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environmental & energy services

NOVI'S ENERGY EFFICIENCY AND CONSERVATION STRATEGY EXECUTIVE SUMMARY

for

CITY OF NOVI
45175 WEST TEN MILE ROAD
NOVI, MICHIGAN 48375

AKT PEERLESS PROJECT NO. PROJECT NO. 6341E
DECEMBER 16, 2009

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NOVI'S ENERGY EFFICIENCY AND CONSERVATION STRATEGY (EECS) EXECUTIVE SUMMARY

FOR

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45175 WEST TEN MILE ROAD
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1.0 INTRODUCTION

City of Novi (Novi) retained AKT Peerless Environmental & Energy Services (AKT Peerless) to complete an Energy Efficiency and Conservation Strategy (EECS) for the Energy Efficiency and Conservation Block Grant Program (EECBG). AKT Peerless' scope of work includes completing energy audits to identify energy conservation measures for the EECS, EECS development and completion of EECBG application material. AKT Peerless' scope of work and methodology is based on its proposal PE-10031, dated September 29, 2009, and the terms and conditions of the agreement.

AKT Peerless' EECS Executive Summary (Summary) compiles the results of the Preliminary Energy Use Analysis, Level I Walk-Through Energy Analysis and Level II Energy Survey and Engineering Analysis energy audits of the property portfolio. The energy conservation measures identified from the energy audits assisted in the recommendations for the EECS. The Summary is intended to assist Novi in evaluating the current energy efficiency and energy cost efficiency of Novi's building portfolio and identifying the allocation of EECBG funding to complete the EECS.

2.0 PRELIMINARY ENERGY USE ANALYSIS

The purpose of the Preliminary Energy Use Analysis (PEUA) reports is to assist the Novi in evaluating the current energy efficiency and energy cost efficiency of the Novi's building portfolio relative to other, similar properties. The PEUAs establish the baseline energy and cost indices for each fuel or demand type, and their combined total for each building. The Energy Utilization Index (EUI) and cost index of the subject properties are compared with the EUI and cost index of similar buildings evaluated in the Commercial Building Energy Consumption Survey (CBECS) conducted by the Energy Information Administration (EIA) of the United States Department of Energy to determine potential savings. The PEUAs have been developed using methods specified in American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) *Standard 105* (sections 5, 6 and 7).

A PEUA was completed for each building identified below and the data measurement period for all energy analysis includes the most recent twelve months of available utility records. For each PEUA, general property characteristics data was obtained from the owner/operator of the subject properties and historic utility use and cost information was analyzed in accordance with ASHRAE *Procedures for Commercial Building Energy Audits* and Sections 5, 6, and 7 of ASHRAE *Standard 105*. Please refer to each report and the PEUA Portfolio Summary for more details.

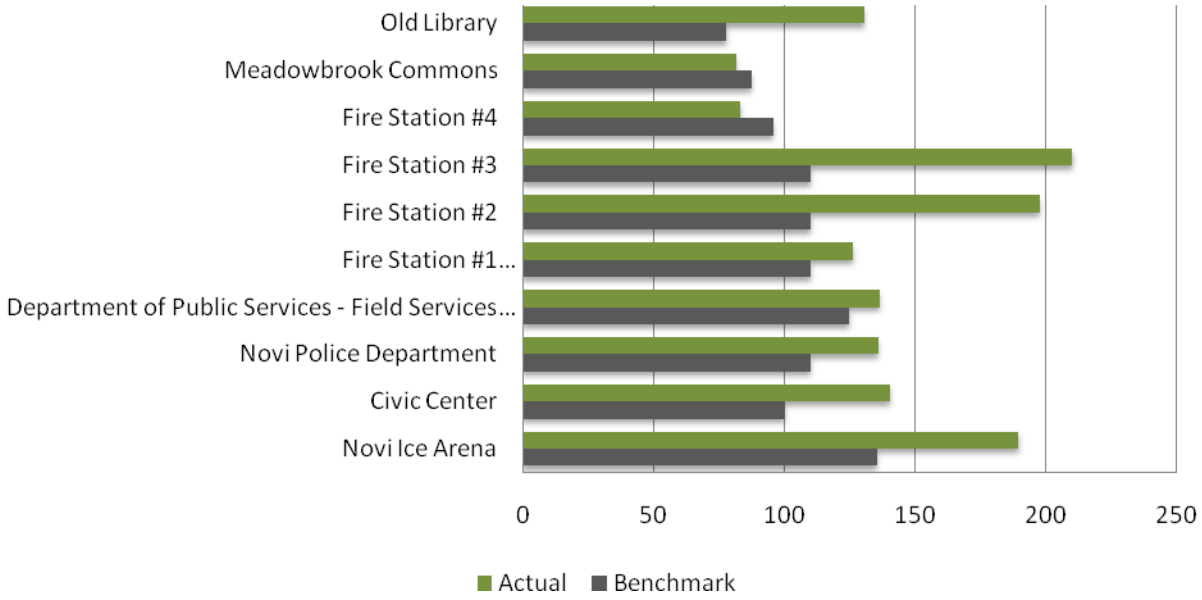
2.1 ENERGY PERFORMANCE BENCHMARK

The subject property's EUI (expressed in units of KBTU/ft^2) is compared to the Energy Performance Benchmarks of other buildings of similar characteristics. Benchmarks maybe expressed as Therms/ft^2, kWh/ft^2 or KBTU/ft^2 (also called EUI). AKT Peerless obtains comparison EUIs (benchmarks) from the following:

- A statistical analysis of the Commercial Building Energy Consumption Survey (CBECS) prepared by the Energy Information Administration of the United States Department of Energy.

The statistical analysis of the CBECS filters the database based on region, building use, size, and year of construction (refer to Appendix D of each Preliminary Energy Use Analysis Report) for this filtered data set. This filtered database is used to calculate the benchmarks. The benchmarks shown in the portfolio summary are derived from the statistical analysis described in this section.

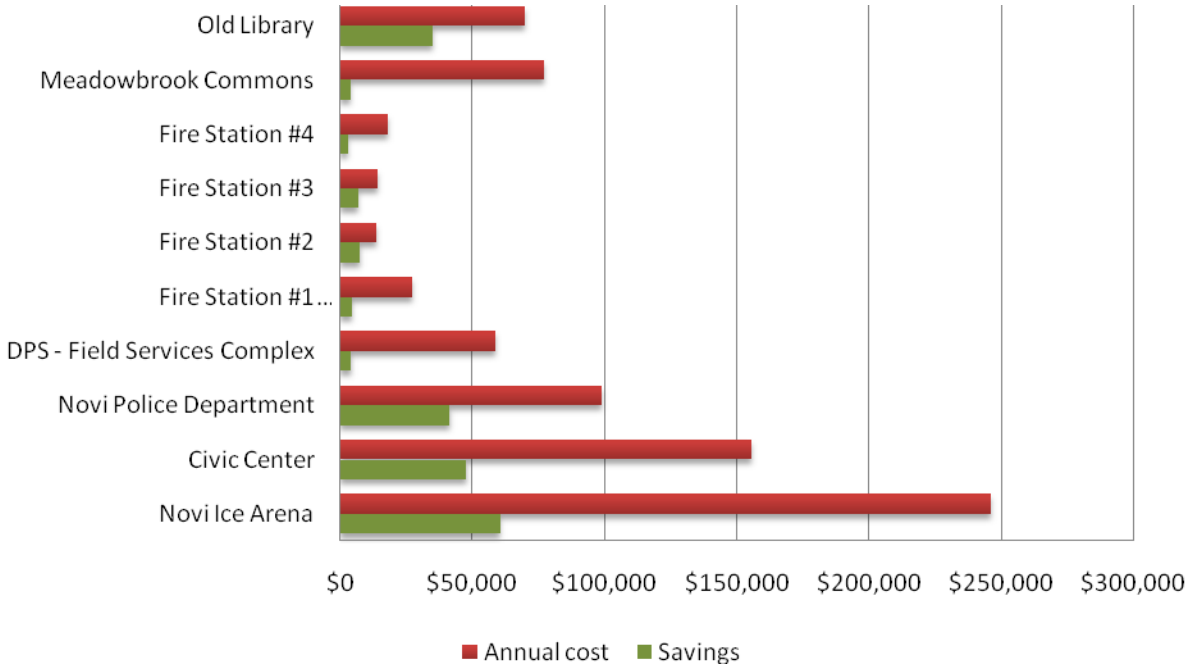
Figure # 1
Performance Benchmark: Combined Energy Use Index (EUI)



2.2 SUMMMARY OF SAVINGS

The following table represents possible annual cost savings should the subject properties reduce their combined energy consumption to target levels defined in Section 2.1.

Figure #2
Potential Cost Savings: Combined



2.3 COMPARISON OF EUI AND ECI FROM 2007

AKT Peerless was provided by the Client an energy audit completed by Rebuild Michigan Energy Services on December 26, 2007. The *Introductory Energy Evaluation* calculated the Energy Use Index (EUI) in Btu per square foot per year (Btu/ ft^2/year) and an Energy Cost Index (ECI) per square foot per year ($/$ft^2$/year) from 2007 monthly utility bills for the following buildings: 1) Civic Center; 2) Police; 3) Department of Public Works; 4) Fire Station 1; 5) Fire Station 2; 6) Fire Station 4; 7) Meadowbrook Commons; 8) Ice Arena; and 9) DPW Lift Station.

AKT Peerless has compared the results of the *Introductory Energy Audit* to those buildings evaluated as part of the scope of the Preliminary Energy Use Analyses. Several buildings show an increase in EUI from 2007 to 2009. This may be explained by the increase in natural gas use due to a 14% increase in heating degree days in 2009 as compared with 2007. The DPW building experienced a reduction in EUI during the same period which may be explained by the installation of radiant heating. The Novi Ice Arena had a lower EUI, but the ECI was greater in 2009 as compared with 2007. This may be due to the demand charge for electricity use at the Novi Ice Arena. AKT Peerless included the demand charge in the PEUA, but is unable to determine if a demand charge was included in the 2007 *Introductory Energy Audit*.

Figure #3
2007 EUI and 2009 EUI (KBTU/ft^2/year)

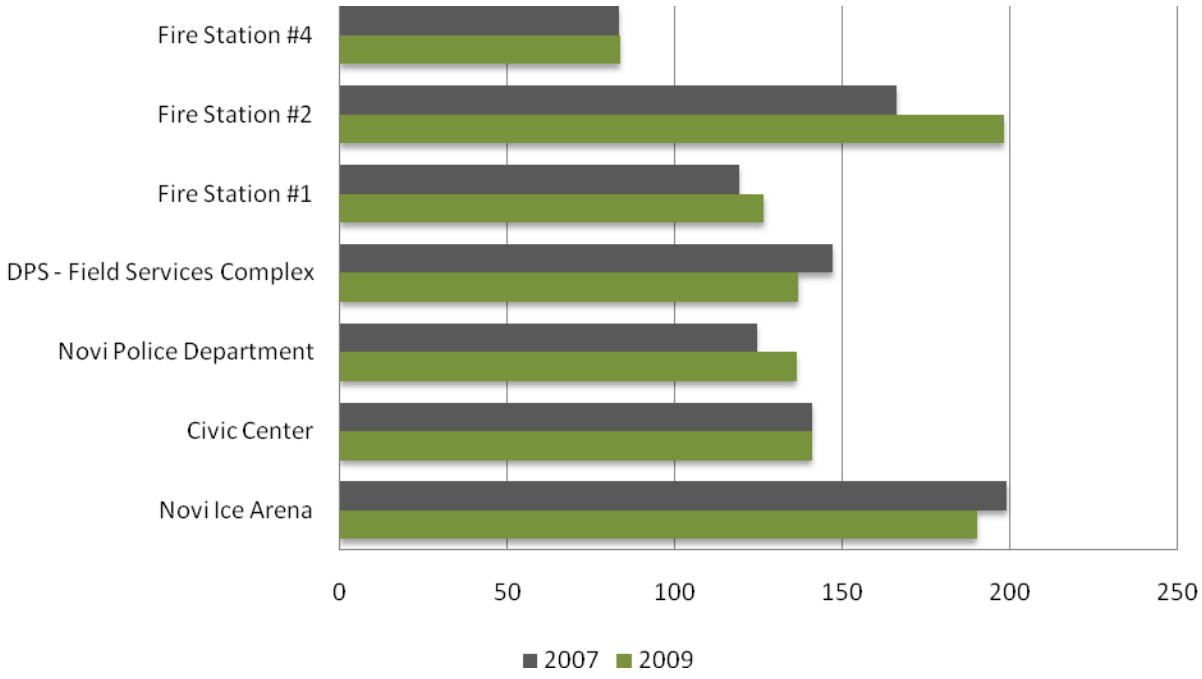
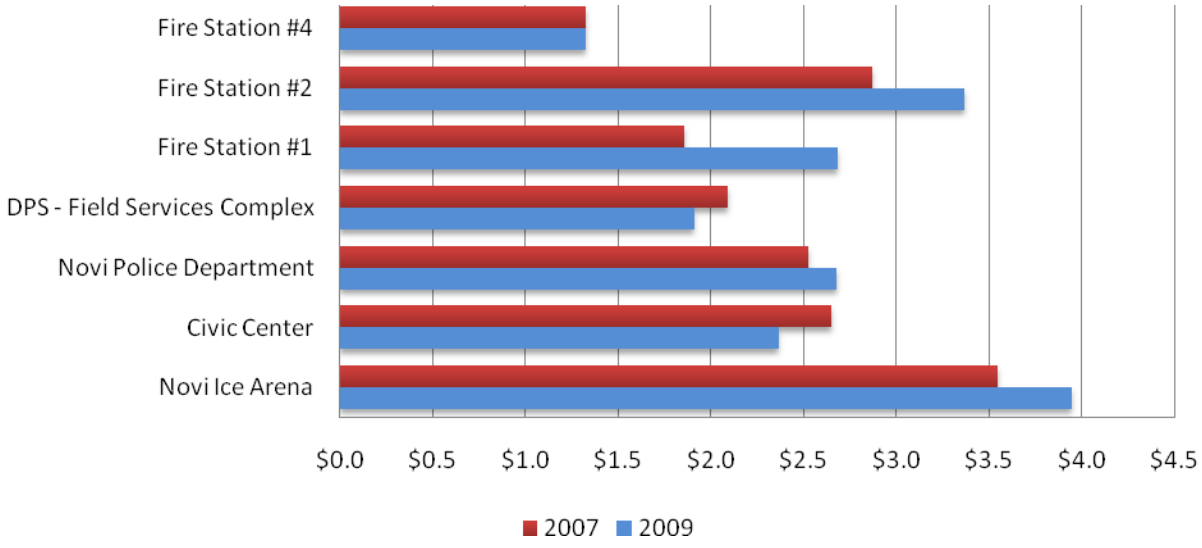


Figure #4
2007 ECI and 2009 ECI ($/ft^2/year)



3.0 LEVEL I WALK-THROUGH ANALYSIS

The purpose of a Level I Walk-Through Analysis is to assist the Client in evaluating the current energy efficiency and energy cost efficiency of the subject property relative to other, similar properties, and also to identify low-cost/no-cost energy conservation measures, and to determine the savings that may result from implementing these measures. This report will include both a listing of potential energy conservation capital improvements that merit further consideration, as well as an initial judgment of potential capital improvement costs and savings.

Six Level I Walk-Through Energy Analysis reports were completed for Fire Stations #1-4, Meadowbrook Commons and the Department of Public Service Field Services buildings. General property characteristics data was obtained from both the owner/operator of the subject property and from on-site observations. All energy analysis was conducted in accordance with ASHRAE Procedures for Commercial Building Energy Audits and ASHRAE Standard 105.

The following table summarizes the ECMs identified for the six buildings evaluated. The following sections describe the individual ECMs. Please refer to the attached photo logs for more information.

Figure #5
Level I ECMs Summary

Building	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	GHG Reduction (Metric Tonnes)
Fire Station #1	$34,157	64,220	$5,368	1,679	$2,904	$8,272	56.4
Fire Station #2	$13,742	34,098	$2,850	165	$147	$2,997	26.1
Fire Station #3	$5,481	13,015	$1,088	0	$0	$1,088	9.6
Fire Station #4	$5,878	14,483	$1,211	123	$122	$1,332	11.4
Meadowbrook Commons	$19,075	50,707	$4,239	345	$335	$4,574	39.4
DPS Field Services	$68,836	22,902	$1,283	676	$581	$2,259	20.5
Totals	**$147,167**	**199,425**	**$16,038**	**2,987**	**$4,089**	**$20,522**	**163.4**

3.1 FIRE STATION #1

AKT Peerless has identified eight potential energy conservation measures (ECMs) for Fire Station #1. The ECMs include Heating, Ventilating and Air Conditioning (HVAC) and ventilation system modifications, wall to ceiling repairs and interior and exterior lighting upgrades. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Fire Station #1 report for more details.

Figure #6
Fire Station #1 ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Correct open pathways to outside air	ECM1	$3,400	5,068	$424	430	$744	$1,167	2.9	6.0
Correct fan forced connection to outside air	ECM2	$34	6,081	$508	516	$892	$1,401	0.0	7.2
HVAC system rezoning	ECM3	$3,270	750	$63	475	$822	$884	3.7	3.1
Correct wall ceiling air leakage	ECM4	$8,800	3,041	$254	258	$446	$700	12.6	3.6
T12 to T8 Lighting Retrofit	ECM5	$13,172	36,266	$3,031	0	$0	$3,031	4.3	26.8
Retrofit exits signs to LED	ECM6	$766	876	$73	0	$0	$73	10.5	0.6
Install motion detectors for interior lighting	ECM7	$1,505	10,405	$870	0	$0	$870	1.7	7.7
LED retrofit of parking lot lighting	ECM8	$3,210	1,734	$145	0	$0	$145	22.1	1.3
Totals		**$34,157**	**64,220**	**$5,368**	**1,679**	**$2,904**	**$8,272**		**56.4**

3.2 FIRE STATION #2

AKT Peerless has identified six potential ECMs. The ECMs include interior and exterior lighting upgrades, installation of occupancy sensors, adding low-e-glazing on windows and closing unnecessary duct connections to outside air. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Fire Station #2 report for more details.

Figure #7
Fire Station #2 ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Retrofit exits signs to LED	ECM1	$766	876	$73	0	$0	$73	10.5	0.6
Install motion detectors for interior lighting	ECM2	$1,505	10,405	$870	0	$0	$870	1.7	7.7
LED retrofit of parking lot lighting	ECM3	$3,210	1,734	$145	0	$0	$145	22.1	1.3
Closing leftover openings to outside air	ECM4	$565	950	$79	50	$45	$124	4.6	1.0
Install a third pane of low-e glass	ECM5	$1,110	2,000	$167	115	$102	$270	4.1	2.1
T12 to T8 Lighting Retrofit	ECM6	$6,586	18,133	$1,516	0	$0	$1,516	4.3	13.4
Totals		**$13,742**	**34,098**	**$2,850**	**165**	**$147**	**$2,997**		**26.1**

3.3 FIRE STATION #3

AKT Peerless has identified three potential ECMs. The ECMs include interior and exterior lighting upgrades and installation of occupancy sensors. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Fire Station #3 report for more details.

Figure #8
Fire Station #3 ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Retrofit exits signs to LED	ECM1	$766	876	$73	0	$0	$73	10.5	0.6
Install motion detectors for interior lighting	ECM2	$1,505	10,405	$870	0	$0	$870	1.7	7.7
LED retrofit of parking lot lighting	ECM3	$3,210	1,734	$145	0	$0	$145	22.1	1.3
Totals		**$5,481**	**13,015**	**$1,088**	**0**	**$0**	**$1,088**		**9.6**

3.4 FIRE STATION #4

AKT Peerless has identified four potential ECMs. The ECMs include interior and exterior lighting upgrades, installation of occupancy sensors and closing unnecessary duct connections to outside air. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Fire Station #4 report for more details.

Figure #9
Fire Station #4 ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Retrofit exits signs to LED	ECM1	$766	876	$73	0	$0	$73	10.5	0.6
Install motion detectors for interior lighting	ECM2	$1,505	10,405	$870	0	$0	$870	1.7	7.7
LED retrofit of parking lot lighting	ECM3	$3,210	1,734	$145	0	$0	$145	22.1	1.3
Close openings to outside air	ECM4	$398	1,468	$123	123	$122	$244	1.6	1.7
Totals		**$5,878**	**14,483**	**$1,211**	**123**	**$122**	**$1,332**		**11.4**

3.5 MEADOWBROOK COMMONS

AKT Peerless has identified two potential ECMs. The ECMs include replacing light baffles with air-tight baffles and upgrading lighting. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Meadowbrook Commons report for more details.

Figure #10
Meadowbrook Commons ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Replace leaky light baffles with air-tight baffles	ECM1	$1,205	10,499	$878	345	$335	$1,213	1.0	9.6
Replace T12 lighting with T8 and retrofit exit signs with LED	ECM2	$17,870	40,208	$3,361	0	$0	$3,361	5.3	29.8
Totals		**$19,075**	**50,707**	**$4,239**	**345**	**$335**	**$4,574**		**39.4**

3.6 DEPARTMENT OF PUBLIC SERVICES

AKT Peerless has identified three potential ECMs. The ECMs include rooftop furnace and makeup air unit replacement, retro-commissioning of the ventilation system and upgrading lighting. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level I Walk-Through Energy Analysis Department of Public Services- Field Services Complex report for more details.

Figure #11
Department of Public Services ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Retrocommisioning	ECM1	$7,700	6,390	$358	676	$581	$939	8.2	8.3
Replace rooftop unit and air handler	ECM2	$53,500	6,000	$336	0	$0	$336	Greater than 30 years	4.4
T12 to T8 Lighting Retrofit	ECM3	$7,636	10,512	$589	0	$0	$985	7.8	7.8
Totals		**$68,836**	**22,902**	**$1,283**	**676**	**$581**	**$2,259**		**20.5**

4.0 LEVEL II ENERGY SURVEY AND ENGINEERING ANALYSIS

The purpose of a Level II Energy Survey and Engineering Analysis is to assist the Client in evaluating the current energy efficiency and energy cost efficiency of the subject property relative to other, similar properties, and to identify and provide in depth analysis of the costs and savings potential of both low-cost/no-cost energy conservation measures as well as energy conservation capital improvements.

Two Level II Energy Survey and Engineering Analysis reports were completed for the Novi Ice Arena and the Civic Center Complex. An energy model was also developed for the Civic Center Complex. A walk-through survey of the subject building has been conducted by the energy analyst in order to become familiar with its construction, equipment, operation, and maintenance. Mechanical and electrical system design, installed condition, maintenance practices, and operating methods have been reviewed. Key operating parameters have been measured and compared to design levels. Where the energy analyst considers discrepancies between design conditions and actual operating conditions to be noteworthy, they have been discussed in the relevant narrative section of the report individual reports.

The following table summarizes the ECMs identified for the Novi Ice Arena and Civic Center buildings. The following sections describe the individual ECMs.

Figure #12
Level II ECMs Summary

Building	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	GHG Reduction (Metric Tonnes)
Novi Ice Arena	$128,070	373,324	$20,906	0	$0	$20,906	276.3
Civic Center	$151,361	694,430	$69,443	(12,041)	($9,633)	$59,810	449.9
Totals	**$279,431**	**1,067,754**	**$90,349**	**(12,041)**	**($9,633)**	**$80,716**	**726.2**

4.1 NOVI ICE ARENA

AKT Peerless has identified six potential ECMs. ECMs have been prioritized according to return on investment, and it is assumed that ECMs with the greatest investment returns will be implemented first. Savings may be different if a different implementation sequence is followed. ECMs include HVAC modifications, energy recovery of "waste" heat, installation of small chiller for air conditioning, increasing the heat exchange pipe in ice melting pit and installing an automated ice plant management system. The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level II Energy Survey and Engineering Analysis Novi Ice Arena report for more details.

Once all the ECMs have been implemented an energy load watch program can be implemented for the Novi Ice Arena. The load watcher program offered by DTE has an initial cost of $1,000 and a month charge of $40. It offers facilities an easy way to monitor their demand charge and to be alerted if a facility is approaching an electricity consumption peak.

Figure #13
Novi Ice Area ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
HVAC - Compressor Head Rebuild (x2)	ECM1	$6,600	49,500	$2,772	0	$0	$2,772	2.4	36.6
HVAC - Sub Slab Heating Energy Recovery (x2)	ECM2	$14,200	35,000	$1,960	0	$0	$1,960	7.2	25.9
HVAC - Hot Water Systems off Compressor Waste Heat (x2)	ECM3	$17,500	26,000	$1,456	0	$0	$1,456	12.0	19.2
Install a small chiller dedicated for air conditioning instead of using larget ice plant chillers	ECM4	$43,600	64,824	$3,630	0	$0	$3,630	12.0	48.0

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	Simple Payback (yrs)	GHG Reduction (Metric Tonnes)
Correct undersized heat exchange pipe in ice melting pit	ECM5	$8,720	100,000	$5,600	0	$0	$5,600	1.6	74.0
HVAC - Ice Plant Automated Management System	ECM6	$37,450	98,000	$5,488	0	$0	$5,488	6.8	72.5
Totals		**$128,070**	**373,324**	**$20,906**	**0**	**$0**	**$20,906**		**276.3**

4.2 CIVIC CENTER

AKT Peerless has identified four potential ECMs. ECMs have been prioritized according to return on investment, and it is assumed that ECMs with the greatest investment returns will be implemented first. Savings may be different if a different implementation sequence is followed. ECMs include upgrades to interior lighting, HVAC modifications (installing variable frequency drive motors on air handling units), installing carbon dioxide sensors and evaluating ductwork redesign. A detailed engineering study would need to be completed to determine the cost for retrofitting the existing duct work (estimates between $50,000 and $150,000). The following table summarizes the anticipated benefits from implementing the ECMs. Please refer to the Level II Energy Survey and Engineering Analysis Civic Center report for more details.

Figure #14
Civic Center ECMs Summary

ECM Description	ECM	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	KW Demand Reduction (KW)	KW Demand Reduction ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	GHG Reduction (Metric Tonnes)
Replace motors with variable frequency drives	ECM1	$35,501	263,780	$26,378	24.00	$0	(388)	($310)	$26,068	193.1
Retrofit T-12 Lighting with T-8	ECM2	$86,360	141,000	$14,100	24.00	$0	(3,227)	($2,582)	$11,518	87.2
C02 Monitors	ECM3	$1,800	210,720	$21,072	0.00	$0	(8,426)	($6,741)	$14,331	111.2
Duct Work Redesign Evaluation	ECM4	$27,700	78,930	$7,893	3.96	$0	0	$0	$7,893	58.4
Totals		**$151,361**	**694430**	**$69,443**	**51.96**	**$0**	**(12,041)**	**($9,633)**	**$59,810**	**449.9**

5.0 ENERGY EFFICIENCY AND CONSERVATION STRATEGY

The Department of Energy (DOE) has identified the following elements as critical components of the EECS:

1) Measurable goals and objectives which increase energy efficiency and reduce operating costs, energy use and greenhouse gas emissions
2) Comprehensive strategies which provide community-wide impacts
3) Activities which generate jobs
4) Strategies to leverage resources and sustain benefits beyond 3 funding period
5) Strategies to coordinate and share information with the State and surrounding jurisdictions
6) Transparency and accountability

The City of Novi began recognizing the importance of sustainability and energy efficiency in 2007 by adopting the goal that Novi will "Be a community that values natural areas and natural features." To achieve this goal City Council adopted two resolutions to utilize "best practices" and Leadership in Energy and Environment Design (LEED) standards for the construction of new and major renovations of publicly-owned buildings and encourage private developments to consider LEED standards. Additionally the Green Subcommittee Venture Team was created to develop and implement a sustainability strategy for the City by June 30, 2010. The strategy will focus on the following areas 1) Community Waste/Recycling; 2) Water Conservation; 3) Green Assets/Technology; 4) Code Changes; 5) Green Website; 6) Renewable Energy; and 7) Reducing Carbon Footprint. The city has made progress in several areas including reducing idling times for police and fire department vehicles, development of draft ordinance amendments to allow for the installation of solar panels and wind turbines for residences and businesses and increasing participation rates for recycling.

EECBG funds will support Novi's sustainability goals by reducing the City's operational carbon footprint with “Energy Efficiency Retrofits”, provide the tools to reduce the community's carbon footprint through the creation of an “Energy Efficiency and Conservation Program for Buildings and Facilities” and encourage the growth, development and installation of the renewable energy systems. The City of Novi intends to lead by example by first implementing energy efficiency measures in municipal buildings to serve as a model for the community.

Utilizing EECBG funds for the “Energy Efficiency and Conservation Program for Buildings and Facilities (Energy Office)” will provide the City of Novi the opportunity to conduct community outreach to residences and businesses. The Energy Office will also provide tools and mechanisms to implement energy efficiency measures on a community-wide scale. Specifically the energy office will:

1) Serves as an outreach to the public to educate about behavioral and infrastructural energy conservation opportunities;
2) Install a Civic Center dashboard display at the Civic Center for public outreach. The dashboard will display the Civic Center energy model on a continuous loop, energy savings and energy program updates;
3) Provides information about financing opportunities such as grant and partnership opportunities, traditional and equipment loans and others;

4) Educates staff on conservation measures and behaviors to save money with respect to municipal facilities;
5) Works with business owners to find funds to implement conservation measures identified in energy audits;
6) Work with renewable energy companies to install renewable energy systems in Novi; and
7) Leverages other resource to help reduce overall community energy use.

The City of Novi will leverage staff, technical resources, utility optimization rebates and energy savings to further energy efficiency activities during and beyond the three year EECBG funding period. Rebates and energy savings will be used to complete future retrofit opportunities and to join regional energy groups, such as the Michigan Suburbs Regional Energy Office. This will allow Novi to continue reduce energy use, share information on new technologies and regional efforts to provide community-wide impacts and identify future funding resources.

6.0 ECM RECOMMENDATIONS AND EECBG ALLOCATION SUMMARY

Figure #15
Energy Retrofit Summary

Activity	Additional First Cost ($)	KWH Annual Savings (KWh)	KWH Annual Savings ($)	Therm Annual Savings (Therms)	Therm Annual Savings ($)	Total Annual Savings ($)	GHG Reduction (Metric Tonnes)
Level I ECMs	$147,167	199,425	$16,038	2,987	$4,089	$20,522	163.4
Level II ECMs	$279,431	1,067,754	$90,349	(12,041)	($9,633)	$80,716	726.2
Totals	**$426,598**	**1,267,179**	**$106,387**	**(9,054)**	**($5,544)**	**$101,238**	**889.6**

Figure #16
EECBG Allocation Summary

Activity	EECBG Funds	Leverage	Total Annual Savings	Summary
Energy Efficiency Retrofits	$426,598	$19,912 *	$101,238	Retrofit eight municipal buildings and utilize a portion of the savings and optimization rebates to fund future retrofit activities
Energy Efficiency and Conservation Program	$35,000	$11,600		Develop an energy program to conduct outreach and provide tools and mechanisms to residences and businesses to conduct energy efficiency retrofits, provide community-wide impact
Administration **	$23,557	$23,557		Administration activities include tracking progress, measuring benefits and completing reporting requirements
EECS Development	$47,945	$9,450		Activity itemizes EECBG activities and is required to receive funding allocation
Totals	**$533,100**	**$44,607**	**$101,238*****	

*Utility optimization rebates used for future efficiency upgrades
**Maximum amount is $53,100
*** Savings will vary depending on the energy conservation measures implemented

Figure #17
Future Energy Efficiency Activities

Building	Activity	Estimated Cost
Fire Station #2	Energy Load Monitoring	$5,000
Novi Ice Arena	Load Watch Program	$2,000 (annually)
Civic Center Duct Work Redesign	Redesign Duct Work	$50,000-$150,000
Totals		**$157,000**

7.0 SIGNATURES

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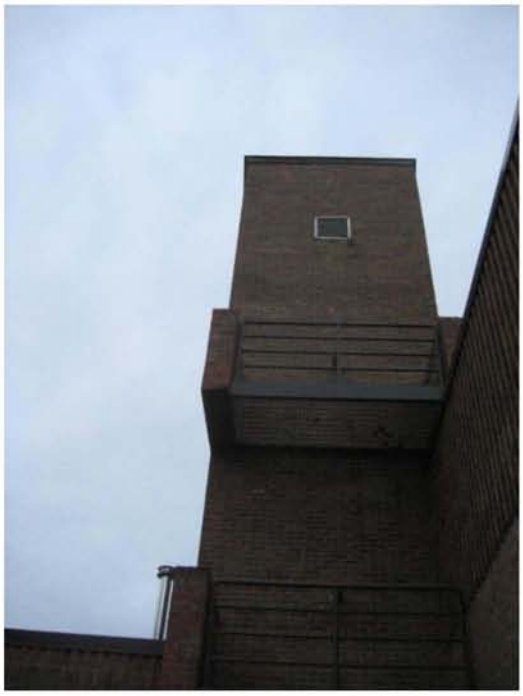
Chicago, Illinois Office

APPENDIX A – PHOTO LOG



Photograph No. 1
Hose drying tower exterior.

Photograph No. 2
Hose drying tower interior.

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PROPERTY PHOTOGRAPHS

Fire Station #1
42975 Grand River
Novi, Michigan

TAKEN BY: CK
DATE: 11.9.2009

Project Number: 6341e

Photograph No. 3
The opening to the hose drying tower, directly connected to the heated equipment bay.

Photograph No. 4
Smoke from puffer being drawn into hose drying tower.

Photograph No. 5
Boot on HVAC trunk line forces conditioned air down the corridor into the equipment bay and out of the building through the hose drying tower in the summer and the winter.

Photograph No. 6
Un-insulated block walls and substantial glazed area – typical of fire house construction.

Photograph No. 7
One of two smaller offices created by remodeling one larger space. Office is cut off from the thermostat that controls the HVAC system.

Photograph No. 1
Smoke rapidly leaving the mechanical room through a vent hole that is no longer necessary.

Photograph No. 2
Electric heat pump rooftop unit. Electricity consumption should be monitored for winter months.

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PROPERTY PHOTOGRAPHS

Firestation #2
1919 Paramount
Novi, Michigan

TAKEN BY: CK
DATE: 11/9/2009

Project Number: 6341e

Photograph No. 1
Unnecessary 1-foot vent openings through roof allow for rapid exchange of conditioned and outside air.

Photograph No. 2
Unnecessary 1-foot vent openings through roof allow for rapid exchange of conditioned and outside air.

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PROPERTY PHOTOGRAPHS

Fire Station #4
21303 Haggerty Road
Novi, Michigan

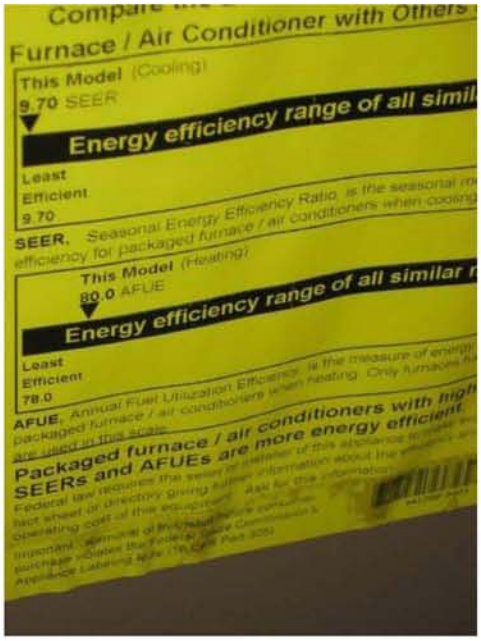
TAKEN BY: CK
DATE: 11/9/2009

Project Number: 6341e

Photograph No. 3
Hose drying machine is an advantage over open chimney in fire house.

Photograph No. 4
Switching over to rubber fire hoses is the best solution to hose drying energy woes.

Photograph No. 1
Parking lot lights on when it is still daylight. Check photo sensors.



Photograph No. 2
Air conditioner portion for individual apartments is lowest efficiency allowed by law. Highest level efficiency available should be considered at time of replacement. Furnace level is also low. Condensing modulating furnaces should be considered at the time of replacement.

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PROPERTY PHOTOGRAPHS

Meadowbrook Commons
25075 Meadowbrook Road
Novi, Michigan

TAKEN BY: CK
DATE: 11/9/2009

Project Number: 6341e

Photograph No. 3
Un-caulked joints where duct work passes through exterior walls to air conditioning unit is responsible for substantial energy loss.

Photograph No.4
View of ceiling of senior center

Photograph No. 5
Recessed Can lights are not air tight.

Photograph No.6
All of the can lights are connected through ceiling ventilation to outside air. Smoke puffed into recessed can descends rapidly due to cold air current. Replace leaky baffles with air tight baffles.

Photograph No. 1
Truck bay for field service complex.

Photograph No. 2
View of ventilation and HVAC ductwork.

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PROPERTY PHOTOGRAPHS

DPS Field Services Complex
26300 Delwal Drive
Novi, Michigan

TAKEN BY: CK
DATE: 11/9/2009

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Photograph No. 3
Mechanics shop.

Photograph No. 4
Rooftop mushroom fan for ventilation system

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PROPERTY PHOTOGRAPHS

DPS Field Services Complex
26300 Delwal Drive
Novi, Michigan

TAKEN BY: CK
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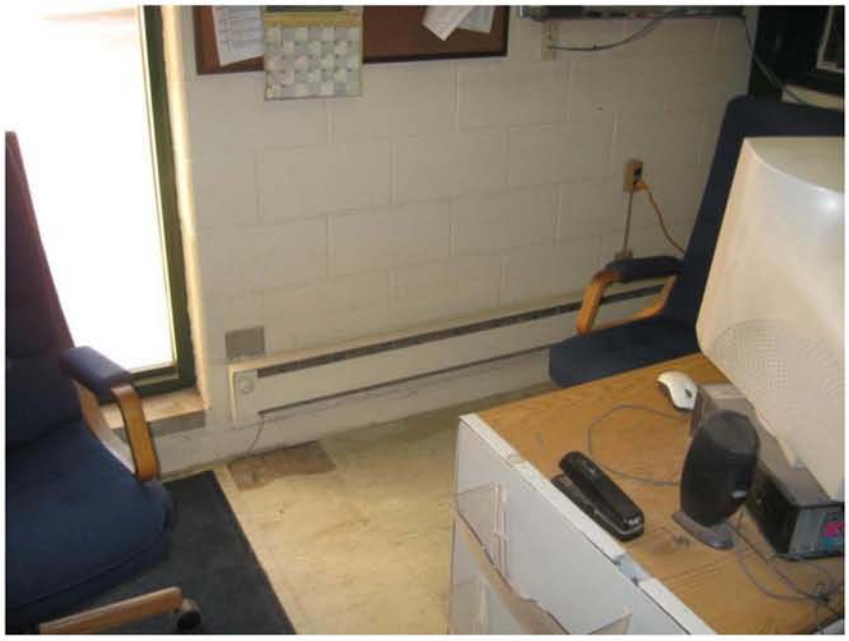
Photograph No. 5
Dampers for ventilation system on underside of room deck. All roof level dampers for ventilation system are stuck in the open position. Control needs to be reestablished. Note new T8 lighting system on right side of photo.

Photograph No. 6
Rooftop makeup air unit for ventilation system

Photograph No. 7
Makeup air unit is direct field system. All products of combustion enter the occupied space.

Photograph No. 8
Direct fired system is legal only if 100% fresh air is used. All take dampers on this unit are closed. The linkage to the actuator is disconnected. Control of damper needs to be reestablished.



Photograph No. 9
Auxiliary electric baseboard heater in mechanics area office is a result of loss of control for the central HVAC system. Part of the problem is a thermostat that is out of calibration.

Photograph No. 10
Lights left on in sporadically occupied spaces. Motion sensors needed.

Photograph No.11
Drip pan and drain to outside needed below condenser.

Photograph No. 12
Interior of DPS storage facility. Automatic door closers and occupying sensors needed for lighting.

Photograph No. 1
View of Ice Arena

Photograph No. 2
Pipes for hot gas snow melting system are too small, forcing high head pressure. Replace with properly sized stainless steel piping.

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PROPERTY PHOTOGRAPHS

Ice Arena
42400 Arena Drive
Novi, Michigan

TAKEN BY: CK
DATE: 11/9/2009

Project Number: 6341e

Photograph No. 3
1 of 2 ice sheets.

Photograph No. 4
Traditional Boiler System for ice arena. Requires purchase of natural gas.

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PROPERTY PHOTOGRAPHS

Ice Arena
42400 Arena Drive
Novi, Michigan

TAKEN BY: CK
DATE: 11/9/2009

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Photograph No. 5
Recommended retrofit – hot water needs are met through energy recovery that would otherwise be wasted.