ELIZABETH PUBLIC SCHOOLS SAVINGS PLAN

DISTRICT-WIDE ENERGY SAVINGS PLAN

June 17, 2021

Honeywell

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Honeywell

ELIZABETH PUBLIC SCHOOLS

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DISTRICT-WIDE ENERGY SAVINGS PLAN

PREPARED FOR:

Mr. Harold Kennedy
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Elizabeth Public School Board of Education
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PREPARED BY:

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Non-Disclosure Statement

This proposal or qualification data includes data that shall not be disclosed outside **ELIZABETH Public Schools Savings Plan** 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 Elizabeth Public Schools** 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 Elizabeth Public Schools** 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

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EXECUTIVE SUMMARY

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SECTION A — EXECUTIVE SUMMARY

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

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

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

The purpose of this document is to provide all the information required for the Elizabeth Public Schools to determine the best path forward in the implementation of a -Wide NJ ESIP Project. It is important to note that the Energy Savings Plan provides a comprehensive evaluation of ALL potential ECMs within the Elizabeth Public Schools. This is not meant to infer that all the ECMs identified can be implemented. However, if the ECM is part of this plan, it may be implemented later as additional funding becomes available or technology changes to provide for an improved financial return.

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

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

B. **Preliminary Utility Analysis –** The Preliminary Utility Analysis (PUA) defines the utility baseline for the Elizabeth Public Schools 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 Elizabeth Public Schools utility consumption to that of other s in the same region on a per square foot basis.

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

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

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

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

G. **Independent Energy Audit –** This section includes, for reference, the independent energy audits as previously received by the Elizabeth Public Schools through the Local Government Energy Audit (LGEA) program. The audits provided by TRC Energy Services have been included on a USB drive as Appendix 1. A comparison can be made between the ECMs outlined in this Independent Energy Audit and the additional ECMs described in the overall Energy Savings Plan.

H. For Appendices 1 to 5, please refer to the following files for their electronic version on the USB drive included along in the submission:

Honeywell – Appendix 1 — INDEPENDENT ENERGY AUDIT(S) (Exhibit 1).pdf

Honeywell – Appendix 2 — ECM CALCULATIONS.pdf

Honeywell – Appendix 3 — SAFETY MANAGEMENT PLAN.pdf

Honeywell – Appendix 4 — EQUIPMENT CUTSHEETS.pdf

Honeywell – Appendix 5 --- (2) ELIZABETH SCHOOL LIGHTING LINE BY LINES.pdf

Benefits

The measures investigated in this Energy Savings Plan could result in an annual utility savings of 13,227,326 kWh of electricity and save 261,570 therms of natural gas. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the school 's carbon footprint by 8338 MTE of CO2 annually. This is equivalent to removing 1759 cars from the road annually and /or 7896 forested acres per year. All these savings are achieved while improving the classroom environment and renewing many items that have been in service beyond useful life expectancy.

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

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

Sincerely,

Joseph Coscia
Senior Business Consultant

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SECTION B — PRELIMINARY UTILITY ANALYSIS

Honeywell

Preliminary Utility Analysis

Elizabeth Board of Education
Elizabeth, 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 Envelope
- 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)

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.

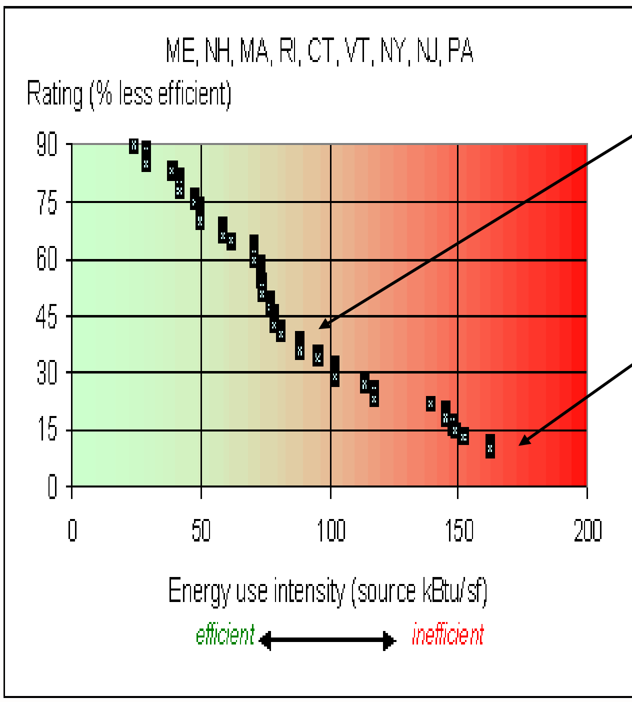
The Source EUI below has been applied to a Department of Energy statistical model from the Oak Ridge National Laboratory web site, http://eber.ed.oml.gov/benchmark. The Department of Energy has estimated energy use and cost reductions for building source EUI ratings (percentiles) in the table below. 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 Ra		Annual Total Electrical Use (kW	Annual Total Non-Electrical Fuel Use (Therms	Building Gross Floor Area (sq-f	Site EUI Rating	Source EUI: Annual Total Source Energy Use per Sq-Ft (kBtu/sf)	Rating (Regional Source EUI Compariso
1	Dwyer-Halsey Academies-81	4,720,295	203,682	375,000	97	184	5%
2	Washington/Dunn Academy-1	2,196,630	110,220	156,748	118	215	23%
3	Terence C. Reilly School-7	1,690,641	71,121	189,030	68	130	12%
4	Abraham Lincoln School-14	756,571	39,284	96,600	67	122	22%
5	Albert Einstein Academy-29	1,504,167	37,764	120,000	74	161	27%
6	Hamilton Prep Academy-80	496,950	35,423	93,510	56	93	23%
7	Benjamin Franklin School-13	523,607	24,155	61,180	69	128	11%
8	Charles J. Hudson School-25	984,642	30,091	67,092	95	197	4%
9	Christopher Columbus School-15	383,235	27,319	61,988	65	108	3%
10	Dr. Martin Luther King Jr. School-52	778,991	27,242	58,857	91	183	1%
11	Dr. Antonia Pantoja School-27	1,705,697	34,867	118,806	78	178	1%
12	Dwyer 9th Grade Annex-82A	366,586	43,276	69,236	81	117	1%
13	Donald Stewart ECE-51	698,935	25,413	54,140	91	180	24%
13	Frank J. Cicarell Academy-89	2,074,756	66,256	183,822	75	153	24%
13	Francis Smith ECE-50	586,877	9,040	55,000	53	127	24%
13	Halsey 9th Grade Academy-83A	421,304	10,213	29,109	84	185	24%
13	Bollwage Academy of Finance-90	538,098	32,733	55,177	93	160	24%
13	Duarte- Marti School-28	1,988,209	33,766	119,532	85	200	24%
13	John Marshall School-20	538,098	32,733	55,177	93	160	24%
13	La Corte-Peterstown School-3	745,029	0	77,400	33	100	24%
13	Lafayette Middle School-6	722,046	70,663	128,333	74	113	24%
13	Mabel G. Holmes School-5	575,022	61,197	111,156	73	109	24%
13	Madison-Monroe School-16	391,533	12,541	45,655	57	116	24%
13	Battin McAuliffe Middle School-4	934,482	58,148	163,580	55	95	24%
13	Nicholas Murray Butler School-23	872,580	42,640	70,000	103	190	24%
13	Orlando Edreira Academy-26	1,620,222	30,349	123,000	70	161	24%
13	Robert Morris School-18	548,721	21,531	61,856	65	127	24%
13	Ronald Reagan Academy-30	1,859,320	56,699	119,800	100	208	24%
13	Thomas A. Edison Academy-87	845,507	127,102	136,440	114	157	24%
13	Thomas Jefferson Arts Academy-84	2,700,385	81,240	177,020	98	204	24%
13	Victor Mravlag School-21	1,414,017	27,368	80,760	94	215	24%
13	Winfield Scott School-2	667,406	11,320	67,835	50	118	24%
13	Woodrow Wilson School-19	681,938	27,660	74,290	69	132	24%
13	Edison 9th Grade Academy-87A	202,733	8,015	31,000	48	93	24%
13	Elmora School-12	407,039	29,126	71,177	60	100	24%
13	Williams Field -98	115,200		57,600	7	21	24%

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 web site, http://eber.ed.ornl.gov/benchmark. 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.)



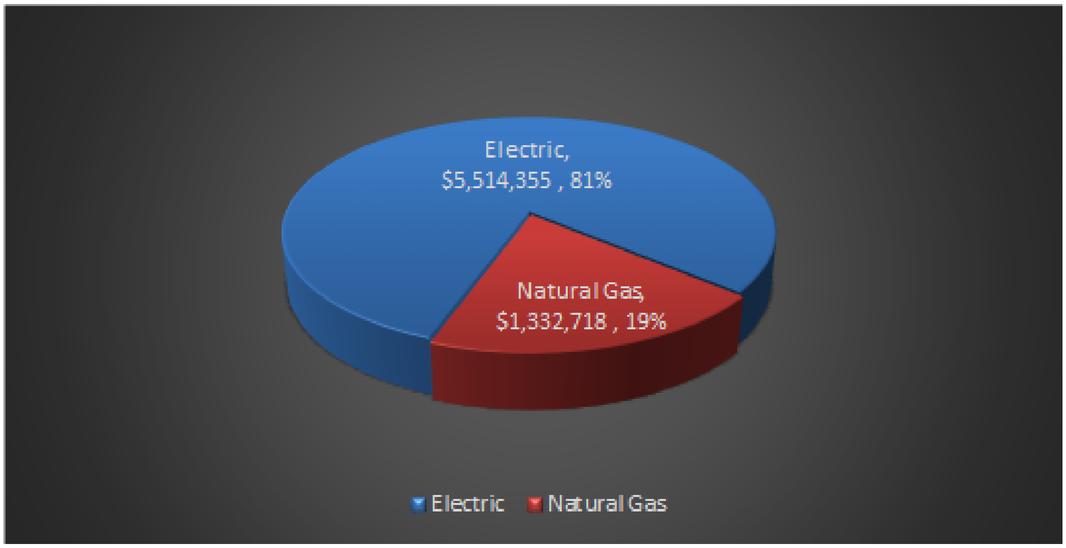
Source EUI	Est Regional Rating	Building
184	5%	Dwyer-Halsey Academies-81
215	23%	Washington/Dunn Academy-1
130	12%	Terence C. Reilly School-7
122	22%	Abraham Lincoln School-14
161	27%	Albert Einstein Academy-29
93	23%	Hamilton Prep Academy-80
128	11%	Benjamin Franklin School-13
197	4%	Charles J. Hudson School-25
108	3%	Christopher Columbus School-15
183	1%	Dr. Martin Luther King Jr. School-52
178	1%	Dr. Antonia Pantoja School-27
117	1%	Dwyer 9th Grade Annex-82A
180	24%	Donald Stewart ECE-51
153	24%	Frank J. Cicarell Academy-89
127	24%	Francis Smith ECE-50
185	24%	Halsey 9th Grade Academy-83A
160	24%	Bollwage Academy of Finance-90
200	24%	Duarte- Marti School-28
160	24%	John Marshall School-20
100	24%	La Corte-Peterstown School-3
113	24%	Lafayette Middle School-6
109	24%	Mabel G. Holmes School-5
116	24%	Madison-Monroe School-16
95	24%	Battin McAuliffe Middle School-4
190	24%	Nicholas Murray Butler School-23
161	24%	Orlando Edreira Academy-26
127	24%	Robert Morris School-18
208	24%	Ronald Reagan Academy-30
157	24%	Thomas A. Edison Academy-87
204	24%	Thomas Jefferson Arts Academy-84
215	24%	Victor Mravlag School-21
118	24%	Winfield Scott School-2
132	24%	Woodrow Wilson School-19
93	24%	Edison 9th Grade Academy-87A
100	24%	Elmora School-12
21	24%	Williams Field -98

Utility Analysis Period:
Apr 2018 through Mar 2019

	Electric	Natural Gas
Utility Costs*	$5,514,355	$1,332,718
Utility Usage (kWh, Therms)	38,257,469	1,560,197
$ Cost/Unit (kWh, Therms)	$0.14414	$0.854
Annual Electric Demand (kW)	123,815	

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

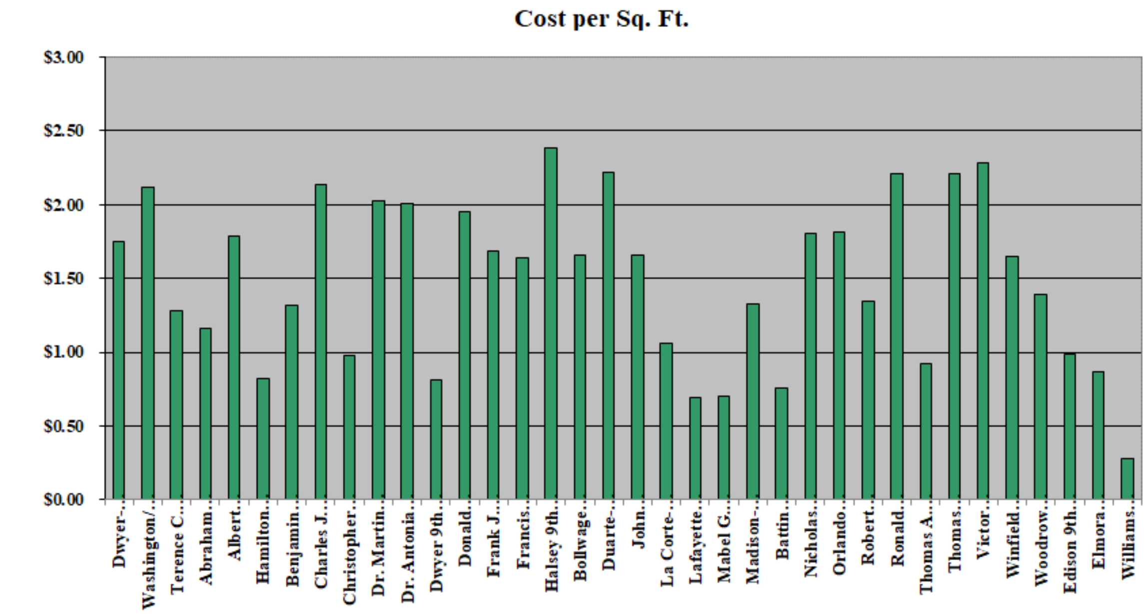
Actual Cost by Utility
Apr 2018 through Mar 2019

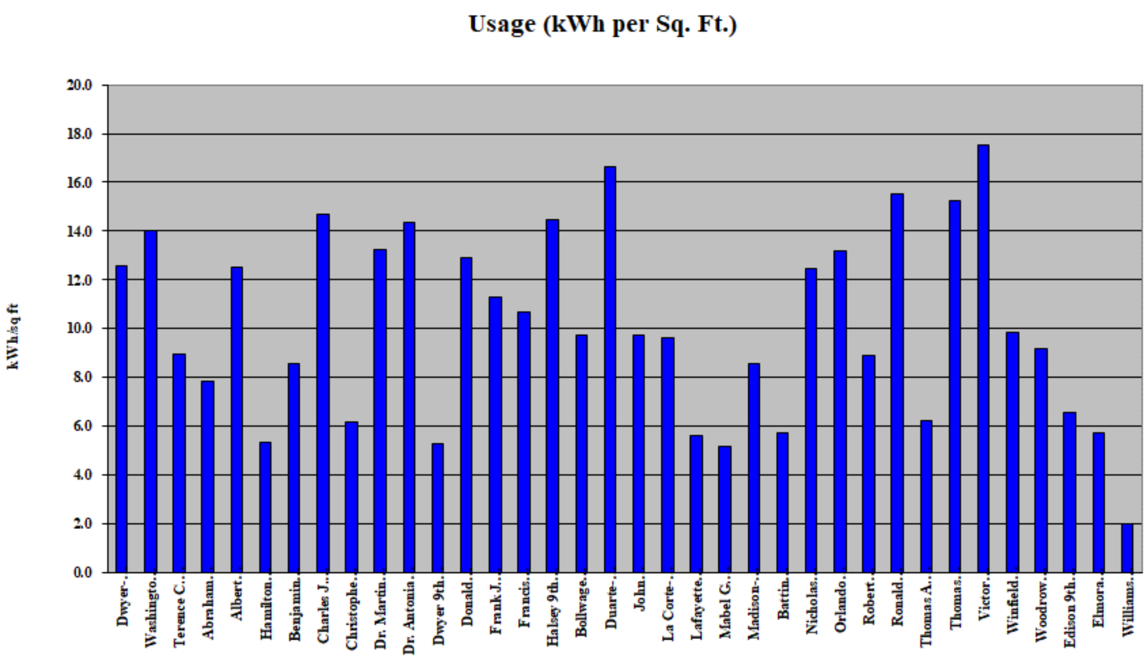


Total Cost
$6,847,073

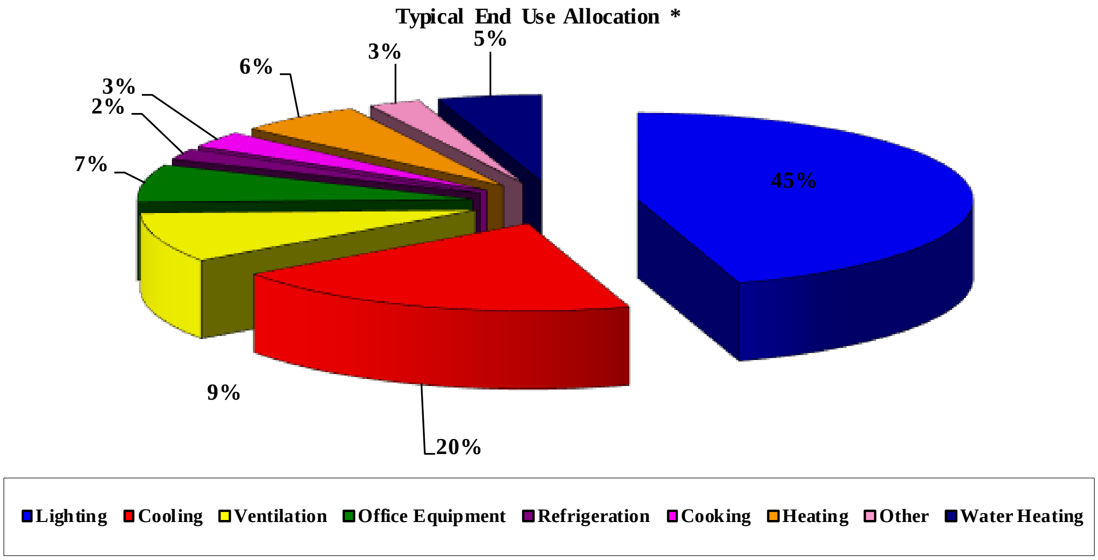
Utility Analysis — Electric

Square Footage Analysis





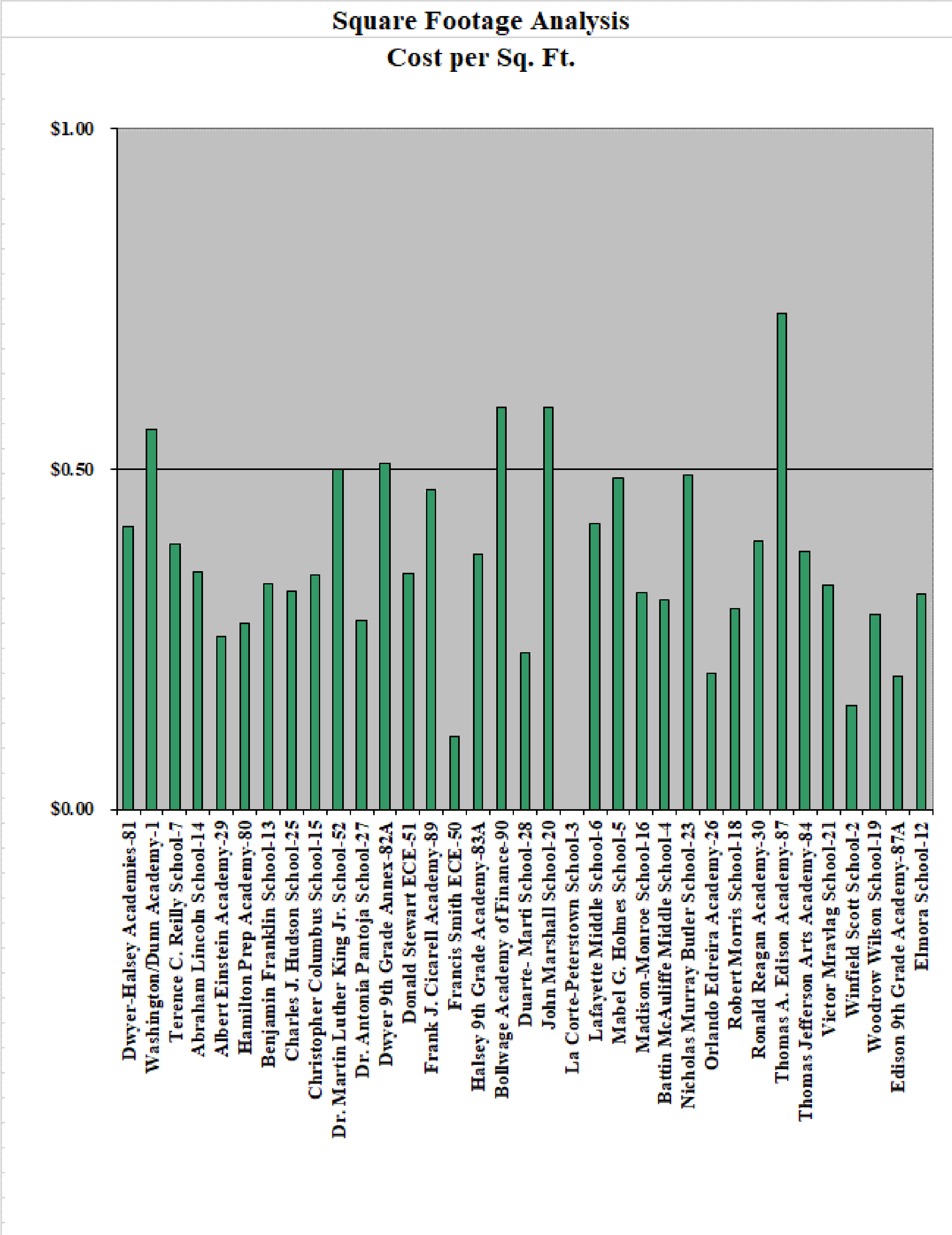
Sources of Electric Consumption

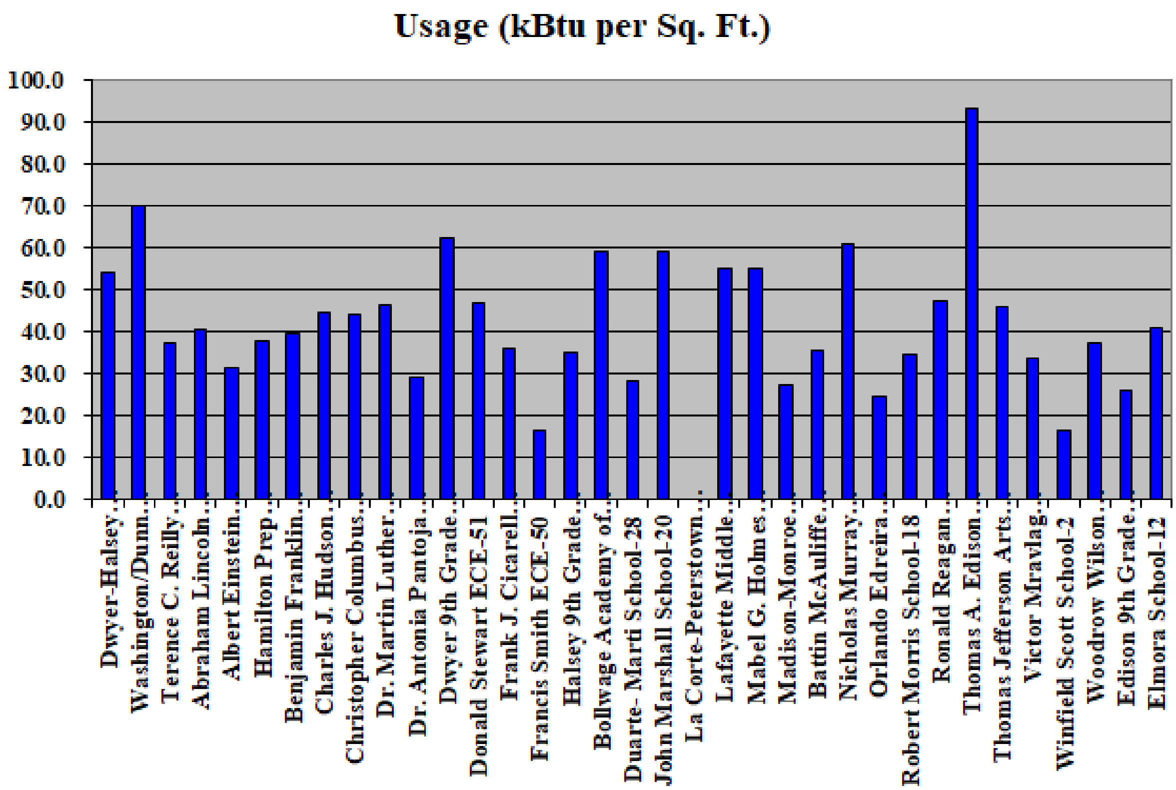


**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

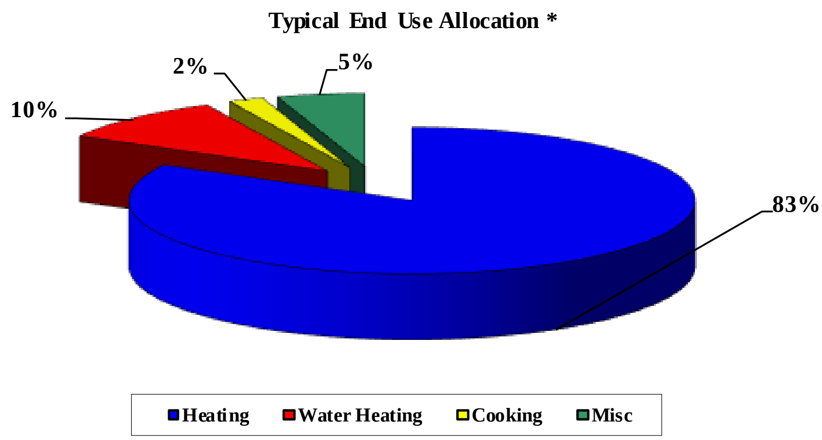
Lighting	$2,481,460
Cooling	$1,102,871
Ventilation	$507,321
Office Equipment	$386,005
Refrigeration	$110,287
Cooking	$165,431
Heating	$330,861
Other	$137,859
Water Heating	$275,718
Your Total Cost Apr 2018 through Mar 2019	**$5,514,355**


Square Footage Analysis
Cost per Sq. Ft.
$1.00
$0.50
$0.00
Dwyer-Halsey Academies-81
Washington/Dunn Academy-1
Terence C. Reilly School-7
Abraham Lincoln School-14
Albert Einstein Academy-29
Hamilton Prep Academy-80
Benjamin Franklin School-13
Charles J. Hudson School-25
Christopher Columbus School-15
Dr. Martin Luther King Jr. School-52
Dr. Antonia Pantoja School-27
Dwyer 9th Grade Annex-82A
Donald Stewart ECE-51
Frank J. Cicarell Academy-89
Francis Smith ECE-50
Halsey 9th Grade Academy-83A
Bollwage Academy of Finance-90
Duarte- Marti School-28
John Marshall School-20
La Corte-Peterstown School-3
Lafayette Middle School-6
Mabel G. Holmes School-5
Madison-Monroe School-16
Battin McAuliffe Middle School-4
Nicholas Murray Butler School-23
Orlando Edreira Academy-26
Robert Morris School-18
Ronald Reagan Academy-30
Thomas A. Edison Academy-87
Thomas Jefferson Arts Academy-84
Victor Mravlag School-21
Winfield Scott School-2
Woodrow Wilson School-19
Edison 9th Grade Academy-87A
Elmora School-12



There is a fairly direct correlation between your gas usage and heating degree days, indicating that the vast majority of your natural gas usage is for space heating.

Sources of Usage
Natural Gas



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

Typical Allocation Applied to Your Cost**
Natural Gas

	Heating	$1,106,156
	Water Heating	$133,272
	Cooking	$26,654
	Misc	$66,636
Your Total Cost	**Apr 2018 through Mar 2019**	**$1,332,718**

Annual Emissions & Environmental Impact

Elizabeth Board of Education

Calendar Year Apr 2018 through Mar 2019

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

Total Annual Electric usage	38,257,469	kWh
Annual Natural Gas usage	1,560,197	Therms

Annual Greenhouse Gas Emissions

CO2	70,043,996	pounds
SO2	176,367	pounds
NOx	120,511	pounds

This is equivalent to one of the following:

300	No. of passenger vehicles - annual greenhouse gas emissions
176,715	Gallons of gasoline consumed - CO_2 emissions
3,653	Barrels of oil consumed - CO_2 emissions
134	No. of homes energy use for one year - CO_2 emissions
40,282	No. of tree seedlings grown for 10 years - carbon sequestered
335	No. of acres of pine or fir forests - carbon sequestered annually
65,458	No. of propane cylinders used for home barbeques - CO_2 emissions
8	No. of railcars' worth of coal burned - CO_2 emissions

Based on the US Environmental Protection Agency -
Clean Energy Power Profiler

SECTION C
ENERGY CONSERVATION MEASURES

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SECTION C – ENERGY CONSERVATION MEASURES

Introduction

The information used to develop this Section was obtained through the independent energy audit building surveys to collect equipment information, interviews with operators and end users, and an understanding of the components to the systems at the sites. The information obtained includes nameplate data, equipment age, condition, the system's design and actual load, operational practices and schedules, and operations and maintenance history.

Honeywell has done a review of the ECMs which would provide energy and cost savings to Elizabeth Public Schools. 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 available ECMs for your facilities

Please reference the legend below for the following Energy Conservation Measures table.

Legend:

- ■ = (blue) included within this recommended energy plan
- ■ = (green) included within this recommended energy plan via direct install program
- ■ = (black) reviewed and analyzed for future consideration

Facility Descriptions

1. **George Washington/Jerome Dunn Academy - School 1/9**

   a. **Description**

      i. George Washington/Jerome Dunn Academy is a 2-story, 156,748 square foot building built in 1971. Spaces in the main building include classrooms, gymnasium, pool, auditorium, offices, cafeteria, corridors, stairwells, kitchen, and mechanical spaces.

   b. **Occupancy**

      i. Occupancy is 187 staff and 1,485 students.

   c. **Major Equipment - HVAC**

      i. Two Cleaver Brooks 4,184 MBh output hot water boilers serve the building heating load. The burners are non- modulating with a nominal efficiency of 80%. The boilers are configured in a lead-lag control scheme. Both boilers may be required under high load conditions. Installed in 1971, they are in fair condition. The boilers are configured in a constant flow primary distribution with two 7.5 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to unit heaters and air handlers throughout the building as well as to a heat exchanger which provides heating to the pool water loop.

ii. The chiller plant consists of two 300-ton Trane water cooled screw chillers in the boiler room and a single 25-ton Trane air cooled scroll chiller on the roof. The large chillers are configured in a primary distribution loop with two constant flow 25 hp primary pumps. The chiller plant supplies chilled water to the air handlers. The chillers are well maintained. The condenser water system consists of one two-cell cooling tower. Water is circulated to the towers by two constant flow 50 hp pumps. The tower has two fan motors each at 20 hp.

2. <u>Winfield Scott - School 2</u>

a. Description

i. Winfield Scott School is a 3-story, 67,835 square foot building built in 1917. Spaces include classrooms, gymnasium, offices, Kitchen, cafeteria, storage rooms, library, corridors, stairwells, and basement mechanical space.

b. Occupancy

i. Occupancy is 91 staff and 702 students.

c. Major Equipment - HVAC

i. Two Weil Mclain 5,600 MBh steam boilers serve major portion of the main building whose heating load is served by unit ventilators and radiators. These boilers have an estimated efficiency of 74%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 1985

ii. The gym and some offices areas in the building are served by packaged roof top unit (RTUs). The RTU serving the gym has a capacity of 20-tons. The office areas are served by two 5-ton and one 3-ton RTUs. All RTUs have gas furnaces built in them to serve the heating requirements of the offices and gymnasium. The gym RTU is relatively new and is in good working condition. The other units were installed in 1997 and may be nearing their end of useful life. There is also a 4-ton packaged Carrier unit located in the mechanical room that provides cooling only to the offices. This unit is relatively new and is in good working condition. The remainder building is cooled by multiple Mitsubishi VRF heat pump units. The condensing units are located on the roof with individual wall mount ductless split units mounted on the wall of the classrooms and office spaces. Fresh air make-up is brought into each space by Lossnay MAUs with vertical heat exchanger and electric heat.

3. <u>Nicholas S. La Corte-Peterstown – School 3</u>

a. Description

i. Nicholas S. La Corte-Peterstown School is a 3-story, 77,400 square foot building built in 1982. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, kitchen, library, and mechanical and electrical spaces.

b. **Occupancy**
   i. Occupancy is 87 staff and 750 students.

c. **Major Equipment -HVAC**
   i. The all electric building is provided heating and cooling through classroom Airedale Units and Mammoth AHU units for common areas. A 40 kW Megatherm hot water boiler serves the building heating load and domestic hot water needs. The boiler is configured in an automated control scheme.

4. **Joseph Battin McAuliffe - School 4**

a. **Description**
   i. Joseph Battin McAuliffe Middle School is a 4-story, 163,580 square foot building built in 1913. Spaces include classrooms, gymnasium, auditorium, media center, offices, cafeteria, corridors, stairwells, kitchen, and mechanical and electrical spaces.

b. **Occupancy**
   i. The facility is occupied year-round. Typical weekday occupancy is 108 staff and 855 students.

c. **Major Equipment - HVAC**
   i. Two Cleaver Brooks 9,918 MBh steam boilers serve the building heating load. The boilers are configured in a lead-lag control scheme. They are in fair condition. The boilers generate hot water through a steam to hot water heat exchanger. The hot water side is served by a primary/secondary distribution system with two constant speed 5 hp pumps circulating the primary loop and two constant speed 20 hp pumps circulating the secondary loop.

   ii. Chilled water is supplied by two large 218-ton McQuay air-cooled screw chillers, two 20-ton McQuay air-cooled split systems serve the cafeteria, and one 40-ton McQuay air-cooled split unit serves the auditorium. The large chillers are configured in a primary distribution loop with two constant flow primary pumps. The chiller is supplied by dedicated 30 hp primary pumps. The smaller chillers are direct exchange units that supply refrigerant to their respective air-handlers. The chiller plant supplies chilled water to four air handlers, and to classroom unit ventilators. The 40-ton chiller is very near the end of its useful life, but all are well maintained.

5. **Mabel G. Holmes – School 5**

a. **Description**
   i. Mabel G. Holmes School is a 3-story, 111,156 square foot building built in 1924. Spaces include classrooms, gymnasium, auditorium, offices, kitchen, corridors, stairwells, and mechanical space.

b. **Occupancy**
   i. Occupancy is 159 staff and 909 students.

c. **Major Equipment - HVAC**

i. Two quantity Weil McClain (A-1894WS) steam boilers serve the building heating load. The burners are non- modulating with a nominal efficiency of 80%. The boilers were installed in 1989 and are in fair condition. A 2-pipe steam distribution system serves the building heating terminals (unit ventilators and radiators). There are three 0.75 hp boiler feed pumps in the mechanical room.

ii. The gym, hallways, auditorium and certain classrooms are served with packaged air conditioning units controlled by room thermostats. There are two Aaon units serving the Upper and Lower Gym and have an 8-ton and 10-ton cooling capacity, respectively. There are two 20-ton York units serving the Auditorium. Some classrooms are served by two 5-ton Luxair units, and the hallways by a 3-ton Luxair unit. The EER for all these packaged units is estimated to be 9.0. The package units are in fair condition and are all equipped with gas fired furnaces.

6. <u>Marques de Lafayette – School 6</u>

a. **Description**

i. Marques de Lafayette Middle School is a 3-story, 128,333 square foot building built in 1926. Spaces include classrooms, gymnasium, temporary classroom units (TCU), auditorium, offices, cafeteria, corridors, stairwells, restrooms, lockers, kitchen and mechanical and electrical spaces.

b. **Occupancy**

i. Occupancy is 137 staff and 1,043 students.

c. **Major Equipment - HVAC**

i. Two Smith 5,400 MBh output hot water boilers serve the heating load of the old and new sections of the building, but not the TCUs. The burners are non-modulating with a nominal efficiency of 80%. The boilers are configured in an automated control scheme. Both boilers may be required under high load conditions. The boilers are configured in a constant flow primary distribution with two 10 hp constant speed hot water pumps operating with an automated control scheme. The boilers provide hot water to unit ventilators, air-handlers, and energy recovery units throughout the building.

ii. Unit ventilators in each classroom have supply fan motors, outside air dampers and electrically actuated fan coil valves that operate with a manual control system. There are three air-handlers, two of which provide the gym with heating and cooling, and one over the stage in the auditorium which is used for air circulation. Gym air handlers receive hot water from the boiler system and have direct exchange (DX) cooling coils from the 10 ton rooftop Lennox split-system AC units. All air-handlers are connected and monitored and/or controlled the EMS.

Packaged and Split-System Units Temporary classroom units (TCU) are served with packaged terminal air conditioning (PTAC) units controlled by room thermostats. These 10 EER units have a 4-ton cooling capacity and 15 kW electric resistance heating capacity. The original building section is served by multiple packaged and split-system roof top units, including

7. **Terence C. Reilly – School 7**

   a. **Description**

      i. Terence C. Reilly School is a 5-story, 189,030 square foot building built in 1924. Spaces include: classrooms, gymnasium, auditorium, conference rooms, offices, cafeteria, restrooms, corridors, stairwells, storage rooms, commercial kitchen and basement mechanical space.

   b. **Occupancy**

      i. Occupancy is 123 staff and 1,077 students.

   c. **Major Equipment - HVAC**

      i. Three Eastmond FST-175H hot water boilers serve the building heating load. The boilers are configured in a lead-lag control scheme using a selector switch. All three boilers are required under high load conditions. These boilers are in fair condition. The hydronic distribution system is a 2-pipe heating and cooling system. Seasonal changeover is done manually based on the building's heating and cooling requirements.

      ii. The boilers serve a primary/secondary distribution system with two constant speed 10 hp pump circulating the primary loop. There are two secondary heating hot water loops, one is a hot water only radiator loop, which serves the baseboard radiators throughout the building. This loop is served by two 7.5 hp VFD controlled hot water pumps. The second secondary loop serves all other air handling units throughout the building. This loop is served by two 20 hp VFD controlled pumps that serve as both heating hot water and chilled water pumps.

      iii. The chiller plant consists of two air cooled 116-ton Trane screw chillers (CH1 and CH2). The chillers are configured in a primary- secondary distribution loop with one constant flow primary pump. As mentioned earlier section, the hydronic system is a cooling and heating system with a seasonal changeover.

8. **Elmora Elementary – School 12**

   a. **Description**

      i. Elmora Elementary School is a 3-story, 71,177 square foot building built in 1916. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, senior center dining room, a commercial kitchen and boiler room. The building underwent upgrades and construction once in 1956 and again in 1997.

b. Occupancy

i. Occupancy is 95 staff and 684 students.

c. Major Equipment - HVAC

i. Two IC Smith 1,350 MBh steam boilers serve the building heating load. The burners are non-modulating with a nominal efficiency of 68%. The boilers are configured in an automated control scheme. Both boilers are required under high load conditions. Installed in 1956, they are in poor condition. The hydronic distribution system is a 2-pipe heating only system which provides steam to the building heating terminals. There are ½ hp boiler feed and condensate pumps in the mechanical room.

ii. Several areas within the building including the New Wing hallway, some of the offices, Auditorium, PTA Room and Cafeteria are served by multiple packaged roof top units, energy recovery units equipped with heat recovery wheels, AC packaged units or outdoor units.

iii. The remaining areas throughout the building such as classrooms, gym and remaining offices use are cooled by a variety of window air conditioning (AC) units and split-system AC units. These units vary in capacity between 1 ton and 3 tons. The units are in fair condition. The HVAC system uses pneumatic controls. Two 1.5 hp air compressors located in the boiler room serve the pneumatic system.

9. Benjamin Franklin – School 13

a. Description

i. Benjamin Franklin School is a 3-story, 61,180 square foot building built in 1914. Spaces include classrooms, gymnasium, offices, cafeteria, restrooms, storage rooms, corridors, stairwells, a commercial kitchen and basement mechanical space.

b. Occupancy

i. Occupancy is 70 staff and 443 students.

c. Major Equipment - HVAC

i. Two. Smith HE 2769 MBh steam boilers serve most of the building heating load. The burners are modulating with a nominal efficiency of 80%. The boilers supply steam to two heat exchangers that are used to transfer heat from the steam to two hot water distribution loops, a baseboard loop and a building loop. The baseboard loop heating hot water (HHW) is circulated by two HHW pumps (P7 & P8), rated at 3/4 hp each. Baseboard radiators provide heat to some of the classrooms and offices located in the perimeter of the building. The building loop has a primary-secondary configuration. The primary loop is served by two 3-hp constant speed pumps (P3 & P4). The secondary loop is a dual temperature loop that circulates water to all unit ventilators in the building.

This loop has a seasonal changeover between HHW and chilled water circulation based on the building's heating or cooling requirement. This loop is served by two constant speed 10-hp pumps (P5 & P6). The schematic of the water distribution system is shown in the below image.

ii. The packaged unit serving the gym has a built-in 470 MBH gas furnace that is used to supply the gym's heating requirement. The Gym is served by packaged heating and cooling unit located outside the gym on ground level. The unit has a capacity of 30-tons and is equipped with a built-in furnace to serve the heating requirement of the gym. This unit is controlled by the central EMS. The chiller plant consists of two 100-ton, McQuay, R-22, air cooled reciprocating chillers located on the roof of the building. The chillers are configured in a primary-secondary distribution loop with two constant speed 7.5-hp primary pumps (P1 & P2) and the two constant speed dual temperature pumps

10. Abraham Lincoln - School 14

a. Description

i. Abraham Lincoln School is a 3-story, 96,600 square foot building built in 1914. Spaces include classrooms, gymnasium, auditorium, offices, kitchen, corridors, stairwells, and mechanical space.

b. Occupancy

i. Occupancy is 112 staff and 859 students.

c. Major Equipment - HVAC

i. Two Smith 4,360 MBh hot water boilers serve the building heating load. The boilers are configured in a lead-lag control scheme. Installed in 2002, the boilers are in good condition. The hydronic distribution system is a 4- pipe heating and cooling system. The boilers are configured in a variable flow primary distribution with four 10 hp VFD controlled hot water pumps (two for each boiler) operating with an automated lead-lag control scheme. The boilers provide hot water to fin tube radiators, unit ventilators and fan coil units throughout the building. There are approximately 47unit ventilators throughout the building, each with a ¼ HP supply fan.

ii. The gym, hallways, and certain classrooms (11A, 11B, 11, 12, 13,14) are served with packaged air conditioning units controlled by room thermostats. There are six Trane classroom units that have a 5-ton cooling capacity. The Trane hallway unit has a 3-ton cooling capacity. There are two Daikin/McQuay units that serve the gym, each with a 15-ton cooling capacity. The package units are equipped with gas fired furnaces.

iii. There is a Daikin/McQuay split system AC unit that serves the Auditorium with a 25-ton cooling capacity, and a 3-ton Mitsubishi split-system AC that serves the Server Room.

There is also a Daikin air-source split-system heat pump (HP) that serves the Main Office. This HP unit has a 4-ton cooling capacity and a 54-MBh heating capacity. The unit has a 15.2 SEER.

11. **Christopher Columbus – School 15**

a. **Description**

i. Christopher Columbus School is a 3-story, 61,988 square foot building built in 1917. Spaces include classrooms, gymnasium, auditorium, speech room, offices, cafeteria, corridors, stairwells, ballrooms, a commercial kitchen, and boiler room mechanical space.

b. **Occupancy**

i. The facility is occupied year round. Typical weekday occupancy is 69 staff and 664 students.

c. **Major Equipment – HVAC**

i. Two Smith 3,836 MBh steam boilers serve the building heating load. The burners are non- modulating with a nominal efficiency of 75%. The boilers are configured in a lead-lag control scheme. Only one boiler is required under high load conditions. Installed in 2007, they are in good condition. There is a service contract in place.

ii. The building is cooled by multiple Mitsubishi VRF heat pump units. The condensing units are located on the roof with individual wall mount ductless split units mounted on the wall of the classrooms and office spaces. Fresh air make-up is brought into each space by Lossnay MAUs with vertical heat exchanger and electric heat. The gymnasium is served by a 18-ton packaged roof top unit (RTU) located on the first floor roof. The unit has a gas fired furnace but is not equipped with economizer.

12. **Madison Monroe – School 16**

a. **Description**

i. Madison Monroe is a three-story, 45,655 square foot building built in 1917. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, offices, a commercial kitchen, mechanical space and 10 TCUs (Temporary Classroom Units).

b. **Occupancy**

i. Occupancy is 95 staff and 718 students.

c. **Major Equipment - HVAC**

i. Two non-condensing Weil McLain steam boilers with heating capacities of 3,480 MBh and efficiencies of 82% serve most of the building heating load.

Steam is circulated to the radiators to heat a few spaces (such as corridors and stairwells) and some parts of the building. This is converted to hot water using heat exchangers and circulated to unit ventilators using two 5 hp constant speed pumps and heats up spaces such as the classrooms. The temperature is controlled in the respective space thermostats.

ii. The gym is cooled using a 15-ton AAON packaged unit with an EER of 11.3. The unit includes a direct gas-fired unit with a capacity of 234 MBh and an efficiency of 80%. Nurse's office and the kitchen are cooled using 2-ton packaged units with EER values averaging approximately 9.2. TCUs 1, 2 8 and 9 have electric cooling provided by Goodman AC units with a capacity of 2-tons and an EER of 10.3. The other 6 TCUs have Bard packaged units that cool the spaces with a 3-ton cooling capacity that provide 34.1 MBh capacity of electric heating in the respective spaces. The balance of the building is cooled by multiple Mitsubishi VRF heat pump units. The condensing units are located on the roof with individual wall mount ductless split units mounted on the wall of the classrooms and office spaces.

13. <u>Robert Morris – School 18</u>

a. Description

i. Robert Morris is a 2-story, 61,856 square foot building built in 1930. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, offices, restrooms, a commercial kitchen and mechanical space.

b. Occupancy

i. Occupancy is 65 staff and 590 students.

c. Major Equipment - HVAC

i. Most of the building heating is provided by two Weil Mclain forced draft steam boilers with output capacities of 4,070 MBh and an efficiency of 78%. The boiler system includes two 1.5 hp condensate pumps and associated feed water pumps. Radiators deliver steam heat to the zones. Some larger spaces are heated using direct fired gas furnaces located in the rooftop packaged units. Furnaces range in capacity and are estimated at an average efficiency 80%. Air is distributed to the respective spaces through the air handlers.

ii. There are three main air handling units serving the larger spaces of the school. One 36-ton McQuay unit serves the gym, while one 40-ton and one 80-ton McQuay units serve other spaces. All three units have direct fired gas furnaces providing heating to the respective spaces. There are other packaged units serving other spaces with capacities ranging from 3-ton to 6-ton. All the packaged units are controlled using the building management system.

14. Woodrow Wilson – School 19

a. Description

i. Woodrow Wilson School is a 3-story, 74,290 square foot building originally built in 1926 with the latest addition to the building in 1999. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, a commercial kitchen, and basement mechanical space.

b. Occupancy

i. Occupancy is 76 staff and 635 students.

c. Major Equipment – HVAC

i. Two Pacific 5,600 MBh steam boilers serve the major portion of the main building heating load. Steam heat is provided to unit ventilators and radiators. The boilers are configured in a lead-lag control scheme; both boilers are required under high load conditions. Installed in 1956.

ii. Gym, kitchen and cafeteria are served by individual rooftop units (RTUs). The RTUs serving the gym and cafeteria have a capacity of 30-tons each. The RTU serving the kitchen has a capacity of 10-tons. All RTUs have individual furnaces built into them to serve the heating requirement of their respective zones. All units were installed in the year 1999 and may be nearing their effective useful life. The TCU's are equipped with wall mounted 3-ton packaged terminal units to serve the cooling and heating requirements of their respective zones. These units have electric resistance heating.

15. John Marshall – School 20

a. Description

i. John Marshall School is a three-story, 45,000 square foot building built in 1930. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, offices, a commercial kitchen and basement mechanical space.

b. Occupancy

i. Occupancy is 53 staff and 379 students.

c. Major Equipment - HVAC

i. Two gas-fired, 4360 MBh forced draft Weil-McLain 80.56% efficient steam boilers provide most of the facility heating. Heat exchangers convert steam to hot water, which is circulated through the school using two constant speed 7.5 hp and two 3 hp constant speed hot water pumps. Hot water is circulated to the air handling units (AHU 1) and the unit ventilators. Space temperatures are controlled using building management system based on the outside air temperature.

ii. The gymnasium is served by a packaged AC unit with a cooling capacity of 30-ton and a direct gas fired furnace with a heating capacity of 437 MBh. was installed in 2003. The chiller plant consists of two 65-ton, McQuay air-cooled scroll chillers. Chilled water is supplied by two dedicated 15 hp constant speed primary pumps to the air handlers (AHU 1) and unit ventilators that has hot water and chilled water coils.

iii. The chilled water supply temperature is reset based on outside air temperature. The chillers were installed in the year 2003

16. <u>Victor Mravlag - School 21</u>

a. Description

i. Victor Mravlag School is a two-story, 80,760 square foot building built in 2013. Spaces include classrooms, a gymnasium, an auditorium, offices, a cafeteria, stairwells, a media room, a commercial kitchen, storage, restrooms, and mechanical space.

b. Occupancy

i. Occupancy is 80 staff and 613 students.

c. Major Equipment – HVAC

i. Three LAARS 1,020 MBh hot water boilers serve the building heating load. The burners are non- modulating with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. All boilers are required under high load conditions. Installed in 2008, they are in good condition. There is a service contract in place. The boilers are configured in a variable flow primary distribution with two 5 hp variable frequency drive (VFD)-controlled hot water pumps operating with an automated control scheme. The boilers provide hot water to makeup air units and other terminal heating units throughout the building.

ii. Several building areas are served by a total of seven packaged terminal air-source heat pump units that are controlled by room thermostats. Their heating and cooling capacities range in size. The gymnasium and auditorium are served by four DX cooled packaged roof top units (RTUs)–two in each area. Each has a gas-fired burner unit ranging in size from 146 to 219 MBh. These units are equipped with economizers and heat recovery wheels. These units are controlled by the school's main Honeywell BMS system. Conditioned air is provided via four heat recovery units (HRUs) through air to air heat exchangers. They are equipped with DX cooling and hot water coils from the boiler heating hot water loop. These units are also equipped with heat recovery wheels and deliver ventilation air to fan coil units (FCU) located in the zones. FCUs are served by the chilled water and heating hot water loops. Additionally, three make up air units and exhaust fans provide conditioned air to kitchen, gym lockers and washroom. The air temperature from these units are also controlled by the main BMS.

iii. The chiller plant consists of a 155-ton Trane R-134a reciprocating chiller. The chiller is configured in a primary variable flow with two 15 hp variable speed chilled water pumps. The chiller is air cooled with ten 1.25 hp evaporator fans. Chilled water is provided to terminal zone fan coil units.

17. Nicholas Murray Butler - School 23

a. Description

i. Nicholas Murray Butler School is a 3-story, 70,000 square foot building built in 1998. Spaces include classrooms, gymnasium/auditorium, offices, cafeteria, corridors, stairwells, restrooms, music room, library, electrical rooms and mechanical spaces.

b. Occupancy

i. Occupancy is 119 staff and 799 students.

c. Major Equipment - HVAC

i. Two Smith cast iron 2,403 MBh hot water boilers serve the building heating load. The hydronic distribution system is a 4- pipe heating and cooling system. The boilers serve a primary/secondary distribution system with two constant speed 7.5 hp pumps circulating the primary loop and two VFD controlled 7.5 hp heating hot water pumps operating in lead/lag fashion on the secondary loop. All air handling units are served by secondary in-line circulating pumps for moving heating hot water through the HHW coils.

ii. The air handling system includes five air handling units (AHU-1 through 5) that have cooling and heating coils that serve the area's heating and cooling loads. Four of the air handling units are single zone constant volume units serving the gym, music room, corridors/toilets and cafeteria. Air handling unit (AHU-3) is a multizone VAV unit that serves the admin area and the library. One of the building's server rooms is served by a 2.5 ton split system air conditioning unit to serve its cooling load. The chiller plant consists of a 250-ton, Trane, R-22, water cooled screw chiller. The chiller is configured in a primary- secondary distribution loop with two constant flow primary pumps (P5 & P6) that provide chilled water to all AHUs and to classroom unit ventilators. All AHUs have in-line circulating pumps that circulate water through their chilled water coils. The condenser water system consists of a one-cell cooling tower that is equipped with a constant speed 15 hp fan.

18. Sonia Sotomayor - School 25

a. Description

i. Sonia Sotomayor School is a 3-story, 67,092 square foot building built in 1958. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, stairwells, offices, a commercial kitchen and basement mechanical space.

There are two temporary classroom units (TCU) on site that also serve as classrooms with restrooms.

b. Occupancy

i. Occupancy is 80 staff and 672 students.

c. Major Equipment – HVAC

i. Two HB Smith 2,498 MBh hot water boilers serve the building heating load. The boilers are configured in a lead-lag control scheme. Installed in 1999, they are in fair condition and have been evaluated for replacement due to their age and efficiency. The boilers serve a primary/secondary distribution system with two constant speed 5 hp pumps circulating the primary loop and two VFD controlled 7.5 hp heating hot water pumps operating in lead/lag fashion on the secondary loop. The hot waters are distributed to the air handlers in the larger spaces (such as corridors, cafeteria, library, music room and gym), and to unit ventilators in the classrooms.

ii. The new wing is being cooled using two Trane 6-ton and one Trane 3-ton packaged units. The units were installed in 1997. The server room is being cooled by one split AC unit (Mitsubishi). Classrooms are cooled using nine Airedale packaged units of 5-ton capacity. These units have hot water coils that are supplied by the boilers with are equipped with supply fans to heat the respective spaces. The units were built in 1996.

iii. Common, larger spaces are cooled using a McQuay air cooled screw chiller with a capacity of 155 tons. The unit is mounted on the roof of the building. The chillers are configured in a primary- secondary distribution loop with two 7.5 hp constant flow primary pumps and two 10 hp variable flow secondary pumps. Chilled water is circulated to the air handling units serving spaces such as the corridors, cafeteria, library, music room and gym.

19. <u>Orlando Edreira Academy - School 26</u>

a. Description

i. Orlando Edreira Academy is a 3-story, 123,000 square foot school built in 2006. The grades for the school are Pre-Kindergarten to 8th grade. Spaces include classrooms, gymnasium, auditorium, offices, kitchen, corridors, stairwells, and mechanical space.

b. Occupancy

i. Occupancy is 73 staff and 668 students.

c. Major Equipment - HVAC

i. Two Smith 5,093 MBh steam boilers serve the building heating load. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in an automated control scheme.

The boilers serve a 2-pipe steam distribution system which serve some fan coils in some AHUs and heat exchangers that supply hot water to fan coil units (FCUs) throughout the school. The hot water loop is used in the winter for space heating and switches to a chilled water loop in the summer. The changeover for the “Dual Temperature” water loop is based on the temperature of the outside air.

ii. There are three package AC units serving the cafeteria and other areas in the building. These vary in capacity between 15 and 5.0 tons. The units are in good condition. Some classrooms and offices use split air conditioning (AC) units (26 units in total). These vary in cooling capacity between 0.75 and 5.0 tons. The units are in good condition. They range in efficiency, estimated between 11.0 EER and 12.0 EER. There are nine AHUs with located on the roof which serve the various spaces in the building. The AHUs have hot water and chilled water coils. The units provide outside air ventilation which is either pre-cooled or pre-heated via an energy recovery wheel.

iii. The chiller plant consists of a two 200-ton, York, air-cooled screw chillers (CH1 and CH2) which are located on the roof. The chillers are configured in a primary variable configuration supplying chilled to fan coils inside roof-top units (RTUs) and to a heat exchanger (HX-1) which supplies chilled water to the Dual Temperature water loop for the ventilation fan coil units.

20. Dr. Antonia Pantoja - School 27

a. Description

i. Dr. Antonia Pantoja School is a 3-story, 118,806 square foot school building built in 2008. The school serves pre-Kindergarten through 8th grade. Spaces include classrooms, gymnasium, auditorium, offices, kitchen, corridors, stairwells, and mechanical space.

b. Occupancy

i. Occupancy is 122 staff and 1012 students.

c. Major Equipment – HVAC

i. Three Harsco PK 1,500 MBh hot water boilers serve the heat pump (HP) water loop for the HP units. The HP water loop is kept between 70 and 85 ℉. The boilers are non-condensing with an efficiency of 85%. The hot water loop is variable flow with two VFD driven 30 hp hot water pumps. The pumps operate with a lead/lag control scheme.

ii. There are approximately 50 water-source heat pump (HP) units used to condition various spaces throughout the building. The units provide space heating and cooling. The HP water loop for the units is maintained by three boilers and a cooling tower that are controlled by the building EMS. The HP water loop is kept between 70 and 85 ℉. Capacity for each of the units is 10 tons and the cooling EER is 13.4. The heating COP is 5.0. The units are in good condition.

iii. There are eleven heat-recovery ventilation (HRV) units which serve the HP units' outside air ventilation. The supply/ventilation fan for these units range from 2 to 5 hp and the exhaust fans' range from 2 to 3 hp. The units are in good condition. A total of four roof mounted package AC units serve the two Gymnasiums. Two of the units have a capacity of 20 tons and the other two are 25 tons. There is one split-system heat pump air conditioner (AC) units for the Elevator Room and two for Room B003A. The cooling capacity for these units is 1.5 tons

21. **Duarte-Marti – School 28**

a. **Description**

i. Juan Pablo Duarte - Jose Julian Marti School is a 3-story, 119,532 square foot school building built in 2008. The school serves pre-Kindergarten through 8th grade. Spaces include classrooms, gymnasium, auditorium, offices, kitchen, corridors, stairwells, and mechanical space.

b. **Occupancy**

i. Occupancy is 120 staff and 991 students.

c. **Major Equipment - HVAC**

i. Five A.O Smith 845 MBh hot water boilers serve the building heating load. The burners are fully modulating from 25 to 100% fire rate, with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. The boilers are in good condition and there is service contract in place. Hot water supply flow is constant, provided by two 20 hp pumps.

ii. A total of three roof mounted package AC units serve the two Gymnasiums. One package AC unit serves Teacher's lounge. These units vary in capacity between 15 and 40 tons. A server closet, teacher's lounge and other small areas receive cooling from a total of eight split air conditioning (AC) units. These vary in cooling capacity between 1.5 and 5.0 tons. There are eleven AHUs located on the roof which serve the various spaces in the building. The AHUs have hot water and chilled water coils which are served by the heating hot water boilers and chillers, respectively. The AHU supply fans range between 1.5 to 15 hp, and the return fans range between 1.5 to 5 hp. The units provide outside air ventilation via economizers.

iii. The chiller plant consists of one 400-ton, Trane, air-cooled screw chiller which is located on the roof. The chiller is configured in a constant flow primary system supplying chilled water to fan coils inside air handler units (AHUs). Chilled water is distributed by two 20 hp pumps.

22. **Dr. Albert Einstein Academy – School 29**

a. **Description**

i. Dr. Albert Einstein Academy is a three-story, 120,000 square foot building built in 2008. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, senior center dining room, a kitchen, and mechanical spaces.

b. Occupancy

i. Occupancy is 119 staff and 789 students.

c. Major Equipment HVAC

i. Majority of the building is served by packaged roof top units (RTUs) sizes are 10 – 40 Tons and All RTU have onboard gas fired furnaces. There are three air handling units (AHU) that serve specific zones of the building. These AHUs are served by DX cooling with condenser units on the roof. Their cooling capacities range between 3 tons and 15 tons

ii. Three A.O Smith 450 MBh condensing hot water boilers serve the heating load for the areas served by AHUs and baseboard radiators. The heating hot water is also circulated to the VAV boxes in all classrooms to serve the individual zone's reheat requirements.

23. <u>Chessie Dentley Roberts Academy – School 30</u>

a. Description

i. Chessie Dentley Roberts Academy is a 3-story, 119,800 square foot building built in 2005. Spaces include classrooms, main and auxiliary gymnasiums, offices, cafeteria, corridors, stairwells, a commercial kitchen and penthouse/basement mechanical spaces.

b. Occupancy

i. Occupancy is 119 staff and 789 students.

c. Major Equipment - HVAC

i. Two Smith 6,622 MBh steam boiler serves most of the building heating load. The burners are modulating with a nominal efficiency of 80%. The boiler supplies steam to two heat exchangers (HX 1 & 2) that are used to transfer heat from steam to two hot water distribution loops. Steam is used directly by the three packaged AC units, AHUs, and HRUs for their heating requirements. HX-1 serves the circulation loop that serves heating hot water to radiators and unit heaters throughout the building. This loop is served by two VFD controlled heating hot water pumps (HWP1 & HWP2) that have motors rated at 1.5 hp each. HX-2 serves a dual loop circulation system that serves chilled water/heating hot water to the fan coil units.
The loop is converted between heating hot water and chilled water using DDC controlled valves. The dual circulation loop is served by two VFD controlled 15-hp pumps.

ii. The building's administration section and corridors are served by air handling units AHU-1 and AHU-2 respectively. These units have heating steam and chilled water coils that are used for serving their respective area's heating and cooling requirement. These units are equipped with constant speed supply and return fans and outside air economizer controls. Two heat recovery units (HRU-1 and HRU-2) serve east wing and west wing classrooms respectively. These units are equipped with supply and return fans and have heat recovery wheels that are used to recover heat from the return/exhaust ducts to pre-condition the supply air. The gym, cafeteria/kitchen and auxiliary gym are served with individual packaged air conditioning units that are controlled by the EMS. The units have cooling capacities of 40-tons, 36 -tons and 15 tons respectively. The heating load for these units are served by steam coils. Some individual zones are served by split system air conditioning units. These vary in capacity between 1-ton and 7-tons. The units are original to the building, and most units may be reaching end of their useful life.

24. <u>Frances C. Smith – School 50</u>

a. Description

i. Frances C. Smith Center of Early Childhood Development is a one-story, 55,000 square foot building built in 2001. Spaces include classrooms, offices, gymnasium, corridors, stairwells, restrooms, storage, a commercial kitchen and mechanical space.

b. Occupancy

i. Occupancy is 73 staff and 308 students.

c. Major Equipment – HVAC

i. Offices and various spaces throughout the school are served by eight packaged roof top units (RTUs). There are seven gas-fired burner units ranging in size from 144 Mbh to 203 MBh. These units are equipped with economizers that are in fair condition.

25. <u>Donald Stewart – School 51</u>

a. Description

i. Donald Stewart School is a 1-story, 54,140 square foot building built in built in 2005. The building serves an early childhood (pre-Kindergarten) school. Spaces include classrooms, offices, cafeteria, corridors, small gym and a multi-purpose room.

b. Occupancy

i. Occupancy is 69 staff and 305 students.

c. Major Equipment – HVAC

i. Two Laars 2040 MBh hot water boilers serve the building heating load. The burners are fully modulating from 50 to 100% fire rate.

The boiler hot water is distributed between a radiation panel loop and an AHU loop. The AHU loop is pumped at a variable flow controlled by variable frequency drives (VFDs), while the radiation panel loop is constant flow. Temperature for the radiation loop is controlled by a mixing valve, which mixes supply and return water. Hot water flow for the constant flow radiation loop is served by two 2 hp pumps and the variable flow AHU loop is served by two 7.5 hp pumps.

ii. There are five AHUs located on the roof and in certain mechanical spaces which serve various spaces in the building via variable-air volume (VAV) air flow distribution. The AHUs have hot water and chilled water coils which are served by the heating hot water boilers and chiller, respectively. The AHU supply fans range between 10 to 20 hp, and the return fans range between 5 to 7.5 hp. The units provide outside air ventilation via economizers.

iii. The chiller plant consists of one 198-ton, York, air-cooled screw chiller which is located on the roof. The chiller is configured in a variable flow primary system supplying chilled water to fan coils inside air handler units (AHUs). Chilled water is distributed by two 15 hp pumps.

26. <u>Dr. Martin Luther King Jr. – School 52</u>

a. Description

i. Dr. Martin Luther King Jr. School is a 2-story, 58,857 square foot school building built in 2005. The building serves an early childhood (pre-Kindergarten) school. Spaces include classrooms, offices, cafeteria, corridors, and a multi-purpose room.

b. Occupancy

i. Occupancy is 72 staff and 308 students.

c. Major Equipment - HVAC

i. Two Laars 2040 MBh hot water boilers serve the building heating load. The burners are fully modulating from 50 to 100% fire rate. The boiler hot water is distributed between a radiation panel loop and a combined AHU and UH loop. The AHU/UH loop is pumped at variable flow, controlled by variable frequency drives, while the radiation panel loop is constant flow. Temperature for the radiation loop is controlled by a mixing valve, which mixes supply and return water. Hot water flow for the constant flow radiation loop is served by two 3 hp pumps and the variable flow AHU/UH loop is served by two 7.5 hp pumps.

ii. There are five AHUs located on the roof and in certain mechanical spaces which serve various spaces in the building via variable-air volume (VAV) air flow distribution. The AHUs have hot water and chilled water coils which are served by the heating hot water boilers and a chiller, respectively. The AHU supply fans range between 10 to 20 hp, and the return fans range between 5 to 7.5 hp. The units provide outside air ventilation via economizers. The AHUs are original to the building and appear to be in good operating condition.

iii. There are eight UHs located in the attic and mechanical rooms. The units serve various spaces in the building. The UHs have hot water coils which are served by the heating hot water boilers. The UHs have a heating capacity that range between 17 to 70 MBh. There is an indirect gas fired make up air unit (MAU) which serves the kitchen area. The unit has a heating capacity of 150 MBh.

iv. The chiller plant consists of one 207-ton, York, air-cooled screw chiller which is located on the roof. The chiller is configured in a variable flow primary system supplying chilled water to fan coils inside air handler units (AHUs). Chilled water is distributed by two 15 hp pumps.

27. Alexander Hamilton Preparatory Academy – School 80

a. Description

i. Alexander Hamilton Preparatory Academy is a 3-story, 93,510 square foot building built in 1924. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, restrooms, locker rooms, corridors, stairwells, offices, a commercial kitchen and basement mechanical space. The school also has four temporary classroom units (TCU).

b. Occupancy

i. Occupancy is 101 staff and 997 students.

c. Major Equipment - HVAC

i. Two Rockmill 5,021.3 MBh steam boilers serve most of the main building's heating load except for the auditorium and cafeteria. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2010, they are in good condition. A 1 pipe steam distribution system serves the building heating terminals (radiators) throughout the building.

ii. The auditorium and cafeteria RTUs are equipped with natural gas furnaces sized at 218.7 MBH and 203 MBH respectively and they serve the heating load of their respective areas. The Auditorium and Cafeteria are served with packaged rooftop units (RTUs) with cooling capacities of 16 tons and 20-tons respectively. These units are equipped with gas fired furnaces, and with outside air economizers. The server room in the main building is served by a 2.5-ton split system AC unit. Also, the guidance office uses a 2.5-ton air-source heat pump rated at 2.5 tons.

28. Dwyer-Halsey Academies – School 81

a. Description

i. Dwyer-Halsey Academies & Dunn Sports Center is three interconnected facilities in a 2-story, 375,000 square foot building built in 1976. Spaces include classrooms, gymnasium, libraries, auditorium, offices, cafeteria, corridors, stairwells, indoor pool, a kitchen, and mechanical and electrical spaces.

b. Occupancy

i. Occupancy is 332 staff and 2,406 students.

c. Major Equipment - HVAC

i. Two Cleaver Brooks 9,917 MBh and one 6,612 MBh steam boilers serve the building space, pool heating loads and domestic hot water needs. The burners have a nominal efficiency of 79%. The boilers are configured in a lead-lag control scheme. Multiple boilers may be required under high load conditions. Installed in 1976, they are in fair condition. The steam distribution system produces hot water through heat exchangers throughout the facility. Hot water is pumped to air-handlers, the pool, unit heaters, and a domestic water loop through several constant flow pumps with motor sizes that are between 3 hp and 10 hp. Several constant flow condensate pumps with motor sizes between 1/3 hp to 1.5 hp serve the steam heating system. Steam supply and condensate return pipe has insulation.

ii. Room 272 is served by a Lennox roof top unit (RTU). The unit has a 8.5 ton cooling capacity. Server rooms and telephone rooms are served by six Mitsubishi ductless mini-split air-conditioning units which have cooling capacities of either 2, 2.5, or 3 tons. The chiller plant consists of two 650-ton Trane variable speed centrifugal chillers. The chillers are configured in a primary distribution loop with two constant flow primary pumps. The distribution system is supplied by two 75 hp pumps. The chiller plant supplies chilled water to various handlers throughout the facility. The chiller plant is well maintained. The condenser water system consists of one four-cell cooling tower. The tower has four fan motors at 60 hp each. Condenser water is supplied to the chillers by three 50 hp constant flow pumps.

29. Dwyer 9th Grade Annex – School 82A

a. Description

i. Dwyer 9th Grade Annex is a two-story, 69,236 square foot building built in 1958. Spaces include classrooms, offices, stairwells, and a mechanical space.

b. Occupancy

i. Occupancy is 150 students and 30 full-time staff members.

c. Major Equipment – HVAC

i. There are three, 20-ton packaged units (York and McQuay) serving the library and the MPR (multipurpose room). The units have an average EER value of 9. These have built-in, gas-fired furnaces with a heating capacity of 237 MBh. The York units are past their useful lives and have been evaluated for replacement. There are three Trane 5-ton units packaged units serving the new wing – annex. The units have gas-fired furnaces with a heating capacity of 72 MBh.

ii. Two gas-fired forced draft steam boilers (HB Smith) serve the building heating load of the building's old wing with an output capacity of 1165 MBh and an efficiency of 78%. The heated air is distributed in the respective spaces through radiators. The boilers are configured in a lead-lag control scheme. Installed in 2006, they are in good condition.

iii. The new wing has heating provided by a Weil Mclain gas-fired, non-condensing hot water boiler with a heating capacity of 1084 MBh and an efficiency of 80%. The hot water is circulated to the unit ventilators using two 3 hp constant speed pumps.

30. Halsey 9th Grade Academy – School 83A

a. Description

i. Halsey 9th Grade Academy is a two-story, 29,109 square foot building built in 1983. Spaces include classrooms, offices, gymnasium, nurse station, cafeteria, corridors, stairwells, offices, a commercial kitchen, and boiler room.

b. Occupancy

i. Occupancy is 16 staff and 67 students.

c. Major Equipment - HVAC

i. Conditioned air is provided through various areas of the facility via an air handling unit (AHU) with a variable speed 10 hp supply fan and a 7.5 hp return fan. The air handling receives its cooling capacity through the chilled water supplied by the 92-ton condensing chiller located on the rooftop. The heating capacity of the air handling units is met by the hot water supplied by the boilers that run through the heating hot water coils within the unit. The school is also equipped with a make-up air unit located at the rooftop of the building providing outside air to the building with a 3 hp supply fan motor. Additionally, each of the classrooms are also equipped with fan coil units with cooling and heating coils. The units receive hot water for heating from the buildings main boiler and receive chilled water for cooling from the building's chiller located on the rooftop.

ii. Two Cleaver Brooks 2,008 MBh non-condensing hot water boilers serve the building heating load. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in a lead-lag control scheme. Only one boiler is required under high load conditions. Installed in 1981, they are in poor condition. There is a service contract in place. The hydronic distribution system is a two-pipe heating only system. The boilers are configured in a constant flow primary distribution with two 7.5 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to unit ventilators and fan coil units throughout the building.

31. Thomas Jefferson Arts Academy – School 84

a. **Description**
   i. Thomas Jefferson Arts Academy is a 3-story, 177,020 square foot building built in 1929. Spaces include classrooms, gymnasium, library, auditorium, offices, cafeteria, kitchen, television studio, and mechanical spaces.

b. **Occupancy**
   i. Occupancy is 135 staff and 1,094 students.

c. **Major Equipment – HVAC**
   i. Three Weil McLain 5,810 MBh steam boilers serve most of the building space heating load. Steam is delivered directly to some of the air handling systems. There is also a heat exchanger that produces hot water for the remaining air handling systems. The hot water distribution system has a 10 hp pump for the heat exchanger and two constant speed 30 hp heating hot water pumps.

   ii. There are eight air handlers (AC 1-6, 8 and 9) with heating coils and direct expansion cooling coils. These units condition the graphic arts room, classrooms, dance studio, and auditorium. The units have supply fans ranging from 1.5 to 25 hp and compressors ranging in capacity from 5 to 50 tons.

   iii. There are seven air handlers (AHUs 1, 2, 4, 5, 6A, 6B, and 10) with heating coils and chilled water coils. These units condition the first and second floors, music rooms, science labs, gymnasium, weight room, and cafeteria. The supply fan motors for these air handlers range from 7.5 to 15 hp.

   iv. The chiller plant consists of a two Trane 350-ton, air cooled chillers using 134A refrigerant. The chiller condenser fans are controlled by variable frequency drives (VFD). Chilled water is distributed by two pumps to the air handling units.

32. Thomas A Edison 9th Grade Academy – School 87A

a. **Description**
   i. Thomas A Edison 9th Grade Academy is a 3-story, 31,000 square foot building built in 1963. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, stairwells, offices, a commercial kitchen and basement mechanical space.

b. **Occupancy**
   i. Occupancy is 40 staff and 200 students.

c. **Major Equipment - HVAC**
   i. Six Slant/Fin 311 MBh non-condensing hot water boilers serve the building heating load. The burners are fully modulating with a nominal efficiency of 78%. Multiple boilers are required under high load conditions. The boilers are configured in a constant flow primary distribution with two 2 hp constant speed hot water pumps operating via an automated control scheme. The boilers provide hot water to radiators and fan coil units throughout the building.

ii. The art room is cooled using two McQuay 5-ton packaged units, and the gym is cooled using three McQuay 15-ton packaged units that have EER values of 11.6 and 10 respectively. These units were installed in 2013 and are within the useful life of the equipment. The packaged units serving the gym and art room have direct gas fired furnaces that provide heat to the respective spaces. The split AC unit serving the server room is a Mitsubishi 2.5-ton unit Various classrooms and offices are cooled using window air conditioning (AC) units. These vary in capacity between 5,000 Btuh and 12,000 Btuh

33. Thomas A. Edison Career and Technical Academy – School 87

a. Description

i. Thomas A. Edison Career and Technical Academy is a three-story, 136,440 square foot building built in 1937. Spaces include classrooms, gymnasium, auditorium, weight rooms, library, woodshops, auto shops, offices, cafeteria, corridors, stairwells, a kitchen and electrical and mechanical spaces.

b. Occupancy

i. Occupancy is 114 staff and 787 students.

c. Major Equipment – HVAC

i. There are several air-handling units (AHUs) throughout the facility that provide space heating and cooling. AHUs have constant volume supply fans, most with 7.5 hp motors. Cooling is provided by direct expansion (DX) coils and heating is provided by hot water coils located in the AHUs.

ii. Two Easco 5,021 MBh steam boilers serve the building heating load and domestic hot water needs. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in a lead/lag control scheme. Both boilers are required under high load conditions. Installed in 2013, they are in good condition.

iii. A steam distribution system serves the building heating terminals and heat exchanger. There are four condensate pumps with motors between 1 hp and 2 hp each in the boiler room. There are steam supply and condensate return pipe with insulation in fair condition.

iv. Hot water is produced by a heat exchanger using steam from the boilers and is supplied to the facility by a primary only distribution system with three constant speed 7.5 hp heating hot water pumps operating in lead/lag fashion. Hot water is circulated from the heat exchanger to AHUs and used in hot water coils for space heating. Hot water is also provided directly to hot water unit heaters located in some areas.

34. Victor Mravlag – School 89

a. Description

i. Victor Mravlag School is a two-story, 80,760 square foot building built in 2013. Spaces include: classrooms, a gymnasium, an auditorium, offices, a cafeteria, stairwells, a media room, a commercial kitchen, storage, restrooms, and mechanical space.

b. Occupancy

i. Occupancy is 80 staff and 613 students.

c. Major Equipment – HVAC

i. Several building areas are served by a total of seven packaged terminal air-source heat pump units that are controlled by room thermostats. Their heating and cooling capacities range in size; the table below provides greater detail. The gymnasium and auditorium are served by four DX cooled packaged roof top units (RTUs)–two in each area. Each has a gas-fired burner unit ranging in size from 146 to 219 MBh. These units are equipped with economizers and heat recovery wheels that are in good condition. These units are controlled by the school's main Honeywell BMS system. Conditioned air is provided via four heat recovery units (HRUs) through air to air heat exchangers. They are equipped with DX cooling and hot water coils from the boiler heating hot water loop. These units are also equipped with heat recovery wheels and deliver ventilation air to fan coil units (FCU) located in the zones. FCUs are served by the chilled water and heating hot water loops.

ii. Additionally, three make up air units and exhaust fans provide conditioned air to kitchen, gym lockers and washroom. The air temperature from these units are also controlled by the main BMS.

iii. Three LAARS 1,020 MBh hot water boilers serve the building heating load. The burners are non- modulating with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. All boilers are required under high load conditions. Installed in 2008, they are in good condition. There is a service contract in place.

iv. The boilers are configured in a variable flow primary distribution with two 5 hp variable frequency drive (VFD)-controlled hot water pumps operating with an automated control scheme. The boilers provide hot water to makeup air units and other terminal heating units throughout the building.

35. J. Christian Bollwage Academy of Finance – School 90

a. Description

i. J. Christian Bollwage Academy of Finance is a 2-story, 55,177 square foot building built in 1951. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, offices, a commercial kitchen and basement mechanical space.

b. Occupancy

i. Occupancy is 31 staff and 384 students.

c. Major Equipment – HVAC

i. Two EASCO 1,674 MBh steam boilers serve the building heating load. The boilers are configured in a lead-lag control scheme. Installed in 2013, they are in good condition. A 1 pipe steam distribution system serves the building heating terminals. There is a 0.75 hp boiler feed pump in the mechanical room. The boilers provide steam to radiators, heating and ventilating gym units and unit ventilators in the classroom.

ii. There are 19 unit ventilators that have supply fan motors with steam coils and are pneumatically controlled. The units are floor mounted vertical self-contained heat pumps. The gym and other large spaces are served using two Trane 15-ton units that were installed in 1999. Several classrooms are cooled using 3-ton Lennox split AC units, shared between classrooms.

36. <u>Williams Field</u>

a. Description

i. Athletic Field with Stadium Lights

b. Occupancy

i. No full time Occupants

c. Major Equipment – HVAC

i. HID Lights 6 Poles, 30 400 W and 48 – 1500 W fixtures
ii. No HVAC Equipment

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Energy Conservation Measures

ECM Description	Washington/Dunn Academy-1	Winfield Scott School-2	La Corte-Peterstown School-3	Battin McAuliffe Middle School-4	Mabel G. Holmes School-5	Lafayette Middle School-6	Terence C. Reilly School-7	Elmora School-12	Benjamin Franklin School-13	Abraham Lincoln School-14	Christopher Columbus School-15	Madison-Monroe School-16	Robert Morris School-18	Woodrow Wilson School-19	John Marshall School-20	Victor Mravlag School-21	Nicholas Murray Butler School-23	Sonia Sotomayor School-25	Orlando Edreira Academy-26	Dr. Antonia Pantoja School-27	Duarte- Marti School-28	Albert Einstein Academy-29	Chessie Dentley Roberts Academy-30	Francis Smith ECE-50	Donald Stewart ECE-51	Dr. Martin Luther King Jr. School-52	Hamilton Prep Academy-80	Dwyer-Halsey Academies-81	Dwyer 9th Grade Annex-82A	Halsey 9th Grade Academy-83A	Thomas Jefferson Arts Academy-84	Thomas A. Edison Academy-87	Edison 9th Grade Academy-87A	Frank J. Cicarell Academy-89	Bollwage Academy of Finance-90	Williams Field-98
1A LED Lighting	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1B Stadium Lighting																																				■
1C Vending Misers																											■	■			■					
1D De-Strat Fans w/Air Purification		■	■				■		■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■						■		
2A Boiler Replacements	■	■		■	■		■					■	■	■			■	■											■		■					
2B Vacuum Tank Replacements					■						■		■	■	■																■					
2C Boiler Burner Controls		■		■		■			■		■		■	■	■		■		■				■				■	■	■	■	■	■			■	
2D Domestic Hot Water Replacement												■															■				■					
2E Rooftop Unit Replacement	■				■■	■	■	■		■			■■	■■				■				■		■■					■		■					
2F Kitchen Hood Controls	■		■				■		■	■			■				■	■	■	■			■				■	■				■		■		
2G Walk In Compressor Controls					■	■		■	■		■	■	■	■										■			■		■	■			■		■	
2H Premium Efficiency Motors and VFDs				■															■		■	■									■					
2I Split System Replacement				■				■					■		■															■			■		■	
2J Chiller Replacements	■			■			■		■								■		■																	

ECM Description	Washington/Dunn Academy-1	Winfield Scott School-2	La Corte-Peterstown School-3	Battin McAuliffe Middle School-4	Mabel G. Holmes School-5	Lafayette Middle School-6	Terence C. Reilly School-7	Elmora School-12	Benjamin Franklin School-13	Abraham Lincoln School-14	Christopher Columbus School-15	Madison-Monroe School-16	Robert Morris School-18	Woodrow Wilson School-19	John Marshall School-20	Victor Mravlag School-21	Nicholas Murray Butler School-23	Sonia Sotomayor School-25	Orlando Edreira Academy-26	Dr. Antonia Pantoja School-27	Duarte- Marti School-28	Albert Einstein Academy-29	Chessie Dentley Roberts Academy-30	Francis Smith ECE-50	Donald Stewart ECE-51	Dr. Martin Luther King Jr. School-52	Hamilton Prep Academy-80	Dwyer-Halsey Academies-81	Dwyer 9th Grade Annex-82A	Halsey 9th Grade Academy-83A	Thomas Jefferson Arts Academy-84	Thomas A. Edison Academy-87	Edison 9th Grade Academy-87A	Frank J. Cicarell Academy-89	Bollwage Academy of Finance-90	Williams Field-98
2K Steam Traps		■							■		■	■	■		■				■				■				■					■	■			
2L Addition of Cooling					■	■		■					■	■													■		■			■				
2M Cooling Tower Replacements	■																			■								■								
2N Pipe Insulation						■			■																											
3A Building Controls/Energy Optimization	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
4A Building Envelope Improvements	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
5A Real Time Metering	■			■			■		■	■						■		■		■	■	■	■	■	■	■				■	■			■	■	
6A Cogeneration CHP	■																											■								
7A Transformer Replacement	■						■		■				■	■					■	■	■		■		■	■		■			■					
8A Ventilation Upgrades - Unit Ventilator/Make-Up Air		■		■	■	■	■	■	■	■	■	■	■	■	■												■		■			■				
8B Ventilation Upgrades - Air Handling Units	■																											■		■						
8C Ventilation Upgrades – NPBI/UV Lighting		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	
8D Ventilation Upgrades - Controls/IAQ Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

ECM Description	Washington/Dunn Academy-1	Winfield Scott School-2	La Corte-Peterstown School-3	Battin McAuliffe Middle School-4	Mabel G. Holmes School-5	Lafayette Middle School-6	Terence C. Reilly School-7	Elmora School-12	Benjamin Franklin School-13	Abraham Lincoln School-14	Christopher Columbus School-15	Madison-Monroe School-16	Robert Morris School-18	Woodrow Wilson School-19	John Marshall School-20	Victor Mravlag School-21	Nicholas Murray Butler School-23	Sonia Sotomayor School-25	Orlando Edreira Academy-26	Dr. Antonia Pantoja School-27	Duarte- Marti School-28	Albert Einstein Academy-29	Chessie Dentley Roberts Academy-30	Francis Smith ECE-50	Donald Stewart ECE-51	Dr. Martin Luther King Jr. School-52	Hamilton Prep Academy-80	Dwyer-Halsey Academies-81	Dwyer 9th Grade Annex-82A	Halsey 9th Grade Academy-83A	Thomas Jefferson Arts Academy-84	Thomas A. Edison Academy-87	Edison 9th Grade Academy-87A	Frank J. Cicarell Academy-89	Bollwage Academy of Finance-90	Williams Field-98
9A Building Modeling and Management	■	■	■	■		■	■			■						■	■	■	■	■	■	■	■		■	■					■	■				

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OVERVIEW

Honeywell has closely evaluated and audited the District to develop the optimum mix of energy saving measures. These site-specific measures have been selected and developed using the following process:

- Review Site Audits
- Engineering Team Site Visits
- Develop Measures
- Review Measures with Team

REJECT AND ACCEPT MEASURES BASED ON

- Alignment with Critical Success Factors (CSF)
- Value to the School
- Economic Financial Payback
- Equipment Service Life
- Effect on Current Space Conditions

In developing the proposed measures, the following considerations were critical:

- Reduction of space heating and cooling loads by performing a system review, with complete consideration of current indoor environmental quality standards.
- Review and redesign lighting systems noting reductions in the internal heat gain in the affected spaces.
- Load reduction measures always precede optimization measures.

Bin weather data was used from a 15-year average reported from Newark, NJ. Ventilation rates, taken from ASHRAE published standard, were predicted by using the building's population multiplied by cfm/person during occupied hours.

Reasonable infiltration rates were assumed based on the building's fenestration conditions and expected values for typical buildings. A reduced infiltration rate was assumed for the unoccupied hours. Envelope heat loss calculations assumed a reasonable heat transmission rate (U value) based on the construction of the buildings. Wall area and glass area were estimated by supplied drawings and field photographs.

Current efficiencies were derived from assumed and later to be measured boiler efficiencies, and assumed system losses due to thermal losses, distribution losses and loose operational control. The current assumed boiler system efficiencies were then applied to the calculated load and calibrated to last year's actual fuel consumption.

DEMAND SENSITIVE OPERATION

Review existing and proposed thermal loads. For example, the review process will facilitate the application of:

- Optimized flow rates (steam, water, and air).
- Optimized operation of equipment, matching current occupancy use profiles, and considering both outside and indoor space temperatures.

BENEFITS OF MECHANICAL IMPROVEMENTS

Listed below are some of the benefits that the District would reap from the mechanical portion of the measures:

- Avoid costly repairs and replace equipment that would have to be replaced in the next five years.
- Improved compliance with ASHRAE Ventilation Standards.
- Ability to trend ventilation rates; thus, insuring compliance through documentation.
- Operating a more weather sensitive facility.
- Allowing for a greater capability of central monitoring and troubleshooting via remote.
- Greater operating flexibility to reduce costs and optimize staff efficiency.

INDOOR AIR QUALITY

The American Council of Governmental Industrial Hygienists (ACGIH) in their booklet “Threshold Limit Values,” has published air quality standards for the industrial environment. No such standards currently exist for the residential, commercial, and institutional environments, although the ACGIH standards are typically and perhaps inappropriately used. The EPA has been working to develop residential and commercial standards for quite some time.

Recent studies indicate that for even the healthiest students, indoor air pollution can reduce the ability to learn. As an example, if you were to place several students in a room where it is hot, there is little or no air circulation, and other children are coughing and sneezing, exposing the student body to airborne related illnesses such as the cold or flu. Honeywell has addressed this issue by focusing on the proper operation and replacement of the unit ventilators and air handler equipment which will assure IAQ standards are met.

ECM 1ALED Lighting and Direct Install

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.
- **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. Light Emitting Diode (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 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!

Building	1A LED Lighting	1A LED Lighting Direct Install
Dwyer-Halsey Academies-81	■	
Washington/Dunn Academy-1	■	
Winfield Scott School-2	■	
La Corte-Peterstown School-3	■	
Battin McAuliffe Middle School-4	■	
Mabel G. Holmes School-5		■
Lafayette Middle School-6	■	
Terence C. Reilly School-7	■	
Elmora School-12		■
Benjamin Franklin School-13		■
Abraham Lincoln School-14	■	
Christopher Columbus School-15		■
Madison-Monroe School-16		■
Robert Morris School-18		■
Woodrow Wilson School-19		■
John Marshall School-20		■

Building	1A LED Lighting	1A LED Lighting Direct Install
Victor Mravlag School-21	▪	
Nicholas Murray Butler School-23	▪	
Sonia Sotomayor School-25	▪	
Orlando Edreira Academy-26	▪	
Dr. Antonia Pantoja School-27	▪	
Duarte- Marti School-28	▪	
Albert Einstein Academy-29	▪	
Chessie Dentley Roberts Academy-30	▪	
Francis Smith ECE-50	▪	
Donald Stewart ECE-51	▪	
Dr. Martin Luther King Jr. School-52	▪	
Hamilton Prep Academy-80		▪
Dwyer 9th Grade Annex-82A		▪
Halsey 9th Grade Academy-83A		▪
Thomas Jefferson Arts Academy-84	▪	
Thomas A. Edison Academy-87	▪	
Edison 9th Grade Academy-87A		▪
Frank J. Cicarell Academy-89	▪	
Bollwage Academy of Finance-90		▪
Williams Field-98		

EXISTING CONDITIONS

Indoor lighting predominantly consists of T-12s and T-8s, some CFLs, and some incandescent bulbs. In general, lighting is operated on switches.

SCOPE OF WORK

The proposed lighting system is based on the recent investment grade lighting system audit where existing lighting systems were analyzed and inventoried. Honeywell proposes to retrofit all existing 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.

Lighting at La Corte-Peterstown School 3

Lighting at Terence C. Reilly School 7

Direct Install

Direct Install, offered through the Clean Energy Office of the NJ Board of Public Utilities (BPU), is a turnkey solution that makes it easy and affordable to upgrade to high efficiency equipment. The program pays up to 80% of retrofit costs, dramatically improving your payback on the project for eligible facilities.

Honeywell has identified the above-listed schools are eligible for the Direct Install program and are part of the LED Lighting Solution.

LED Outdoor Lighting Upgrades

Existing Conditions

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

Lighting at Dr. Martin Luther King Jr. 52

Lighting at Francis Smith 50

SCOPE OF WORK

OUTDOOR LIGHTING

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

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 1B Stadium Lighting

The key benefits of this ECM include:

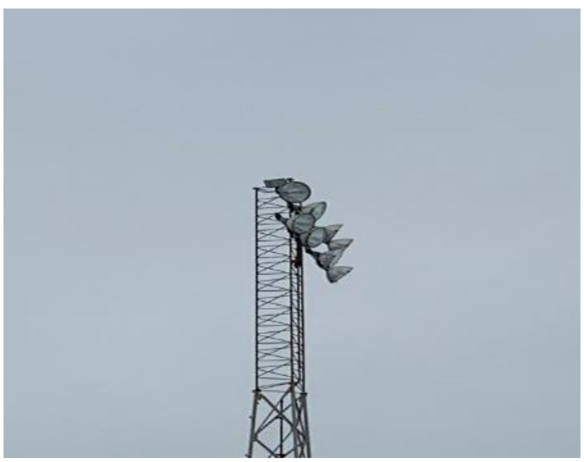
- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology. New stadium lighting will reduce energy and maintenance costs over typical high intensity discharge (HID) equipment.
- **Reduced maintenance and operational costs** by reducing the runtime of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

EXISTING CONDITIONS

Williams Field at Thomas A. Edison Academy 87 has existing 1500-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.

SOLUTION

Honeywell proposes the installation of Musco factory built, wired, aimed and tested lighting. The factory aimed and assembled luminaires include Ball Tracker technology. This Ball Tracker technology allows for targeted, aerial light which optimizes visibility of the ball in play with no glare for players and reduces spill light making it better for neighbors. The Control-Link System allows for remote on/off control and performance monitoring with 24/7 customer support.



Williams Field Stadium Lights

Williams Field Stadium Lights

Building	Manufacture	Model	Watts
Williams Field -98	Musco	TLC-LED-1500	1500
Williams Field -98	Musco	TLC-LED-1200	1200
Williams Field -98	Musco	TLC-BT-575*	575
Williams Field -98	Musco	TLC-LED-400	400

**Ball Tracker Optional*

Example of Stadium Lighting Fixture

Example of Stadium Lighting

SCOPE OF WORK

New lighting will be installed to lower 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 1CVending Misers

The key benefits of this ECM include:

- **Energy savings** by better managing the power consumption of electrical equipment.
- **Longer equipment life** thanks to reduced usage.

Multiple vending machines were observed in various buildings. As such, Honeywell has investigated the use of vending machine misers for these areas.

EXISTING CONDITIONS

Vending machines are located throughout multiple buildings offering soft drinks to the occupants. A typical cold drink machine consumes over 5,000 kWh annually.

Dwyer-Halsey – Vending Machines

Thomas Jefferson Vending Machines

Building	Type	Qty	Location
Dwyer-Halsey Academies-81	Cold Beverage	2	Dwyer Cafeteria
Dwyer-Halsey Academies-81	Snack	1	Dwyer Cafeteria
Dwyer-Halsey Academies-81	Cold Beverage	1	Halsey Cafeteria
Dwyer-Halsey Academies-81	Snack	1	Halsey Cafeteria
Hamilton Prep Academy-80	Cold Beverage	1	Cafeteria
Hamilton Prep Academy-80	Snack	1	Cafeteria
Hamilton Prep Academy-80	Cold Beverage	1	Cafeteria
Thomas Jefferson Arts Academy-84	Cold Beverage	3	Kitchen
	Total	**11**	

Proposed Vending Machines for Vending Miser Controls

PROPOSED SOLUTION

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

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

INTERFACE WITH EXISTING EQUIPMENT

All the VMOC devices are easily installed. The vending machine controllers are installed separately from the machine, and implementation will occur during working hours. A period of three (3) weeks will be required to verify proper calibration of the sensors.

With respect to the vending machines in the various buildings, Honeywell has estimated the number and types of vending machines based on our site tour. During the implementation phase, Honeywell will check with the vendor about the type and specification of the vending machines as it relates to any internal time clocks which may exist inside the machine. Should this be the case, the savings and cost will be adjusted accordingly.

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor 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 1D De-Stratification Fans w/Air Purification

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.

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.

Duarte-Marti School 28

Victor Mravlag School 21

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 or Needle Point Bi-Polar Ionization (NPBI) 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 following as indicated in the table below:

School	Location	Airius Model	Qty PureAir	Qty Air Pear
Dwyer-Halsey Academies-81	Wrestling Gym	S-10-SP-SH-120-W***	2	2
Terence C. Reilly School 7	Gym 1	A-25-SP-STD-120-W-PHI	2	-
Terence C. Reilly School-7	Gym 2	A-25-SP-STD-120-W-PHI	2	-
Abraham Lincoln School-14	Gym	A-25-SP-STD-120-W***	3	1
Albert Einstein Academy-29	Cafetorium	S-15-SP-STD-120-W***	2	4
Albert Einstein Academy-29	Gym	A-15-SP-STD-120-W***	3	5
Hamilton Prep Academy-80	Upper Gym	A-25-SP-STD-120-W***	1	1
Hamilton Prep Academy-80	Lower Gym	A-25-SP-STD-120-W***	1	1
Benjamin Franklin School-13	Gym	A-25-SP-STD-120-W***	1	1
Sonia Sotomayor School-25	Multi-Purpose	S-25-SP-STD-120-W***	2	2
Christopher Columbus School-15	Multi-Purpose	A-25-SP-STD-120-W***	2	2
Dr. Martin Luther King Jr. School-52	Gym	S-25-SP-STD-120-W***	1	1
Dr. Martin Luther King Jr. School-52	Multi-Purpose	S-15-SP-STD-120-W***	2	2
Dr. Antonia Pantoja School-27	Gym	A-25-SP-STD-120-W***	3	3
Dr. Antonia Pantoja School-27	Cafetorium	S-15-SP-STD-120-W***	2	4
Dr. Antonia Pantoja School-27	K-3 Gym	A-25-SP-STD-120-W***	1	1
Donald Stewart ECE-51	Multi-Purpose	S-15-SP-STD-120-W***	3	5
Donald Stewart ECE-51	Multi-Purpose	S-15-SP-STD-120-W***	1	1
Frank J. Cicarell Academy-89	Main Gym	A-25-SP-STD-120-W***	3	3
Frank J. Cicarell Academy-89	Auxiliary Gym	A-25-SP-STD-120-W***	2	2
Francis Smith ECE-50	Gym	S-15-SP-STD-120-W***	1	3
Duarte- Marti School-28	Cafetorium	S-15-SP-STD-120-W***	2	4
Duarte- Marti School-28	Gym	A-45-P4-STD-120-W	-	3
Duarte- Marti School-28	Gym	A-25-SP-STD-120-W-PHI	4	-

School	Location	Airius Model	Qty PureAir	Qty Air Pear
John Marshall School-20	Multi-Purpose	S-25-SP-STD-120-W***	2	2
La Corte-Peterstown School-3	Gym	S-25-SP-STD-120-W***	2	1
Madison-Monroe School-16	Gym	A-25-SP-STD-120-W-PHI	2	-
Nicholas Murray Butler School-23	Gym	A-25-SP-STD-120-W***	4	2
Nicholas Murray Butler School-23	Cafeteria	A-15-SP-STD-120-W***	1	2
Orlando Edreira Academy-26	Cafetorium	A-25-SP-STD-120-W***	3	2
Orlando Edreira Academy-26	Large Gym	A-25-SP-STD-120-W***	4	2
Orlando Edreira Academy-26	Small Gym	A-25-SP-STD-120-W***	1	1
Robert Morris School-18	Gym	S-25-SP-STD-120-W-PHI	2	-
Robert Morris School-18	Cafetorium	A-45-P4-STD-120-W***	4	2
Chessie Dentley Roberts Academy-30	Cafetorium	A-45-P4-STD-120-W-PHI	5	-
Chessie Dentley Roberts Academy-30	Gym	A-45-P4-STD-120-W-PHI	5	-
Victor Mravlag School-21	Gym	A-25-SP-STD-120-W***	3	2
Victor Mravlag School-21	Cafetorium	S-25-SP-STD-120-W***	2	1
Winfield Scott School-2	Multi-Purpose	A-25-SP-STD-120-W-PHI	2	-
Total			**88**	**68**

Proposed De-Stratification Fans

SCOPE OF WORK

Per De-Stratification Fan:

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

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 2ABoiler Replacements

The key benefits of this ECM include:

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

EXISTING CONDITIONS

Some boilers within the District are near or past the end of their useful life and are less efficient compared to new boilers. Some existing boilers can be replaced with high-efficiency, condensing boilers or High Efficiency Steam Boilers.

Boilers – Sonia Sotomayor School 25

Boilers – Washington/Dunn Academy 1

Building	Type	Manufacturer	Model	Qty	Capacity (MBH)	Fuel
Battin McAuliffe Middle School-4	Steam	Cleaver Brooks	CB-600-300	2	10,042	NG
Sonia Sotomayor School-25	Hot Water	HB Smith	28A-10	2	2,172	NG
Nicholas Murray Butler School-23	Hot Water	Smith	28A-11	2	2,403	NG
Washington/Dunn Academy-1	Hot Water	Cleaver Brooks	CB-760-124	2	4,184	NG
Dwyer 9th Grade Annex-82A	Hot Water	Weil Mclain	588.00	1	1,084	NG
Terrence C. Reilly School-7	Hot Water	Eastmond	FST-175HW	3	5,858	NG
Mabel G. Holmes School-5	Steam	Weil McLain	H-1894-WS	2	4,940	NG
Madison-Monroe School-16	Steam	Weil McLain	H-1394-WS	2	3,480	NG
Thomas Jefferson Arts Academy-84	Steam	Weil McLain	2,194.00	2	5,772.8	NG
Thomas Jefferson Arts Academy-84	Steam	Weil McLain	2,194.00	1	5,772.8	NG
Woodrow Wilson School-19	Steam	Pacific	-	2	1,664.1	NG
Robert Morris School-18	Steam	Weil McLain	4070	2	3,256.0	NG
Winfield Scott School-2	Steam	Weil McLain	WM-88	2	4,480.0	NG

Existing Boilers to be Replaced

PROPOSED SOLUTION

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency listed 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. Compared to the existing boilers in these schools, the new boilers will provide an increase in boiler efficiency of anywhere between 10% to 15%. Boilers which cannot be converted from steam will be replaced with new steam boilers, which will still operate at to 10% more efficient than the existing boilers.

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

Building	Type	Manufacturer	Model	Qty	Capacity (MBH)	Fuel
Battin McAuliffe Middle School-4	Steam	EASCO	FPS-250	2	8,369	NG
Sonia Sotomayor School-25	Hot Water	Aerco	BMK-1000	3	1,000	NG
Nicholas Murray Butler School-23	Hot Water	Aerco	BMK-1000	3	1,000	NG
Washington/Dunn Academy-1	Hot Water	Aerco	BMK-3000	3	3,000	NG
Dwyer 9th Grade Annex-82A	Hot Water	Aerco	AM-750	2	750	NG
Terence C. Reilly School-7	Hot Water	Aerco	BMK-4000	3	4,000	NG
Mabel G. Holmes School-5	Steam	Weil McLain	1888 w/Slate	2	4,857	NG
Madison-Monroe School-16	Steam	Weil McLain	1088 w/Slate	2	2,561	NG
Thomas Jefferson Arts Academy-84	Steam	Weil McLain	1888 w/Slate	2	4,857	NG
Thomas Jefferson Arts Academy-84	Steam	Weil McLain	1088 w/Slate	1	2,561	NG
Woodrow Wilson School-19	Steam	Weil McLain	888 w/Slate	2	1,987	NG
Robert Morris School-18	Steam	Weil McLain	1288 w/Slate	2	3,135	NG
Winfield Scott School-2	Steam	Weil McLain	1388 w/Slate	2	3,422	NG

Proposed Boiler Equipment

SCOPE OF WORK

The following outlines the boiler replacement:

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost effective manufacturers are available. 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 boilers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance. New gas piping will need to be run from the new gas service/meter to the equipment.

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 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 2BVacuum Tank Replacements

The key benefits of this ECM include:

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

EXISTING CONDITIONS

Several schools with steam systems have condensate return vacuum pump which are failing and in need of replacement.

Vac. Tank – Thomas Jefferson School 84

Vac. Tank –Mabel G. Holmes School 5

Building	Location	Manufacturer	Model	Qty
Mabel G. Holmes School-5	Boiler Room	FT Pump Industries	VCRC 36	1
Thomas Jefferson Arts Academy-84	Boiler Room	FT Pump Industries	VBFCC 940	1
Thomas Jefferson Arts Academy-84	Mech Room	Domestic	402CC	1
Robert Morris School-18	Boiler Room	FT Pump Industries	VBFCC	1
John Marshall School-20	Boiler Room	Flotronics	VBFHCL05-250	1
Mabel G. Holmes School-5	Boiler Room	FT Pump Industries	VBFC0	1
Woodrow Wilson School-19	Boiler Room	Flotronics	VBFC5	1
Total				**7**

Existing Unit to be Replaced

PROPOSED SOLUTION

A condensate vacuum is important because it captures the condensate emitted from the boiler and allows it to be reused. Not only does this improve the efficiency of your equipment, it also extends the life of it. A condensate receiver also makes it possible for to:

- Maintain a steady temperature
- Eliminate product quality issues
- Reduce corrosion
- Prevent damage to the equipment
- How Condensate Receivers Can Save You Money

Using a condensate vacuum tank can save energy in many ways:

- Less Make-up Water Needed– When the condensate escapes the steam trap, it still contains some of the original heat that was in the steam. By capturing this hot condensate and reusing it, the boiler does not have to be continually fed with new water. This means lower water costs over time.
- Reduce Chemical Usage – Since less fresh water needs to be used in the boiler, the amount of water treatments that are necessary are also greatly decreased.
- Eliminate Penalties – In many states, there are strict regulations about what can be drained into the sewer system. By returning condensate to the condensate receiver instead of through the drainage system, you can avoid fees for non-compliance.
- Decrease Blow Down – Condensate is essentially distilled water, so there are no dissolved solids in it like there are with the other water found in a boiler. Since the water is pure, the need for blow down is reduced, which also saves on energy costs.
- A condensate vacuum tank/receiver is an essential part to any boiler system. It will h reuse the condensate naturally produced by your boiler instead of it going to waste. This not only makes the entire operation more efficient, but it can have a dramatic impact on the money it takes to keep the system running.

Building	Location	Manufacturer	Qty
Mabel G. Holmes School-5	Boiler Room	Shipco	1
Thomas Jefferson Arts Academy-84	Boiler Room	Shipco	1
Thomas Jefferson Arts Academy-84	Mech Room	Shipco	1
Robert Morris School-18	Boiler Room	Shipco	1
John Marshall School-20	Boiler Room	Shipco	1
Mabel G. Holmes School-5	Boiler Room	Shipco	1
Woodrow Wilson School-19	Boiler Room	Shipco	1
Total			**7**

Proposed Vacuum Tanks

SCOPE OF WORK

The following outlines the vacuum tank replacement:

1. Secure gas and electric back to boiler and ensure boiler will not operate.
2. Disconnect condensate piping
3. Remove electric to existing vacuum tanks
4. Install new vacuum tanks and reconnect piping
5. Terminate and power new electric circuiting.
6. Start up, commissioning, and operator training.

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 vacuum tanks will be installed where existing in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

O&M Impact

The new vacuum pumps will decrease the O&M cost for maintaining the units.

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 efficiency, reduced maintenance costs control and setback.
Waste Production	Existing Vacuum Tanks 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 2CBoiler Burner Controls

The key benefits of this ECM include:

- **Reduced energy usage** from improved boiler efficiency resulting from replacement of older burner controls.
- **Lower operational costs** through less frequent maintenance and operational issues.

EXISTING CONDITIONS

Honeywell observed that the existing boiler burners have limited fuel / air ratio controls in place, which reduces your ability to optimize combustion efficiency and system reliability. The below table indicates which systems Honeywell recommends installation of new advanced combustion controls to decrease costs and increase efficiency. In cases where burners cannot be retrofit with controls, new burners will be installed.

Burner-Mabel G. Holmes School 5

Burner – Dwyer Halsey Academies 81

Building	Type	Manufacturer	Model	Qty	Output (MBH)	Fuel
Mabel G. Holmes School-5	Steam	Weil McLain	H-1894-WS	2	4,940	NG
Madison-Monroe School-16	Steam	Weil McLain	H-1394-WS	2	3,480	NG
Robert Morris School-18	Steam	Weil McLain	4070	2	4,070	NG
Thomas Jefferson Arts Academy-84	Steam	Weil McLain	2194	3	5,773	NG
Woodrow Wilson School-19	Steam	Pacific		2	1,664	NG
Winfield Scott School-2	Steam	Weil McLain	WM-88	2	5,600	NG
Benjamin Franklin School-13	Steam	Smith	28HE-S-14	2	3,567	NG
Bollwage Academy of Finance-90	Steam	EASCO	SM4-50-S015	2	1,674	NG
Christopher Columbus School-15	Steam	Smith	3500A-12	2	3,836	NG
Dwyer 9th Grade Annex-82A	Steam	HB Smith	3500A-12	2	2,360	NG
Dwyer-Halsey Academies-81	Steam	Cleaver Brooks	CB-600-300	2	10,042	NG

Building	Type	Manufacturer	Model	Qty	Output (MBH)	Fuel
Dwyer-Halsey Academies-81	Steam	Cleaver Brooks	CB-800-200	1	6,695	NG
Halsey 9th Grade Academy-83A	Hot Water	Cleaver Brooks	CB200-60	2	2,009	NG
Hamilton Prep Academy-80	Steam	Rockmill	MP150	2	5,021	NG
John Marshall School-20	Hot Water	Weil-McLain	94-1694	2	4,360	NG
Chessie Dentley Roberts Academy-30	Steam	Smith	4500A-S/W-22	2	5,994	NG
Thomas A. Edison Academy-87	Steam	Easco	SM4-150-S015	2	5,021	NG
Lafayette Middle School-6	Hot Water	Easco	FST 100.W031	2	3,348	NG
Orlando Edreira Academy-26	Steam	Smith	4500A-S/W-19	2	5,093	NG

Existing Boilers for Burner Controls

PROPOSED SOLUTION

Typically, boilers are sized to accommodate the coldest days (approximately 5% of the year). During these periods of maximum demand, the burner is constantly on and operating at maximum capacity. The burner cycles on and off, maintaining temperature or pressure in the boiler. It is during these periods of lesser demand, that the controller will monitor the boiler make up rate, and efficiently manage the firing of the boiler.

The length of the burner’s off cycle is the best measure of total heating demand or load. In other words, the load is directly related to the time it takes for water (or steam) in the boiler to drop from its high-limit temperature (or pressure) to its low-limit or “call” setting. When demand is high, these off-cycles are short, and the on-cycles are longer. When demand is lower, off-cycles are longer, and on-cycles are reduced.

The device, which is a microprocessor-based computer, constantly monitors the demand on the boiler by assimilating all factors affecting a building’s heating requirements, including occupancy, climate, wind chill, solar gain, type of building, and many others.

PROPOSED SYSTEMS AND SCOPE OF WORK

Honeywell will replace the burners on the boilers listed above with new, natural gas-fired burners, utilizing advanced controls.

HONEYWELL SLATE™

SLATE™ from Honeywell brings together configurable safety and programmable logic for the first time ever. It’s one platform from one vendor that can easily be customized for almost any application – in less time with less complexity.
This upgrade will provide a combustion curve and light-off points including minimum/maximum firing rate points resulting in a precise firing rate control over the entire firing rate of the burner. Combustion efficiency will be maximized throughout the combustion curve and will provide a fuel curve to achieve maximum efficiency.

MODULATING BURNER CONTROL

The Modulating Burner integrates flame safeguard control, fuel-air ratio control, O_2 Trim, VFD control, and proportional integral derivative (PID) control into a single, integrated, user-friendly system.

The features integrated into the burner provide energy savings, reduced emissions, reduced installation costs and enhanced safety.

Fuel Metering

- Reduced fuel use.
- Increased burner efficiency.
- Greenhouse gas emissions reduction.

Easy Access Panels

- Total access to components.
- Easy maintenance.

Graphic Burner Management System

- Graphic annunciation of critical burner functions.

SCOPE OF WORK

The following outlines the boiler burner controls:

1. Disconnect electrical and gas from existing boiler burner.
2. Install new burner controls on existing burner (where applicable).
3. Start up, commissioning and operator training.

Energy Savings Methodology and Results

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

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

Equipment Information

Manufacturer and Type	Several quality and cost effective manufacturers are available. 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 combustion controls 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 boiler controls 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	Energy savings will result from greater boiler load control, reduced maintenance costs control and setback.
Waste Production	Existing equipment 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 2D Domestic Water Heater 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

EXISTING CONDITIONS

The existing Domestic Hot Water (DHW) heaters are generally in good condition but are not high-efficiency units. Some use electrical power to heat water, which is not cost effective.

DHW – Madison Monroe School 16

DHW - Thomas Jefferson Academy 84

Building	Qty	Manf.	Model	MBH	Storage (Gal)	Fuel
Madison-Monroe School-16	1	Universal	G91-200	199	91	NG
Thomas Jefferson Arts Academy-84	1	Laars	PW1430IN09C1AC	1,158	400	NG
Hamilton Prep Academy-80	1	AO Smith	Burkay HW-420	420	500	NG

Existing Domestic Hot Water Heater Equipment

PROPOSED SOLUTION

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

Building	Qty	Manf.	Model	MBH	Storage (Gal)	Fuel
Madison-Monroe School-16	1	AO Smith	BTH-199	199	120	NG
Thomas Jefferson Arts Academy-84	1	Lochinvar	AW-501	500	400	NG
Hamilton Prep Academy-80	1	Lochinvar	AW-400	399	200	NG

Proposed Domestic Hot Water Heater Equipment

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

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.

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.

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.

UTILITY INTERRUPTIONS

Proper phasing procedures will minimize gas interruptions.

ECM 2E Roof Top Unit Replacements

The key benefits of this ECM include:

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

EXISTING CONDITIONS

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

RTU – Robert Morris School 18

RTU – Sonia Sotomayor School 25

Building	Make	Model	Location Served	Tons	Qty.
Abraham Lincoln School-14	Trane	YCD037C3LABE	Hallway	3.0	1
Abraham Lincoln School-14	Trane	YCD061C3LABE	Classrooms	5.0	5
Sonia Sotomayor School-25	Trane	YCD061C3L0BE	New Wing Classrooms	5.0	3
***Dwyer 9th Grade Annex-82A**	York	DH240N24C2ACG1A	Gym	20.0	2
***Elmora School-12**	Trane	YCD061C3LOBE	New Addition Classrooms	5.0	2
***Elmora School-12**	Trane	YCD037C3LOBE	New Addition Classrooms	3.0	1
Francis Smith ECE-50	Carrier	48E0E030	MPR	30.0	1
Francis Smith ECE-50	Carrier	48TJE008	Main Office	8.0	1
Robert Morris School-18	York	D4CG036N08225A	RM M1, M2	3.0	2
***Robert Morris School-18**	Trane	YCD061C3L0BE	RM B1, B2, Hallway	5.0	3
***Robert Morris School-18**	Lennox	LGA072HH1Y	Rooms 206, 208A/B	6.0	1
Robert Morris School-18	Xetex	XHR50-84RT	MPR/New Wing	80.0	1
Robert Morris School-18	McQuay	RPS0360LA	Kitchen	36.0	1

Building	Make	Model	Location Served	Tons	Qty.
Terence C. Reilly School-7	Trane	TCC036F300BA	Conference Room	3.0	1
Terence C. Reilly School-7	Trane	WCC042	Offices	3.5	1
Thomas Jefferson Arts Academy-84	Carrier	50AJ-050-G	Auditorium	50.0	1
Washington/Dunn Academy-1	Trane	YCD037C3LOBE	Hallway Units	3.5	2
Washington/Dunn Academy-1	Trane	YCD061C3LOBE	RM 115	5.0	4
Woodrow Wilson School-19	McQuay	RPS030CLA	Classrooms, Cafeteria	30.0	2
***Woodrow Wilson School-19**	Lennox	LGA120HH1G	Kitchen	10.0	1
***Dwyer 9th Grade Annex-82A**	Trane	YCD061C3LOBE	Rm 25, 26, Hallway	5.0	3
***Mabel G. Holmes School-5**	York	DBUS-T060N1250	Classroom – 19	5.0	1
***Mabel G. Holmes School-5**	York	DBUS-T060N1250	Classroom – 18	5.0	1
***Mabel G. Holmes School-5**	York	DAYA-F030N078A	Rm. 19, 18, Hallway	3.0	1
Mabel G. Holmes School-5	York	D2CE240A25D	Auditorium	20.0	1
Mabel G. Holmes School-5	York	D2CE240A25D	Auditorium	20.0	1
Lafayette Middle School-6	Trane	YCD061C3LOBE	Rm 120,121	5.0	2
Lafayette Middle School-6	Trane	YCD037C3LOBE	Hallway Units (120,121)	3.5	1
Albert Einstein Academy-29	Trane	SFHFC304	RTU9A - 1st Floor Cafetorium	30.0	1
Albert Einstein Academy-29	Trane	SFHFC254	3rd Floor Area A & B	25.0	1
Albert Einstein Academy-29	Trane	SFHFC304	1st Floor Classrooms	30.0	1
Albert Einstein Academy-29	Trane	SFHFC254	RTU4A - Gymnasium	25.0	1
Albert Einstein Academy-29	Trane	SFHFC304	RTU7 - 2nd Floor Area 6	30.0	1
Albert Einstein Academy-29	Trane	SFHFC404	RTU9 - 1st Floor Cafetorium/ Stage	40.0	1
***Dwyer 9th Grade Annex-82A**	Trane	YCD037C3L0BE	Education Spaces	3.0	1
***Dwyer 9th Grade Annex-82A**	ICP	PAF024K000E	Education Spaces	2.0	1
***Dwyer 9th Grade Annex-82A**	McQuay	MPS020BYCM	Education Spaces	20.0	1
***Francis Smith ECE-50**	Trane	YCD300B4LAHB	Quad 1 to 4	25.0	1
***Francis Smith ECE-50**	Trane	YCD300B4LAHB	Quad 1 to 4	25.0	1

Existing Rooftop Units to be Replaced

*Note * - Unit installed under Direct Install Program*

PROPOSED SOLUTION

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

Building	Make	Model	Location Served	Tons	Qty.
Abraham Lincoln School-14	Trane	YZC-036	Hallway	3.0	1
Abraham Lincoln School-14	Trane	YZC-060	Classrooms	5.0	5
Sonia Sotomayor School-25	Trane	YZC-060	New Wing Classrooms	5.0	3
Dwyer 9th Grade Annex-82A	Trane	YHD-240	Gym	20.0	2
Elmora School-12	Trane	YZC-060	New Addition Classrooms	5.0	2
Elmora School-12	Trane	YZC-036	New Addition Classrooms	3.0	1
Francis Smith ECE-50	Trane	RF030	MPR	30.0	1
Francis Smith ECE-50	Trane	YZC-096	Main Office	8.0	1
Robert Morris School-18	Trane	YZC-036	RM M1, M2	3.0	2
Robert Morris School-18	Trane	YZC-060	RM B1, B2, Hallway	5.0	3
Robert Morris School-18	Trane	YZC-072	Rooms 206, 208A/B	6.0	1
Robert Morris School-18	Trane	XHS5084R	MPR/New Wing	80.0	1
Robert Morris School-18	Trane	RF030	Kitchen	36.0	1
Terence C. Reilly School-7	Trane	TZC-036	Conference Room	3.0	1
Terence C. Reilly School-7	Trane	TZC-036	Offices	3.5	1
Thomas Jefferson Arts Academy-84	Trane	RF050	Auditorium	50.0	1
Washington/Dunn Academy-1	Trane	YZC-036	Hall Way Units	3.5	2
Washington/Dunn Academy-1	Trane	YZC-060	RM 115	5.0	4
Woodrow Wilson School-19	Trane	RF030	Classrooms, Cafeteria	30.0	2
***Woodrow Wilson School-19**	Trane	YZC-120	Kitchen	10.0	1
***Dwyer 9th Grade Annex-82A**	Trane	TZC-060	Rm 25, 26, Hallway	5.0	3
***Mabel G. Holmes School-5**	Trane	TZC-060	Classroom – 19	5.0	1
***Mabel G. Holmes School-5**	Trane	TZC-060	Classroom – 18	5.0	1

Building	Make	Model	Location Served	Tons	Qty.
***Mabel G. Holmes School-5**	Trane	TZC-036	Rm. 19, 18, Hallway	3.0	1
Mabel G. Holmes School-5	Trane	THD-240	Auditorium	20.0	1
Mabel G. Holmes School-5	Trane	THD-240	Auditorium	20.0	1
Lafayette Middle School-6	Trane	YZC-060	Rm 120,121	5.0	2
Lafayette Middle School-6	Trane	YZC-036	Hallway Units (120,121)	3.5	1
Albert Einstein Academy-29	Trane	SFHL*304	1st Floor Cafetorium	30.0	1
Albert Einstein Academy-29	Trane	SFHL*254	3rd Floor Area A & B	25.0	1
Albert Einstein Academy-29	Trane	SFHL*304	1st Floor Classrooms	30.0	1
Albert Einstein Academy-29	Trane	SFHL*254	Gymnasium	25.0	1
Albert Einstein Academy-29	Trane	SFHL*304	2nd Floor Area 6	30.0	1
Albert Einstein Academy-29	Trane	SFHL*404	Cafetorium/Stage	40.0	1
***Dwyer 9th Grade Annex-82A**	Trane	THD-240	Education Spaces	2.0	1
***Dwyer 9th Grade Annex-82A**	Trane	THD-300	Education Spaces	20.0	1
***Dwyer 9th Grade Annex-82A**	Trane	THD-300	Quad 1 to 4	25.0	1
***Francis Smith ECE-50**	Trane	TZC-036	Quad 1 to 4	25.0	1

Proposed Rooftop Units

*Note * - Unit installed under Direct Install Program*

SCOPE OF WORK

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

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

ECM 2F Kitchen Hood Controls

The key benefits of this ECM include:

- **Reduced energy usage** from improved equipment control and reduced exhaust of conditioned air.
- **Lower operational costs** through less frequent maintenance and operational issues.

EXISTING CONDITIONS

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

Kitchen Hood –School 30

Kitchen Hood –School 81

PROPOSED SOLUTION

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

Building	Kitchen Hood Area (sq. ft.)
Dwyer-Halsey Academies-81	100
Washington/Dunn Academy-1	100
Terence C. Reilly School-7	100
Abraham Lincoln School-14	90
Hamilton Prep Academy-80	128
Benjamin Franklin School-13	100
Sonia Sotomayor School-25	75
Dr. Antonia Pantoja School-27	100
Frank J. Cicarell Academy-89	100
La Corte-Peterstown School-3	80
Nicholas Murray Butler School-23	100
Orlando Edreira Academy-26	80

Building	Kitchen Hood Area (sq. ft.)
Robert Morris School-18	100
Chessie Dentley Roberts Academy-30	64
Edison 9th Grade Academy-87	72
Edison 9th Grade Academy-87	112

Existing Kitchen Hoods to Receive Controls

SCOPE OF WORK

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 2G Walk-In Compressor Controls – DI Program

The key benefits of this ECM include:

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

EXISTING CONDITIONS

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

Walk In Freezer – Robert Morris-18

Walk In Freezer – Ben Franklin-13

Building	Location	Walk-In Refrigerators	Walk-In Freezers
Hamilton Prep Academy-80	Kitchen	1	1
Benjamin Franklin School-13	Kitchen	1	1
Christopher Columbus School-15	Kitchen	1	-
Dwyer 9th Grade Annex-82A	Kitchen	1	-
Francis Smith ECE-50	Kitchen	1	1
Bollwage Academy of Finance-90	Kitchen	1	-
Mabel G. Holmes School-5	Kitchen	-	1
Madison-Monroe School-16	Kitchen	1	-
Robert Morris School-18	Kitchen	1	1
Woodrow Wilson School-19	Kitchen	1	1
Edison 9th Grade Academy-87A	Kitchen	1	-
Elmora School-12	Kitchen	1	-
Halsey 9th Grade Academy-83A	Kitchen	1	-
Total		**12**	**6**

Existing Walk-In Refrigerator/Freezers to receive Controls

PROPOSED SOLUTION

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

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

INTELLIDYNE SENSOR FEATURES

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

INTELLIDYNE SENSOR BENEFITS

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 2HMotors 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 OVERVIEW

Variable Frequency Drives (VFDs) allow motors to run at specified speeds rather than just on or off while allowing systems to more accurately move heat. Honeywell recommends this ECM due to the significant savings potential given the relationship between energy consumption and motor speed.

Motors – Albert Einstein Academy - 29

Motors – Duarte-Marti School - 28

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.

The motors that were identified in the buildings are listed as follows:

Building	Equipment Description	Qty	Motor HP	Replace Motor Y/N	Add VFD Y/N
Albert Einstein Academy-29	Heating Hot Water Pump	2	7.5	Y	Y
Battin McAuliffe Middle School-4	Heating Hot Water Pump	2	20.0	Y	Y
Duarte- Marti School-28	Heating Hot Water Pump	2	20.0	Y	Y
Orlando Edreira Academy-26	Heating Hot Water Pump	2	25.0	Y	Y
Thomas Jefferson Arts Academy-84	Heating Hot Water Pump	2	30.0	Y	Y

Existing Motors

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.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost effective manufacturers are available.
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

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 2I Split System Replacements

The key benefits of this ECM include:

- **Energy savings** from increased equipment efficiency.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace key HVAC equipment

EXISTING CONDITIONS

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

Split Units – Morris – 18

Split Units – Morris – 18

Building	Make	Model	Qty.	Area Served	Tons
Robert Morris School-18	McQuay	ACR040AS27-ER10	1	Gym	40.0
Robert Morris School-18	McQuay	ACR080AS27-ER10	1	MPR/New Wing	80.0
Battin McAuliffe Middle School-4	McQuay	ACZ040AS42-ER10	1	Auditorium	40.0
John Marshall School-20	McQuay	AGZ065BM12-ER10	1	CHW Plate and Frame	65.0
John Marshall School-20	McQuay	AGZ065BM12-ER10	1	CHW Plate and Frame	65.0
Halsey 9th Grade Academy-83A	McQuay	RCS092DYY	1	AHU-1 First Floor	92.0
***Bollwage Academy of Finance-90**	Fujitsu	AOU30C1	1	Educational Spaces	2.5
*** Edison 9th Grade Academy-87A**	Mitsubishi	MUY-D30NA	1	Educational Spaces	2.5
***Elmora School-12**	Fujistu	AOU24CL	1	Educational Spaces	2.0
***Elmora School-12**	Fujistu	AOU24CL	1	Educational Spaces	2.0
***Elmora School-12**	Sanyo	CL2432	1	Educational Spaces	2.0
***Elmora School-12**	Mitsubishi	MUY-D30NA	1	Educational Spaces	2.5

Existing Split Systems to be Replaced

Note * - Installed Through Direct Install Program

PROPOSED SOLUTION

Honeywell proposes replacing the existing condensing units in the table above. 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.

Building	Make	Model	Qty.	Area Served	Tons
Robert Morris School-18	McQuay	ACR040AS27-ER10	1	Gym	40.0
Robert Morris School-18	McQuay	ACR080AS27-ER10	1	MPR/New Wing	80.0
Battin McAuliffe Middle School-4	McQuay	ACZ040AS42-ER10	1	Auditorium	40.0
John Marshall School-20	McQuay	AGZ065BM12-ER10	1	CHW Plate and Frame	65.0
John Marshall School-20	McQuay	AGZ065BM12-ER10	1	CHW Plate and Frame	65.0
Halsey 9th Grade Academy-83A	McQuay	RCS092DYY	1	AHU-1 First Floor	92.0
***Bollwage Academy of Finance-90**	Fujitsu	AOU30C1	1	Educational Spaces	2.5
*** Edison 9th Grade Academy-87A**	Mitsubishi	MUY-D30	1	Educational Spaces	2.5
***Elmora School-12**	Mitsubishi	MUY-D24	1	Educational Spaces	2.0
***Elmora School-12**	Mitsubishi	MUY-D24	1	Educational Spaces	2.0
***Elmora School-12**	Mitsubishi	MUY-D24	1	Educational Spaces	2.0
***Elmora School-12**	Mitsubishi	MUY-D24	1	Educational Spaces	2.5

Proposed Split Systems

Note * - Installed Through Direct Install Program

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

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

ECM 2J Chiller Replacements

The key benefits of this ECM include:

- **Reduced energy usag**e from improved efficiency due to replacement of older equipment.
- **Lower operational costs** through less frequent maintenance and operational issues.

EXISTING CONDITIONS

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

Chiller – Battin McAuliffe School 4

Chiller – Terence C. Reilly School 7

Building	Make	Model	Qty.	Tons
Battin McAuliffe Middle School-4	McQuay	ALS218C12-ER11	1	218.0
Battin McAuliffe Middle School-4	McQuay	ALS218C12-ER11	1	218.0
Benjamin Franklin School-13	McQuay	AGR100AS27-ER10	2	100.0
Nicholas Murray Butler School-23	Trane	RTHR255F11001WP	1	250.0
Terence C. Reilly School-7	Trane	RTAA2154XR01A3	2	215.0
Washington/Dunn Academy 1	Trane	RTHB300	2	300.0
Orlando Edreira Academy-26	York	YCAS0218EB46X	2	200.0

Existing Chiller Units to be Replaced

PROPOSED SOLUTION

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

Building	Make	Model	Qty.	Tons
Battin McAuliffe Middle School-4	Trane	ACRB225	1	200.0
Battin McAuliffe Middle School-4	Trane	ACRB225	1	200.0
Benjamin Franklin School-13	Trane	CGAM-100	2	100.0
Nicholas Murray Butler School-23	Trane	Optimus RTHD250	1	250.0
Terence C. Reilly School-7	Trane	ACRB225	2	200.0
Washington/Dunn Academy 1	Trane	Optimus RTHD300	2	300.0

Building	Make	Model	Qty.	Tons
Orlando Edreira Academy-26	Trane	ACRB225	2	200.0

Proposed Chillers

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 (kW/ton) – replacement unit energy consumption (kW/ton

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

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

ECM 2K Steam Trap Retrofits

The key benefits of this ECM include:

- **Energy savings** from reducing heating losses caused by old, inefficient steam traps
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace key heating equipment

EXISTING CONDITIONS

When steam heats the building and transfers heat throughout the building, it condenses back to water. The condensate must be trapped and sent back to the boiler. When steam traps fail, the steam does not condense, which reduces the heat transfer, causing unnecessary heat losses. The repair or replacement of the steam traps will reduce unnecessary losses.

Traps are designed to drain only the condensate, and prevent live steam from entering the condensate return piping. As the distribution system ages, the moving parts in the trap tend to get sluggish or fail altogether. This failure results in live steam entering the condensate return piping. The cumulative effect of this is to return the condensate above the flash point, resulting in steam and hence valuable heating energy loss at the boiler. This loss of energy can be minimized by a thorough survey to identify leaking traps by use of infrared temperature sensing instruments.

Steam Trap - Scott School -2

Steam Trap – Columbus School -15

School	1/2" Thermo-static	3/4" Thermo-static	1" Thermo-static	3/4" FT)	1" (FT)	1 1/4" (FT)	1 1/2" (FT)	2" (FT)
Winfield Scott School-2	3	9	0	1	0	1	0	2
Benjamin Franklin School-13	0	0	0	0	2	0	0	1
Christopher Columbus School-15	167	1	0	4	0	0	3	0
Madison-Monroe School-16	0	0	0	0	0	0	1	1
Robert Morris School-18	71	0	0	1	3	0	0	0
John Marshall School-20	104	0	0	3	0	1	2	2
Orlando Edreira Academy-26	0	0	0	13	0	2	1	9
Ronald Reagan Academy-30	0	0	0	8	0	0	7	2
Hamilton Prep Academy-80	75	0	0	2	0	0	2	4
Thomas A. Edison Academy-87	168	7	14	7	11	9	0	0
Edison 9th Grade Academy-87A	0	0	0	0	0	0	0	0
Totals	**588**	**17**	**14**	**39**	**16**	**13**	**16**	**21**

Existing Steam Traps

PROPOSED SOLUTION

Honeywell recommends retrofitting the traps per the following scope of work. The steam trap retrofit includes surveying all the existing steam traps and engineering appropriate replacements. During construction, Honeywell will provide all materials, fittings, labor and supervision for the timely completion of the project. All existing strainers, isolation valves, check valves, and fittings in good repair will be reused.

ENERGY SAVINGS METHODOLOGY AND RESULTS

All mechanical steam traps lose some live steam, either through normal cycling, leaking through a closed trap, or failing in the open position. Various sources have stated that the loss through a properly operational trap may exceed ten lbs./hour, while the failed steam trap population ranges between 20-50% at any given time.

We have estimated the steam losses based on a conservative figure of 20% leaking. Failure rates are based on sample testing of the steam trap population. In determining steam losses, the trap orifices and steam pressures have been grouped and averaged to create a simpler statistical basis.

EQUIPMENT INFORMATION

Material and Type	Steam Trap selection will be determined in conjunction with District.
Material Identification	Specific material selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the trap installation.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result the reduction of steam loss from malfunctioning traps resulting in lower fuel consumption. The equipment uses no other resources.
Waste Production	Existing steam traps scheduled for removal will be disposed of properly.
Environmental Regulations	Asbestos abatement may be required.

ECM 2L Addition Of Cooling Systems

The key benefits of this ECM include:

- **Energy savings** from increased equipment efficiency.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.

EXISTING CONDITIONS

Honeywell and the district have identified several schools where the addition of cooling is desirable. Although adding cooling increases the energy use of the building, the addition of cooling makes a better learning environment for students by increasing comfort during warmer school days.

High Efficiency VRF – Monroe School 16

High Efficiency VRF – Scott School 2

Typical VRF Systems Installed in District

PROPOSED SOLUTION

Honeywell proposes installing high efficiency Variable Refrigerant Flow (VRF) heat pump units and/or air-cooled chillers at these schools to add cooling to classrooms and offices.

SCOPE OF WORK

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

Building	Make	Type	Tons
Robert Morris School-18	Trane	VRF-PUHY	35.0
Lafayette Middle School-6	Trane	Chiller-ACRB	190.0
Thomas A. Edison Academy-87	Trane	VRF-PUHY	107.0
Hamilton Prep Academy-80	Trane	VRF-PUHY	83.0
Mabel G. Holmes School-5	Trane	Chiller-ACRB	120.0
Elmora School-12	Trane	VRF-PUHY	126.0
Woodrow Wilson School-19	Trane	VRF-PUHY A	65.0
Dwyer 9th Grade Annex-82A	Trane	VRF-PUHY A	70.0

Proposed Cooling Systems

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ECM 2M Cooling Tower Replacements

The key benefits of this ECM include:

- **Reduced energy usag**e from improved efficiency due to replacement of older equipment.
- **Lower operational costs** through less frequent maintenance and operational issues.

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

Cooling Tower – Dr. A. Pantoja School 27

Cooling Tower – Washington School 1

Building	Make	Model	Qty.	Tons
Dr. Antonia Pantoja School-27	BAC	VTL-200	1	200
Washington/Dunn Academy-1	Marley	NC3222SM	2	300
Dwyer-Halsey Academies-81	BAC	-	4	325

Existing Cooling Tower Units to be Replaced

PROPOSED SOLUTION

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

Building	Make	Model	Qty.	Tons
Dr. Antonia Pantoja School-27	BAC	VTL-200-M	1	200.0
Washington/Dunn Academy-1	BAC	S3E-8518-05M	2	322.0
Dwyer-Halsey Academies-81	BAC	S3E-8518-06L	4	329.0

Proposed Cooling Tower Units

SCOPE OF WORK

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

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

ECM 2NPipe Insulation

The key benefits of this ECM include:

- **Energy savings** from increased equipment efficiency.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.

EXISTING CONDITIONS

An insulation audit was conducted identifying an approximated quantity of heat that is lost from various locations throughout the buildings. The heat losses result from hot piping giving off heat to the space around it. This measure will insulate these surfaces, resulting in energy savings and improved comfort of those areas in or near occupied spaces.

During the site visits, it was noticed that hot water piping and valves in boiler rooms were not insulated. The un-insulated piping and valves waste energy and pose a danger of getting injured with exposed hot piping. In addition, the boiler must work harder to make up for the wasted energy.

Boiler Piping – Ben Franklin School - 13

Boiler Piping - Lafayette School - 6

Building	Pipe Diameter (inches)	Linear Feet of Pipe
Benjamin Franklin School-13	8.00	200
Benjamin Franklin School-13	1.50	100
Lafayette Middle School-6	8.00	200
Lafayette Middle School-6	2.00	100

Pipe Diameters and Linear Feet of Insulation

PROPOSED SOLUTION

Honeywell proposes insulating these pipes and valves with appropriately sized fiberglass insulation. The following table lists the recommended insulation thickness.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Energy savings results from significantly reducing the heat lost to the atmosphere from the piping and valve surfaces. In general, Honeywell uses the following approach to determine savings for this specific

Energy Savings $	= ((Heat Loss Rate per foot of Uninsulated Pipe – Heat Loss Rate per foot of Insulated Pipe) x (Length of Pipe x Hours of Operation) x Cost/btu)/(Boiler Efficiency))

Reference is made to the ASHRAE 1989 Fundamentals text page 22.19, Table 9A "Heat Loss from Bare Steel Pipe to Still Air at 80 degrees F, Btu/hr-ft" for losses from un-insulated lines, and Table 11 "Recommended Thickness for Pipe and Equipment Insulation".

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

The service to the specific lines may require interruption to allow for the repair or replacement. Coordination with site personnel will be required to minimize interruption to the buildings affected.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

The service to the specific lines may require interruption to allow for the repair or replacement. Coordination with site personnel will be required to minimize interruption to the buildings affected.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result the reduction of heat loss from uninsulated lines resulting in lower fuel consumption. The equipment uses no other resources.
Waste Production	This measure produces no waste by products.
Environmental Regulations	Asbestos abatement may be required

ECM 3ABuilding Controls/Energy Optimization

The key benefits of this ECM include:

- **Operational efficiency** thanks to better control and system wide visibility.
- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Occupancy comfort and productivity** by way of enhanced temperature and humidity control throughout your buildings.

EXISTING CONDITIONS

Existing Controls – Edreira School 26

Existing Controls – Edreira School 26

PROPOSED CONDITIONS

General

1. All wiring to be installed in a neat, workmanlike manner parallel to building lines, securely supported and consistent with local codes and existing control installation in each building.
2. Cap any pneumatic tubing which is abandoned because of the controls upgrade.
3. Safe-off and identify source of any existing electrical wiring which is abandoned because of the controls upgrade.
4. Communication bus routing is shown for illustrative purposes only on the building floor plans included in this RFQ package. The Electrical Contractor shall determine final routing to interconnect the devices.
5. Any equipment deficiencies that interfere with the electrical and/or controls scope of work will be documented and reported to the customer.
6. Installation shall be performed in EMT where exposed in mechanical equipment rooms, EMT with compression fittings for outdoors and plenum rated cable where concealed above ceilings and within walls. Wiremold shall be used in any open finished areas where surface mounting is required.
7. All OAT/RH will be installed at the North wall of the building.
8. The installation shall be performed in accordance with all applicable specifications, drawings, building standards and local electrical and fire codes. If conflicts should exist between documents/codes, the most stringent requirement shall rule.

Battin Middle School # 4

Boilers (Typical of 4)

a. Install CPO controller to controller the Boilers
b. Extend wiring to heat exchanger pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs, etc.)
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Chilled Water System

a. Install new CPO controller to control the chillers.
b. Extend wiring to pumps and auxiliaries.
c. Run new BACnet MSTP communication to-from each equipment.

AHU - (Typical for 4)

a. Install new CPO controller to controls the AHUs.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Install and wire 2 Freezer Temp sensor for the kitchen Fridge and freezer. Use the controller controlling the kitchen AHU.
f. Run new BACnet MSTP communication to-from each equipment.

Fan Coils (Typical of 134)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Exhaust Fans (Typical of 11)

a. Install new CPO controller to control the exhaust fans.
b. Reuse existing field devices (Relay / CTs etc)
c. Run new BACnet MSTP communication to-from each equipment.

Terrence C. Reily # 7

Boilers (Typical of 3)

a. Install new CPO controller to control the Boilers
b. Extend wiring to pumps and auxiliaries.
c. Reuse existing field devices.
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Chilled Water System (Typical of 2)

a. Install new CPO controller to control the chillers.
b. Reuse existing wiring.
c. Reuse field devices (Relays / CTs etc.)
d. Extend wiring to pumps and auxiliaries.
e. Replace temp sensors.
f. Run new BACnet MSTP communication to-from each equipment.

AHU - (Typical for 4)

a. Install new CPO controller the AHUs.
b. Reuse all field devices (relays / CTs etc.)

c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Fan Coils (Typical of 113)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Ben Franklin School # 13

Boilers (Typical of 2)

a. Install new CPO controller to controller the Boilers
b. Extend wiring to pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs, etc.).
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Chilled Water System (Typical of 2)

a. Install new CPO controller to control the chillers.
b. Reuse existing wiring.
c. Reuse field devices (Relays / CTs etc.)
d. Extend wiring to pumps and auxiliaries.
e. Replace temp sensors.
f. Run new BACnet MSTP communication to-from each equipment.

AHU - (typical for 1)

a. Install new CPO controller to control the AHU.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Fan Coils (Typical of 52)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
f. Install new discharge temp sensors.
g. Run new BACnet MSTP communication to-from each equipment.

MADISON MONROE SCHOOL # 16

Boilers (Typical of 2)

a. Install new CPO controller to controller the Boilers
b. Extend wiring to pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs, etc.).
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Exhaust Fans (Typical of 13)

a. Install new CPO controller to control the exhaust fans.
b. Reuse existing field devices (Relay / CTs etc)
c. Run new BACnet MSTP communication to-from each equipment.

Fan Coils (Typical of 28)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.

c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Robert Morris School # 18

Boilers (Typical of 2)

a. Install CPO controller to controller the Boilers
b. Extend wiring to heat exchanger pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs, etc.)
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment

Chilled Water System

a. Install new CPO controller to control the chillers.
b. Reuse existing field devices (Relays / CTs etc.).
c. Extend wiring to pumps and auxiliaries.
d. Run new BACnet MSTP communication to-from each equipment

AHU - (Typical for 4)

a. Install new CPO controller to controls the AHUs.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Install and wire 2 Freezer Temp sensor for the kitchen Fridge and freezer.
f. Use the controller controlling the kitchen AHU.
g. Run new BACnet MSTP communication to-from each equipment

Fan Coils (Typical of 134)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Run new BACnet MSTP communication to-from each equipment

Sonia Sotomayor School # 25

Boilers (Typical of 2)

a. Install CPO controller to controller the Boilers
b. Extend wiring to heat exchanger pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs, etc.)
d. Extend wiring to Steam 3 steam valves.
e. Replace temp sensors.
f. Run new BACnet MSTP communication to-from each equipment

Chilled Water System (Typical of 2)

a. Install new CPO controller to control the chillers.
b. Extend wiring to pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs etc.).
d. Run new BACnet MSTP communication to-from each equipment

AHU - (Typical for 6)

a. Install new CPO controller to controls the AHUs.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.

d. Replace temp sensors.
e. Install and wire 2 Freezer Temp sensor for the kitchen Fridge and freezer. Use the controller controlling the kitchen AHU.
f. Run new BACnet MSTP communication to-from each equipment

Fan Coils (Typical of 27)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

Frances C. Smith School # 50

AHU - (Typical for 8)

a. Install new CPO controller to controls the AHUs.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Extend wiring to damper actuators.
f. Run new BACnet MSTP communication to-from each equipment.

VAV Boxes (Typical of 35 – No Reheat)

a. Install new CPO-VAV2A Controller to control the VAV boxes.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Run new BACnet MSTP communication as needed to-from each equipment.

Exhaust Fans (Typical of 13)

a. Install new CPO controller to control the exhaust fans.
b. Reuse existing field devices (Relay / CTs etc)
c. Run new BACnet MSTP communication to-from each equipment.

Thomas Edison School # 87

Fan Coils (Typical of 90)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Extend wiring to damper actuators.
f. Extend wiring to reheat valves.
g. Run new BACnet MSTP communication to-from each equipment.

AHU - (Typical for 5) (2 Units are for the Gym).

a. Units are pneumatics.
b. Install new CPO controller to controls the AHUs.
c. Install new relay / CTs to control the fans.
d. Extend wiring to damper actuators.
e. Install new temp sensors and room temperature sensors.
f. Extend wiring to 3-way reheat valves.
g. Extend wiring to reheat pumps. (Relays/CTs)
h. Run new BACnet MSTP communication to-from each equipment.

Package RTUs (Typical of 5).

a. Install new BACnet controller to control the package roof tops.
b. Run new BACnet MSTP communication to-from each equipment.

Exhaust Fans (Typical of 25)

a. Install new CPO controller to control the exhaust fans.
b. Reuse existing field devices (Relay / CTs etc)
c. Run new BACnet MSTP communication to-from each equipment.

Woodrow Wilson School # 19

Boilers (Typical of 2)

a. Install CPO controller to controller the Boilers
b. Install new (Relays / CTs, etc.) to start and monitor the boilers
c. Install and wire new Steam supply temp sensor. (Surface or Well).
d. Install and wire new steam supply pressure sensor.
e. Run new BACnet MSTP communication to-from each equipment.

ERH - (Typical of 4).

a. Install new BACnet controllers to control the units.
b. Units have electric heat.
c. Install new relay/CTs to start and monitor the electric heat.
d. Install new relay / CTs to control the fans.
e. Install relay/CTs to control the energy recovery wheels.
f. Install and wire new damper actuators.
g. Install new temp sensors and room temperature sensors.
h. Run new BACnet MSTP communication to-from each equipment.

AHU - (typical for 6)

a. Install new CPO controller or BACnet thermostat to control the AHU.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Install and wire new temp sensors.
e. Install and wire new damper actuators.
f. Run new BACnet MSTP communication to-from each equipment.

Fan Coils (Typical of 34)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Install new damper actuators.
f. Wire new reheat valves.
g. Run new BACnet MSTP communication to-from each equipment.

Exhaust Fans (Typical of 8)

a. Install new CPO controller to control the exhaust fans.
b. Reuse existing field devices (Relay / CTs etc)
c. Run new BACnet MSTP communication to-from each equipment.

Abraham Lincoln School # 14

Boilers (Typical of 3)

a. Install CPO controller to controller the Boilers.
b. Install new (Relays / CTs, etc.) to start and monitor the boilers.
c. Install new (Relay / CTs) to start and monitor 3 HWP.
d. Install and wire new differential pressure sensor. (Surface or Well).

e. Install and wire new steam supply pressure sensor.
f. Reuse wiring and field devices as much as possible.
g. Run new BACnet MSTP communication to-from each equipment.

Chilled Water System (Typical of 2)

a. Install new CPO controller to control the chillers.
b. Extend wiring to pumps and auxiliaries.
c. Reuse existing field devices (Relays / CTs etc.).
d. Run new BACnet MSTP communication to-from each equipment

Fan Coils (Typical of 35)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Install new discharge temp sensors.
e. Install new damper actuators.
f. Wire new reheat valves.
g. Run new BACnet MSTP communication to-from each equipment.

Radiator Valve (Typical of 2)

a. Install new CPO-RL5 Controller to control the fan coils.
b. Install new Room Sylk Temp Sensor and reuse existing wiring.
c. Reuse existing wiring and field devices.
d. Wire new reheat valves.
e. Run new BACnet MSTP communication to-from each equipment.

Standalone Unit Heaters (Typical of 5)

a. Install new aquastat to control the unit.
b. Install new thermostatic radiator valve.
c. Wire fan interlock with aquastat.

AHU - (Typical for 1)

a. Install new CPO controller to controls the AHUs.
b. Reuse all field devices (relays / CTs etc.)
c. Reuse existing wiring to field devices.
d. Replace temp sensors.
e. Run new BACnet MSTP communication to-from each equipment.

RTU - (Typical for 2)

a. Install new BACnet thermostat to control the unit.
b. Reuse all field devices (relays / CTs etc.) if applicable
c. Reuse existing wiring to field devices.
d. Run new BACnet MSTP communication to-from each equipment.

Exhaust Fans (Typical of 8)

d. Install new CPO controller to control the exhaust fans.
e. Reuse existing field devices (Relay / CTs etc.)
f. Run new BACnet MSTP communication to-from each equipment.

Nicholas Murray Butler School-23

Complete Replacement of the Barber Coleman System:

AH-1, 2 & 4 (typical) to include:

- Furnish and install new CPO DDC controller.
- Furnish and install (21) field devices
- Field devices to be replace including:
  - **a.** Space temp sensor
  - **b.** MA temp sensor
  - **c.** Supply air temp sensor
- Relays to be added for DO’s including:
  - a. SF start/stop
  - b. RF start/stop
  - c. EF start/stop
  - d. CW Coil pump start/stop
  - e. HW coil pump start/stop
  - f. (3) Customer future tie in relays
- Control transformer for 24v to CPO
- New BacNet MSTP bus.

AHU-3 to include:

- Replacement of Existing BC MZ-42 & 43 as indicated on drawing 4 with new CPO DDC controller.
- Furnish and install of (20) for reconnection to new CPO.
- Field devices to be replace including:
  - o RA temp sensor
  - o Supply air temp sensor
- Relays to be added for DO’s including:
  - o SF start/stop
  - o RF start/stop
  - o System minimum OAI start/stop
  - o CW Coil pump start/stop
  - o HW coil pump start/stop
  - o (3) Customer future tie in relays
- Control transformer for 24v to CPO
- New BacNet MSTP Bus.

(7) VAV’s to include:

- Furnish and install new CPO VAV controllers and reuse existing 24v transformers
- New communications bus
- Furnish and install new space sensors
- Furnish and install new DA temp sensors
- Valves to be re-terminated to new controllers.
- Tubing to be reconnected to new controllers.

AHU-5 to include:

- Replacement of BC MZ-44 as indicated on drawing 6 with new CPO DDC controller
- Furnish and install (20) field devices for reconnection to new CPO.
- Field devices to be replace including:
  - o RA temp sensor
  - o Supply air temp sensor

- Relays to be added for DO's including:
  - SF start/stop
  - RF start/stop
  - System minimum OAI start/stop
  - CW Coil pump start/stop
  - HW coil pump start/stop
  - (3) Customer future tie in relays
- Control transformer for 24v to CPO
- New BacNet MSTP bus

(26) UV's to include:

- Replacement of PEM controllers with CPO-R as indicated on drawing 7 typical for each.
- Field devices to be replace including:
  - Space temp sensor
  - Supply air temp sensor
- Devices figured functional and reconnected for each to including:
  - Freezestat
  - MA damper actuator
  - F & B damper actuator
  - Power exhaust damper
  - UV start/stop relay
  - EF start/stop relay
- Control transformer for 24v to CPO
- New BacNet MSTP bus.
- Wire mold from ceiling down to UV and stats for each figured for estimate. All field devices assumed in working order.

Hot water system to include:

- Replacement of BC MZ-45 as indicated on drawing 8 with CPO DDC controller.
- Furnish and install (21) field devices for reconnection to new CPO.
- Field devices to be replace including:
  - HWS temp
  - OA temp
- Relays to be added for DO's including:
  - P1 start/stop
  - P2 start/stop
  - Combustion air damper start/stop
  - Boiler 1 start/stop
  - Boiler 2 start/stop
  - (3) secondary pumps start/stop (3, 4 & 11)
- Control transformer for 24v to CPO
- New BacNet MSTP Bus

Gym hot water circuit to include:

- Replacement of BC MZ-46 as indicated on drawing 9 with CPO field controller.
- Furnish and install (12) field devices for reconnection to new CPO.
- Field devices to be replace including:
  - (2) HWS temp sensors
  - (3) space temp sensors
- Relays to be added for DO's including:
  - P9 start/stop

    - P10 start/stop
    - P11 start/stop
- Control transformer for 24v to CPO
- New BacNet MSTP Bus

Chilled water system to include:

- Replacement of BC MZ-47 as indicated on drawing 9 with new CPO DDC controller.
- Furnish and install new (13) for reconnection to new CPO.
- Field devices to be replace including:
    - CHWS temp
    - CWS temp
- Relays to be added for DO's including:
    - P5 start/stop
    - P6 start/stop
    - P7 start/stop
    - P8 start/stop
    - Chiller start/stop
- Control transformer for 24v to CPO
- New BacNet MSTP Bus

Lighting controllers to include:

- Replacement of BC MZ-48 & 49 as indicated on drawing 11 with new CPO DDC controller.
- Furnish and install (14) field devices for reconnection to new CPO.
- Relays to be added for DO's including:
    - (14) lighting circuit relays as required
- Control transformer for 24v to CPO
- New BacNet MSTP Bus

Washington School-1

AHU-1 in Penthouse East wing to include:

- Furnish and install new CPO DDC field controller.
- Furnish and install new field devices:
    - DA temp
    - RA temp
    - RA RH
    - RA CO2
    - Preheat coil DA temp
    - MA temp
    - Filter DP
    - Freezestat
    - SF Start/stop & status)
- EMT for pneumatic field device locations including:
    - Mixed air dampers
    - Heating coil valve
    - CC face and bypass damper
- New BacNet MSTP Bus.

AHU-2 in Penthouse East wing to include:

- Furnish and install new CPO DDC field controller.
- Furnish and install new field devices:
    - DA temp

  - RA temp
  - RA RH
  - RA CO2
  - Preheat coil DA temp
  - MA temp
  - Filter DP
  - Freezestat
  - SF Start/stop & status)
- EMT for pneumatic field device locations including:
  - Mixed air dampers
  - Heating coil valve
  - CC face and bypass damper
- New BacNet MSTP Bus.

AHU-5 in MER 300/400 wing to include:

- Furnish and install new CPO DDC field controller.
- Furnish and install new field devices:
  - DA temp
  - RA temp
  - RA RH
  - RA CO2
  - Preheat coil DA temp
  - MA temp
  - Filter DP
  - Freezestat
  - SF Start/stop & status)
- EMT for pneumatic field device locations including:
  - Mixed air dampers
  - Heating coil valve
  - CC face and bypass damper
- New BacNet MSTP Bus.

Control wiring of AHU-6 in MER 300/400 wing to include:

- Furnish and install new CPO DDC field controller.
- Furnish and install new field devices:
  - DA temp
  - RA temp
  - RA RH
  - RA CO2
  - Preheat coil DA temp
  - MA temp
  - Filter DP
  - Freezestat
  - SF Start/stop & status)
- EMT for pneumatic field device locations including:
  - Mixed air dampers
  - Heating coil valve
  - CC face and bypass damper
- New BacNet MSTP Bus.

AHU-9 in lunchroom to include:

- Furnish and install new CPO DDC field controller.

- Furnish and install new field devices:
  - DA temp
  - RA temp
  - RA RH
  - RA CO2
  - Preheat coil DA temp
  - MA temp
  - Filter DP
  - Freezestat
  - SF Start/stop & status)
- EMT for pneumatic field device locations including:
  - Mixed air dampers
  - Heating coil valve
  - CC face and bypass damper
- New BacNet MSTP Bus.

AH-1 Trane (Kitchen and Acme Exhaust Fan)

Replace existing stand-alone Trane Unit AH-1 (Kitchen) and Acme Exhaust Fan

- Furnish and install new Honeywell CPO-PC-400 with Panel I/O modules

for AHI-1 and EF

- Furnish and install 12 new non-compatible field devices/sensor.
- Generate New DDC program
- New BacnNet MSTP Bus.

WINFIELD SCOTT SCHOOL -2

1. Remove Existing FTR pneumatic controls and cap lines.
2. Furnish labor to remove and reinstall a new steam valves at each FTR.
3. Furnish and install:
   a. (1) pre-assembled panel containing Network Controller, Data switch, and all necessary power supplies.
   b. (1) pre-assembled panel containing Unitary Controller and Power supply

CHRISTOPHER COLUMBUS SCHOOL-15

1. Remove Existing FTR pneumatic controls and cap lines.
2. Furnish labor to remove and reinstall a new steam valve at each FTR.
3. Furnish and install:
   a. (1) pre-assembled panel containing Network Controller, Data switch, and all necessary power supplies.
   b. (1) pre-assembled panel containing Unitary Controller and Power supply

ENERGY OPTIMIZATION

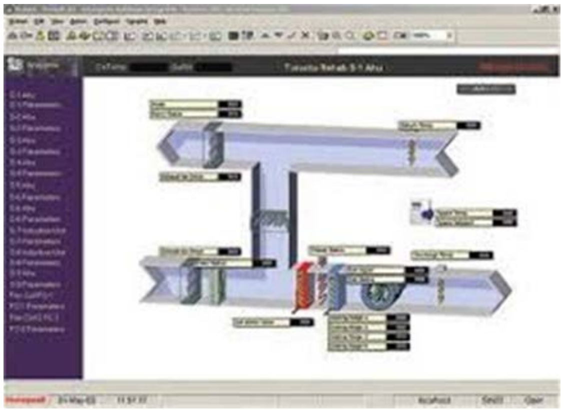
EXISTING CONDITIONS

HVAC Systems are the biggest consumer of energy in commercial facilities, and most rely on conservative 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.

SOLUTION

HONEYWELL FORGE closed-loop solution operates without the need for customer intervention by regularly analyzing real-time conditions data – weather and occupancy - with predictive, machine learning models that compute and adjust set points automatically over a facility's entire HVAC distribution system.

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



HVAC Equipment Control

HVAC Equipment Control

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

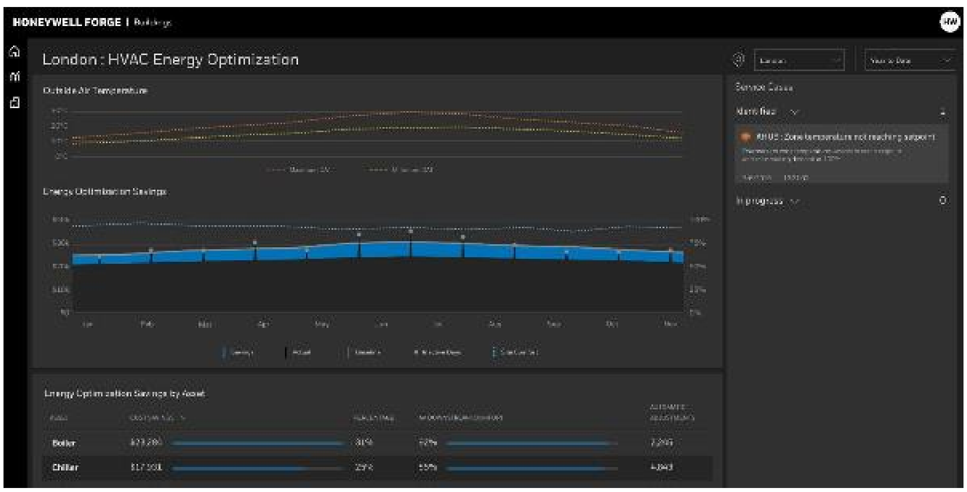
Advanced machine learning calculates occupancy and weather data to optimize set-points every 15-minutes.

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 SAVINGS METHODOLOGY AND RESULTS

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

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

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

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 4ABuilding 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.

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.

Building Envelope – Hamilton School 80

Building Envelope – Roberts Academy 30

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

ROOF-WALL JOINTS

Existing – Buildings throughout the 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 – We found that roof overhangs at exterior doors are open to the drop ceilings, providing a pathway allowing heated and cooled air to escape between the interior and exterior of the building.

Proposed – Honeywell proposes to install rigid foam boards and seal the perimeter and any penetrations with spray foam to prevent air leak and provide a sufficient thermal barrier between the spaces.
Windows

Existing - The operable windows in most of your buildings could present air leak issues that require weather stripping with fuzz or gasket type materials.

Proposed – Honeywell recommends installing weather stripping and door sweeps to prevent air leak.
Doors

Existing – Doors in this facility need full weather-stripping replacement and/or door sweeps.

Proposed – Honeywell recommends new weather stripping and door sweeps to be installed where needed.

BENEFITS

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

SCOPE OF WORK

Building	Attic Air Barrier Retrofit (SF)	Attic Bypass Air Sealing (LF)	Awning Window Weatherization (Units)	Buck Frame Air Sealing (LF)	Caulking (LF)
Abraham Lincoln School-14					
Albert Einstein Academy-29					2,215
Battin McAuliffe Middle School-4				112	30,174
Benjamin Franklin School-13					
Bollwage Academy of Finance-90					
Charles J. Hudson School-25				275	
Christopher Columbus School-15					
Donald Stewart ECE-51					
Dr. Antonia Pantoja School-27					2,312
Dr. Martin Luther King Jr. School-52				135	2,566
Duarte- Marti School-28					
Dwyer 9th Grade Annex-82A					
Dwyer-Halsey Academies-81					
Edison 9th Grade Academy-87A					68
Elmora School-12					
Francis Smith ECE-50					
Frank J. Cicarell Academy-89					
Halsey 9th Grade Academy-83A			16		338
Hamilton Prep Academy-80					
John Marshall School-20				29	
La Corte-Peterstown School-3				18	
Lafayette Middle School-6					12,840
Mabel G. Holmes School-5					
Madison-Monroe School-16					3,051
Nicholas Murray Butler School-23					
Orlando Edreira Academy-26				8	17
Robert Morris School-18					3,718
Ronald Reagan Academy-30					2,840
Terence C. Reilly School-7				180	31,005
Thomas A. Edison Academy-87					
Thomas Jefferson Arts Academy-84					
Victor Mravlag School-21	222	72		34	17
Washington/Dunn Academy-1				1,144	4,116
Winfield Scott School-2					
Woodrow Wilson School-19					
Total Quantity	**222**	**72**	**16**	**1,935**	**95,277**

Building	Caulking (Units)	Door - Install Jamb Spacer (Units)	Door Weather Striping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Overhang Air Sealing (LF)
Abraham Lincoln School-14			12	8	
Albert Einstein Academy-29		2	11	8	
Battin McAuliffe Middle School-4	80	1	9	13	
Benjamin Franklin School-13	16		7	1	
Bollwage Academy of Finance-90			2	33	
Charles J. Hudson School-25			4	14	167
Christopher Columbus School-15			5	8	
Donald Stewart ECE-51			8	13	
Dr. Antonia Pantoja School-27			12	7	
Dr. Martin Luther King Jr. School-52			9		
Duarte- Marti School-28	52		8	17	56
Dwyer 9th Grade Annex-82A			3	34	
Dwyer-Halsey Academies-81			15	135	
Edison 9th Grade Academy-87A			5	2	
Elmora School-12			7	8	
Francis Smith ECE-50				9	
Frank J. Cicarell Academy-89			15		
Halsey 9th Grade Academy-83A		1	4	9	
Hamilton Prep Academy-80			5	12	
John Marshall School-20			3	4	
La Corte-Peterstown School-3			8	9	69
Lafayette Middle School-6			8	15	
Mabel G. Holmes School-5			5	23	
Madison-Monroe School-16			2	29	
Nicholas Murray Butler School-23			12	8	
Orlando Edreira Academy-26			5	16	272
Robert Morris School-18	32		7	13	18
Ronald Reagan Academy-30			10	4	
Terence C. Reilly School-7			16	4	
Thomas A. Edison Academy-87			15	27	
Thomas Jefferson Arts Academy-84			15	9	
Victor Mravlag School-21			11	8	8
Washington/Dunn Academy-1	20		14	18	
Winfield Scott School-2			4	29	
Woodrow Wilson School-19			9	9	

Task	Overhang Air Sealing (SF)	Overhang Air Sealing (Units)	Penetration Air Sealing (Units)	Roof-Wall Intersection Air Sealing (LF)	Roof-Wall Intersection Air Sealing (SF)
Total Quantity	**200**	**4**	**285**	**556**	**590**
Abraham Lincoln School-14					
Albert Einstein Academy-29					
Battin McAuliffe Middle School-4	30			60	
Benjamin Franklin School-13			1	82	
Bollwage Academy of Finance-90					
Charles J. Hudson School-25				499	
Christopher Columbus School-15					
Donald Stewart ECE-51				45	
Dr. Antonia Pantoja School-27					
Dr. Martin Luther King Jr. School-52					
Duarte- Marti School-28				366	549
Dwyer 9th Grade Annex-82A	48			370	
Dwyer-Halsey Academies-81				3,002	
Edison 9th Grade Academy-87A					
Elmora School-12				186	
Francis Smith ECE-50				265	
Frank J. Cicarell Academy-89					
Halsey 9th Grade Academy-83A			1	388	

Hamilton Prep Academy-80					
John Marshall School-20					
La Corte-Peterstown School-3		4			
Lafayette Middle School-6				226	28
Mabel G. Holmes School-5					
Madison-Monroe School-16					
Nicholas Murray Butler School-23				640	
Orlando Edreira Academy-26	96				
Robert Morris School-18	16			144	
Ronald Reagan Academy-30				700	
Terence C. Reilly School-7					
Thomas A. Edison Academy-87				180	
Thomas Jefferson Arts Academy-84					
Victor Mravlag School-21	16			248	
Washington/Dunn Academy-1					
Winfield Scott School-2					
Woodrow Wilson School-19					
Total Quantity	**206**	**4**	**2**	**7,401**	**577**

Building	Wall Air Sealing (LF)	Wall Air Sealing (SF)	Install New Attic Hatch (Units)	Capital Improvement	Window Restoration (Units)
Abraham Lincoln School-14		431	1		
Albert Einstein Academy-29					
Battin McAuliffe Middle School-4					271
Benjamin Franklin School-13					
Bollwage Academy of Finance-90					
Charles J. Hudson School-25		497			
Christopher Columbus School-15					
Donald Stewart ECE-51					
Dr. Antonia Pantoja School-27					
Dr. Martin Luther King Jr. School-52	308				
Duarte- Marti School-28	538				
Dwyer 9th Grade Annex-82A		460			
Dwyer-Halsey Academies-81					
Edison 9th Grade Academy-87A					
Elmora School-12		344			
Francis Smith ECE-50					
Frank J. Cicarell Academy-89					
Halsey 9th Grade Academy-83A					
Hamilton Prep Academy-80					
John Marshall School-20					
La Corte-Peterstown School-3					
Lafayette Middle School-6					
Mabel G. Holmes School-5					
Madison-Monroe School-16					
Nicholas Murray Butler School-23					
Orlando Edreira Academy-26					
Robert Morris School-18	50				
Ronald Reagan Academy-30					
Terence C. Reilly School-7					
Thomas A. Edison Academy-87					334
Thomas Jefferson Arts Academy-84					
Victor Mravlag School-21					
Washington/Dunn Academy-1					
Winfield Scott School-2					
Woodrow Wilson School-19					
Total Quantity	**896**	**1,732**	**1**		**605**

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

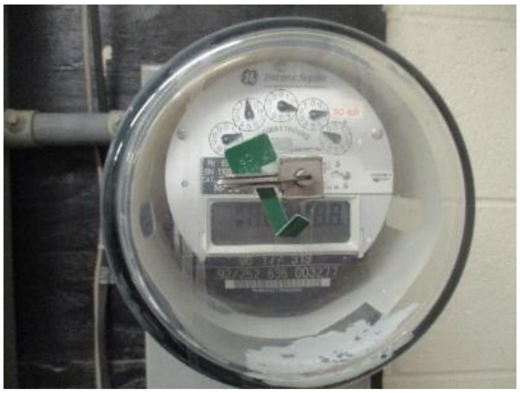
Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Some existing caulking and weather-stripping will be removed and disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 5A Real Time Metering

The key benefits of this ECM include:

- **Energy savings** from reducing energy loads during peak hours.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Revenue generation** from participation in the Real Time Metering program.

Honeywell proposed to facilitate the District's participation in an advanced Real-Time Metering (RTM) program so the District can see exactly what their energy consumption is at any point in time. The District will be able to view all real-time usage and costs through the EnerTrac dashboard by NuEnergen so it can make more informed energy management decisions.



Load Reduction Electric Meter

Load Reduction – Electric Meter

RTM HOW IT WORKS

By having a real-time meter installed on a school's utility line, NuEnergen is able to gather data every five minutes by any of the following means; a Local-Area-Network (LAN), a GSM Cell signal or through a Phone line. Usage data is stored in databases and reviewed in by a Network Operations Center (NOC). That same data is available to the District through an on-line EnerTrac Dashboard. The District will be able to run a myriad of reports, analyze current & historical usage patterns, review real-time costs and more.

Building	kW Increase w/ RTM (kW)
Washington/Dunn Academy-1	10
Battin McAuliffe Middle School-4	10
Terence C. Reilly School-7	15
Benjamin Franklin School-13	5
Abraham Lincoln School-14	5
Victor Mravlag School-21	5
Charles J. Hudson School-25	10
Dr. Antonia Pantoja School-27	10
Duarte- Marti School-28	15
Albert Einstein Academy-29	10
Ronald Reagan Academy-30	10
Francis Smith ECE-50	5
Donald Stewart ECE-51	10
Dr. Martin Luther King Jr. School-52	15
Halsey 9th Grade Academy-83A	0
Thomas Jefferson Arts Academy-84	0

Building	kW Increase w/ RTM (kW)
Frank J. Cicarell Academy-89	20
Bollwage Academy of Finance-90	5

Proposed RTM kW Increase

DATA COMMUNICATION METHODS

- LOCAL AREA NETWORK (LAN) You will need to provide a data line to the RTM that can access a public IP address. This is the preferred and least costly solution to communicate with our NOC.
- GSM CELL SIGNAL A cell line with a local carrier will be provisioned that sends District data to the NOC. There is an upgrade fee for the RTM and a small monthly GSM cell signal fee.
- PHONE LINE The District will need to provide a phone line to the RTM with a working number. There is an upgrade fee for the RTM and a small monthly ISP fee.

CHANGES IN INFRASTRUCTURE

A Demarcation Box will be required so the RTM can communicate with the utility meter. Honeywell/NuEnergen arranges with the local utility provider for the installation.

Utility will provide Interval Meter. Honeywell/NuEnergen will arrange with the local utility provider to install an Interval Meter and a Demarcation Box.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Initiation of meters will be required.

Environmental Issues

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

ECM 6A Combined Heat & Power (Cogeneration)

The key benefits of this ECM include:

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

EXISTING CONDITIONS

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

PROPOSED SOLUTION

Honeywell recommends the installation of one 35 kW CHP generating unit that will generate electric power and produce thermal energy that can supplement heating loads. This system will be appropriate to this site given the year-round operational needs of this facility and leverage healthy state rebates to help pay for it. Since the unit is a synchronous generator it does not require any excitation energy to produce electricity and therefore may be used for emergency back-up power.

YANMAR UNIT

Yanmar Low Emissions CHP Module takes the many benefits of modular cogeneration. Modules come fully pre-packaged from the factory, including engine, generator, oil/ jacket/ exhaust heat recovery, controls, electrical switchgear, emissions controls, and modem for remote monitoring and data-logging. This allows for standardization and minimizes installation cost and complexity in the field. Also, the comprehensive third-party (ETL/IEEE/NYSIR/UL) certifications provide streamlined interconnection permitting with the local electric utility and are NJDEP Air Permit Exempt.

SCOPE OF WORK

Building	Qty	Make	Model
Dwyer-Halsey Academies-81	1	Yanmar	CP-35
Washington/Dunn Academy-1	1	Yanmar	CP-35

Recommended Cogeneration Units

EQUIPMENT INFORMATION

Manufacturer and Type	Yanmar-CP35, Electrical Output 35 kW, Thermal Output 203,000 Btu/hr, or approved equal.
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.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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 7ATransformer 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.

EXISTING CONDITIONS

The transformers in locations within the electrical distribution systems in the District 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.

Transformer – Marti School 28

Transformer – Edreira School 26

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:

Building	Location	kVA	Qty
Benjamin Franklin School-13	Boiler	225.0	1
Donald Stewart ECE-51	Electric Rm 140	75.0	1
Donald Stewart ECE-51	Electric Rm 116	75.0	1
Donald Stewart ECE-51	Boiler Rm	112.5	1
Donald Stewart ECE-51	Boiler Rm	112.5	1
Dr. Antonia Pantoja School-27	B003	75.0	1

Building	Location	kVA	Qty
Dr. Antonia Pantoja School-27	B003	45.0	1
Dr. Martin Luther King Jr. School-52	Main Electric	112.5	1
Dr. Martin Luther King Jr. School-52	Electric 184	112.5	1
Dr. Martin Luther King Jr. School-52	Electric 184	75.0	1
Dr. Martin Luther King Jr. School-52	Electric Rm 147	75.0	1
Duarte- Marti School-28	Electric Rm by 115	150.0	1
Duarte- Marti School-28	Main Electric Rm 150	75.0	1
Duarte- Marti School-28	Electric Rm 207	75.0	1
Duarte- Marti School-28	Electric Rm 234	75.0	1
Duarte- Marti School-28	Main Electric Rm 150	45.0	1
Duarte- Marti School-28	Electric Rm 234	45.0	1
Duarte- Marti School-28	Electric Rm 320	45.0	1
Duarte- Marti School-28	Electric Rm 306	45.0	1
Duarte- Marti School-28	Electric Rm 133	45.0	1
Dwyer-Halsey Academies-81	Mech 106	112.5	1
Dwyer-Halsey Academies-81	Mech Rm 306	75.0	1
Dwyer-Halsey Academies-81	Loading Dock Mech Rm	75.0	1
Orlando Edreira Academy-26	Main Electric Rm 158B	150.0	1
Orlando Edreira Academy-26	Electric Rm 135	150.0	1
Orlando Edreira Academy-26	Electric Rm 101-B	112.5	1
Orlando Edreira Academy-26	Electric Rm 135	45.0	1
Orlando Edreira Academy-26	Gym 151	45.0	1
Orlando Edreira Academy-26	Electric Rm 237	45.0	1
Orlando Edreira Academy-26	Electric Rm 237	45.0	1
Orlando Edreira Academy-26	Electric Rm 237	45.0	1
Orlando Edreira Academy-26	Electric Rm 225	45.0	1
Orlando Edreira Academy-26	Stage Electric Rm 275	45.0	1
Orlando Edreira Academy-26	Electric 336	45.0	1
Orlando Edreira Academy-26	Electric 326	45.0	1
Robert Morris School-18	Boiler Rm	112.5	1
Robert Morris School-18	New Wing Electric	45.0	1
Chessie Dentley Roberts Academy-30	Main Electric 106	225.0	1
Chessie Dentley Roberts Academy-30	Main Electric 106	225.0	1
Chessie Dentley Roberts Academy-30	Main Electric 106	75.0	1
Terence C. Reilly School-7	Boiler Room	500.0	1
Thomas Jefferson Arts Academy-84	Main Electric	300.0	1
Thomas Jefferson Arts Academy-84	Main Electric	75.0	1
Thomas Jefferson Arts Academy-84	Mech 032	225.0	1
Thomas Jefferson Arts Academy-84	Mech 025	112.5	1
Washington/Dunn Academy-1	Boiler Rm	112.5	1

Building	Location	kVA	Qty
Washington/Dunn Academy-1	Boiler Rm	150.0	1
Washington/Dunn Academy-1	Boiler Rm	75.0	1
Washington/Dunn Academy-1	Boiler Rm	150.0	1
Woodrow Wilson School-19	New Addition by Cafe	150.0	1

Existing Transformers to be Replaced

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:

1. Shut off the main electric power to the transformer to be replaced.
2. Disconnect the existing transformer and install replacement unit.
3. Turn power back on.
4. Inspect unit operation by performing electrical and harmonics testing.
5. 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 transformers and parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 8A Ventilation Upgrades - Unit Ventilator/ make-up air

The key benefits of this ECM include:

- **Increase Ventilation** in the classroom
- **Reduced energy usage** from improved boiler efficiency resulting from replacement of older burner controls.
- **Lower operational costs** through less frequent maintenance and operational issues.

EXISTING CONDITIONS

Honeywell observed that the existing unit ventilators are beyond the useful life with many being inoperable or unrepairable.

Univent – Thomas A. Edison School - 87

Univent – Thomas A. Edison School - 87

Building	Type	Qty
Thomas A. Edison Academy-87	Steam	43
Mabel G. Holmes School-5	Steam	20
Benjamin Franklin School-13	Dual Temp	31
Lafayette Middle School-6	Dual Temp	88
Woodrow Wilson School-19	Steam	28
Christopher Columbus School-15	Steam	38
Abraham Lincoln School-14	Dual Temp	51
Terence C. Reilly School-7	Dual Temp	107
John Marshall School-20	Dual Temp	53
Robert Morris School-18	Steam	20
Madison-Monroe School-16	Hot Water	34
Hamilton Prep Academy-80	Steam	45
Battin McAuliffe Middle School-4	Dual Temp	131
Dwyer 9th Grade Annex-82A	Steam	26
Elmora School-12	Steam	46

Building	Type	Qty
Winfield Scott School-2	Steam	31

Existing Unit Ventilators to be Replaced

PROPOSED SOLUTION

Honeywell proposes to replace existing unit ventilators with new units. New units will be equipped with open protocol factory mounted controls which can be tied into existing BMS system and monitored for **Indoor Air Quality** conditions.

SCOPE OF WORK

The following outlines the unit ventilator replacements:

1. Disconnect electrical, water or steam from existing units.
2. Install new unitvents and reconnect water or steam and electric
3. Start up, commissioning and operator training.

EQUIPMENT INFORMATION

Manufacturer and Type	Several qualities 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.

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	Increase Fresh Air and IAQ.
Waste Production	Existing equipment 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 8B Ventilation Upgrades – Air Handling Units

The key benefits of this ECM include:

- **Increase Ventilation**
- **Energy savings** from increased equipment efficiency.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.

EXISTING CONDITIONS

Honeywell and the district have identified several schools where the Pool Air Handling Units (AHU) are not adequate to control humidity in the pool areas as well as provide the proper ventilation to the spaces. The evaporation rate is generally high due to the large pool surface area, elevated water temperature and bather activity. Air and water temperatures along with humidity are especially difficult to balance, and improper control usually results in an uncomfortable environment compounded by structural damage due to the corrosive chloromine-laden environment.

Pool Unit – Washington-Dunn - 1

Pool Unit – Dwyer-Halsey - 81

PROPOSED SOLUTION

Pool Units

Honeywell proposes installing high efficiency pool units to replace the existing AHUs to provide proper ventilation and humidity control inside the pool spaces. The evaporation rate is generally high due to the large pool surface area, elevated water temperature and bather activity.

Natatoriums require a large, high capacity dehumidification to control condensate formation from pool water evaporation. They require ventilation to meet safe building requirements, and the addition of colder outside air can increase heating costs during winter months or increase cooling/dehumidification costs during hot summer months.

Dehumidification systems for natatoriums need to be cost effective in heating both the pool water and air space. Operational costs are important due to the high cost of energy to heat and cool the facility, and performance and reliability are equally important to maximize return on investment and user satisfaction.

Honeywell proposes dehumidification equipment using both mechanical refrigeration and outside air. Mechanical refrigeration recycles the heat captured during dehumidification to heat the air or water while the outside air system effectively captures heat from the exhaust air stream.

Building	Make	Type	QTY	MBH
Dwyer-Halsey Academies-81	Desert Aire	SA24EG3WWWH	1	329
Washington/Dunn Academy-1	Desert Aire	SA24EG3WWWH	1	329

Proposed Pool Unit Systems

Air Handling Units

Honeywell proposes to replace existing AHUs to provide proper ventilation and temperatures control inside the classroom spaces.

Honeywell proposes air handling equipment using both mechanical refrigeration, hydronic heating and outside air and monitored for **Indoor Air Quality** conditions.

Building	Make	Type	QTY	MBH
Halsey 9th Grade Academy-83A	McQuay	3MB00205-00	1	1,104

Proposed AHU System

SCOPE OF WORK

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

1. Disconnect and Demo existing AHU Units
2. Rig and set new units
3. Connect electric power.
4. Start up and commissioning of new unit.
5. Maintenance operator(s) training.

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ECM 8CVentilation Upgrades NPBI / Ultraviolet Lighting

The key benefits of this ECM include:

- **Improve Air Quality** by inactivating infectious aerosols thereby mitigating the risk of airborne transmission of viral and bacterial pathogens.
- **Improved efficiency & energy savings** through reduction of outside air.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace equipment.

*Note - Schools 1 and 81 have NPBI already installed

There are many HVAC systems throughout the facilities which provide outside air for ventilation. Outside air is expensive to heat and cool but is required to meet indoor air quality requirements. The use of air cleaning equipment will permit the reduction of outside air while maintaining indoor air quality.

RTU – Abraham Lincoln - 14

AHU – Robert Morris - 18

Building	Location	Qty.	CFM
Winfield Scott School-2	HVAC	36	25,200
La Corte-Peterstown School-3	HVAC	44	29,500
Battin McAuliffe Middle School-4	HVAC	137	70,000
Mabel G. Holmes School-5	HVAC	70	38,000
Lafayette Middle School-6	HVAC	98	27,000
Terence C. Reilly School-7	HVAC	111	7,800
Elmora School-12	HVAC	49	5,200
Benjamin Franklin School-13	HVAC	32	14,000
Abraham Lincoln School-14	HVAC	63	19,200
Christopher Columbus School-15	HVAC	40	12,200
Madison-Monroe School-16	HVAC	35	8,000

Building	Location	Qty.	CFM
Robert Morris School-18	HVAC	28	54,000
Woodrow Wilson School-19	HVAC	31	18,000
John Marshall School-20	HVAC	54	6,000
Victor Mravlag School-21	HVAC	12	64,400
Nicholas Murray Butler School-23	HVAC	5	38,000
Sonia Sotomayor School-25	HVAC	13	4,000
Orlando Edreira Academy-26	HVAC	22	58,000
Dr. Antonia Pantoja School-27	HVAC	66	55,200
Duarte- Marti School-28	HVAC	14	104,900
Albert Einstein Academy-29	HVAC	26	227,000
Chessie Dentley Roberts Academy-30	HVAC	3	36,400
Francis Smith ECE-50	HVAC	13	68,000
Donald Stewart ECE-51	HVAC	5	16,000
Dr. Martin Luther King Jr. School-52	HVAC	5	17,000
Hamilton Prep Academy-80	HVAC	52	23,800
Dwyer 9th Grade Annex-82A	HVAC	33	21,000
Halsey 9th Grade Academy-83A	HVAC	22	55,800
Thomas Jefferson Arts Academy-84	HVAC	2	40,000
Thomas A. Edison Academy-87	HVAC	43	2,000
Edison 9th Grade Academy-87A	HVAC	5	10,000
Frank J. Cicarell Academy-89	HVAC	19	265,600
Bollwage Academy of Finance-90	HVAC	19	30,400

Existing Units to be Retrofitted with Cold Plasma Systems or Ultraviolet Systems

OVERVIEW

Ionization of air and the resultant reduction in volatile organic compounds permits application of the IAQ procedure in ASHRAE 62-2013, Ventilation for Acceptable Indoor Air Quality. The IAQ procedure allows for control of ventilation air based upon VOC concentration rather than the more conventional approach using CO_2 as the controlled parameter. The result is a significant reduction in outside air requirement for ventilation from 10 to 15 cfm per person to levels at 5 cfm per person or lower. Figure below shows the relationship in CO_2 concentration with the two (2) methods.

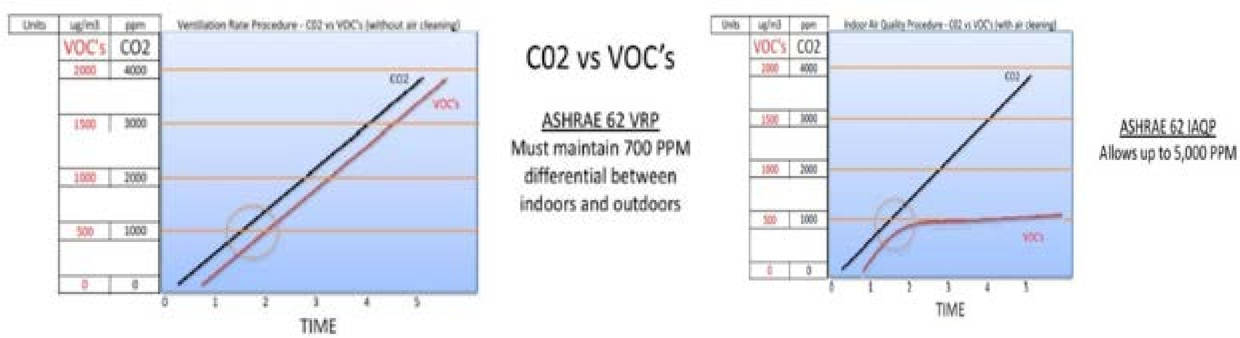


Figure VRP vs. IAQP CO_2 Concentrations

In addition to reduced outside air load on a building's HVAC systems, there are a number of other benefits resulting from improving the quality of the air circulating in a space. These are described in the following paragraphs. Note the ionization device is placed in the mixed air stream downstream of the filters for all types of air handling units. This ensures the ions produced mix with the total volume of air being circulated maximizing the benefit. Figure below graphically depicts the effect of ions on an air stream.

Cold Plasma Impact

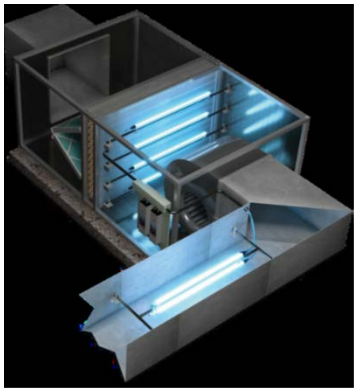
Kills Virus, Bacteria & Mold - In the Space - Similar to how positive and negative ions surround particles, they are also attracted to pathogens. When the ions combine on the surface of a pathogen, they rob the pathogen of the hydrogen necessary for them to survive. During the final step of deactivation, the ions eliminate hydrogen from the pathogen and then the plasma cleansing process is complete, making the airborne virus, bacteria or mold spore inactive.

Reduction in Airborne Particles - The positive and negative ions are drawn to airborne particles by their electrical charge. Once the ions attach to the particle, the particle grows larger by attracting nearby particles of the opposite polarity, thereby allowing low efficiency filters to capture very fine particles.

Odor Control - The ions produced by needlepoint ionization breaks down gases with electron-volt potential numbers below 12 to harmless compounds prevalent in the atmosphere such as oxygen, nitrogen, water vapor and carbon dioxide. The resultant compounds are a function of the entering contaminants into the plasma field. A simple example would be formaldehyde, which is produced by building furnishings and thought to be carcinogenic; formaldehyde breaks down to carbon dioxide and water vapor, thus eliminating the health hazard. Another example is ammonia, which is produced by occupants (typical body odor smell), and ammonia breaks down to oxygen, nitrogen and water vapor. As you can see, what chemical you start with determines how it reacts with the ionization field and how it breaks down.

Control Allergens - The positive and negative ions generated in the HVAC system flow free into the occupied space through the forced air system. Particles are reduced from the air and once this occurs and the deactivation of the airborne contaminants is complete, people with allergies have reported a reduction in symptoms and many have reported a reduction in required medication, or no medication required at all! Removing the “trigger” items from the air is what helps control allergies.

Ultra-Violet Lighting Technology



Overview

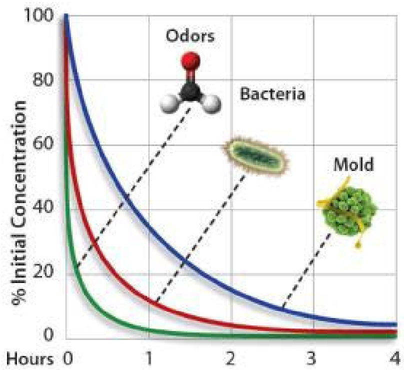
Ultraviolet (UV) lighting devices offer a wide range of health benefits when we install them in a buildings HVAC system. Honeywell recommends adding UV lighting to a buildings heating and cooling equipment. Absorptive Photo Catalytic Oxidation (APCO) is a combination of UVC (200-280 nm short wave UV) and activated carbon filtration used to maximize efficiency. Below are some benefits of UV lights in your duct system.

In addition to reduced outside air load on a building’s HVAC systems, there are a number of other benefits resulting from improving the quality of the air circulating in a space. These are described in the following paragraphs. Like plasma systems the UV lamp is placed in the mixed air stream downstream of the filters for all types of air handling units. This ensures the UV light interacts with the total volume of air being circulated maximizing the benefit. Figure below graphically depicts the effect of ions on an air stream.

1. Improved Airflow

UV lighting prevents microbial buildup on air filters, cooling coils, drain pans, and duct surfaces. The entire HVAC system will operate smoothly throughout the year. UV lighting reduces contaminants built up in a system’s ductwork; thus, the heat exchange and airflow are both dramatically improved. Improved airflow reduces a buildings energy use, enhances air quality, and reduces maintenance costs over the life a HVAC system.

APCO® % Reduction of Common Indoor Air Contaminants Over 4 Hours



Tested at airflow velocity of 492-fpm (0.93m3/sec), on a single pass.

2. Energy Efficiency

Implementing a UV light in a HVAC system can reduce energy consumption by up to 35 percent. UV lighting returns the heating and cooling system’s performance to optimal levels, reducing its power consumption, and helping it work like new. With the addition of UV lighting and regular maintenance, a system stays in excellent condition over a longer period of time.

3. Lower Cost Investment

UV installations are a cost-effective investment because they keep the system clean and less resources need for maintenance. Factors to consider:

- The size of the UV light the system requires
- The number of UV lights needed to install

- UV Light location
- The reflectivity of the surrounding surfaces
- A buildings temperature and humidity levels

4. Reducing Illnesses and Diseases

An HVAC system is designed to circulate air throughout the building. The downside is that it can also distribute a variety of airborne bacteria and viruses. UV lights help reduce disease transmission by destroying pathogens and other microorganisms that would usually thrive in an HVAC system. While placing filters in the system does an adequate job of blocking the dust and particles throughout the building, it does not prevent bacteria and germs from circulating. Making UV lights are a viable option.

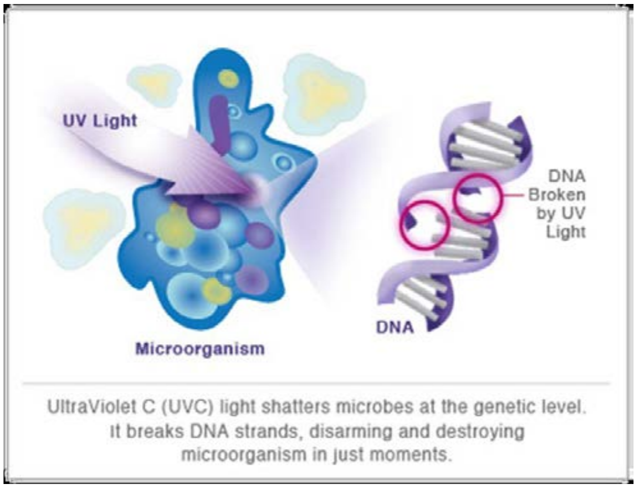


Figure – UVC Light Impact

Proposed Solution

For this application Honeywell intends to deploy a UVC technology to provide the air cleaning required to implement IAQP. UV Light introduced to the system will effectively scrub contaminants from the air stream. The technology also removes smoke, odors, and many pathogens. Over time, the operation of the system will clean cooling coils preventing the buildup of algae and other contaminants on the surface of the coil and fins.

EQUIPMENT INFORMATION

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ECM 8DVentilation Upgrades – Controls/IAQ Monitoring

The key benefits of this ECM include:

- **Increased Ventilation** thanks to better control and system wide visibility.
- **Reduction and Monitoring of Air quality Contaminates.**
- **Occupancy comfort and productivity** by way of enhanced temperature and humidity control throughout your buildings.

NPBI – Installed inTypical AHU Coil

NPBI and Controls – Installed in Classroom Unit Ventilator

SCOPE OF WORK

Building	Total GPS Units	Healthy Building Estimate (IAQ, GPS INSTALLTION & MONITORING & CONTROL)
Dwyer-Halsey Academies-81	0	**Y**
Washington/Dunn Academy-1	38	Y
Winfield Scott School-2	48	Y
La Corte-Peterstown School-3	143	Y
Battin McAuliffe Middle School-4	76	Y
Mabel G. Holmes School-5	104	Y
Lafayette Middle School-6	111	Y
Terence C. Reilly School-7	49	Y
Elmora School-12	33	Y
Benjamin Franklin School-13	67	Y
Abraham Lincoln School-14	42	Y

Building	Total GPS Units	Healthy Building Estimate (IAQ, GPS INSTALLTION & MONITORING & CONTROL)
Christopher Columbus School-15	36	Y
Madison-Monroe School-16	31	Y
Robert Morris School-18	34	Y
Woodrow Wilson School-19	55	Y
John Marshall School-20	24	Y
Victor Mravlag School-21	10	Y
Nicholas Murray Butler School-23	13	Y
Sonia Sotomayor School-25	43	Y
Orlando Edreira Academy-26	74	Y
Dr. Antonia Pantoja School-27	27	Y
Duarte- Marti School-28	50	Y
Albert Einstein Academy-29	6	Y
Chessie Dentley Roberts Academy-30	24	Y
Francis Smith ECE-50	10	Y
Donald Stewart ECE-51	10	Y
Dr. Martin Luther King Jr. School-52	55	Y
Hamilton Prep Academy-80		Y
Dwyer 9th Grade Annex-82A	36	Y
Halsey 9th Grade Academy-83A	44	Y
Thomas Jefferson Arts Academy-84	4	Y
Thomas A. Edison Academy-87	43	Y
Edison 9th Grade Academy-87A	10	Y
Frank J. Cicarell Academy-89	38	Y
Bollwage Academy of Finance-90		Y
Williams Field-98	19	Y

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 9ABuilding Modeling and Management

The key benefits of this ECM include:

- **Rebates** from whole building energy savings
- **Additional Work** completed due to additional cashflow from rebates.
- **Verification of Energy Savings** through building modeling and utility bill calibration.

EXISTING CONDITIONS

Commercial and industrial (C&I) sector building energy use represents approximately 40% of the total energy consumption in New Jersey. NJ Clean Energy along with their certified partners such as Honeywell will use **Energy and Building Modeling technologies** to maximize energy savings incentives to the City through The Pay for Performance Program (P4P) program which is aimed at reducing the consumption of this market sector by at least 15% across the State of New Jersey.

Example Building Modeling Software ***Buildng Energy Use Calibration***

PROPOSED SOLUTION

Honeywell will use its Energy and Building Modeling software and expertise to maximize NJ Clean Energy P4P incentives. Individual Models will be developed by building and by energy conservation measure to maximize the rebate incentive for inclusion in the overall project cash flow.

SCOPE OF WORK

1. **Submittal of Application Package** - Honeywell will download and complete the Application and Participation Agreement and submit the forms and required documentation according to the Instructions section of the application.
2. **Receive Approval Notice** - Program representatives will review your application package and if approved, will send a notice to proceed. A case manager will be assigned to the project.
3. **Development of Benchmarks and Goals** - Honeywell shall benchmark the qualified buildings, identify performance goals and create an energy reduction plan to achieve no less than 15% energy savings.
4. **Submission of Energy Reduction Plan** – Honeywell will submit your energy reduction plan, a complete benchmarking report and partner-participant contract with a request for Incentive #1 as defined in the participation agreement. When the energy reduction plan is approved, the City will receive Incentive #1.
5. **Implement Project** – Honeywell will manage the bidding process and will monitor construction to ensure that the appropriate steps are being taken to achieve the expected performance goals.
6. **Submit Request for Second Incentive** - Honeywell will submit a request for Incentive #2 along with the material and labor invoices when the project is complete. When approved, you will receive Incentive #2.
7. **Submit Request for Final Incentive** - Within approximately 12 months after the project is completed, Honeywell will re-benchmark the building and submit a request for Incentive #3 along with the post-construction benchmarking report. When the building performance goal is met, the city will receive Incentive #

PROPOSED P4P BUILDINGS:

Building	P4P Building
Washington/Dunn Academy-1	Y
Winfield Scott School-2	Y
La Corte-Peterstown School-3	Y
Battin McAuliffe Middle School-4	Y
Lafayette Middle School-6	Y
Terence C. Reilly School-7	Y
Abraham Lincoln School-14	Y
Victor Mravlag School - 21	Y
Nicholas Murray Butler School-23	Y
Sonia Sotomayor School-25	Y

Building		P4P Building
Orlando Edreira Academy-26		Y
Dr. Antonia Pantoja School-27		Y
Duarte- Marti School-28		Y
Albert Einstein Academy-29		Y
Chessie Dentley Roberts Academy-30		Y
Donald Stewart ECE-51		Y
Dr. Martin Luther King Jr. School-52		Y
Dwyer Halsey Acadamy - 81	Y	
Thomas Jefferson Arts Academy-84		Y
Thomas A. Edison Academy-87		Y
Frank Cicarell Academy - 89	Y	

ENERGY SAVINGS METHODOLOGY AND RESULTS

Annual savings is calculated through Building Modeling and Calibration with Existing Utility Bills.

EQUIPMENT INFORMATION

Manufacturer Type and 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

None

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Support will be required for utility Data and Site Access

ENVIRONMENTAL ISSUES

Resource Use	None
Waste Production	None.
Environmental Regulations	No environmental impact is expected.

SECTION D
TECHNICAL AND FINANCIAL SUMMARY

SECTION D — TECHNICAL AND FINANCIAL SUMMARY

1. Recommended ESIP Project

Recommended ESIP Project	
Value of Project	$42,584,107
Term of Repayment	19 Years
Projected Savings Over Term	$52,686,622
Projected NJ Rebates & Incentives	$3,693,066
Projected Interest Rate	2.4%

Recommended Project Technical and Financial Summary Documents

Form II: Energy Conservation Measures (ECMs) Summary Form
Form III: Projected Annual Energy Savings Data Form
Form IV: Projected Annual Energy Savings Data Form in MMBTUs
Form V: ESCOs Proposed Final Project Cost Form
Form VI: ESCOs Preliminary Annual Cash Flow Analysis Form

Building-by-Building Simple Payback Summary

A simple payback summary broken down by building by ECM has been provided for the Elizabeth Public Schools use in reviewing available scope combinations and options.

Building by Building Simple Payback Summary (Hard Costs Only)

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
ELIZABETH SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Installed Hard Costs (1) $	Estimated Annual Savings $	Estimated Simple Payback (years)
1A LED Lighting	$ 6,927,106	$ 1,877,914	3.69
1B Stadium Lighting	$ 478,563	$ 8,133	58.84
1C Vending Misers	$ 5,592	$ 708	7.90
1D De-Stratification Fans w/ UV	$ 565,486	$ 22,235	25.43
2A Boiler Replacements	$ 5,058,427	$ 115,088	43.95
2B Vacuum Tank Replacements	$ 1,013,667	$ 19,303	52.51
2E Rooftop Unit Replacement	$ 4,541,506	$ 102,087	44.49
2G Walk In Compressor Controls	$ 47,173	$ 2,678	17.61
2H Premium Efficiency Motors and VFDs	$ 265,143	$ 21,767	12.18
2I Split System Replacement	$ 1,620,145	$ 42,956	37.72
2J Chiller Replacements	$ 3,758,095	$ 172,117	21.83
2K Steam Traps	$ 321,705	$ 32,516	9.89
2M Cooling Tower Replacements	$ 1,147,733	$ 43,963	26.11
2N Pipe Insulation	$ 42,032	$ 4,977	8.45
3A Building Controls/Energy Optimization	$ 5,720,823	$ 319,079	17.93
4A Building Envelope Improvements	$ 772,632	$ 67,773	11.40
5A Real Time Metering	$ 70,940	$ 6,401	11.08
6A Cogeneration CHP	$ 300,294	$ 26,083	11.51
7A Transformer Replacement	$ 631,703	$ 43,149	14.64
9A Building Modeling and Management	$ 431,468	$ -	-
10A Design Allowance	$ 374,326	$ -	-
	$ -	$ -	-
Add additional lines as needed* **Project Summary:**	$ 34,094,561	$ 2,928,930	11.64

Optional ECMs Considered, but not included with base project at this time	Estimated Installed Hard Costs (1) $	Estimated Annual Savings $	Estimated Simple Payback (years)
2C Boiler Burner Controls	$ 788,221	$ 27,458	28.71
2D Domestic Hot Water Replacement	$ 129,009	$ 1,045	123.48
2F Kitchen Hood Controls	$ 405,371	$ 21,482	18.87
2L Addition of Cooling	$ 14,715,306	$ (61,082)	(240.91)
8A Ventilation Upgrades - Unit Ventilator/Make-Up Air	$ 13,732,976	$ -	-
8B Ventilation Upgrades - Air Handling Units	$ 2,356,473	$ -	-
8C Ventilation Upgrades - Plasma Ionization	$ 2,745,420	$ -	-
8D Ventilation Upgrades - Controls/IAQ Monitoring	$ 7,369,840	$ -	-

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

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

FORM III

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP)
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
ELIZABETH 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)	123,930	$458,856	32,148	$117,723
Electric Energy (KWH)	38,257,469	$5,514,355	13,227,326	$1,742,291
Natural Gas (therms)	1,560,197	$1,332,718	261,570	$218,316
Fuel Oil (Gal)	0	$0	0	$0
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	14,972			
SO2	29,232			
CO2	18,382,377			

(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
ELIZABETH 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)	130,534	45,132	
Natural Gas (MMBTUs)	156,020	26,157	
Fuel Oil (MMBTUs)	0	0	
Steam (MMBTUs)			
Other (Specify) (MMBTUs)			
Other (Specify)			

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

Form V: Recommended Project — ESCO's Proposal Project Cost Form

FORM V

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCOs PROPOSED FINAL PROJECT COST FORM FOR BASE CASE PROJECT
ELIZABETH SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **HONEYWELL INTERNATIONAL**

PROPOSED CONSTRUCTION FEES

Fee Category	Fees [1] Dollar ($) Value	Percentage of Hard Costs
Estimated Value of Hard Costs [2]:	$34,094,560.89	
Project Service Fees		
Investment Grade Energy Audit	$647,796.66	1.90%
Design Engineering Fees	$2,113,862.78	6.20%
Construction Management & Project Administration	$1,875,200.85	5.50%
System Commissioning	$340,945.61	1.00%
Equipment Initial Training Fees	$102,283.68	0.30%
ESCO Overhead	$2,386,619.26	7.00%
ESCO Profit	$1,022,836.83	3.00%
Project Service Fees Sub Total	$5,080,089.57	14.90%
TOTAL FINANCED PROJECT COSTS:	$42,584,106.55	24.90%
ESCO Termination Fee (To be paid only if the Board decides not to proceed beyond the ESP)	$0.00	0.00%

PROPOSED ANNUAL SERVICE FEES

First Year Annual Service Fees	Fees [1] Dollar ($) Value	Percentage of Hard Costs
SAVINGS GUARANTEE (OPTION)	$0.00	0.00%
Measurement and Verification (Associated w/ Savings Guarantee Option)	$145,000.00	Flat Fee
ENERGY STAR™ Services (optional)	Included	0.00%
Post Construction Services (If applicable)	N/A	-
Performance Monitoring	Included	-
On-going Training Services	N/A	-
Verification Reports	Included	-
TOTAL FIRST YEAR ANNUAL SERVICES	$145,000.00	Flat Fee

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

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

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Form VI: Recommended Project — ESCO's Preliminary Annual Cash Flow Analysis Form

FORM VI
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
ELIZABETH 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 assum **2.4%** gas, **2.2%** electric per year

1. Term of Agreement: **19** (Years) (Months)
2. Construction Period [2] (months): **18**
3. Cash Flow Analysis Format:

Form V Project Cost:	$	42,584,107
Direct Install State Contribution:	$	(778,318)
ESIP Contract Value:	$	41,805,789
ESSER Act Grant:	$	-
Professional Fees:	$	229,000
Lease Issuance Fees:	$	50,000
Total Project Cost [1]:	$	**42,084,789**

Interest Rate to Be Used for Proposal Purpos **2.4%**

Year	Annual Energy Savings	Annual Operational Savings	Energy Rebates/Incentives	Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs [3]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation (2)	$ 1,039,165			$ 1,039,165	$ (1,039,165)	$ (1,039,165)	$ -	$ 0	$ 0
1	$ 2,078,330	$ 850,599	$ 314,955	$ 3,243,885	$ (3,187,885)	$ (3,332,885)	$ (145,000)	$ 56,000	$ 56,000
2	$ 2,124,490	$ 850,599	$ 1,345,862	$ 4,320,951	$ (4,264,951)	$ (4,264,951)	$ -	$ 56,000	$ 112,000
3	$ 2,171,676	$ 491,918	$ 185,905	$ 2,849,499	$ (2,793,499)	$ (2,793,499)	$ -	$ 56,000	$ 168,000
4	$ 2,219,911	$ 491,918	$ -	$ 2,711,829	$ (2,655,829)	$ (2,655,829)	$ -	$ 56,000	$ 224,000
5	$ 2,269,218	$ 491,918	$ -	$ 2,761,136	$ (2,705,136)	$ (2,705,136)	$ -	$ 56,000	$ 280,000
6	$ 2,319,621		$ -	$ 2,319,621	$ (2,263,621)	$ (2,263,621)	$ -	$ 56,000	$ 336,000
7	$ 2,371,144		$ -	$ 2,371,144	$ (2,315,144)	$ (2,315,144)	$ -	$ 56,000	$ 392,000
8	$ 2,423,813		$ -	$ 2,423,813	$ (2,367,813)	$ (2,367,813)	$ -	$ 56,000	$ 448,000
9	$ 2,477,652		$ -	$ 2,477,652	$ (2,421,652)	$ (2,421,652)	$ -	$ 56,000	$ 504,000
10	$ 2,532,688		$ -	$ 2,532,688	$ (2,476,688)	$ (2,476,688)	$ -	$ 56,000	$ 560,000
11	$ 2,588,948		$ -	$ 2,588,948	$ (2,532,948)	$ (2,532,948)	$ -	$ 56,000	$ 616,000
12	$ 2,646,458		$ -	$ 2,646,458	$ (2,590,458)	$ (2,590,458)	$ -	$ 56,000	$ 672,000
13	$ 2,705,247		$ -	$ 2,705,247	$ (2,649,247)	$ (2,649,247)	$ -	$ 56,000	$ 728,000
14	$ 2,765,343		$ -	$ 2,765,343	$ (2,709,343)	$ (2,709,343)	$ -	$ 56,000	$ 784,000
15	$ 2,826,775		$ -	$ 2,826,775	$ (2,770,775)	$ (2,770,775)	$ -	$ 56,000	$ 840,000
16	$ 2,889,572		$ -	$ 2,889,572	$ (2,833,572)	$ (2,833,572)	$ -	$ 56,000	$ 896,000
17	$ 2,953,766		$ -	$ 2,953,766	$ (2,897,766)	$ (2,897,766)	$ -	$ 56,000	$ 952,000
18	$ 3,019,387		$ -	$ 3,019,387	$ (2,963,387)	$ (2,963,387)	$ -	$ 56,000	$ 1,008,000
19	$ 3,086,467		$ -	$ 3,086,467	$ (3,029,722)	$ (3,029,722)	$ -	$ 56,745	$ 1,064,745
Totals	$ 49,509,670	$ 3,176,952	$ 1,846,722	$ 54,533,344	$ (53,468,599)	$ (53,613,599)	$ (145,000)	$ 1,064,745	$ 1,064,745

Additional 3rd P4P Incentive	$	1,068,026
Total Cash Flow	$	2,132,771

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) P&I Payment to be made by ELIZABETH SCHOOLS (12) twelve months into 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.

***Annual Service only applies if customer accepts energy guarantee.**

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.

ECM Paybacks by Building

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Abraham Lincoln School-14	**$ 48,908**	**$ 3,368**	**$ 7,855**	**$ -**	**$ -**	**$ 86,891**	**$ 26,760**	**$ 883,927**	**7.8**
1A LED Lighting	$ 40,971	$ 3,139	$ (1,692)	$ -	$ -	$ 56,312	$ 13,893	$ 165,021	2.4
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (75)	$ -	$ 823	$ -	$ -	$ 748	$ -	$ 15,378	20.6
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 1,941	$ -	$ -	$ -	$ -	$ 6,496	$ 4,555	$ 220,057	19.9
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 5,696	$ -	$ 7,280	$ -	$ -	$ 21,289	$ 8,313	$ 440,446	14.9
4A Building Envelope Improvements	$ 375	$ -	$ 1,443	$ -	$ -	$ 1,818	$ -	$ 17,329	9.5
5A Real Time Metering	$ -	$ 229	$ -	$ -	$ -	$ 229	$ -	$ 3,941	17.2
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 21,755	-
Albert Einstein Academy-29	**$ 89,489**	**$ 5,571**	**$ (274)**	**$ -**	**$ -**	**$ 114,832**	**$ 20,046**	**$ 1,635,643**	**12.1**
1A LED Lighting	$ 82,316	$ 5,122	$ (3,010)	$ -	$ -	$ 103,974	$ 19,546	$ 330,107	2.7
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (124)	$ -	$ 1,668	$ -	$ -	$ 1,544	$ -	$ 47,413	30.7
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 5,814	$ -	$ -	$ -	$ -	$ 5,814	$ -	$ 1,193,388	205.3
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ 1,199	$ (2)	$ -	$ -	$ -	$ 1,696	$ 500	$ 19,401	8.8
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 285	$ -	$ 1,068	$ -	$ -	$ 1,353	$ -	$ 14,368	10.6
5A Real Time Metering	$ -	$ 450	$ -	$ -	$ -	$ 450	$ -	$ 3,941	8.8
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,025	-
Battin McAuliffe Middle School-4	**$ 68,027**	**$ 5,250**	**$ 24,752**	**$ -**	**$ -**	**$ 168,193**	**$ 70,163**	**$ 3,201,400**	**13.4**
1A LED Lighting	$ 34,638	$ 4,804	$ (2,001)	$ -	$ -	$ 59,811	$ 22,370	$ 333,195	4.1
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ 7,150	$ -	$ -	$ 23,788	$ 16,638	$ 1,013,428	25.1
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ 2,855	$ (4)	$ -	$ -	$ -	$ 3,351	$ 500	$ 51,735	13.4
2I Split System Replacement	$ 1,433	$ -	$ -	$ -	$ -	$ 6,851	$ 5,419	$ 293,186	23.9
2J Chiller Replacements	$ 14,650	$ -	$ -	$ -	$ -	$ 28,823	$ 14,173	$ 750,981	17.5
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 12,480	$ -	$ 10,877	$ -	$ -	$ 34,421	$ 11,064	$ 612,882	13.5
4A Building Envelope Improvements	$ 1,971	$ -	$ 8,726	$ -	$ -	$ 10,697	$ -	$ 105,213	9.8
5A Real Time Metering	$ -	$ 451	$ -	$ -	$ -	$ 451	$ -	$ 3,941	8.7
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Benjamin Franklin School-13	**$ 23,845**	**$ 927**	**$ 7,845**	**$ -**	**$ -**	**$ 53,519**	**$ 20,902**	**$ 717,854**	**9.6**
1A LED Lighting	$ 9,331	$ 630	$ (381)	$ -	$ -	$ 15,136	$ 5,556	$ 40,181	1.9
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (39)	$ -	$ 501	$ -	$ -	$ 462	$ -	$ 7,312	15.8
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 359	$ -	$ -	$ -	$ -	$ 359	$ -	$ 1,548	4.3
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 201	$ -	$ -	$ 201	$ -	$ 3,390	16.9
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ 2,580	$ -	$ -	$ 2,580	$ -	$ 21,790	8.4
5A Real Time Metering	$ -	$ 226	$ -	$ -	$ -	$ 226	$ -	$ 3,941	17.4
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Bollwage Academy of Finance-90	**$ 10,254**	**$ 1,049**	**$ 53**	**$ -**	**$ -**	**$ 16,832**	**$ 5,476**	**$ 56,950**	**2.6**
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 111	$ -	$ -	$ -	$ -	$ 111	$ -	$ 1,548	14.0
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 137	$ -	$ 545	$ -	$ -	$ 681	$ -	$ 8,032	11.8
5A Real Time Metering	$ -	$ 262	$ -	$ -	$ -	$ 262	$ -	$ 3,941	15.0
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Chessie Dentley Roberts Academy-30	**$ 69,540**	**$ 5,624**	**$ 1,344**	**$ -**	**$ -**	**$ 96,654**	**$ 20,146**	**$ 488,830**	**4.2**
1A LED Lighting	$ 67,322	$ 5,551	$ (3,312)	$ -	$ -	$ 89,707	$ 20,146	$ 330,004	3.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (234)	$ -	$ 1,342	$ -	$ -	$ 1,108	$ -	$ 34,810	31.4
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 1,058	$ -	$ -	$ 1,058	$ -	$ 19,208	18.2
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 581	$ -	$ 2,257	$ -	$ -	$ 2,838	$ -	$ 36,728	12.9
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,941	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 1,870	$ 73	$ -	$ -	$ -	$ 1,943	$ -	$ 37,159	19.1
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,980	-
Christopher Columbus School-15	**$ 14,684**	**$ 1,431**	**$ 12,367**	**$ -**	**$ -**	**$ 43,922**	**$ 15,440**	**$ 438,281**	**7.4**
1A LED Lighting	$ 11,368	$ 1,431	$ (518)	$ -	$ -	$ 21,612	$ 9,331	$ 52,821	1.7
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (77)	$ -	$ 704	$ -	$ -	$ 627	$ -	$ 14,624	23.3
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 101	$ -	$ -	$ -	$ -	$ 101	$ -	$ 774	7.7
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 7,152	$ -	$ -	$ 7,152	$ -	$ 63,023	8.8
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 3,170	$ -	$ 4,608	$ -	$ -	$ 13,887	$ 6,109	$ 302,309	15.1
4A Building Envelope Improvements	$ 122	$ -	$ 420	$ -	$ -	$ 543	$ -	$ 4,730	8.7
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Donald Stewart ECE-51	**$ 38,233**	**$ 3,217**	**$ 71**	**$ -**	**$ -**	**$ 51,092**	**$ 9,571**	**$ 252,923**	**4.2**
1A LED Lighting	$ 33,850	$ 2,601	$ (1,141)	$ -	$ -	$ 44,881	$ 9,571	$ 144,749	2.7
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (93)	$ -	$ 757	$ -	$ -	$ 664	$ -	$ 35,806	53.9
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 140	$ -	$ 455	$ -	$ -	$ 595	$ -	$ 6,689	11.2
5A Real Time Metering	$ -	$ 453	$ -	$ -	$ -	$ 453	$ -	$ 3,941	8.7
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 4,336	$ 162	$ -	$ -	$ -	$ 4,498	$ -	$ 49,545	11.0
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,193	-
Dr. Antonia Pantoja School-27	**$ 61,234**	**$ 5,684**	**$ 307**	**$ -**	**$ -**	**$ 87,722**	**$ 20,498**	**$ 640,432**	**5.9**
1A LED Lighting	$ 56,768	$ 5,171	$ (2,626)	$ -	$ -	$ 77,683	$ 18,370	$ 336,429	3.5
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (195)	$ -	$ 2,165	$ -	$ -	$ 1,970	$ -	$ 50,430	25.6
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ 2,993	$ -	$ -	$ -	$ -	$ 5,121	$ 2,128	$ 183,261	25.3
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 171	$ -	$ 767	$ -	$ -	$ 938	$ -	$ 14,843	15.8
5A Real Time Metering	$ -	$ 453	$ -	$ -	$ -	$ 453	$ -	$ 3,941	8.7
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 1,497	$ 60	$ -	$ -	$ -	$ 1,556	$ -	$ 24,773	15.9
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,756	-
Dr. Martin Luther King Jr. School-52	**$ 41,781**	**$ 3,342**	**$ 223**	**$ -**	**$ -**	**$ 56,314**	**$ 10,968**	**$ 343,753**	**5.1**
1A LED Lighting	$ 37,298	$ 2,503	$ (1,839)	$ -	$ -	$ 48,930	$ 10,968	$ 241,768	4.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (76)	$ -	$ 1,098	$ -	$ -	$ 1,022	$ -	$ 21,936	21.5
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 202	$ -	$ 964	$ -	$ -	$ 1,166	$ -	$ 13,308	11.4
5A Real Time Metering	$ -	$ 677	$ -	$ -	$ -	$ 677	$ -	$ 3,941	5.8
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 4,357	$ 162	$ -	$ -	$ -	$ 4,519	$ -	$ 49,545	11.0
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 13,255	-
Duarte- Marti School-28	**$ 108,084**	**$ 6,690**	**$ (524)**	**$ -**	**$ -**	**$ 133,751**	**$ 19,501**	**$ 591,128**	**3.9**
1A LED Lighting	$ 94,761	$ 5,684	$ (4,001)	$ -	$ -	$ 114,945	$ 18,501	$ 326,718	2.4
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (201)	$ -	$ 1,465	$ -	$ -	$ 1,264	$ -	$ 45,867	36.3
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ 6,195	$ 39	$ -	$ -	$ -	$ 7,233	$ 1,000	$ 51,735	6.3
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 493	$ -	$ 2,013	$ -	$ -	$ 2,505	$ -	$ 24,471	9.8
5A Real Time Metering	$ -	$ 678	$ -	$ -	$ -	$ 678	$ -	$ 3,941	5.8
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 6,837	$ 289	$ -	$ -	$ -	$ 7,126	$ -	$ 111,477	15.6
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,919	-
Dwyer 9th Grade Annex-82A	**$ 16,456**	**$ 1,771**	**$ 1,137**	**$ -**	**$ -**	**$ 30,609**	**$ 11,245**	**$ 506,056**	**12.1**
1A LED Lighting	$ 12,944	$ 1,771	$ (528)	$ -	$ -	$ 20,269	$ 6,083	$ 56,203	2.1
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 2,936	$ -	$ -	$ -	$ -	$ 8,099	$ 5,162	$ 421,299	31.8
2G Walk In Compressor Controls	$ 103	$ -	$ -	$ -	$ -	$ 103	$ -	$ 6,998	68.2
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 473	$ -	$ 1,666	$ -	$ -	$ 2,139	$ -	$ 21,555	10.1
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Dwyer-Halsey Academies-81	**$ 189,260**	**$ 6,544**	**$ (427)**	**$ -**	**$ -**	**$ 259,468**	**$ 64,091**	**$ 1,827,018**	**5.6**
1A LED Lighting	$ 165,688	$ 6,473	$ (7,568)	$ -	$ -	$ 220,938	$ 56,345	$ 1,018,977	3.7
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (32)	$ -	$ 374	$ -	$ -	$ 342	$ -	$ 14,624	42.7
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ 18,049	$ -	$ -	$ -	$ -	$ 25,795	$ 7,746	$ 667,262	19.9
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 1,933	$ -	$ 6,767	$ -	$ -	$ 8,699	$ -	$ 76,610	8.8
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 3,622	$ 70	$ -	$ -	$ -	$ 3,693	$ -	$ 49,545	13.4
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Edison 9th Grade Academy-87A	**$ 6,112**	**$ 557**	**$ 111**	**$ -**	**$ -**	**$ 10,783**	**$ 4,003**	**$ 33,488**	**2.3**
1A LED Lighting	$ 5,918	$ 557	$ (235)	$ -	$ -	$ 10,243	$ 4,003	$ 26,515	1.9
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 96	$ -	$ -	$ -	$ -	$ 96	$ -	$ 3,010	31.5
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 98	$ -	$ 346	$ -	$ -	$ 444	$ -	$ 3,963	8.9
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Elmora School-12	**$ 13,431**	**$ 1,670**	**$ (52)**	**$ -**	**$ -**	**$ 27,447**	**$ 12,397**	**$ 183,273**	**4.6**
1A LED Lighting	$ 12,286	$ 1,670	$ (559)	$ -	$ -	$ 22,551	$ 9,154	$ 60,001	1.9
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 901	$ -	$ -	$ -	$ -	$ 4,144	$ 3,243	$ 107,065	14.5
2G Walk In Compressor Controls	$ 99	$ -	$ -	$ -	$ -	$ 99	$ -	$ 5,328	54.0
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 146	$ -	$ 507	$ -	$ -	$ 653	$ -	$ 10,879	16.7
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Francis Smith ECE-50	**$ 18,048**	**$ 787**	**$ 2,217**	**$ -**	**$ -**	**$ 39,332**	**$ 18,280**	**$ 644,835**	**11.2**
1A LED Lighting	$ 8,643	$ 562	$ (295)	$ -	$ -	$ 15,841	$ 6,931	$ 46,667	2.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (37)	$ -	$ 723	$ -	$ -	$ 685	$ -	$ 13,870	20.2
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 3,582	$ -	$ -	$ -	$ -	$ 8,335	$ 4,753	$ 237,114	18.1
2G Walk In Compressor Controls	$ 352	$ -	$ -	$ -	$ -	$ 352	$ -	$ 1,548	4.4
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 5,328	$ -	$ 1,274	$ -	$ -	$ 13,198	$ 6,597	$ 332,886	16.8
4A Building Envelope Improvements	$ 180	$ -	$ 515	$ -	$ -	$ 695	$ -	$ 8,809	12.7
5A Real Time Metering	$ -	$ 225	$ -	$ -	$ -	$ 225	$ -	$ 3,941	17.5
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Frank J. Cicarell Academy-89	**$ 84,180**	**$ 7,358**	**$ (2,586)**	**$ -**	**$ -**	**$ 116,346**	**$ 27,394**	**$ 524,779**	**3.7**
1A LED Lighting	$ 84,247	$ 6,454	$ (5,496)	$ -	$ -	$ 112,600	$ 27,394	$ 475,766	3.4
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (188)	$ -	$ 2,198	$ -	$ -	$ 2,010	$ -	$ 36,560	18.2
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
4A Building Envelope Improvements	$ 121	$ -	$ 711	$ -	$ -	$ 833	$ -	$ 8,512	10.2
5A Real Time Metering	$ -	$ 904	$ -	$ -	$ -	$ 904	$ -	$ 3,941	4.4
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Halsey 9th Grade Academy-83A	**$ 5,516**	**$ 409**	**$ 968**	**$ -**	**$ -**	**$ 9,841**	**$ 2,948**	**$ 44,035**	**3.4**
1A LED Lighting	$ 5,128	$ 409	$ (261)	$ -	$ -	$ 8,224	$ 2,948	$ 24,180	2.2
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 108	$ -	$ -	$ -	$ -	$ 108	$ -	$ 774	7.2
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 280	$ -	$ 1,229	$ -	$ -	$ 1,509	$ -	$ 15,139	10.0
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,941	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Hamilton Prep Academy-80	**$ 20,288**	**$ 1,837**	**$ 3,635**	**$ -**	**$ -**	**$ 28,750**	**$ 2,990**	**$ 220,610**	**7.0**
1A LED Lighting	$ 19,565	$ 1,837	$ (714)	$ -	$ -	$ 23,679	$ 2,990	$ 162,926	6.1
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ 303	$ -	$ -	$ -	$ -	$ 303	$ -	$ 2,779	9.2
1D De-Stratification Fans w/ UV	$ (78)	$ -	$ 922	$ -	$ -	$ 845	$ -	$ 14,624	17.3
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 355	$ -	$ -	$ -	$ -	$ 355	$ -	$ 1,548	4.4
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 2,980	$ -	$ -	$ 2,980	$ -	$ 33,643	11.3
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 142	$ -	$ 447	$ -	$ -	$ 588	$ -	$ 5,089	8.7
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
John Marshall School-20	**$ 16,171**	**$ 888**	**$ 7,283**	**$ -**	**$ -**	**$ 44,757**	**$ 20,415**	**$ 992,291**	**15.2**
1A LED Lighting	$ 10,082	$ 888	$ (520)	$ -	$ -	$ 15,417	$ 4,967	$ 41,001	2.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (84)	$ -	$ 709	$ -	$ -	$ 625	$ -	$ 14,624	23.4
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ 877	$ -	$ -	$ 2,558	$ 1,681	$ 144,810	34.2
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ 6,093	$ -	$ -	$ -	$ -	$ 19,860	$ 13,766	$ 744,873	22.2
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 5,897	$ -	$ -	$ 5,897	$ -	$ 43,157	7.3
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 80	$ -	$ 319	$ -	$ -	$ 400	$ -	$ 3,826	9.6
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
La Corte-Peterstown School-3	**$ 17,334**	**$ 2,358**	**$ -**	**$ -**	**$ -**	**$ 28,699**	**$ 9,007**	**$ 168,737**	**4.5**
1A LED Lighting	$ 17,250	$ 2,358	$ -	$ -	$ -	$ 28,615	$ 9,007	$ 131,866	3.5
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (40)	$ -	$ -	$ -	$ -	$ (40)	$ -	$ 11,345	(285.4)
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 124	$ -	$ -	$ -	$ -	$ 124	$ -	$ 8,095	65.2
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,431	-
Lafayette Middle School-6	$ 23,229	$ 1,887	$ 4,816	$ -	$ -	$ 50,277	$ 20,344	$ 320,788	4.5
1A LED Lighting	$ 21,419	$ 1,887	$ (1,015)	$ -	$ -	$ 39,338	$ 17,047	$ 134,447	2.4
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 993	$ -	$ -	$ -	$ -	$ 4,290	$ 3,297	$ 111,763	14.7
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ 2,397	$ -	$ -	$ 2,397	$ -	$ 20,243	8.4
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 818	$ -	$ 3,434	$ -	$ -	$ 4,252	$ -	$ 54,335	12.8
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Mabel G. Holmes School-5	$ 21,569	$ 1,549	$ 13,783	$ -	$ -	$ 69,297	$ 32,396	$ 1,406,941	13.8
1A LED Lighting	$ 18,276	$ 1,549	$ (1,069)	$ -	$ -	$ 32,447	$ 13,691	$ 116,465	2.5
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ 11,077	$ -	$ -	$ 21,466	$ 10,389	$ 735,964	23.1
2B Vacuum Tank Replacements	$ -	$ -	$ 2,892	$ -	$ -	$ 6,255	$ 3,362	$ 289,619	30.1
2E Rooftop Unit Replacement	$ 2,881	$ -	$ -	$ -	$ -	$ 7,835	$ 4,954	$ 254,456	19.9
2G Walk In Compressor Controls	$ 216	$ -	$ -	$ -	$ -	$ 216	$ -	$ 2,322	10.7
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 195	$ -	$ 883	$ -	$ -	$ 1,078	$ -	$ 8,115	7.5
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Madison-Monroe School-16	$ 20,798	$ 852	$ 7,724	$ -	$ -	$ 41,445	$ 12,072	$ 781,999	14.6
1A LED Lighting	$ 8,755	$ 852	$ (588)	$ -	$ -	$ 14,406	$ 5,387	$ 39,030	2.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (38)	$ -	$ 1,289	$ -	$ -	$ 1,251	$ -	$ 8,066	6.4
2A Boiler Replacements	$ -	$ -	$ 1,894	$ -	$ -	$ 1,894	$ -	$ 374,296	197.7
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ 100	$ -	$ -	$ -	$ -	$ 100	$ -	$ 774	7.7
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 242	$ -	$ -	$ 242	$ -	$ 2,260	9.3
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 11,642	$ -	$ 3,146	$ -	$ -	$ 21,473	$ 6,685	$ 338,399	12.0
4A Building Envelope Improvements	$ 338	$ -	$ 1,741	$ -	$ -	$ 2,079	$ -	$ 19,174	9.2
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Nicholas Murray Butler School-23	$ 40,341	$ 2,519	$ 9,155	$ -	$ -	$ 79,292	$ 27,276	$ 1,086,515	10.2
1A LED Lighting	$ 27,769	$ 2,519	$ (1,191)	$ -	$ -	$ 40,264	$ 11,167	$ 157,121	3.1
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (81)	$ -	$ 1,001	$ -	$ -	$ 920	$ -	$ 32,527	35.4
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ 7,774	$ -	$ -	$ -	$ -	$ 14,943	$ 7,169	$ 382,591	17.3
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 4,392	$ -	$ 7,433	$ -	$ -	$ 20,765	$ 8,940	$ 479,769	16.2
4A Building Envelope Improvements	$ 486	$ -	$ 1,913	$ -	$ -	$ 2,399	$ -	$ 18,742	7.8
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,764	-
Orlando Edreira Academy-26	$ 118,041	$ 7,324	$ 682	$ -	$ -	$ 157,195	$ 31,148	$ 1,522,510	8.1

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
1A LED Lighting	$ 82,011	$ 6,890	$ (4,129)	$ -	$ -	$ 100,747	$ 15,975	$ 442,446	3.8
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (224)	$ -	$ 1,842	$ -	$ -	$ 1,618	$ -	$ 48,659	30.1
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ 3,746	$ (3)	$ -	$ -	$ -	$ 4,743	$ 1,000	$ 64,669	11.3
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ 22,900	$ -	$ -	$ -	$ -	$ 37,073	$ 14,173	$ 750,981	14.7
2K Steam Traps	$ -	$ -	$ 1,853	$ -	$ -	$ 1,853	$ -	$ 28,247	15.2
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 253	$ -	$ 1,117	$ -	$ -	$ 1,370	$ -	$ 11,172	8.2
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 9,354	$ 438	$ -	$ -	$ -	$ 9,792	$ -	$ 148,636	15.2
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,700	-
Robert Morris School-18	**$ 39,362**	**$ 1,175**	**$ 10,843**	**$ -**	**$ -**	**$ 100,404**	**$ 49,025**	**$ 2,542,409**	**17.0**
1A LED Lighting	$ 16,835	$ 1,126	$ (820)	$ -	$ -	$ 25,151	$ 8,010	$ 65,662	2.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (186)	$ -	$ 1,430	$ -	$ -	$ 1,244	$ -	$ 28,188	22.7
2A Boiler Replacements	$ -	$ -	$ 1,996	$ -	$ -	$ 8,263	$ 6,266	$ 374,296	25.8
2B Vacuum Tank Replacements	$ -	$ -	$ 490	$ -	$ -	$ 2,171	$ 1,681	$ 144,810	37.6
2E Rooftop Unit Replacement	$ 9,759	$ -	$ -	$ -	$ -	$ 25,689	$ 15,930	$ 941,525	22.6
2G Walk In Compressor Controls	$ 351	$ -	$ -	$ -	$ -	$ 351	$ -	$ 12,494	35.6
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ 5,092	$ -	$ -	$ -	$ -	$ 15,850	$ 10,758	$ 582,086	21.9
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 3,283	$ -	$ -	$ 3,283	$ -	$ 27,812	8.5
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 6,055	$ -	$ 3,931	$ -	$ -	$ 16,364	$ 6,379	$ 319,221	14.0
4A Building Envelope Improvements	$ 143	$ -	$ 532	$ -	$ -	$ 675	$ -	$ 21,544	31.9
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 1,314	$ 49	$ -	$ -	$ -	$ 1,363	$ -	$ 24,773	18.2
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Sonia Sotomayor School-25	**$ 44,829**	**$ 2,384**	**$ 5,111**	**$ -**	**$ -**	**$ 72,172**	**$ 19,848**	**$ 635,550**	**6.9**
1A LED Lighting	$ 30,914	$ 2,384	$ (1,158)	$ -	$ -	$ 43,353	$ 11,213	$ 143,634	2.6
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (74)	$ -	$ 697	$ -	$ -	$ 623	$ -	$ 14,624	23.5
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 1,010	$ -	$ -	$ -	$ -	$ 3,321	$ 2,312	$ 112,980	20.1
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 12,695	$ -	$ 4,642	$ -	$ -	$ 23,661	$ 6,323	$ 315,722	10.5
4A Building Envelope Improvements	$ 285	$ -	$ 929	$ -	$ -	$ 1,214	$ -	$ 29,539	24.3
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,941	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,110	-
Terence C. Reilly School-7	**$ 100,536**	**$ 6,222**	**$ 14,244**	**$ -**	**$ -**	**$ 175,512**	**$ 54,509**	**$ 1,912,781**	**8.3**
1A LED Lighting	$ 73,887	$ 5,510	$ (4,076)	$ -	$ -	$ 102,297	$ 26,976	$ 334,032	2.6
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (73)	$ -	$ 1,477	$ -	$ -	$ 1,404	$ -	$ 16,132	11.5
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 562	$ -	$ -	$ -	$ -	$ 3,300	$ 2,737	$ 63,516	10.5
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ 20,392	$ -	$ -	$ -	$ -	$ 34,565	$ 14,173	$ 750,981	15.4
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 4,941	$ -	$ 15,880	$ -	$ -	$ 31,444	$ 10,623	$ 585,236	13.9
4A Building Envelope Improvements	$ 201	$ -	$ 964	$ -	$ -	$ 1,165	$ -	$ 103,985	89.3
5A Real Time Metering	$ -	$ 687	$ -	$ -	$ -	$ 687	$ -	$ 3,941	5.7
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 626	$ 25	$ -	$ -	$ -	$ 651	$ -	$ 12,386	19.0
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 42,571	-
Thomas A. Edison Academy-87	**$ 52,290**	**$ 5,265**	**$ 33,085**	**$ -**	**$ -**	**$ 121,659**	**$ 31,019**	**$ 905,923**	**5.9**
1A LED Lighting	$ 48,138	$ 5,265	$ (2,168)	$ -	$ -	$ 73,005	$ 21,771	$ 267,304	2.8
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 8,880	$ -	$ -	$ 8,880	$ -	$ 92,510	10.4
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 2,765	$ -	$ 21,443	$ -	$ -	$ 33,455	$ 9,248	$ 499,049	11.7
4A Building Envelope Improvements	$ 1,387	$ -	$ 4,931	$ -	$ -	$ 6,318	$ -	$ 16,334	2.6
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 30,727	-
Thomas Jefferson Arts Academy-84	**$ 67,896**	**$ 5,272**	**$ 15,652**	**$ -**	**$ -**	**$ 121,748**	**$ 32,927**	**$ 1,709,537**	**11.1**
1A LED Lighting	$ 56,250	$ 5,182	$ (2,776)	$ -	$ -	$ 84,340	$ 25,684	$ 58,766	0.5
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ 405	$ -	$ -	$ -	$ -	$ 405	$ -	$ 2,813	7.0
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ 14,882	$ -	$ -	$ 14,882	$ -	$ 929,993	62.5
2B Vacuum Tank Replacements	$ -	$ -	$ 2,710	$ -	$ -	$ 6,072	$ 3,362	$ 289,619	30.7
2E Rooftop Unit Replacement	$ 3,736	$ -	$ -	$ -	$ -	$ 7,617	$ 3,881	$ 248,169	21.6
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ 4,752	$ (9)	$ -	$ -	$ -	$ 4,743	$ -	$ 77,603	16.4
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 221	$ -	$ 837	$ -	$ -	$ 1,059	$ -	$ 9,221	8.7
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,941	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 2,532	$ 98	$ -	$ -	$ -	$ 2,631	$ -	$ 49,545	18.8
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 39,866	-
Victor Mravlag School-21	**$ 34,480**	**$ 3,992**	**$ 478**	**$ -**	**$ -**	**$ 52,160**	**$ 13,211**	**$ 251,038**	**3.8**
1A LED Lighting	$ 34,365	$ 3,742	$ (1,741)	$ -	$ -	$ 49,576	$ 13,211	$ 205,031	3.3
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (134)	$ -	$ 997	$ -	$ -	$ 863	$ -	$ 30,002	34.8
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ 249	$ -	$ 1,222	$ -	$ -	$ 1,471	$ -	$ 12,064	8.2
5A Real Time Metering	$ -	$ 250	$ -	$ -	$ -	$ 250	$ -	$ 3,941	15.7
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Washington/Dunn Academy-1	**$ 158,768**	**$ 6,623**	**$ 23,019**	**$ -**	**$ -**	**$ 246,999**	**$ 58,589**	**$ 3,081,510**	**10.1**
1A LED Lighting	$ 64,383	$ 5,330	$ (2,620)	$ -	$ -	$ 87,338	$ 20,245	$ 326,940	3.0
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ 14,749	$ -	$ -	$ 24,492	$ 9,743	$ 679,289	19.8
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ 1,908	$ -	$ -	$ -	$ -	$ 6,476	$ 4,568	$ 221,172	20.0
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ 26,391	$ -	$ -	$ -	$ -	$ 41,410	$ 15,019	$ 823,878	14.6
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ 9,597	$ -	$ -	$ -	$ -	$ 13,047	$ 3,450	$ 297,210	18.0
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 17,049	$ -	$ 18,909	$ -	$ -	$ 41,522	$ 5,564	$ 308,045	6.5
4A Building Envelope Improvements	$ 766	$ -	$ 2,688	$ -	$ -	$ 3,454	$ -	$ 35,895	10.4
5A Real Time Metering	$ -	$ 454	$ -	$ -	$ -	$ 454	$ -	$ 3,941	8.7
6A Cogeneration CHP	$ 36,050	$ 739	$ (10,706)	$ -	$ -	$ 26,083	$ -	$ 300,294	11.5
7A Transformer Replacement	$ 2,625	$ 99	$ -	$ -	$ -	$ 2,723	$ -	$ 49,545	18.2
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 35,301	-
Williams Field -98	**$ 6,133**	**$ 2,000**	**$ -**	**$ -**	**$ -**	**$ 8,133**	**$ -**	**$ 478,563**	**58.8**
1A LED Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1B Stadium Lighting	$ 6,133	$ 2,000	$ -	$ -	$ -	$ 8,133	$ -	$ 478,563	58.8
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
4A Building Envelope Improvements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Winfield Scott School-2	**$ 36,184**	**$ 3,197**	**$ 4,863**	**$ -**	**$ -**	**$ 69,226**	**$ 24,983**	**$ 1,054,773**	**11.2**
1A LED Lighting	$ 28,986	$ 3,197	$ (1,472)	$ -	$ -	$ 41,661	$ 10,950	$ 192,033	3.7
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ (41)	$ -	$ 478	$ -	$ -	$ 437	$ -	$ 8,066	18.5
2A Boiler Replacements	$ -	$ -	$ 1,883	$ -	$ -	$ 8,149	$ 6,266	$ 374,296	26.0
2B Vacuum Tank Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2E Rooftop Unit Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2G Walk In Compressor Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ 970	$ -	$ -	$ 970	$ -	$ 8,456	8.7
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 7,036	$ -	$ 2,240	$ -	$ -	$ 17,042	$ 7,766	$ 446,085	18.0
4A Building Envelope Improvements	$ 203	$ -	$ 766	$ -	$ -	$ 968	$ -	$ 10,560	10.9
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,277	-
Woodrow Wilson School-19	**$ 16,563**	**$ 1,130**	**$ 8,557**	**$ -**	**$ -**	**$ 57,262**	**$ 31,012**	**$ 1,633,155**	**18.5**
1A LED Lighting	$ 9,149	$ 1,089	$ (431)	$ -	$ -	$ 16,848	$ 7,041	$ 55,675	2.3
1B Stadium Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1C Vending Misers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
1D De-Stratification Fans w/ UV	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2A Boiler Replacements	$ -	$ -	$ 3,580	$ -	$ -	$ 12,155	$ 8,575	$ 576,866	27.8
2B Vacuum Tank Replacements	$ -	$ -	$ 566	$ -	$ -	$ 2,248	$ 1,681	$ 144,810	36.9
2E Rooftop Unit Replacement	$ 4,923	$ -	$ -	$ -	$ -	$ 10,671	$ 5,748	$ 408,999	24.9
2G Walk In Compressor Controls	$ 328	$ -	$ -	$ -	$ -	$ 328	$ -	$ 8,505	25.9
2H Premium Efficiency Motors and VFDs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2I Split System Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2J Chiller Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2K Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2M Cooling Tower Replacements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
2N Pipe Insulation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
3A Building Controls/Energy Optimization	$ 1,474	$ -	$ 4,573	$ -	$ -	$ 14,013	$ 7,966	$ 418,709	19.1
4A Building Envelope Improvements	$ 74	$ -	$ 269	$ -	$ -	$ 343	$ -	$ 7,205	21.0
5A Real Time Metering	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
6A Cogeneration CHP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
7A Transformer Replacement	$ 615	$ 41	$ -	$ -	$ -	$ 656	$ -	$ 12,386	18.9
9A Building Modeling and Management	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Project Total	**$ 1,741,896**	**$ 117,723**	**$ 218,316**	**$ -**	**$ -**	**$ 2,928,534**	**$ 850,599**	**$ 33,720,235**	**8.9**

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2. Utility and Other Rebates and Incentives

NJ Pay-for-Performance Program (P4P)

Honeywell has been certified as a Pay for Performance Program Partner to provide technical services under direct contract to you. Acting as your energy expert, Honeywell will develop an Energy Reduction Plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation. This supports your ability to take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings.

Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100kW demand to participate in the Program: hospitals, public s and universities, non-profits, affordable multifamily housing, and local governmental entities. Your Energy Reduction Plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more to utilize the Pay Performance Program.

ENERGY STAR Portfolio Manager

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

Incentives

Incentives for the P4P program are based on the annual electric and natural gas savings produced by the Energy Conservation Measures. There are three incentives to the program; details are included in the follow page. The first incentive is distributed after a finalized project is selected and bid. This usually occurs shortly before construction starts or shortly thereafter. The second incentive is distributed a few months after construction is completed, while the third incentive is distributed usually thirteen to fourteen months after the second incentive - once a year of building usage, post-retrofit, is completed.

Incentives, Rebates and Grants Summary

Honeywell has a great deal of experience in applying for, and successfully securing, all available incentives, rebates, and grants for our clients. We have been approved and allocated for over $9M of incentives on behalf of our New Jersey customers alone since the introduction of the Energy Savings Improvement Program legislation in 2009. The New Jersey programs employed included primarily the Office of Clean Energy's Pay for Performance and Cogeneration Incentives. A table of the incentive amounts on a per project basis is provided below.

NJ Customers	Rebate Amount
Hudson County (Projected)	$2,369,012
East Brunswick Public Schools (Projected)	$1,601,318
West Orange Board of Education	$1,399,747
City of Newark	$1,242,368
Passaic County (Projected)	$1,209,061
Old Bridge Board of Education	$1,085,614
Bridgewater-Raritan Regional	$963,034
Elizabeth Schools	$934,209
Parsippany-Troy Hills Board of Education	$831,175
Camden County Technical Schools	$734,803
West Orange Board of Education	$644,744
Hillsborough Board of Education	$584,736
NH-Voorhees Regional HS	$511,558
School of the Chathams	$419,056
West Morris Regional High School (Projected)	$392,700
Phillipsburg School	$274,278
Educational Services Commission of NJ	$260,603
Somerset County Vocational	$246,095
Robbinsville Public School	$231,015
Bloomfield Board of Education	$225,868
Mountain Lakes Board of Education	$194,722
Lower Cape May Regional	$190,658
Verona School	$171,015
Hanover Township School	$169,882
City of Perth Amboy	$137,441
Town of Kearny	$84,147
Frankford School	$30,743

P4P Incentives

Regarding Elizabeth Public Schools ***2.4% Interest, 19 Year Project:***

Honeywell has determined that the District is eligible for $2,411,332 in estimated total incentives for the projects. This includes $1,633,014 for the P4P program, $110,840 in Prescriptive Lighting Incentives and $778,318 in Direct Install Incentives.

Please refer to the tables below for a breakdown of incentive levels on a building by building basis for each type of incentive.

P4P Incentives

	P4P Incentives			
Building	**First Incentive**	**Second Incentive**	**Third Incentive**	**Total Incentive**
Dwyer-Halsey Academies-81	$0	$0	$0	$0
Washington/Dunn Academy-1	$23,512	$150,577	$15,058	$189,147
Winfield Scott School-2	$10,175	$33,450	$10,000	$53,625
La Corte-Peterstown School-3	$11,610	$19,883	$10,000	$41,493
Battin McAuliffe Middle School-4	$24,537	$98,224	$10,000	$132,761
Mabel G. Holmes School-5	$0	$0	$0	$0
Lafayette Middle School-6	$0	$0	$0	$0
Terence C. Reilly School-7	$28,355	$99,161	$10,000	$137,515
Elmora School-12	$0	$0	$0	$0
Benjamin Franklin School-13	$0	$0	$0	$0
Abraham Lincoln School-14	$14,490	$50,893	$10,000	$75,383
Christopher Columbus School-15	$0	$0	$0	$0
Madison-Monroe School-16	$0	$0	$0	$0
Robert Morris School-18	$0	$0	$0	$0
Woodrow Wilson School-19	$0	$0	$0	$0
John Marshall School-20	$0	$0	$0	$0
Victor Mravlag School-21	$0	$0	$0	$0
Nicholas Murray Butler School-23	$10,500	$47,422	$10,000	$67,922
Sonia Sotomayor School-25	$10,064	$45,759	$10,000	$65,822
Orlando Edreira Academy-26	$18,450	$104,049	$10,405	$132,903
Dr. Antonia Pantoja School-27	$17,821	$51,994	$10,000	$79,815
Duarte- Marti School-28	$17,930	$97,444	$10,000	$125,374
Albert Einstein Academy-29	$18,000	$74,725	$10,000	$102,725
Chessie Dentley Roberts Academy-30	$17,970	$58,162	$10,000	$86,132
Francis Smith ECE-50	$0	$0	$0	$0
Donald Stewart ECE-51	$8,121	$30,450	$10,000	$48,571

Building	P4P Incentives First Incentive	Second Incentive	Third Incentive	Total Incentive
Dr. Martin Luther King Jr. School-52	$8,829	$33,113	$10,000	$51,942
Hamilton Prep Academy-80	$0	$0	$0	$0
Dwyer 9th Grade Annex-82A	$0	$0	$0	$0
Halsey 9th Grade Academy-83A	$0	$0	$0	$0
Thomas Jefferson Arts Academy-84	$26,553	$79,165	$10,000	$115,718
Thomas A. Edison Academy-87	$20,466	$95,699	$10,000	$126,165
Edison 9th Grade Academy-87A	$0	$0	$0	$0
Frank J. Cicarell Academy-89	$0	$0	$0	$0
Bollwage Academy of Finance-90	$0	$0	$0	$0
	$0	$0	$0	$0
TOTALS	**$287,382**	**$1,170,169**	**$175,463**	**$1,633,014**

Prescriptive Lighting and Direct Install Incentives

Building	Prescriptive Lighting and Direct Install Incentives: Prescriptive Incentives Lighting	DI Incentives Lighting	DI Incentives Mechanical	Total Incentive
Dwyer-Halsey Academies-81	$57,510	$0	$0	$57,510
Washington/Dunn Academy-1	$0	$0	$0	$0
Winfield Scott School-2	$0	$0	$0	$0
La Corte-Peterstown School-3	$0	$0	$0	$0
Battin McAuliffe Middle School-4	$0	$0	$0	$0
Mabel G. Holmes School-5	$0	$81,386	$1,623	$83,009
Lafayette Middle School-6	$9,370	$0	$0	$9,370
Terence C. Reilly School-7	$0	$0	$0	$0
Elmora School-12	$0	$29,386	$34,704	$64,090
Benjamin Franklin School-13	$0	$28,547	$1,100	$29,647
Abraham Lincoln School-14	$0	$0	$0	$0
Christopher Columbus School-15	$0	$37,527	$550	$38,077
Madison-Monroe School-16	$0	$27,729	$550	$28,279
Robert Morris School-18	$0	$43,237	$53,397	$96,633
Woodrow Wilson School-19	$0	$39,555	$20,194	$59,749
John Marshall School-20	$0	$29,130	$0	$29,130
Victor Mravlag School-21	$13,790	$0	$0	$13,790
Nicholas Murray Butler School-23	$0	$0	$0	$0
Sonia Sotomayor School-25	$0	$0	$0	$0
Orlando Edreira Academy-26	$0	$0	$0	$0

Building	Prescriptive Lighting and Direct Install Incentives Prescriptive Incentives Lighting	DI Incentives Lighting	DI Incentives Mechanical	Total Incentive
Dr. Antonia Pantoja School-27	$0	$0	$0	$0
Duarte- Marti School-28	$0	$0	$0	$0
Albert Einstein Academy-29	$0	$0	$0	$0
Chessie Dentley Roberts Academy-30	$0	$0	$0	$0
Francis Smith ECE-50	$0	$25,433	$37,383	$62,816
Donald Stewart ECE-51	$0	$0	$0	$0
Dr. Martin Luther King Jr. School-52	$0	$0	$0	$0
Hamilton Prep Academy-80	$0	$115,753	$864	$116,617
Dwyer 9th Grade Annex-82A	$0	$26,393	$73,219	$99,612
Halsey 9th Grade Academy-83A	$0	$17,179	$550	$17,729
Thomas Jefferson Arts Academy-84	$0	$0	$0	$0
Thomas A. Edison Academy-87	$0	$0	$0	$0
Edison 9th Grade Academy-87A	$0	$18,838	$2,138	$20,976
Frank J. Cicarell Academy-89	$29,540	$0	$0	$29,540
Bollwage Academy of Finance-90	$0	$30,854	$1,100	$31,954
	$0	$0	$0	$0
TOTALS	**$110,210**	**$550,946**	**$227,372**	**$888,528**

Total Rebates and Incentives

Year	Total Incentives P4P Incentives	Direct Install Incentives Lighting	Direct Install Incentives Mechanical	Prescriptive Lighting Incentives	Total Incentives
Installation	$287,382	$550,946	$227,372	$110,210	$838,328
Year 1	$1,170,169				$1,170,169
Year 2	$175,463				$175,463
Year 3					
Year 4					
TOTALS	**$1,633,014**	**$550,946**	**$227,372**	**$110,210**	**$2,183,960**

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3. 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 s, cities, counties, and fire s 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 Elizabeth Public Schools may authorize a lease purchase agreement between the Elizabeth Public Schools High School and a financier. Ownership of the equipment or improved facilities will pass to the Elizabeth Public Schools 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 Elizabeth Public Schools 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 Elizabeth Public Schools. Payments are typically scheduled to commence after the construction is complete and acceptance of the project has been received by the Elizabeth Public Schools. Typically, payment terms are structured so there is no up-front capital expense to the Elizabeth Public Schools and payments are aligned within your cash flow and fiscal limits.

Certificates of Participation (COP's)

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

Energy Savings Obligations

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

SECTION E
MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

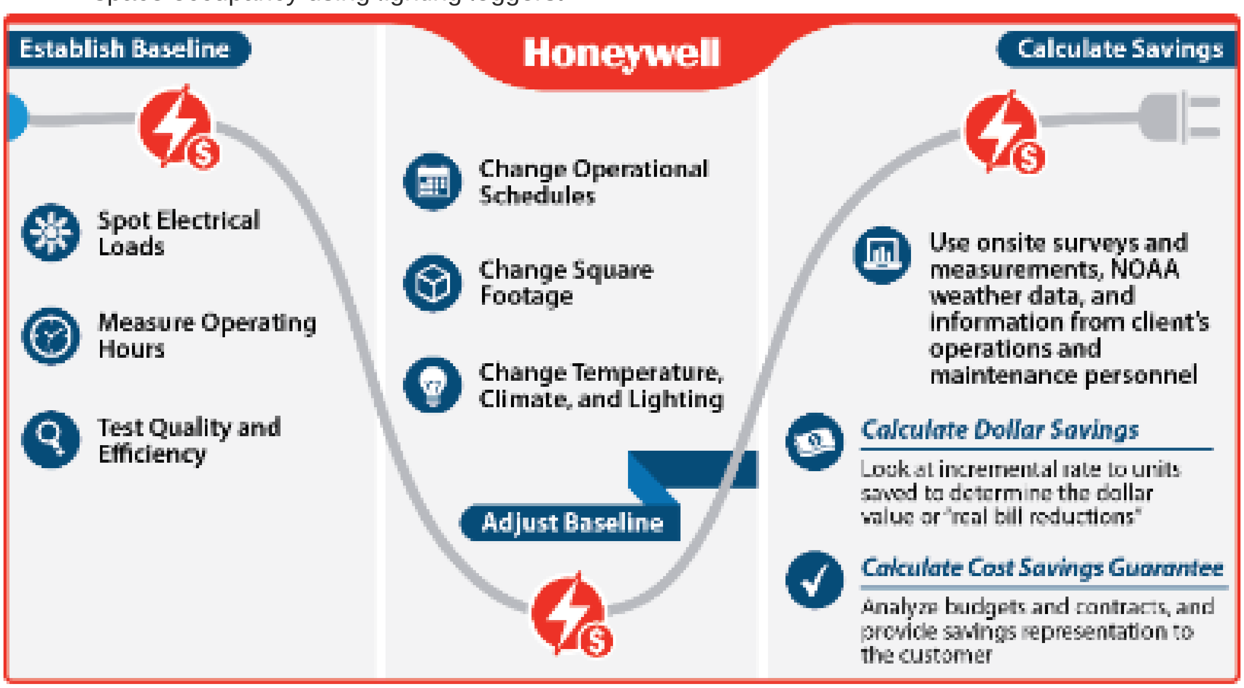
SECTION E — MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

1. Baseline

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

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

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



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

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

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

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

1. Recording and instantaneous power and harmonic analyzers.
2. Data loggers for pressures, temperatures, flow rates, humidity and CO_2.
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 the Honeywell finds to be very accurate and cost-effective.

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

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

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

2. Adjustment to Baseline Methodology

Honeywell's methodology[1] 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 Elizabeth Public Schools requires and the needs of the Elizabeth Public Schools for future changes in facility use.

The purpose of this flexible approach is to make the most accurate possible measurement of the changes in energy uses that are specifically attributable to Honeywell installed ECMs. This creates the ability over the life of the contract to continue measuring only savings achieved by Honeywell and leaves the Elizabeth Public Schools free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for making adjustments to the baseline.

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

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

Examples of situations where the baseline needs to be adjusted are: i) changes in the amount of space being air conditioned, ii) changes in auxiliary systems (towers, pumps, etc.) and iii) changes in occupancy or schedule. If the baseline conditions for these factors are not well documented it becomes difficult, if not impossible, to properly adjust them when they change and require changes to payment calculations. To compensate for any addition and deletion of buildings and impact on the baseline model, Honeywell will use sound technical methodologies to adjust the baseline. An example would be to add or delete building energy impact via the calculated cooling load in tons as a percentage of the existing campus tonnage baseline or use indices like W/ft^2 and Btu/ft^2 to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

[1] The energy baseline modifications shall use commonly accepted energy engineering methods that are mutually agreeable to both Honeywell and customer. Should agreement on these methods, including the climate adjustments, not be reached between Honeywell and customer, both parties could appeal to an independent engineering.

3. Energy Savings Calculations

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

Typically, the following data is gathered:

- Local weather data.
- Utility bills and sub-metered consumption trends.
- Utility rate structure.
- Facility use and occupancy data.
- Internal equipment loads.
- Interviews of operations and maintenance staff and management.
- Building construction, age, use and layout.
- Schematics of energy and water distribution systems.
- Identification and inventory of HVAC equipment.
- Identification and inventory of process equipment.
- Design, configuration, and operating characteristics of HVAC systems.
- Design, configuration, and operating characteristics of process systems.
- Control strategies and sequences of operation for HVAC and other process equipment.
- Identification and count of all lighting fixtures and determination of power consumption for each type.
- Identification and inventory of lighting control methods.
- Measurement of foot-candle levels at sample locations.
- Power quality and harmonics, power factor.
- Indoor air quality issues.

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

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

$$AnnualSavings(\$) = \sum_{m=1}^{12} \{ \left(Rate_{kWh,Base} \times kWh_{Saved,m} \right) + \left(Rate_{fuel\ Oil,\ Base} \times Fuel\ Oil_{Saved,\ gal,\ m} \right) + \left(Rate_{Steam,\ Base} \times Steam_{Saved,\ klbs,\ m} \right) + \left(Rate_{NG} \times NG_{Saved,\ MCF,\ m} \right) \} + Agreed(\$)$$

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*

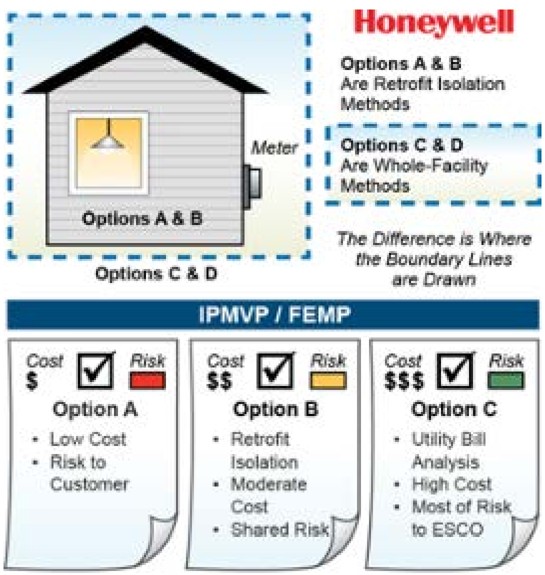
Agreed($)= Annual savings in dollars (water, sewer, maintenance, etc.)

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 Elizabeth Public Schools or “real bill reductions”. As noted in the RFP energy escalation rates will be established in accordance with New Jersey Board of Public Utility guidelines.

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

The O&M savings is typically a function of existing the Elizabeth Public Schools High School ’s budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell will analyze the information to provide a conservative savings representation for the Elizabeth Public Schools 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 Elizabeth Public Schools 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)***[2]. 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 Elizabeth Public Schools 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 Elizabeth Public Schools to adapt to the demands of future campus growth and changes without the need for the Elizabeth Public Schools and Honeywell to negotiate energy baseline adjustments.

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

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

[2] www.ipmvp.org.

recommendations to provide optimum energy performance.

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

General Approach to M&V

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

M&V Options

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

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

In general,

ECM Energy Savings = Baseline Energy Use - Post-Installation Energy Use

And
Energy Cost savings ($) = Total Energy Savings x Contractual Energy Rates

Exceptions to this simple equation are as follows:

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

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

Post-Retrofit M&V Activities

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

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 Client to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and/or spot or short-term metering.

Regular Interval Post-Installation Verification

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

Computation of Energy Savings

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

Construction/Interim Savings

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

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.

5. Site-specific M&V Plan

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 1A – LED Lighting	Upgrade Lighting systems: Re-lamp/Re-ballast T8/T12 to LED, Incandescent to LED, Metal Halide and Sodium Vapor to LED High Bays	Option A: Pre and Post measurements Line by Line scope and engineering calculations	Pre M&V: Measurement of kW for 5% sample fixtures in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours Post M&V: Measurement of kW for 5% sample fixtures in each category Usage Hours to remain same Occupancy schedules to remain same Energy Savings: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
ECM 1B – Stadium Lighting	Install field sports 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
ECM 1C – Vending Misers	Install Vending machine energy management devices	Option C: Pre and Post measurements Line by Line scope and engineering calculations	Pre M&V: Measurement of kW for 5% sample machines in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours Post M&V: Measurement of kW for 5% sample machines in each category Usage Hours to remain same Energy Savings scope with measured kW and usage hours and compare to pre-retrofit calculated savings
ECM 1D - De-Stratification Fans	Install De-Stratification fans in Gymnasiums and Multipurpose Rooms 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.	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
ECM 2A – Boiler Replacements	Replace boilers in select locations to handle base load	Option C: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units	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
ECM 2B - Vacuum Tank Replacements	Replace existing Vacuum Tanks in select locations	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 insure operating conditions are maintained

District-Wide Energy Savings Plan

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 2C – Boiler Burner Controls	Install advanced combustion controls, on existing burners	**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 insure operating conditions are maintained
ECM 2D – Domestic Hot Water Replacements	Replace existing domestic hot water heaters with condensing natural gas domestic hot water heater	**Option C:** 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
ECM 2E - Rooftop Unit Replacement	Replace antiquated Roof Top Units with new high efficiency Rooftop Units	Option C: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units	Pre M&V: Verify manufacturer provided data for existing unit efficiency (EER) Post M&V: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2F - Kitchen Hood Controls	Install control devices on the Kitchen hoods to control exhaust air in response to the cooking load. Replace fan motors with new premium efficiency motors and VFD drives	**Option A:** Energy savings - Engineering calculations based on programmed parameters.	Pre M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions
ECM 2G – Walk-In Compressor Controls	Install control device on walk-in freezer and refrigerator evaporators to shut down the fan motor when the compressor is off on duty cycle	N/A – Measure completed under Direct Install Program	Pre M&V: None Post M&V: None
ECM 2H –Motors & 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
ECM 2I– Split System Replacements	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 rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2J – Chiller Replacements	Install new High Efficiency Chillers	**Option A:** Electric energy savings - Engineering calculations based on material specifications.	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
ECM 2K – Steam Trap Replacements	Comprehensive replacement or internal repair of building steam traps	**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 Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 2L – Addition of Cooling Systems	Replace antiquated Chillers with new efficient units.	**Option A:** Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units	Pre M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2M – Cooling Tower Replacements	Replace Existing Cooling Towers with new higher efficiency units.	**Option A:** Electric energy savings - Engineering calculations based on material specifications.	Pre M&V: Verify manufacturer provided data for existing unit efficiency (kW/ton) Post M&V: Verify manufacturer provided data for new unit (kW/ton) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2N – Pipe Insulation	Insulate Various Piping sizes and runs to prevent thermal losses.	**Option C:** Engineering calculations based on manufacturer supplied data for the existing and replacement material	Pre M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new material verify the new material is installed and commissioned as recommended by manufacturer

District-Wide Energy Savings Plan

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
3A– Building Controls/ Energy Optimization	Upgrade Building Management Systems to DDC and integrate all systems to a central platform.	**Option A:** Electric energy savings - Engineering calculations based on programmed parameters. **Option C:** Fuel Savings Utility Bill Comparison for all fuel related measures	Pre M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 4A - Building Envelope Improvements	Install weather stripping on doors, seal roof wall joints and roof penetrations	Option A: Electric energy savings - Engineering calculations based on programmed parameters. Option C: Fuel Savings Utility Bill Comparison for all fuel related measures	Pre M&V: Verify parameters used in engineering calculations with site conditions Post M&V: Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 5A – Real Time Metering	Use of real time metering to curtail electric costs	N/A	Pre M&V: N/A Post M&V: N/A
ECM 6A – Combined Heat & Power (CHP)	Install Cogeneration units	Option A: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units	Pre M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 7A – Transformer Upgrades	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
8A - Ventilation Upgrades - Unit Ventilator/Make-Up Air	Install new Univentilators and fresh air make-up units in various classrooms	N/A – No energy savings taken for this measure	Pre M&V: N/A
8B - Ventilation Upgrades - Air Handling Units	Install new Air Handling Units and fresh air make-up units in various classrooms	N/A – No energy savings taken for this measure	Pre M&V: N/A
8C - Ventilation Upgrades - Plasma Ionization	Install NPBI in AHUs and Univentilators serving in various classrooms	N/A – No energy savings taken for this measure	Pre M&V: N/A
8D - Ventilation Upgrades - Controls/IAQ Monitoring	Install new Univentilators and fresh air make-up units in various classrooms	N/A – No energy savings taken for this measure	Pre M&V: N/A
9A - Building Modeling and Management	Install new Univentilators and fresh air make-up units in various classrooms	N/A – No energy savings taken for this measure	Pre M&V: N/A

6. Guarantee of Savings

The approach that Honeywell utilizes in this asset management program includes two key components: a *performance guarantee* and *financial savings*. Honeywell guarantees the Elizabeth Public Schools that all installations and work performed are subject to final inspection and the Elizabeth Public Schools acceptance. This procedure ensures all work will be to the level of quality the Elizabeth Public Schools expects.

Honeywell also guarantees it will meet the objectives mutually defined with the Elizabeth Public Schools. Honeywell takes its commitment to partner with the Elizabeth Public Schools for the life of the contract seriously, and looks forward to a successful, long-term partnership.

Honeywell considers the guarantee to be the cornerstone of our service to you. In order to be considered a *performance contract,* a energy guarantee is an optional component under the New Jersey Energy Savings Improvement Program (ESIP) legislation. The basis of an energy performance contract is that most risk is shifted from the Elizabeth Public Schools to the ESCO. The strength of the Guarantee is only as good as the Company backing it and their financial solvency. With over $40.5 Billion in assets, Honeywell has the financial strength and background to support the Elizabeth Public Schools for the long term.

Savings Guarantee: With the understanding that the Elizabeth Public Schools High School must maintain fiscal health and accountability, Honeywell can financially guarantee the results of its programs and clearly support this obligation with the commitment to regular review of program results and reconciliation. **Honeywell's financial strength and stability give it the ability to extend a FIRST-PARTY GUARANTEE to the Elizabeth Public Schools. A first party guarantee eliminates the risk on the Elizabeth Public Schools and places it directly onto Honeywell.** This differs from some other ESCO's who provide a third-party guarantee, which insulates them from the owner through the use of insurance instruments.

If at the end of any year the program has not met or exceeded the guaranteed savings for that year, Honeywell will refund the difference between the guaranteed amount and what was actually saved.

For all equipment covered by the Energy Savings Guarantee, the Elizabeth Public Schools shall be responsible for on-going maintenance and component replacement in accordance with manufacturer's standards. The customer will also be responsible for operating the equipment in accordance with manufacturer's specifications.

Honeywell will develop savings methodologies that follow current industry practice, such as outlined by the New Jersey Board of Public Utilities (BPU) and Federal Energy Management Program's (FEMP) M&V Guidelines: Measurement and Verification for Federal Energy Projects. References to M&V protocols from the International Performance Measurement and Verification Protocol (IPMVP), ASHRAE Guideline 14 and the Air-Conditioning Refrigeration Institute (ARI) are used to further qualify the M&V plan.

As stated above, under the New Jersey ESIP legislation acceptance of a performance guarantee is optional at the Elizabeth Public Schools sole discretion. In the same way, the duration of the guarantee is also optional. Many of Honeywell's New Jersey customers have elected to keep the guarantee in force for less than the total performance periods, i.e. three (3) to five (5) years.

Others have elected to accept a one (1) year guarantee, while reserving the option to renew for additional years after they have had the opportunity to review the track record of actual savings results. Obviously, this a very customer specific decision based on the risk management culture of each unique organization. The key point is that Honeywell is flexible regarding the structure and duration of the guarantee. The final terms will be discussed and defined as part of our co-authored ESIP project.

Solely for informational purposes, it is worth noting that if the Elizabeth Public Schools does elect to accept a guarantee, New Jersey ESIP law requires that the Elizabeth Public Schools contract with a third-party independent firm to verify that the energy savings are realized. To preserve the independent status of this contractor these costs are required to be incurred directly by the Elizabeth Public Schools.

Honeywell develops and implements every project with the same high level of detail and confidence and therefore will always provide a Savings Guarantee at no additional cost. However, if the Elizabeth Public Schools opts to accept the Savings Guarantee, the fee indicated on Form V in Section D will be applicable to account for on-going Honeywell service costs incurred during the measurement and verification of the savings as indicated in Form V of our RFP response.

All guarantees require that the owner maintain the system in accordance with the manufacturer's specifications. Regardless of guarantee acceptance, ongoing maintenance as recommended by the BPU, Honeywell and / or manufacturer specifications is required to achieve the projected energy savings. Maintenance should also include a periodic verification of the system to make sure the maintenance is properly conducted, and the system is meeting the original specifications and design.

7. Recommended Preventive Maintenance Services

Per the NJ ESIP program, all services are required to be bid by the Elizabeth Public Schools 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 Elizabeth Public Schools 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 Elizabeth Public Schools 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 Elizabeth Public Schools 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.

SECTION F
DESIGN APPROACH

SECTION F — DESIGN APPROACH

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

1. Safety Management Plan

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

Honeywell's Safety Management Plan is provided in Appendix 4.

2. Project Management Process

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

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

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

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

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

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

IGA Development Process

Step 1 - Discovery

Ascertain your goals and expectations to define project requirements

Involve key decision makers to prioritize

Aggregate utility and building data to benchmark energy consumption

Ensure site access for energy audits and site measurements to complete survey work

Inventory of equipment

Step 2 – Identify and Develop Project

Complete ECM list focused on your requirements

Coordinated development effort to refine project scope

Conceptual scopes of work to further define project

Determine modeling approach and M&V methodology

Step 3 – Cost and Savings Forecasting

Calculate energy and cost savings

Identify utility rebates

Detailed scopes of work

Operating strategies and equipment performance data

Step 4 – Deliver Solution

Deliver final IGA Report and contract

Finalize scope of work

Secure financing

Deliver positive cash flow

Finalize savings guarantee

Commissioning, M&V and training program

A. Honeywell Performance Contracting

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

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

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

Our Safety Commitment to the Elizabeth Public Schools

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

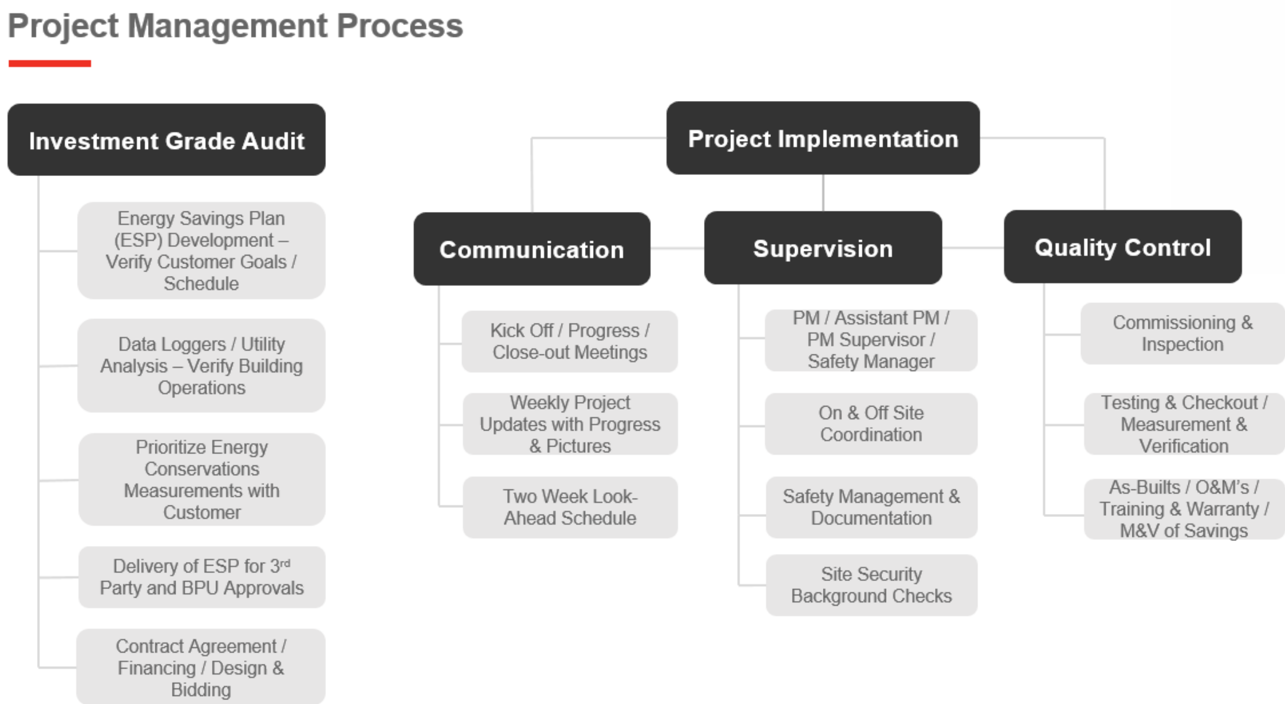
Our projects all begin with the following steps:

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

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

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

C. Project Management Process



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

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

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

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

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

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

3. Construction Management

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

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

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

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

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

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

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

Approval of subcontractors that Honeywell proposes to use lies with the Elizabeth Public Schools.

4. Commissioning

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

Prior to customer acceptance of the project, Honeywell submits the final commissioning report containing signed acceptance sheets for each ECM. Signed acceptance sheets are obtained upon demonstrating the functionality of each ECM to a Elizabeth Public Schools appointed representative.

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

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

5. Installation Standards

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

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

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

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

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

Heating and Cooling Standards

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

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

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

Hazardous Waste Disposal or Recycling

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

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

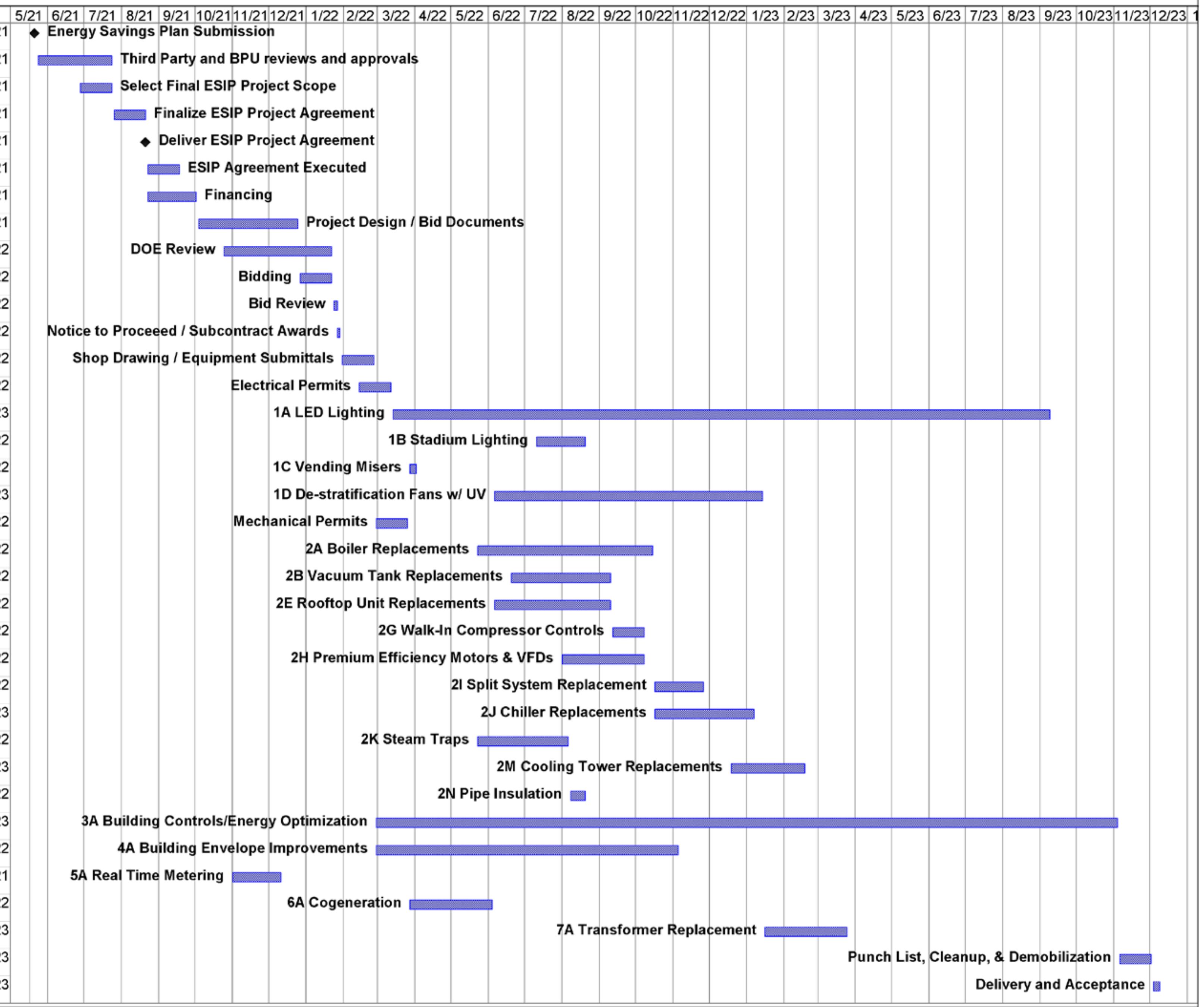
6. Implementation Schedule

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

Elizabeth Public Schools
Energy Savings Plan Estimated Construction Schedule

Honeywell

ID	Task Name	Start	Finish
1	Energy Savings Plan Submission	Fri 5/21/21	Fri 5/21/21
2	Third Party and BPU reviews and approvals	Mon 5/24/21	Fri 7/23/21
3	Select Final ESIP Project Scope	Mon 6/28/21	Fri 7/23/21
4	Finalize ESIP Project Agreement	Mon 7/26/21	Fri 8/20/21
5	Deliver ESIP Project Agreement	Fri 8/20/21	Fri 8/20/21
6	ESIP Agreement Executed	Mon 8/23/21	Fri 9/17/21
7	Financing	Mon 8/23/21	Fri 10/1/21
8	Project Design / Bid Documents	Mon 10/4/21	Fri 12/24/21
9	DOE Review	Mon 10/25/21	Fri 1/21/22
10	Bidding	Mon 12/27/21	Fri 1/21/22
11	Bid Review	Mon 1/24/22	Wed 1/26/22
12	Notice to Proceeed / Subcontract Awards	Thu 1/27/22	Fri 1/28/22
13	Shop Drawing / Equipment Submittals	Mon 1/31/22	Fri 2/25/22
14	Electrical Permits	Mon 2/14/22	Fri 3/11/22
15	1A LED Lighting	Mon 3/14/22	Fri 9/8/23
16	1B Stadium Lighting	Mon 7/11/22	Fri 8/19/22
17	1C Vending Misers	Mon 3/28/22	Fri 4/1/22
18	1D De-stratification Fans w/ UV	Mon 6/6/22	Fri 1/13/23
19	Mechanical Permits	Mon 2/28/22	Fri 3/25/22
20	2A Boiler Replacements	Mon 5/23/22	Fri 10/14/22
21	2B Vacuum Tank Replacements	Mon 6/20/22	Fri 9/9/22
22	2E Rooftop Unit Replacements	Mon 6/6/22	Fri 9/9/22
23	2G Walk-In Compressor Controls	Mon 9/12/22	Fri 10/7/22
24	2H Premium Efficiency Motors & VFDs	Mon 8/1/22	Fri 10/7/22
25	2I Split System Replacement	Mon 10/17/22	Fri 11/25/22
26	2J Chiller Replacements	Mon 10/17/22	Fri 1/6/23
27	2K Steam Traps	Mon 5/23/22	Fri 8/5/22
28	2M Cooling Tower Replacements	Mon 12/19/22	Fri 2/17/23
29	2N Pipe Insulation	Mon 8/8/22	Fri 8/19/22
30	3A Building Controls/Energy Optimization	Mon 2/28/22	Fri 11/3/23
31	4A Building Envelope Improvements	Mon 2/28/22	Fri 11/4/22
32	5A Real Time Metering	Mon 11/1/21	Fri 12/10/21
33	6A Cogeneration	Mon 3/28/22	Fri 6/3/22
34	7A Transformer Replacement	Mon 1/16/23	Fri 3/24/23
35	Punch List, Cleanup, & Demobilization	Mon 11/6/23	Fri 12/1/23
36	Delivery and Acceptance	Mon 12/4/23	Fri 12/8/23



APPENDICES

For Appendices 1 to 5, please refer to the following files for their electronic version on the USB drive included along in the submission:

`Honeywell – Appendix 1 — INDEPENDENT ENERGY AUDIT (Exhibit 1).pdf
`Honeywell – Appendix 2 — ECM CALCULATIONS.pdf
`Honeywell – Appendix 3 — SAFETY MANAGEMENT PLAN.pdf
`Honeywell – Appendix 4 — EQUIPMENT CUT SHEETS.pdf
`Honeywell – Appendix 5 — (2) LIGHTING LINE BY LINEs.pdf

THE FUTURE IS WHAT WE MAKE IT

Power for Air Taxis

Real-time Data Makes Work More Efficient

Surveillance Cameras Foresee Buyer Behavior

Digital Twins Get Smart About Maintenance

Access to Quantum Computing

Fast Communication During Emergencies

Intelligent Hearing Protection

Virtual Engineering and Control

Robotic Cargo Unloading

Machine Learning to Fight Cyberattacks

Predictive Airplane Maintenance

To learn more about Honeywell innovations visit:
https://www.honeywell.com/us/en/news/2020/12/top-innovations-of-2020

Thank you for considering our proposal. We look forward to working with you in the future.

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