopy of the letter of Federal Approval issued by the US Department of Labor, Office of Federal Contract Compliance Programs, not greater than one year old, may be submitted to the awarding agency in lieu of the State Certificate. Please do not submit an EEO-1 Report as it will not be accepted.

All goods, service and professional service vendors are encouraged to complete and file these renewal documents electronically by accessing the Division's website at **www.state.nj.us/treasury/contract_compliance**. This website provides access to the forms in electronic format or on-line internet submission registration via the internet. You may also call the Division at (609) 292-5473 and a representative will assist you. Please have your State Certificate number ready when calling. Your State Certificate number is noted at the end of your company name on your mailing label.

Upon receipt of the above-referenced documents, the Division will approve or reject your application within sixty (60) days of submission. If your application is approved, the Division will issue a State Certificate provided your firm meets the standards of good faith compliance with the Affirmative Action Regulations set forth in N.J.A.C. 17:27-1.1 et seq. Periodic reviews may be conducted and additional information may be requested, as required by the Division. In all instances, however, a copy of the State Certificate must be presented to the public agency awarding the contract, prior to the award of the contract.

Rev. 4-18

INSTRUCTIONS FOR COMPLETING THE EMPLOYEE INFORMATION REPORT (FORM AA302)

IMPORTANT: READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE COMPLETING THE FORM. PRINT OR TYPE ALL INFORMATION. FAILURE TO PROPERLY COMPLETE THE ENTIRE FORM **AND TO SUBMIT THE REQUIRED $150.00 NON-REFUNDABLE FEE MAY DELAY ISSUANCE OF YOUR CERTIFICATE. IF YOU HAVE A CURRENT CERTIFICATE OF EMPLOYEE INFORMATION REPORT, DO NOT COMPLETE THIS FORM UNLESS YOUR ARE RENEWING A CERTIFICATE THAT IS DUE FOR EXPIRATION. DO NOT COMPLETE THIS FORM FOR CONSTRUCTION CONTRACT AWARDS.**

ITEM 1 - Enter the Federal Identification Number assigned by the Internal Revenue Service, or if a Federal Employer Identification Number has been applied for, or if your business is such that you have not or will not receive a Federal Employer Identification Number, enter the Social Security Number of the owner or of one partner, in the case of a partnership.

ITEM 2 - Check the box appropriate to your TYPE OF BUSINESS. If you are engaged in more than one type of business check the predominate one. If you are a manufacturer deriving more than 50% of your receipts from your own retail outlets, check "Retail".

ITEM 3 - Enter the total "number" of employees in the entire company, including part-time employees. This number shall include all facilities in the entire firm or corporation.

ITEM 4 - Enter the name by which the company is identified. If there is more than one company name, enter the predominate one.

ITEM 5 - Enter the physical location of the company. Include City, County, State and Zip Code.

ITEM 6 - Enter the name of any parent or affiliated company including the City, County, State and Zip Code. If there is none, so indicate by entering "None" or N/A.

ITEM 7 - Check the box appropriate to your type of company establishment. "Single-establishment Employer" shall include an employer whose business is conducted at only one physical location. "Multi-establishment Employer" shall include an employer whose business is conducted at more than one location.

ITEM 8 - If "Multi-establishment" was entered in item 8, enter the number of establishments within the State of New Jersey.

ITEM 9 - Enter the total number of employees at the establishment being awarded the contract.

ITEM 10 - Enter the name of the Public Agency awarding the contract. Include City, County, State and Zip Code. This is not applicable if you are renewing a current Certificate.

ITEM 11 - Enter the appropriate figures on all lines and in all columns. THIS SHALL ONLY INCLUDE EMPLOYMENT DATA FROM THE FACILITY THAT IS BEING AWARDED THE CONTRACT. DO NOT list the same employee in more than one job category. **DO NOT attach an EEO-1 Report**.

Racial/Ethnic Groups will be defined:
Black: Not of Hispanic origin. Persons having origin in any of the Black racial groups of Africa.
Hispanic: Persons of Mexican, Puerto Rican, Cuban, or Central or South American or other Spanish culture or origin, regardless of race.
American Indian or Alaskan Native: Persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.
Asian or Pacific Islander: Persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian Sub-continent or the Pacific Islands. This area includes for example, China, Japan, Korea, the Phillippine Islands and Samoa.
Non-Minority: Any Persons not identified in any of the aforementioned Racial/Ethnic Groups.

ITEM 12 - Check the appropriate box. If the race or ethnic group information was not obtained by 1 or 2, specify by what other means this was done in 3.

ITEM 13 - Enter the dates of the payroll period used to prepare the employment data presented in Item 12.

ITEM 14 - If this is the first time an Employee Information Report has been submitted for this company, check block "Yes".

ITEM 15 - If the answer to Item 14 is "No", enter the date when the last Employee Information Report was submitted by this company.

ITEM 16 - Print or type the name of the person completing the form. Include the signature, title and date.

ITEM 17 - Enter the physical location where the form is being completed. Include City, State, Zip Code and Phone Number.

TYPE OR PRINT IN SHARP BALL POINT PEN

THE VENDOR IS TO COMPLETE THE EMPLOYEE INFORMATION REPORT FORM (AA302) AND RETAIN A COPY FOR THE VENDOR'S OWN FILES. THE VENDOR SHOULD ALSO SUBMIT A COPY TO THE PUBLIC AGENCY AWARDING THE CONTRACT IF THIS IS YOUR FIRST REPORT; AND FORWARD ONE COPY **WITH A CHECK IN THE AMOUNT OF $150.00 PAYABLE TO THE TREASURER, STATE OF NEW JERSEY(FEE IS NON-REFUNDABLE)** TO:

NJ Department of the Treasury
Division of Purchase & Property
Contract Compliance Audit Unit
EEO Monitoring Program
P.O. Box 206
Trenton, New Jersey 08625-0206 **Telephone No. (609) 292-5473**

Your will find Honeywell's Equal Employment Opportunity ("EEO") and Affirmative Action statement after the last page of thi

INSTRUCTIONS

VENDOR ACTIVITY SUMMARY REPORTS

1. You should complete 4 blank Vendor Activity Summary Reports with your AA-302, Employee Information Report Renewal Application package. These 4 Reports are to be completed for new hires, promotions, transfers and terminations that took place between the time you received your Certificate of Employee Information Report (hereafter referred to as "Certificate") and the date of your Renewal Application.

2. The Vendor Activity Summary Reports must be completed to show your firm's total personnel actions for the previous Certificate period. For example, if your firm renews its Certificate every 3 years, one of the reports should indicate the total number of people hired during the entire 3-year period during which you held the Certificate. Another report should indicate the total number of people terminated during that 3-year period. The third report should indicate the total number of people transferred during that 3-year period and the final report should indicate the total number of people promoted during that 3-year period. Please note, there is no need to re-state the information provided on the AA-302 form.

PB-AAF.1 R5/26/09

Affirmative Action Supplement

AFFRIMATIVE ACTION	**Term Contract - Advertised Bid Proposal**
Department of the Treasury Division of Purchase & Property State of New Jersey 33 W. State St., 9th Floor PO Box 230 Trenton, New Jersey 08625-0230	**Bid Number:** _____ **Bidder:** _____ _____

EXHIBIT A
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27
GOODS, PROFESSIONAL SERVICE AND GENERAL SERVICE CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative or workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to afford equal employment opportunities to minority and women workers consistent with Good faith efforts to meet targeted county employment goals established in accordance with N.J.A.C. 17:27-5.2, or Good faith efforts to meet targeted county employment goals determined by the Division, pursuant to N.J.A.C. 17:27-5.2.

The contractor or subcontractor agrees to inform in writing its appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, labor unions, that it does not discriminate on the basis of age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personnel testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.
In conforming with the targeted employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

Letter of Federal Affirmative Action Plan Approval

Certificate of Employee Information Report

Employee Information Report Form AA302

The contractor and its subcontractors shall furnish such reports or other documents to the Division of Public Contracts Equal Employment Opportunity Compliance as may be requested by the office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Public Contracts Equal Employment Opportunity Compliance for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code at N.J.A.C. 17:27**.

*** NO FIRM MAY BE ISSUED A PURCHASE ORDER OR CONTRACT WITH THE STATE UNLESS THEY COMPLY WITH THE AFFIRMATIVE ACTION REGULATIONS**

PLEASE CHECK APPROPRIATE BOX (ONE ONLY)

☑ I HAVE A CURRENT NEW JERSEY AFFIRMATIVE ACTION CERTIFICATE, (PLEASE ATTACH A COPY TO YOUR PROPOSAL).

☐ I HAVE A VALID FEDERAL AFFIRMATIVE ACTION PLAN APPROVAL LETTER, (PLEASE ATTACH A COPY TO YOUR PROPOSAL).

☐ I HAVE COMPLETED THE ENCLOSED FORM AA302 AFFIRMATIVE ACTION EMPLOYEE INFORMATION REPORT.

Your will find Honeywell's Equal Employment Opportunity ("EEO") and Affirmative Action - in this pdf.

Attachment 3

EXHIBIT A

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq., N.J.A.C. 17:27

GOODS, PROFESSIONAL SERVICES AND GENERAL SERVICE CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Except with respect to affectional or sexual orientation, the contractor will take affirmative action to ensure that such applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Such action shall include, but not limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative or workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq. as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to employ minority and women workers consistent with the applicable county employment goals established in accordance with N.J.A.C. 17:27-5.2, or a binding determination of the applicable county employment goals determined by the Division, pursuant to N.J.A.C. 17:27-5.2.

10

EXHIBIT A (*Cont*)

The contractor or subcontractor agrees to inform in writing its appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, labor unions, that it does not discriminate on the basis of age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personal testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

In conforming with the applicable employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor and its subcontractor shall furnish such reports or other documents to the Division of Contract Compliance & EEO as may be requested by the Division from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Contract Compliance & EEO for conducting a compliance investigation pursuant **to Subchapter 10 of the Administrative Code at N.J.A.C.17:27.**

Caroline Jackson,
Sr. Bus. Consultant
Name of Vendor is aware of our obligation to the State of New Jersey pursuant to NJSA 10:5-31

Caroline Jackson
Signature of Highest Official

11

Country(ies): U.S.	Policy Title: EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION	Effective Date: 01/01/2000
Policy Number: 2060		Revision Date: 10/01/2017

PURPOSE

This Policy sets forth Honeywell's Equal Employment Opportunity ("EEO") and Affirmative Action statement.

SCOPE AND ELIGIBILITY

Honeywell's employment practices will conform to both the spirit and the letter of Federal, state and local laws and regulations regarding nondiscrimination in employment. This Policy applies to all Honeywell sites within the United States, other than National Technology and Engineering Solutions of Sandia, LLC sites.

POLICY

1. HIRING STATEMENT

All applicants for employment with Honeywell will be considered without regard to sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status, national origin, citizenship or any other legally protected status.

The Human Resources leaders at each Company site ("HR Site Leaders") are responsible for monitoring, at least annually, the selection process for all positions filled at their site. They accomplish this by determining whether there are selection disparities and, if so, whether impediments to equal employment opportunity exist. If impediments are not based on legitimate business practices, the HR Site HR Leaders are responsible for removing such impediments.

2. EMPLOYMENT ACTIONS

There shall be no discrimination with regard to sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status national origin, citizenship or any other legally protected status in any employment actions including, but not limited to, promotions, demotions, transfers, layoffs or terminations, compensation, use of facilities and selection for training or related programs.

HR Site Leaders are responsible for monitoring, at least annually, all employment actions including, but not limited to, promotions, demotions, transfers, layoffs or terminations, compensation, use of facilities and selection for training or related programs at their sites. They accomplish this by determining whether there are disparities and, if so, whether impediments to equal employment opportunity exist. If impediments are not based on legitimate business practices, the HR Site Leaders are responsible for removing such impediments.

2. WORK ENVIRONMENT

It is the Company's policy to maintain a work environment that fosters respect for all employees. A good working environment includes freedom from harassment based on sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status, national origin, citizenship or any other legally protected status.

HR Site Leaders are responsible for posting the policy statement attached hereto as Exhibit A or, in the case of the Company's Minnesota locations, Exhibit B.

3. GOVERNMENT CONTRACT COMPLIANCE

Honeywell is a U.S. Federal Government contractor and subcontractor subject to Executive Order ("EO") 11246, Section 4212 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended ("Section 4212"), and Section 503 of the Rehabilitation Act of 1973, as amended ("Section 503"). It is Honeywell's policy to take affirmative action to employ, advance in employment, and otherwise treat as qualified minorities, women, protected veterans, and individuals with disabilities without regard to their race/ ethnicity, sex, protected veteran status, or physical or mental disability. Honeywell will also provide reasonable accommodation to the known physical or mental limitations of an otherwise qualified employee or applicant for employment, unless the accommodation would impose undue hardship on the operation of the Company's business.

HR Site Leaders are responsible for making the non-confidential portions of their site's affirmative action plans ("AAPs") for individuals with disabilities and protected veterans available to applicants and employees. The non-confidential portions of the AAPs are available to applicants and employees upon request to the HR Site Leader during the working hours of 9:00 AM through 4:30 PM.

4. NO RETALIATION

Honeywell prohibits retaliation and will not tolerate harassment, intimidation, threats, coercion, or discrimination against applicants or employees because they have engaged in, or may engage in, (1) filing a complaint; (2) assisting or participating in an investigation, compliance review, hearing, or any other activity related to the administration of EO 11246, Section 503, Section 4212, or any other Federal, state or local law requiring equal opportunity; (3) opposing any act or practice made unlawful by EO 11246, Section 503, Section 4212 or any other Federal, state or local law requiring equal opportunity; or (4) exercising any other right protected by such laws or their implementing regulations.

DEFINITIONS

Honeywell or *Company*. For purposes of this Policy, Honeywell or Company shall mean Honeywell International Inc., its subsidiaries and affiliates, and their respective predecessors and successors.

Law. For purposes of this Policy, Law means all applicable federal, state and local laws and regulations.

RESPONSIBILITY FOR THE POLICY

This Policy is administered by Honeywell Human Resources, in consultation with the Honeywell Law Department.

Honeywell's Chief Executive Officer shall fully support the Company's affirmative action program and commit to the implementation of the Company's EEO and Affirmative Action policies.

The Company's Director, Staffing Excellence, shall (i) be responsible for the maintenance of the Company's EEO programs, and (ii) be responsible for (but is not restricted to) establishing and implementing reporting procedures and related systems for monitoring and auditing the Company's EEO practices.

RELATED POLICIES, INFORMATION AND RESOURCES

Workplace Harassment (Policy 2025)
Reduction-in-Force (Policy 2031)
Employees and Applicants with Disabilities (Policy 2079)

The following laws, all as amended, along with any implementing regulations:

- Title VII of the Civil Rights Act of 1964
- The Equal Pay Act of 1963
- The Age Discrimination in Employment Act of 1967
- The Americans with Disabilities Act of 1990
- The Job for Veterans Act (PL 107-288)
- Civil Rights Act of 1991
- Section 503 of the Rehabilitation Act of 1973
- Section 4212 of the Vietnam Era Veterans Readjustment Assistance Act of 1974
- Genetic Information Nondiscrimination Act of 2007
- Executive Order 11246

EXHIBITS

Exhibit A: Equal Employment and Affirmative Action Policy Statement for all U.S. and Expatriate Employees EEO AA Policy Statement 2017.pdf

Exhibit B: Equal Employment and Affirmative Action Policy Statement for Minnesota EEO AA Policy Statement MN 2017.pdf

REPORTING CONCERNS AND SEEKING GUIDANCE

Additional guidance can be sought by contacting a Human Resources representative.

REVISION HISTORY

This Policy was originally effective January 1, 2000. It was amended and restated effective January 1, 2001, May 15, 2009, September 19, 2011, and October 6, 2014.

MANAGEMENT'S RIGHTS

The Company, in its sole discretion, reserves the exclusive right to interpret, administer and apply this Policy, to make any exceptions to it, and to change this Policy at any time and for any reason.

This Policy is not intended to create contractual obligations. Employment with the Company in the U.S. (other than Puerto Rico) is at will, which means that either the Company or the employee may terminate the employment relationship at any time and for any reason, without notice. The Company reserves the right to modify, amend, or terminate this Policy at any time. This Policy supersedes any prior policies of Honeywell, whether written or oral, on the topics covered in this Policy.

This Policy is the property of Honeywell International Inc. and is published on the Company's intranet at http://policy.honeywell.com. It is the reader's responsibility to review the intranet publication of this policy to ensure the most current version is being referenced before taking action based on this printed copy, which may be outdated.

Certification of Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 03/27/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:
Aon Risk Services Northeast, Inc. New York NY Office One Liberty Plaza 165 Broadway, Suite 3201 New York NY 10006 USA	PHONE (A/C. No. Ext): (866) 283-7122 FAX (A/C. No.): (800) 363-0105 E-MAIL ADDRESS:

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
Honeywell International Inc. 855 S. Mint Street Charlotte NC 28202 USA	INSURER A: XL Insurance America Inc	24554
	INSURER B: XL Specialty Insurance Co	37885
	INSURER C: Greenwich Insurance Company	22322
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** 570104640771 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. Limits shown are as requested

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
C	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:			RGC943763011	04/01/2024	04/01/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$5,000,000 $5,000,000 $50,000 $5,000,000 $5,000,000 Included
C	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			RAC943764211	04/01/2024	04/01/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
C	UMBRELLA LIAB X OCCUR X EXCESS LIAB CLAIMS-MADE DED RETENTION			RAO943764511 EXCESS AUTO ONLY	04/01/2024	04/01/2025	EACH OCCURRENCE AGGREGATE	$4,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		RWD943540311	04/01/2024	04/01/2025	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	$5,000,000 $5,000,000 $5,000,000
B	Excess Workers Compensation			RWE943540411 XS WC (AZ, OH, WA) SIR applies per policy terms & conditions	04/01/2024	04/01/2025	EL Each Accident EL Disease - Ea Emp	$5,000,000 $5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Evidence of coverage . Blanket Additional Insured where required by written contract endorsement is included on the General Liability and Automobile Liability policies . Blanket contractual Liability is included on the General Liability and Auto policies per the policy coverage forms. A waiver of subrogation where required by written contract is included on applicable policies shown above. Honeywell will provide the General Liability ISO endorsement form numbers where required by written contract upon request.

CERTIFICATE HOLDER	CANCELLATION
Honeywell International Inc. 855 S. Mint Charlotte NC 28202 USA	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE *Aon Risk Services Northeast, Inc.*

Holder Identifier :

Certificate No : 570104640771

ACORD 25 (2016/03) The ACORD name and logo are registered marks of ACORD

AGENCY CUSTOMER ID: 570000054391
LOC #:

ACORD

ADDITIONAL REMARKS SCHEDULE

Page _ of _

AGENCY	NAMED INSURED
Aon Risk Services Northeast, Inc.	Honeywell International Inc.
POLICY NUMBER: See Certificate Number: 570104640771	
CARRIER: See Certificate Number: 570104640771 / NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,
FORM NUMBER: ACORD 25 **FORM TITLE:** Certificate of Liability Insurance

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER	
INSURER	
INSURER	
INSURER	

ADDITIONAL POLICIES If a policy below does not include limit information, refer to the corresponding policy on the ACORD certificate form for policy limits.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
	OTHER							
B				RWE943540511 XS WC (NM) SIR applies per policy terms & conditions	04/01/2024	04/01/2025		

ACORD 101 (2008/01)

Honeywell W-9

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

► Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give Form to the requester. Do not send to the IRS.

Print or type. See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
Honeywell International Inc.

2 Business name/disregarded entity name, if different from above
Honeywell Building Solutions

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☑ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ►

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):
Exempt payee code (if any) 5
Exemption from FATCA reporting code (if any) D
(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.
855 S. Mint Street

Requester's name and address (optional)

6 City, state, and ZIP code
Charlotte, NC 28202

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN,* later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number
[ ][ ][ ] – [ ][ ] – [ ][ ][ ][ ]

or

Employer identification number
2 2 – 2 6 4 0 6 5 0

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here Signature of U.S. person ► Mark L. Hall Date ► 1/10/2024

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9.*

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

Cat. No. 10231X Form **W-9** (Rev. 10-2018)

NJ Co-Op Purchasing Required Information

Since the Monroe Township Board of Education is a member in good standing with the Omnia Cooperative, use of Omnia Cooperative in the selection of Honeywell under contract # R221502 is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- "an organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use."
- "in the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit's bid threshold."
- The national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires a contracting unit can use national cooperatives only when the contracting unit determines " the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered."
- The LFN states if using an online ordering system, local officials must put "appropriate internal controls" in place to ensure purchases are documented and that an audit trail exists

This document will certify Honeywell, and the use of this cooperative purchasing agreement will remain compliant with the services of the COOP for the Monroe Township Public School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc. Additionally, that no on-line ordering system will be used as part of this process.

It is estimated the cost savings to the District by using the Cooperative Agreement will save approximately $8,500 in legal fees, 100-man hours as well as significant lost energy savings per month for every month waiting to administer the RFP process on their own. Because Omnia has undertaken the competitive process on the district's behalf, the savings can be achieved as outlined in this plan approximately 10 months sooner than via a local competitive contracting approach.

For more information

www.honeywell.com/us/en/industries/buildings-cities

Honeywell Energy Services Group

Caroline Jackson
Senior Business Consultant
Honeywell Energy Services Group
534 Fellowship Rd.
Mt. Laurel, NJ 08054
Office: 856.437.1856
Mobile: 610.247.8126
caroline.jackson@honeywell.com
www.honeywell.com

THE FUTURE IS WHAT WE MAKE IT

Honeywell