

# SAMPLE AUDIT

## Comprehensive Energy Analysis

Arapahoe County

Littleton, Colorado

October 2005

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Prepared by

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Energy Analysis**

**of**

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**by:**

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**Executive Summary**

**Energy Consumption History**

**Data on Present Facilities**

**Energy Conservation Measures**

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# Executive Summary

Chevron Energy Solutions (“Chevron ES”) is pleased to present this Comprehensive Energy Analysis (CEA) to Arapahoe County. Our proposal is dedicated to the identification and implementation of energy cost savings projects and facility upgrades. There are fifteen building sites included in this CEA. They are listed and described in detail in Section 3 of this report, Data on Present Facilities.

The Chevron ES performance based energy savings program has been developed with the assistance of the County's administrative and site maintenance staff. Coordination with the staff was a crucial factor in allowing us to develop a program that will enhance the working environment and address current and long-range facility planning requirements. We would like to thank Bob Roby, Anne Cecilione, Wayne Cooper, and the rest of the Facilities Staff for their assistance in preparation of this report. The Chevron Energy Solutions proposal was developed based on the following objectives:

- *Improve comfort for the staff and occupants of the County's buildings.*
- *Extend value to the County by upgrading facility infrastructures and increasing the life expectancy of existing building systems.*
- *Implement energy efficiency measures that support the County's operating cost improvement goals.*
- *Provide flexibility in product and vendor selection to meet specific operating requirements for each building.*
- *Support program implementation through a turnkey approach including on-site construction management and follow-up support after installation of proposed energy retrofit measures.*

Chevron ES' philosophy regarding performance contracting is based on determining the most cost-effective solution to a client's needs and then selecting the equipment/manufacturer required to meet each technical application. Additionally, Chevron ES requires review of facilities on a holistic basis, that is, accounting for the interaction of energy conservation measures on the building environment and operating cost. This approach also supports the County's standard for excellence in meeting or exceeding current environmental requirements for facility operation while insuring occupant comfort and safety. The resulting energy services proposal fully describes a list of retrofit opportunities to support these objectives along with firm installation costs and guaranteed energy savings. It takes into account specific site operating requirements, historical energy and operating cost data, and current facility planning studies.



## **Background**

The proposed project contained in this report analyzes energy conservation measures (ECM's) at fifteen individual building sites. These buildings encompass a great variety of usage types and operating parameters. A thorough survey of the buildings and their energy using systems was conducted. Potential measures were analyzed based on their potential to generate energy savings and upon the need for upgraded equipment to improve the operation and environmental control of the facilities.

For the 12-month period of most recent utility data, Arapahoe County spent a total of \$2,274,106 in utility costs for the buildings included in this scope of work as follows:

Electricity	\$843,134
Natural Gas	\$425,902
Water/Sewer	\$1,005,070
Total	<u>\$2,274,106</u>

## **Project Opportunities**

The recommended project includes a variety of projects, including the following:

- ✓ Upgrades to all interior lighting systems, where required. In addition to decreasing energy consumption, the types of lamps and ballasts will be standardized so that less replacement inventory need be kept on hand.
- ✓ Upgrades to heating, ventilating, and air conditioning (HVAC) systems to improve efficiency and comfort.
- ✓ Implementation of new and upgrade of existing Energy Management Systems (EMS) with actual occupancy and zone temperature requirements.
- ✓ HVAC improvements at the Administration I facility including a new chilled water plant with a waterside economizer, heating and domestic hot water plants, and improving the airside distribution system.
- ✓ New boilers at Administration I, Altura Plaza, ACJC Courthouse, ACJC Administration II, as well as the ACJC Detention Center.
- ✓ Improve evaporation cooling efficiency in air handling units reducing water usage.
- ✓ End-use fixture replacement. Approximately five million gallons of annual water usage will be avoided with the implementation of low flow toilets and waterless urinals.
- ✓ New cooling tower at the ACJC Courthouse.
- ✓ Programmable flush valve controls to eliminate excessive inmate usage.
- ✓ Ozone laundry system that will reduce detergent and water consumption.
- ✓ On-site Energy Resource Conservation Manager to expand, enhance, and assist current energy manager roles.
- ✓ Retro-commissioning of existing EMS systems at Centrepont Plaza and Sheriff's/Coroners Facility to optimize control and achieve greater efficiencies.
- ✓ Along with the 12-year financing term that the project has a 16 year weighted life.

The detailed descriptions and benefits of these and other improvements are addressed in Section 4 of this report.

The installation costs, including labor, material, engineering design, and construction management for the ECM's proposed in the buildings are guaranteed. The guarantee of the installation cost assures the County that the installation of the ECM's will not exceed the amount presented. The savings guarantee assures the County that utility savings for the ECM's will be realized for the life of the guarantee.

### **Recommended Project**

This CEA has shown that, if implemented, the performance contract set forth by Chevron ES will save \$632,694 in the first year.

Table 1.1 provides the cash flow scenario for the recommended project. The total guaranteed cost of the project is \$10,093,933. *\$5,622,508 of the project will be paid for out of the performance contract as detailed in Table 1.1, the remaining \$4,471,425 will be paid for from other means.* Utilizing a 3.54% interest rate, the program pays for itself within 12 years, using funds already available in the current operational and utility budgets. Tables 1.2 through 1.14 provide a building-by-building breakdown of the construction costs and savings for the ECM's included in the recommended package. Table 1.15 provides a total of all recommended ECM's.

*Arapahoe County retains all excess savings generated by this Project.* These funds could be used to install additional capital improvements in facilities that could not be included in the project.

### **Report Layout**

This report contains, among other items, the Executive Summary (Section 1), Energy Consumption History (Section 2), Data on Present Facilities (Section 3), Energy Conservation Measures (Section 4), proposed Measurement and Verification Program (Section 5); and Section 6, the Appendix, is divided into four (4) separate sections: Appendix A, Appendix B, Appendix C, and Appendix D. Appendix A provides an inventory of all existing light fixtures within the selected buildings at Arapahoe County. Appendix B provides an inventory of the Standards of Control for existing conditions and proposed new conditions on which the energy savings calculations are based. Appendix C provides the points lists per facility for the recommended energy management system. Appendix D provides the weighted average life of each ECM.

### **Performance Based Energy Savings Program**

Chevron ES has detailed the results of the CEA in this report and will assist in selecting energy efficiency measures that would best meet the County's energy efficiency goals. These measures will also be targeted for improving the working environment and comfort for the occupants, and increasing the life expectancy of the building systems.

After Arapahoe County approves the measures for implementation, Chevron ES will then prepare specifications and drawings for the implementation of the selected measures. The specifications and drawings will adhere to the County's design guidelines and will be reviewed by Arapahoe County personnel as well. The installed costs provided in this report include labor and material, engineering design, and construction management.

### **The Chevron Energy Solutions Team**

Chevron ES is highly qualified and uniquely positioned to develop a successful energy savings performance contract that will meet the needs and goals of Arapahoe County. We believe that the technical and financial solutions described in our comprehensive energy audit, together with Chevron ES' unparalleled, no-risk energy savings guarantee, will solidify our selection as your energy service company (ESCO) of choice.



Chevron Energy Solutions Company (Chevron ES) is a division of **Chevron**, the second-largest U.S.-based energy company and the fifth largest publicly traded integrated oil and gas company in the world, based on market capitalization. The corporation engages in all aspects of the energy industry, including exploration, production, refining, equity gas marketing and transportation, power generation and energy conservation services. Chevron ES, already a major energy services company, has become the leader in this services area with the recent acquisitions of Energy Masters International, a major presence at the Federal level and Viron Energy Services, a major presence in the public sector particularly with the education market. With these acquisitions, Chevron ES is positioned to provide the industry's leading vendor-independent energy services to markets throughout North America.

Chevron ES legacy companies have been providing the industry's leading energy performance contract services for 24 years and have been in the energy services business for over 30 years. The following points regarding our unique market position need to be made:

- Performance contracting has been our only business since 1981.
- Our core competency is custom-engineered solutions.
- We have highly qualified, seasoned professionals on our project team.
- Chevron ES is vendor-independent, yet experienced with all major brands of HVAC equipment and building control systems.
- Chevron ES currently monitors energy consumption for over 1200 buildings.
- We presently manage over \$250 million in energy savings guarantees.
- Chevron ES is a single-source energy performance engineering and contracting company.
- Our project values range from \$500,000 to \$220 million.
- Chevron ES completed the 1st ESPC contract at **Adrian College** in 1981.
- Chevron ES has completed the installation of the largest college/university energy performance contract ever implemented in the U.S -- **University of Utah \$43MM**
- Chevron ES is an EPA Energy Star Partner.



"By having a more engineering based company involved, I think you get a broader spectrum, a broader aspect of involvement on how the total project needs to come together."

Charlie Hargett  
Physical Plant Administrator

- Chevron ES is a pre-qualified with the Department of Energy/Defense.
- Chevron ES is a founding member of the National Association of Energy Services Companies, the industry's trade association.

CES will provide the County with the services required to make a project of this size successful. Chevron ES' areas of expertise are rooted in our technical team that will be assigned to the project. We take great pride in the fact that we have the largest in-house bench of energy engineers in the industry. The Chevron ES technical in-house staff is experienced in performing in-depth energy evaluations, implementing successful paid from savings programs that are rigorously reviewed with a strong measurement and verification program by our monitoring department.

Our engineers have worked in the industry in a wide variety of capacities and, together, they bring to the County project broad experience and expertise in all areas of energy and water conservation. Our staff's areas of expertise include computer modeling, design and analysis, HVAC, energy management controls, contracting, test and balancing, EMCS commissioning, monitoring and verification, facility operations, finance, and maintenance. On-site construction management and ongoing support are included to minimize disruption to work spaces while maximizing program results.

Once the optimal retrofits have been determined for installation and Chevron ES has developed engineering/specification documents, Arapahoe County staff and Chevron ES will then select the most qualified contractors to install the measures.

We do not have a list of preferred suppliers or subcontractors. Our philosophy is to recommend the most cost effective and appropriate selection of suppliers and subcontractors for the immediate project. By not being tied to a single supplier or manufacturer, we are able to utilize equipment already in place without the added expense of having to replace it. We are able to design the best solution for our customer, rather than specifying the equipment of a parent company.

Efforts will be made to utilize and maximize **local subcontractors as much as possible**. We at Chevron ES recognize the importance of maximizing local subcontractors as a way to contribute to the local economies.

## **Conclusion**

Acceptance of the foregoing proposal will allow Arapahoe County to greatly improve the operation and condition of its facilities with funds that are already identified. Performance contracts are unique among contracting methods because they allow for the creation of "win-win" rather than adversarial relationships between the customer and contractor. Both parties involved in a performance contract share a common goal: *save energy and utility costs in order to improve the facilities*. We genuinely believe that the partnership between the contractor and the on-site personnel that is formed during this process is the key factor in ensuring long-term project success. We appreciate the assistance of all members of the County staff whose input and assistance was essential in the preparation of this report.

In summary, we believe that we have demonstrated through our proposal that the Chevron ES team has the technical resources and expertise on staff to handle the full range of technologies that will be required in this program.

We are extremely excited about the opportunity to partner with Arapahoe County in realizing the benefits that will be obtained through program implementation.

**Table 1.1**  
**Financial Aspects of Performance Based Energy Program for**  
**Arapahoe County**  
**Littleton, CO**

Implementation Cost	\$10,042,594
CEA Fee	\$51,339
<b>Total Project Fee</b>	<b>\$10,093,933</b>
Construction Period Savings	\$0
Client Buydown	\$0
<b>Cash Contribution to Project</b>	<b>\$0</b>
<b>Financed amount of Project</b>	<b>\$10,093,933</b>
Construction Period Interest	\$ 434,838
Financing Fees	\$ -
<b>Total Financing Costs during Construction</b>	<b>\$ 434,838</b>
<b>Total Amount Financed</b>	<b>\$10,528,771</b>

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Year	Total Energy Savings	Maintenance Reallocation	Other Funds	Total Program Contributions / Savings	Payment to Lessor	Monitoring and Verification	Laundry Ozone Service Contract	EMS Service Contract	Irrigation Service Contract	Water Softener Maintenance / Material Costs	Third Party Review	Total Program Costs	Net Savings
1	\$542,694	\$90,000	\$456,500	\$1,089,194	\$1,045,571	\$13,500	\$0	\$7,000	\$945	\$19,365	\$2,713	\$1,089,095	\$99
2	\$556,261	\$92,250	\$456,500	\$1,105,011	\$1,056,733	\$13,905	\$3,500	\$7,175	\$969	\$19,849	\$2,781	\$1,104,912	\$99
3	\$570,168	\$94,556	\$456,500	\$1,121,224	\$1,071,672	\$14,322	\$3,588	\$7,354	\$993	\$20,345	\$2,851	\$1,121,125	\$99
4	\$584,422	\$96,920	\$456,500	\$1,137,842	\$1,104,656	\$0	\$3,677	\$7,538	\$1,018	\$20,854	\$0	\$1,137,743	\$99
5	\$599,033	\$99,343	\$456,500	\$1,154,876	\$1,120,862	\$0	\$3,769	\$7,727	\$1,043	\$21,375	\$0	\$1,154,776	\$99
6	\$511,380	\$101,827	\$456,500	\$1,069,706	\$1,034,845	\$0	\$3,863	\$7,920	\$1,069	\$21,910	\$0	\$1,069,607	\$99
7	\$524,164	\$104,372	\$456,500	\$1,085,036	\$1,049,306	\$0	\$3,960	\$8,118	\$1,096	\$22,457	\$0	\$1,084,937	\$99
8	\$537,268	\$106,982	\$456,500	\$1,100,750	\$1,064,129	\$0	\$4,059	\$8,321	\$1,123	\$23,019	\$0	\$1,100,651	\$99
9	\$550,700	\$109,656	\$456,500	\$1,116,856	\$1,079,322	\$0	\$4,160	\$8,529	\$1,151	\$23,594	\$0	\$1,116,757	\$99
10	\$564,467	\$112,398	\$456,500	\$1,133,365	\$1,094,895	\$0	\$4,264	\$8,742	\$1,180	\$24,184	\$0	\$1,133,266	\$99
11	\$578,579	\$115,208	\$456,500	\$1,150,287	\$1,110,857	\$0	\$4,371	\$8,961	\$1,210	\$24,789	\$0	\$1,150,187	\$99
12	\$593,043	\$118,088	\$456,500	\$1,167,631	\$1,127,219	\$0	\$4,480	\$9,185	\$1,240	\$25,409	\$0	\$1,167,532	\$99
<b>Totals</b>	<b>\$6,712,179</b>	<b>\$1,241,600</b>	<b>\$5,478,000</b>	<b>\$13,431,779</b>	<b>\$12,960,065</b>	<b>\$41,727</b>	<b>\$43,692</b>	<b>\$96,569</b>	<b>\$13,037</b>	<b>\$267,151</b>	<b>\$8,346</b>	<b>\$13,430,587</b>	<b>\$1,192</b>

*Notes By Column:*

- (1) Years after implementing retrofit changes
- (2) Energy Savings are escalated by 2.5% to account for inflation. Energy Savings at Altura Plaza and Peoria Shops eliminated after Year 5.
- (3) Maintenance funds reallocated with implementation of Performance Contract escalated at 2.5% per year. Estimated that 1/3 of maintenance costs will be reduced.
- (4) Other funds provided annually for program to cash flow.
- (5) Total Program Savings is the sum of Columns (2), (3), and (4)
- (6) Payment to Lessor is based on an annual interest rate of 3.54%, 12 year term. Actual rate will be determined at closing
- (7) Monitoring Services are included for the entire term of the project as listed in Column 1 and are required for guaranteed programs. Monitoring and Verification services are escalated by 3% to account for inflation.
- (8) Service contract escalated 2.5% per year. Year 1 is included in the base contract.
- (9) Service contract escalated 2.5% per year.
- (10) Service contract escalated 2.5% per year.
- (11) Water Softener Material & Maintenance Costs Escalated at 2.5% per year.
- (12) 1/2% of Column 1 "Total Energy Savings" for third party review.
- (13) Total Program Costs are the sum of Columns (6) thru (12)
- (14) Net Savings equals Total Program Savings less Total Program Costs, Columns (5) - (13).

Table 1.2  
ECM Summary Table – 01 Administration

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
01 - ADMINISTRATION BUILDING														
1	Lighting Energy Efficiency Improvements	172,101	54.5	125,062	(1,322)	0	0	16,593	(838)	0	0	2,760	18,515	9.3
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	62,182	0.0	0	0	669	0.0	0	0	3,588	0	0	3,588	17.3
3	Install New/Upgrade the Existing EMCS	189,038	0.0	218,866	11,548	0.0	0.0	12,845	7,331	0	0	0	20,176	9.4
5a	Replace the Existing Chillers and Cooling Tower - Performance Cont	173,888	54.1	79,870	0	0.0	0.0	10,052	0	0	0	0	10,052	17.3
5b	Replace the Existing Chillers and Cooling Tower - GC Contract	998,944	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
6a	Replace the Existing Natural Gas Fired Boilers - Performance Contra	24,747	(1.7)	(5,038)	1,851	0.0	0.0	(464)	1,175	0	0	0	711	34.8
6b	Replace the Existing Natural Gas Fired Boilers - GC Contract	142,167	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
7	Install a New VFD on Existing Exhaust Fan	31,006	0.0	18,915	0	0.0	0.0	1,110	0	0	0	0	1,110	27.9
13	Waterside Economizer	81,635	52.2	46,637	0	0.0	0.0	6,433	0	0	0	0	6,433	12.7
16	Irrigation Control System Upgrade	9,988	0.0	0	0	0.0	126.9	0	0	0	680	(120)	560	17.8
20	Replace DHW HX with new DHW Heater	25,810	0.0	0	2,158	0.0	0.0	0	1,370	0	0	0	1,370	18.8
23	Energy Resource Conservation Management Program	9,229	0.0	22,742	701	0.0	0.0	1,335	445	0	0	0	1,780	5.2
26	Replace Existing Moduline Boxes w/ VAV Terminal Units	2,015,547	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		3,936,281	159.1	507,055	14,936	669.410	127	47,904	9,483	3,588	680	2,640	64,295	61.2

Table 1.3  
ECM Summary Table – 12 Arapahoe Plaza East

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
12 - ARAPAHOE PLAZA EAST BUILDING														
1	Lighting Energy Efficiency Improvements	19,519	6.1	16,471	-165	0.0	0.0	1,998	-105	0	0	10	1,903	10.3
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	8,108	0.0	0	0	118.9	0.0	0	0	637	0	0	637	12.7
3	Install New/Upgrade the Existing EMCS	73,176	0.0	76,871	2,516	0.0	0.0	4,512	1,597	0	0	0	6,109	12.0
23	Energy Resource Conservation Management Program	1,379	0.0	3,398	89	0.0	0.0	199	56	0	0	0	255	5.4
TOTAL OF RECOMMENDED ECMs		102,182	6.1	96,740	2,439	119	0	6,709	1,548	637	0	20	8,914	11.5

Table 1.4  
ECM Summary Table – 13 Arapahoe Human Services

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
13 - ARAPAHOE HUMAN SERVICES														
1	Lighting Energy Efficiency Improvements	44,031	13.1	35,863	(379)	0	0	4,324	(241)	0	0	59	4,142	10.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	13,657	0.0	0	0	279.1	0.0	0	0	1,496	0	0	1,496	9.1
3	Install New/Upgrade the Existing EMCS	192,336	0.0	132,023	4,300	0.0	0.0	7,748	2,730	0	0	0	10,478	18.4
21	Change Natural Gas Utility Provider	0	0.0	0	0	0.0	0.0	0	3,619	0	0	0	3,619	0.0
23	Energy Resource Conservation Management Program	3,598	0.0	8,865	231	0.0	0.0	520	147	0	0	0	667	5.4
TOTAL OF RECOMMENDED ECMs		253,622	13	176,752	4,152	279	0	12,592	6,255	1,496	0	59	20,403	12.4

Table 1.5  
ECM Summary Table – 14 Arapahoe Plaza West

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
14 - ARAPAHOE PLAZA WEST BUILDING (COUNTY COURT)														
1	Lighting Energy Efficiency Improvements	17,823	5.9	12,783	-128	0.0	0.0	1,751	-81	0	0	213	1,883	9.5
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	15,109	0.0	0	0	305.1	0.0	0	0	1,635	0	0	1,635	9.2
3	Install New/Upgrade the Existing EMCS	58,216	0.0	71,285	5,076	0.0	0.0	4,184	3,222	0	0	0	7,406	7.9
23	Energy Resource Conservation Management Program	1,374	0.0	3,385	88	0.0	0.0	199	56	0	0	0	255	5.4
TOTAL OF RECOMMENDED ECMs		92,522	5.9	87,453	5,036	305	0	6,133	3,197	1,635	0	213	11,178	8.3

Table 1.6  
ECM Summary Table – 15 Federal Warehouse

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
15 - FEDERAL WAREHOUSE														
1	Lighting Energy Efficiency Improvements	18,056	7.0	15,823	-159	0.0	0.0	2,125	-119	0	0	129	2,135	8.5
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	6,552	0.0	0	0	18.5	0.0	0	0	99	0	0	99	66.2
4	Install Programmable Thermostats	550	0.0	13,513	1,662	0.0	0.0	793	1,246	0	0	0	2,039	0.3
16	Irrigation Control System Upgrade	0	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
23	Energy Resource Conservation Management Program	4,940	0.0	12,172	318	0.0	0.0	714	238	0	0	0	952	5.2
TOTAL OF RECOMMENDED ECMs		30,097	7.0	41,508	1,821	19	0	3,632	1,365	99	0	129	5,225	5.8



Table 1.7  
ECM Summary Table – 20 Tri County Health

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
20 - TRI COUNTY HEALTH														
1	Lighting Energy Efficiency Improvements	11,012	4.2	10,584	-106	0.0	0.0	1,337	-80	0	0	342	1,599	6.9
4	Install Programmable Thermostats	2,477	0.0	6,828	1,166	0.0	0.0	401	874	0	0	0	1,275	1.9
23	Energy Resource Conservation Management Program	553	0.0	1,362	36	0.0	0.0	80	27	0	0	0	107	5.2
TOTAL OF RECOMMENDED ECMs		14,042	4.2	18,774	1,095	0	0	1,817	821	0	0	342	2,980	4.7

Table 1.8  
ECM Summary Table – 23 Altura Plaza

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
23 - ALTURA PLAZA BUILDING														
1	Lighting Energy Efficiency Improvements	89,736	61.5	159,641	0	0	0	19,820	0	0	0	2,821	22,641	4.0
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	41,333	0.0	0	0	515.4	0.0	0	0	2,572	0	0	2,572	16.1
3	Install New/Upgrade the Existing EMCS	162,874	0.0	262,098	55,360	0.0	0.0	15,383	35,143	0	0	0	50,526	3.2
6a	Replace the Existing Natural Gas Fired Boilers - Performance Contra	30,938	0.0	(1,402)	1,729	0.0	0.0	(82)	1,098	0	0	0	1,016	30.5
6b	Replace the Existing Natural Gas Fired Boilers - GC Contract	177,734	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
23	Energy Resource Conservation Management Program	4,914	0.0	12,108	373	0.0	0.0	711	237	0	0	0	948	5.2
TOTAL OF RECOMMENDED ECMs		507,529	61.5	432,444	57,462	515	0	35,831	36,478	2,572	0	2,821	77,702	6.5

Table 1.9  
ECM Summary Table – 24 Cetrepoint Plaza

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
24 - CENTREPOINT PLAZA														
1	Lighting Energy Efficiency Improvements	35,152	10.2	35,183	(353)	0	0	3,954	(285)	0	0	0	3,669	9.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	17,979	0.0	0	0	397	0.0	0	0	1,981	0	0	1,981	9.1
23	Energy Resource Conservation Management Program	6,953	0.0	15,907	415	0	0.0	1,005	335	0	0	0	1,340	5.2
25	Retro Commissioning	29,723	0.0	237,292	(4,540)	0.0	0.0	14,999	(3,664)	0	0	0	11,335	2.6
TOTAL OF RECOMMENDED ECMs		89,807	10.2	288,382	(4,478)	397	0	19,958	(3,614)	1,981	0	0	18,325	4.9

Table 1.10  
ECM Summary Table – 29 Peoria Shops

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
29 - PEORIA SHOPS														
1	Lighting Energy Efficiency Improvements	16,715	5.4	16,327	-164	0.0000	0.0	1,867	-104	0	0	349	2,112	7.9
2	Water Conservation Measures	5,878	0.0	0	0	59.6560	0.0	0	0	780	0	0	780	7.5
4	Install Programmable Thermostats	2,477	0.0	6,053	8,615	0.0	0.0	355	5,469	0	0	0	5,824	0.4
18	Water Reclaim	52,181	-6.6	-2,793	0	576.0	0.0	-1,277	0	7,528	0	-1,280	4,971	10.5
23	Energy Resource Conservation Management Program	1,646	0.0	4,055	125	0.0	0.0	238	79	0	0	0	317	5.2
TOTAL OF RECOMMENDED ECMs		78,897	-1.2	23,642	8,576	636	0	1,183	5,444	8,308	0	-931	14,004	5.6

Table 1.11  
ECM Summary Table – 35 ACJC Courthouse

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
35 - ACJC COURTHOUSE														
1	Lighting Energy Efficiency Improvements	160,935	69.8	220,825	0	0	0	24,825	0	0	0	5,114	29,938	5.4
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	66,175	0.0	0	0	508	0.0	0	0	6,644	0	0	6,644	10.0
3	Install New/Upgrade the Existing EMCS	368,278	0.0	74,515	4,922	0	0.0	4,373	3,125	0	0	0	7,498	49.1
6a	Replace the Existing Natural Gas Fired Boilers - Performance Contra	28,053	0.0	-8,023	7,294	0	0.0	(471)	4,630	0	0	0	4,159	6.7
6b	Replace the Existing Natural Gas Fired Boilers - GC Contract	161,154	0.0	0	0	0	0.0	0	0	0	0	0	0	
8	Install a New VFD on Existing Vane Axial Fan	117,393	0.0	226,190	0	0	0.0	13,275	0	0	0	0	13,275	8.8
12	Water Softener	35,093	0.0	0	0	2,624	0.0	0	0	34,295	0	-5,805	28,490	1.2
23	Energy Resource Conservation Management Program	9,773	0.0	24,081	742	0	0.0	1,413	471	0	0	0	1,884	5.2
24	New Cooling Tower	216,088	3.9	6,587	0	0	0.0	1,048	0	0	0	0	1,048	206.1
TOTAL OF RECOMMENDED ECMs		1,162,942	74	544,175	12,959	3,132	0	44,464	8,226	40,939	0	-691	92,938	12.5

Table 1.12  
ECM Summary Table – 36 ACJC Detention Center

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
36 - ACJC DETENTION CENTER														
1	Lighting Energy Efficiency Improvements	158,033	55.1	277,890	-2,790	0	0	25,677	-1,771	0	0	3,148	27,054	5.8
2	Water Conservation Measures	151,960	0.0	0	1,261	1,582	0	0	800	24,769	0	0	25,569	5.9
3	Install New/Upgrade the Existing EMCS	548,787	0.0	0	0	0	0	0	0	0	0	0	0	
6a	Replace the Existing Natural Gas Fired Boilers - Performance Contra	149,938	0.0	0	23,459	0	0	0	14,892	0	0	0	14,892	10.1
6b	Replace the Existing Natural Gas Fired Boilers - GC Contract	861,356	0.0	0	0	0	0	0	0	0	0	0	0	
12	Water Softener	344,359	0.0	0	0	3,094	0	0	0	48,459	0	-9,080	39,379	8.7
16	Irrigation Control System Upgrade	19,519	0.0	0	0	0	306	0	0	0	2,395	-825	1,570	12.4
17	Programmable Flush Valve Controls	739,681	0.0	0	0	3,615	0	0	0	56,616	0	0	56,616	13.1
19	Laundry Conservation	52,492	0.0	0	1,276	440	0	0	810	6,888	0	0	7,698	6.8
23	Energy Resource Conservation Management Program	19,211	0.0	47,337	1,459	0.0	0.0	2,778	926	0	0	0	3,704	5.2
TOTAL OF RECOMMENDED ECMs		3,045,336	55.1	325,227	24,665	8,731	306	28,455	15,657	136,732	2,395	(6,757)	176,482	17.3

Table 1.13  
ECM Summary Table – 37 ACJC Administrative II

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
37 - ACJC ADMINISTRATIVE II														
1	Lighting Energy Efficiency Improvements	196,219	62.2	210,550	(2,225)	0	0	22,933	(1,666)	0	0	3,638	24,905	7.9
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	34,298	0.0	0	0	220.5	0.0	0	0	2,882	0	0	2,882	11.9
3	Install New/Upgrade the Existing EMCS	216,659	0.0	18,671	1,970	0.0	0.0	1,096	1,477	0	0	0	2,573	84.2
6a	Replace the Existing Natural Gas Fired Boilers - Performance Contra	19,935	-0.7	-6,467	1,783	0.0	0.0	-504	1,337	0	0	0	833	23.9
6b	Replace the Existing Natural Gas Fired Boilers - GC Contract	114,524	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
10	Install A/C Units to Serve Computer Equipment Rooms	83,981	0.0	37,602	2,356	0.0	0.0	2,207	1,766	0	0	0	3,973	21.1
12	Water Softener	19,016	0.0	0	0	0.0	0.0	0	0	0	0	(2,720)	(2,720)	
23	Energy Resource Conservation Management Program	5995.1	0.0	14,772	386	0.0	0.0	867	289	0	0	0	1,156	5.2
TOTAL OF RECOMMENDED ECMs		690,626	62	275,128	4,270	221	0	26,600	3,203	2,882	0	918	33,603	20.6

Table 1.14  
ECM Summary Table – 38 Sheriff/Coroner Facility

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
38 - SHERIFF/CORONER FACILITY														
1	Lighting Energy Efficiency Improvements	42,927	12.9	39,353	(395)	0	0	4,498	(287)	0	0	0	4,211	10.2
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	17,979	0.0	0	0	180.0	0.0	0	0	1,175	0	0	1,175	15.3
23	Energy Resource Conservation Management Program	8,229	0.0	20,276	545	0.0	0.0	1,190	397	0	0	0	1,587	5.2
25	Retro Commissioning	20,916	0.0	227,590	(6,766)	0.0	0.0	13,357	(4,923)	0	0	0	8,434	2.5
TOTAL OF RECOMMENDED ECMs		90,049	12.9	287,219	(6,616)	180	0	19,045	(4,813)	1,175	0	0	15,407	5.8

Table 1.15  
ECM Summary Table – All Buildings Combined

SUMMARY OF ECMs	Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
							Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
1 Lighting Energy Efficiency Improvements	982,260	367.8	1,176,356	(8,187)	0	0	131,702	(5,577)	0	0	18,583	144,708	6.8
2 Water Conservation Measures	157,838	0.0	0	1,261	1,641	0	0	800	25,549	0	0	26,349	6.0
2a Water Conservation Measures w/ Waterless Urinal Retrofit	283,370	0.0	0	0	3,212	0	0	0	22,709	0	0	22,709	12.5
3 Install New/Upgrade the Existing EMCS	1,809,364	0.0	854,329	85,692	0	0	50,141	54,625	0	0	0	104,766	17.3
4 Install Programmable Thermostats	5,504	0.0	26,394	11,443	0	0	1,549	7,589	0	0	0	9,138	0.6
5a Replace the Existing Chillers and Cooling Tower - Performance Cont	173,888	54.1	79,870	0	0	0	10,052	0	0	0	0	10,052	17.3
5b Replace the Existing Chillers and Cooling Tower - GC Contract	998,944	0.0	0	0	0	0	0	0	0	0	0	0	0
6a Replace the Existing Natural Gas Fired Boilers - Performance Contra	253,611	-2.4	-20,930	36,117	0	0	-1,521	23,132	0	0	0	21,611	11.7
6b Replace the Existing Natural Gas Fired Boilers - GC Contract	1,456,935	0.0	0	0	0	0	0	0	0	0	0	0	0
7 Install a New VFD on Existing Exhaust Fan	31,006	0.0	18,915.0	0	0	0	1,110	0	0	0	0	1,110	27.9
8 Install a New VFD on Existing Vane Axial Fan	117,393	0.0	226,190	0	0	0	13,275	0	0	0	0	13,275	8.8
9 Replace Air-Cooled Chiller with Water Cooled Chillers	0	0.0	0	0	0	0	0	0	0	0	0	0	0
10 Install A/C Units to Serve Computer Equipment Rooms	83,981	0.0	37,602	2,356	0	0	2,207	1,766	0	0	0	3,973	21.1
11 Variable Flow Water Source Heat Pump Circulation Loop	0	0.0	0	0	0	0	0	0	0	0	0	0	0
12 Water Softener	398,467	0.0	0	0	5,718	0	0	0	82,754	0	(17,605)	65,149	6.1
13 Waterside Economizer	81,635	52.2	46,637	0	0	0	6,433	0	0	0	0	6,433	12.7
14 Chilled Water Storage	0	0.0	0	0	0	0	0	0	0	0	0	0	0
15 Install a Cogeneration Plant	0	0.0	0	0	0	0	0	0	0	0	0	0	0
16 Irrigation Control System Upgrade	29,507	0.0	0	0	0	433	0	0	0	3,075	(945)	2,130	13.9
17 Programmable Flush Valve Controls	739,681	0.0	0	0	3,615	0	0	0	56,616	0	0	56,616	13.1
18 Water Reclaim	52,181	-6.6	-2,793	0	576	0	-1,277	0	7,528	0	(1,280)	4,971	10.5
19 Laundry Conservation	52,492	0.0	0	1,276	440	0	0	810	6,888	0	0	7,698	6.8
20 Replace DHW HX with new DHW Heater	25,810	0.0	0	2,158	0	0	0	1,370	0	0	0	1,370	18.8
21 Change Natural Gas Utility Provider	0.0	0.0	0	0	0	0	0	3,619	0	0	0	3,619	0.0
22 Remove Existing Fire Pumps	0	0.0	0	0	0	0	0	0	0	0	0	0	0
23 Energy Resource Conservation Management Program	77,792	0.0	190,460	5,508	0	0	11,250	3,703.0	0	0	0	14,953	5.2
24 New Cooling Tower	216,088	3.9	6,587	0	0	0	1,048	0	0	0	0	1,048	206.1
25 Retro Commissioning	50,639	0.0	464,882	-11,306	0	0	28,357	-8,587	0	0	0	19,770	2.6
26 Replace Existing Moduline Boxes w/ VAV Terminal Units	2,015,547	0.0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL OF ALL RECOMMENDED ECMs</b>	<b>10,093,933</b>	<b>469</b>	<b>3,104,500</b>	<b>126,317</b>	<b>15,203</b>	<b>433</b>	<b>254,325</b>	<b>83,250</b>	<b>202,044</b>	<b>3,075</b>	<b>(1,247)</b>	<b>541,448</b>	<b>18.6</b>

# 2

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## Energy Consumption History

This section of the report contains the electric, natural gas, steam, and water usage history for each of the Arapahoe County facilities. Tables 2-1, 2-2, and 2-3 summarize all electric, natural gas, and water meters serving the sites. These tables also provide the applicable account number, meter number, utility company, and the rate type, where applicable.

For each utility type, a history of the energy usage has been established. The purpose of the energy consumption history is to represent the utility usage that is currently being used under the existing site conditions and schedules. Pages 2-14 through 2-38 show the energy consumption history for each site.

Table 2-4 summarizes the utility usage and costs that occurred generally during the latest 12 months of bills available. Referring to Table 2-4, Arapahoe County spent \$2,249,990 in electric, natural gas, and water costs for the sites included in this study. Of this amount, 36% of the costs are related to electricity usage, 19% of the costs are related to natural gas usage, and 45% are related to water usage. The costs included in this table are based on existing utility rates.

The utility dollar savings in this report are calculated by multiplying the unit savings by the cost per unit determined from the most recent applicable energy rate. The cost per unit of electric demand (kW), electrical energy (kWh), natural gas (Therm), and water (Kgal) for each rate is given below.

## **Electricity**

There are two major electricity utility rate structures applied to the Arapahoe County facilities. Both rates have escalated as a result of the recent rate change June 1, 2005. These changes are reflected below. Table 2-1 lists the rate type associated with each building. Descriptions of the electrical rates are included in the appendix. The unit costs for savings, as shown in the tabulation on page 2-9, are derived for each site from the rates shown below:

### **Electric Rate SG: Secondary General Service (Xcel Energy)**

The portions of this rate that are related to energy savings are the Energy Charge, Demand Charge, General Rate Schedule Adjustments (GRSA), Electric Commodity Adjustment, Air Quality Improvement Rider, the Franchise Fee, and Sales Tax. The Service and Facility Charge of \$25.00 remains fixed each month.

*The Energy Charge:* The Energy Charge is \$0.0288/kWh.

*The Demand Charge:* The Demand Charge is \$13.75/kW.

*The General Rate Schedule Adjustments (GRSA):* The General Rate Schedule Adjustments (GRSA) has been eliminated.

*The Electric Commodity Adjustment:* The Electric Commodity Adjustment is \$0.02703/kWh.

*The Air Quality Improvement Rider:* The Air Quality Improvement Rider is \$0.00115/kWh.

*The Franchise Fee:* The Franchise Fee is a percentage of the total charges listed above. The Franchise Fee is 3% for each of the buildings except for the Peoria Shops, ACJC Courthouse, and the Sheriff/Coroner Facility, all of which are not charged a Franchise Fee.

*PCCA (Purchase Capacity Cost Adjustment):* There is a 2.6193% charge applied to the sum of the previous items.

*DSMCA (Demand Side Management Cost Adjustment):* There is a 0.83% charge applied to the sum of the previous items.

*Fort St. Vrain Decommissioning:* There is a 1.19% charge applied to the sum of the previous items.

*Sales Tax:* Local Sales Tax is applied to each of the charges at the Centrepont Plaza building only.

### Electric Rate C: Commercial Service (Xcel Energy)

The portions of this rate that are related to energy savings are the Energy Charge, General Rate Schedule Adjustments (GRSA), Electric Commodity Adjustment, Air Quality Improvement Rider, and the Franchise Fee. The Service and Facility Charge of \$6.25 remains fixed each month.

*The Energy Charge (Summer):* The Energy Charge is \$0.04852/kWh. Summer is identified as the period between June 1 and September 30.

*The Energy Charge (Winter):* The Energy Charge is \$0.04475/kWh. Winter is identified as the period between October 1 and May 31.

*The General Rate Schedule Adjustments (GRSA):* The General Rate Schedule Adjustments (GRSA) has been eliminated.

*The Electric Commodity Adjustment:* The Electric Commodity Adjustment is \$0.02703/kWh.

*The Air Quality Improvement Rider:* The Air Quality Improvement Rider is \$0.00115/kWh.

*PCCA (Purchase Capacity Cost Adjustment):* There is a 2.6193% charge applied to the sum of the previous items.

*DSMCA (Demand Side Management Cost Adjustment):* There is a 0.83% charge applied to the sum of the previous items.

*Fort St. Vrain Decommissioning:* There is a 1.19% charge applied to the sum of the previous items.

*The Franchise Fee:* The Franchise Fee is a percentage of the total charges listed above. The Franchise Fee is 3% for each of the buildings except for the Peoria Shops, which is not charged a Franchise Fee.



## **Natural Gas**

There are two major natural gas utility rate structures applied to the Arapahoe County facilities. Table 2-2 lists the rate type associated with each building. Descriptions of the natural gas rates are included in the appendix. The unit costs for savings, as shown in the tabulation on page 2-9, are derived for each site from the rates shown below:

### **Natural Gas Rate CG-T: Commercial Gas Service (Xcel Energy)**

The portions of this rate that are related to energy savings are the Distribution System Charge, Natural Gas Charge, Interstate Pipeline Charge, the Franchise Fee, and Sales Tax. The Metering and Billing Charge of \$15.38 remains fixed each month.

*The Distribution System Charge:* The Distribution System Charge is \$0.08703/Therm.

*The Natural Gas Charge:* The Natural Gas Charge is \$0.572/Therm. This is the average cost per Therm over the last twelve months of data collected (June 2004 thru May 2005). A copy of the historical rate data can be found in the Appendix.

*The Interstate Pipeline Charge:* The Interstate Pipeline Charge is \$0.06860/Therm.

*The Franchise Fee:* The Franchise Fee is a percentage of the total charges listed above. The Franchise Fee is 3% for each of the buildings except for the Sheriff/Coroner Facility, which is not charged a Franchise Fee.

*Sales Tax:* Local Sales Tax is applied to each of the charges at the Centrepoint Plaza building only.

### **Natural Gas Rate (Seminole Energy Services)**

The portions of this rate that are related to energy savings are the Gas Usage Charge, Pipeline Transport Fee, Supply Cost, and the Franchise Fee. The Pipeline Meter Fee of \$56.95 remains fixed each month. The Pipeline Reservation Charge differs for each facility and typically remains fixed each month but it can change if the customer's Peak Daily Quantity (PDQ) increases.

*The Gas Usage Charge:* The Gas Usage Charge is the current Colorado Interstate Gas Co. charge of \$0.5785/Therm. This is the average cost per Therm over the last twelve months of data collected (May 2004 thru April 2005). A copy of the historical rate data can be found in the Appendix. Add \$0.03/Therm for a total charge of \$0.658/Therm.

*The Pipeline Transport Fee:* The Pipeline Transport Fee is \$0.0304/Therm.

*The Supply Cost:* The Supply Cost is \$0.025/Therm.

*The Pipeline Reservation Charge:* The current Pipeline Reservation Charge for each facility is listed in the table below.

<b>Building:</b>	<b>Meter #:</b>	<b>Current PDQ:</b>	<b>Pipeline Reservation Charge:</b>
01-Administration Building	67268001	43	\$165.98
23-Altura Plaza Building	67399201	77	\$297.22
29-Peoria Shops	153320301	45	\$173.70
35-ACJC Courthouse	67892701	51	\$196.86
36-ACJC Detention Center	67271401	87	\$335.82
36-ACJC Detention Center	67893101	96	\$370.56

Note: The Pipeline Reservation Charge is calculated by multiplying the PDQ by \$3.86.

*The Franchise Fee:* The Franchise Fee is 3% of the Pipeline Meter Fee, the Pipeline Reservation Charge, and Pipeline Transport Fee.

## **Water**

There are four major water utility rate structures applied to the Arapahoe County facilities. Table 2-2 lists the rate type associated with each building. Descriptions of the water rates are included in the appendix. The unit costs for savings, as shown in the tabulation on page 2-9, are derived for each site from the rates shown below:

### Denver Water – Rate Schedule No. 2 – Outside City – Total Service:

The portions of this rate that are related to energy savings are the winter consumption rate of \$2.14/Kgal (1,000 Gallons), the summer consumption rate of \$2.57/Kgal, and the sewer rate of \$3.00/Kgal. The winter consumption rate is applied during the months of January through April, November and December. The summer consumption rate is applied during the months of May through October. The sewer charge is billed annually by the City of Littleton. The sewer charge is applied to the previous year's lowest billed consumption, as measured by Denver Water. The bi-monthly service charge and fire protection charge (if applicable) remain the same each billing period. The storm water charge remains the same each billing period too. Each of the fixed charges is listed for each building in the table below.

<b>Building:</b>	<b>Bi-Monthly Service Charge:</b>	<b>Bi-Monthly Fire Protection Charge:</b>	<b>Annual Storm Water Charge:</b>
01-Administration Building	\$85.20	\$15.03	\$2,460
12-Arapahoe Plaza East Building	\$14.60	None	\$623.38
13-Arapahoe Human Services	\$32.19	\$15.03	Incl. w/ Bldg. 12
14-Arapahoe Plaza West Building (County Court)	\$14.60	None	Incl. w/ Bldg. 12
15-Federal Warehouse	\$32.19	\$26.30	\$812.50
16-CSU Extension Office	\$8.51	None	\$74.16
17-CSU Warehouse	\$8.51	None	\$135.62

### City of Englewood – Water & Sewer Charges:

The portions of this rate that are related to water savings are the consumption rate of \$2.15/Kgal (1,000 Gallons), and the sewer rate of \$1.3291/Kgal. The consumption rate and sewer rate are only applied if the facility consumes more than 45 Kgals each billing period (three months), otherwise a minimum consumption charge of \$104.83 and a minimum sewer charge of \$176.56 are charged to the customer each billing period. The consumption and sewer charges shall increase 15% every January through January 2008. The Storm Water Charge of \$22.00 remains the same each billing period.

NOTE: Building 20 – Tri County Health is the only facility that utilizes this rate. Since their consumption has always been much less than 45 Kgals each billing period than they have been billed the minimum consumption and sewer charges each month. So, water dollar savings cannot be achieved at this facility.

City of Aurora - Commercial:

The portions of this rate that are related to water savings are the consumption rate of \$3.34/Kgal, and the sewer rate of \$1.65/Kgal. The sewer consumption value remains the same each month and is calculated by taking the average consumption of the three winter months of December, January, and February. The Fire Protection Charge, the Storm Drain Component, the Meter Charge, the Sewer Service Charge, and the Water Service Charge remain the same each month. The table below lists each of these charges for each building.

<b>Building:</b>	<b>Fire Protection Charge:</b>	<b>Storm Drain Component:</b>	<b>Meter Charge:</b>	<b>Sewer Service Charge:</b>	<b>Water Service Charge:</b>
23-Altura Plaza Building	N/A	\$3.83	\$90.90	\$14.33	\$12.13
24-Centrepont Plaza	\$20.44	\$3.83	\$160.59	\$31.37	\$24.04

N/A – Not Applicable

Arapahoe County Water and Wastewater Authority:

The portions of this rate that are related to water savings are the tiered consumption rate and the tiered sewer rate - which is 80% of the consumption rate. A minimum usage charge is billed each month depending on the water meter's size. Once the minimum usage is met, the tiered rates are then used to bill the remaining water usage. The irrigation water usage is metered separately. Irrigation water is billed in the same manner that's described above but, it does not have a sewer charge. A Stormwater Fee and a Fire Line Charge (if applicable) remain the same each billing period. Also, some of the facilities are billed a Capitol Finance (CF) Fee. The CF Fee is calculated by adding up each of the aforementioned charges and fees, except for the Stormwater Fee.

The tiered consumption and sewer rates are listed in the table below.

<b>Usage (Gallons):</b>	<b>Consumption Rate (\$/Kgal):</b>	<b>Sewer Rate (\$/Kgal):</b>
Less Than or Equal to 25,000	\$2.90	\$2.32
25,001 to 200,000	\$3.63	\$2.90
Greater Than 200,001	\$4.35	\$3.48

The water meter data for each facility is listed in the table below.

<b>Building:</b>	<b>Meter Size (in.):</b>	<b>Min. Usage (Kgals):</b>	<b>Stormwater Fee:</b>	<b>Fire Line Charge:</b>	<b>CF Fee:</b>
29-Peoria Shops	2	12	\$117.45	N/A	Yes
35-ACJC Courthouse	3	24	Incl. w/ 36	\$95.18	Yes
36-ACJC Detention Center (Main Building)	6	144	\$232.00	\$1,142.04	Yes
36-ACJC Detention Center (Warehouse)	2	12	Incl. w/ 36	N/A	Yes
37-ACJC Administrative II	3	24	Incl. w/ 36	\$190.34	Yes
38-Sheriff/Coroner Facility	3	24	\$100.56	\$380.68	No

The irrigation meter data for each facility is listed in the table below.

<b>Building:</b>	<b>Meter Size (in.):</b>	<b>Min. Usage (Kgals):</b>	<b>CF Fee:</b>
35-ACJC Courthouse	1-1/2	8	Yes
36-ACJC Detention Center (Main Building)	1-1/2	8	Yes
36-ACJC Detention Center (Warehouse)	1-1/2	8	Yes
37-ACJC Administrative II	1-1/2	8	Yes
38-Sheriff/Coroner Facility	1-1/2	8	No

NOTE: The water consumption at Building 36 – ACJC Detention Center (Warehouse) has always been much less than the 12 Kgals minimum that they are billed for each month for water and sewer. So, water dollar savings cannot be achieved at this facility.

## Unit Costs for the Dollar Savings Calculations

Building:	Electric		Natural Gas	Water & Sewer
	\$/kW:	\$/kWh:	\$/Therm:	\$/Kgal:
01 – Administration Building	\$14.16	\$0.05869	\$0.63481	\$5.36
12 – Arapahoe Plaza East Building	\$14.16	\$0.05869	\$0.63481	\$5.36
13 – Arapahoe Human Services	\$14.16	\$0.05869	\$0.63481	\$5.36
14 – Arapahoe Plaza West Building (County Court)	\$14.16	\$0.05869	\$0.63481	\$5.36
15 – Federal Warehouse	\$14.16	\$0.05869	\$0.74946	\$5.36
16 – CSU Extension Office	\$14.16	\$0.05869	\$0.74946	\$5.36
17 – CSU Warehouse (Summer)	0.00	\$0.07900	\$0.74946	\$5.36
17 – CSU Warehouse (Winter)	0.00	\$0.07512	\$0.74946	\$5.36
20 – Tri County Health	\$14.16	\$0.05869	\$0.74946	(1)
23 – Altura Plaza Building	\$14.16	\$0.05869	\$0.63481	\$4.99
24 – Centrepont Plaza	\$14.16	\$0.06321	\$0.80714	\$4.99
29 – Peoria Shops	\$14.16	\$0.05869	\$0.63481	\$13.07
35 – ACJC Courthouse	\$14.16	\$0.05869	\$0.63481	\$13.07
36 – ACJC Detention Center (Main Building)	\$14.16	\$0.05869	\$0.63481	\$15.66
36 – ACJC Detention Center (Warehouse)	\$14.16	\$0.05869	\$0.74946	\$13.07
37 – ACJC Administrative II	\$14.16	\$0.05869	\$0.74946	\$13.07
38 – Sheriff/Coroner Facility	\$14.16	\$0.05869	\$0.72763	\$6.53

(1) Tri County Health is billed as a Commercial Rate. This rate is described earlier in this section.

**Table 2-1 ELECTRICAL ACCOUNT SUMMARY****Arapahoe County**

<b>Building</b>	<b>Address</b>	<b>Utility Company</b>	<b>Account No.</b>	<b>Meter No.</b>	<b>Rate Type</b>
01 - Administration Building	5334 S. Prince St. Littleton, CO	Xcel Energy	53-3441672-9	44743T	SG
12 - Arapahoe Plaza East Building	1610 W. Littleton Blvd. Littleton, CO	Xcel Energy	53-3441672-9	28161T	SG
13 - Arapahoe Human Services	1690 W. Littleton Blvd. Littleton, CO	Xcel Energy	53-3441672-9	21739T	SG
14 - Arapahoe Plaza West Building	1790 W. Littleton Blvd. Littleton, CO	Xcel Energy	53-3441672-9	28196T	SG
15 - Federal Warehouse	5251 S. Federal Blvd. Littleton, CO	Xcel Energy	53-3441672-9	32895T	SG
16 - CSU Extension Office	5804 S. Datura St. Littleton, CO	Xcel Energy	53-3441672-9	11579T	SG
17 - CSU Warehouse	5814 S. Datura St. Littleton, CO	Xcel Energy	53-3441672-9	2351236	C
20 - Tri County Health	4857 S. Broadway St. Englewood, CO	Xcel Energy	53-3441672-9	25086T	SG
23 - Altura Plaza Building	15400 E. 14th PL. Aurora, CO	Xcel Energy	53-3441672-9	31141T	SG
24 - Centrepont Plaza	14980 E. Alameda Ave. Aurora, CO	Xcel Energy	53-3441672-9	22021T	SG
29 - Peoria Shops	7600 S. Peoria St. Englewood, CO	Xcel Energy	53-3441672-9	16228T & 18555T	SG
			53-3441672-9	112586S	C
35 - ACJC Courthouse	7325 S. Potomac St. Englewood, CO	Xcel Energy	53-3441672-9	44203T	SG
36 - ACJC Detention Center (Main Building)	7375 S. Potomac St. Englewood, CO	Xcel Energy	53-3441672-9	29911T	SG
36 - ACJC Detention Center (Warehouse)			53-3441672-9	76942S	C
37 - ACJC Administrative II	7305 S. Potomac St. Englewood, CO	Xcel Energy	53-3441672-9	41435T	SG
38 - Sheriff/Coroner Facility	13101 E. Broncos Pkwy. Englewood, CO	Xcel Energy	53-3441672-9	44403T	SG

1) Rate type SG is Secondary General Service

2) Rate type C is Commercial Service

Table 2-2 NATURAL GAS ACCOUNT SUMMARY

## Arapahoe County

<b>Building</b>	<b>Address</b>	<b>Utility Company</b>	<b>Account No.</b>	<b>Meter No.</b>	<b>Rate Type</b>
01 - Administration Building	5334 S. Prince St. Littleton, CO	Seminole Energy Services	500892	67268001	None
13 - Arapahoe Human Services	1690 W. Littleton Blvd. Littleton, CO	Xcel Energy	53-3441672-9	1015025	CG-T
15 - Federal Warehouse	5251 S. Federal Blvd. Littleton, CO	Xcel Energy	53-3441672-9	1299336	CG-T
16 - CSU Extension Office	5804 S. Datura St. Littleton, CO	Xcel Energy	53-3441672-9	481873	CG-T
17 - CSU Warehouse	5814 S. Datura St. Littleton, CO	Xcel Energy	53-3441672-9	391242	CG-T
20 - Tri County Health	4857 S. Broadway St. Englewood, CO	Xcel Energy	53-3441672-9	298402	CG-T
23 - Altura Plaza Building	15400 E. 14th PL. Aurora, CO	Seminole Energy Services	500059	67399201	None
24 - Centrepont Plaza	14980 E. Alameda Ave. Aurora, CO	Xcel Energy	53-3441672-9	1309638	CG-T
29 - Peoria Shops	7600 S. Peoria St. Englewood, CO	Seminole Energy Services	500893	153320301	None
35 - ACJC Courthouse	7325 S. Potomac St. Englewood, CO	Seminole Energy Services	500894	67892701	None
36 - ACJC Detention Center (Main Building)	7375 S. Potomac St. Englewood, CO	Seminole Energy Services	500891	67271401 & 67893101	None
36 - ACJC Detention Center (Warehouse)		Xcel Energy	53-3441672-9	1353953	CG-T
37 - ACJC Administrative II	7305 S. Potomac St. Englewood, CO	Xcel Energy	53-3441672-9	FC24679	CG-T
38 - Sheriff/Coroner Facility	13101 E. Broncos Pkwy. Englewood, CO	Xcel Energy	53-3441672-9	1454533	CG-T

Notes:

1. The boilers served by the natural gas meter at building 13-Arapahoe Human Services provide heating to the 12-Arapahoe Plaza East and 14-Arapahoe Plaza West (County Court) Buildings as well.
2. Rate CG-T is Commercial Gas Service



Table 2-3 WATER ACCOUNT SUMMARY

## Arapahoe County

<b>Building</b>	<b>Address</b>	<b>Utility Company</b>	<b>Account No.</b>
01 - Administration Building	5334 S. Prince St. Littleton, CO	Denver Water	10407675-01-5
12 - Arapahoe Plaza East Building	1610 W. Littleton Blvd. Littleton, CO	Denver Water	10447924-01-6
13 - Arapahoe Human Services	1690 W. Littleton Blvd. Littleton, CO	Denver Water	10447925-01-7
14 - Arapahoe Plaza West Building (County Court)	1790 W. Littleton Blvd. Littleton, CO	Denver Water	10447928-01-1
15 - Federal Warehouse	5251 S. Federal Blvd. Littleton, CO	Denver Water	10411460-01-1
16 - CSU Extension Office	5804 S. Datura St. Littleton, CO	Denver Water	10403740-01-3
17 - CSU Warehouse	5814 S. Datura St. Littleton, CO	Denver Water	10403741-01-4
20 - Tri County Health	4857 S. Broadway St. Englewood, CO	City of Englewood	01000-04857-0
23 - Altura Plaza Building	15400 E. 14th PL. Aurora, CO	City of Aurora Utilities	20703-16332
24 - Centrepont Plaza	14980 E. Alameda Ave. Aurora, CO	City of Aurora Utilities	199313-132082
29 - Peoria Shops	7600 S. Peoria St. Englewood, CO	Arapahoe County Water & Wastewater Authority	1041
35 - ACJC Courthouse	7325 S. Potomac St. Englewood, CO	Arapahoe County Water & Wastewater Authority	1124 & 123820
36 - ACJC Detention Center (Main Building)	7375 S. Potomac St. Englewood, CO		
36 - ACJC Detention Center (Warehouse)	7375 S. Potomac St. Englewood, CO		
37 - ACJC Administrative II	7305 S. Potomac St. Englewood, CO	Arapahoe County Water & Wastewater Authority	125775
38 - Sheriff/Coroner Facility	13101 E. Broncos Pkwy. Englewood, CO		

**Table 2-4 -- ENERGY CONSUMPTION SUMMARY FOR THE MOST RECENT 12 MONTHS OF DATA**  
**Arapahoe County**

BUILDING	ELECTRICITY			NATURAL GAS			WATER		
	kWh	Cost	Average Blended \$/kWh	Therms	Cost	Average \$/Therm	Kgals (1000 gallons)	Sewer (If Applicable) & Water Cost	Average \$/Kgal
01 - Administration Building	2,792,459	\$109,608	\$0.039	39,560	\$26,818	\$0.68	5,206	\$27,603	\$5.30
12 - Arapahoe Plaza East Building	339,031	\$20,496	\$0.060	(1)	(1)	(1)	633	\$3,363	\$5.31
13 - Arapahoe Human Services	718,155	\$44,407	\$0.062	43,910	\$33,255	\$0.76	653	\$3,467	\$5.31
14 - Arapahoe Plaza West Building (County Court)	398,714	\$21,390	\$0.054	(1)	(1)	(1)	867	\$4,534	\$5.23
15 - Federal Warehouse	500,390	\$32,097	\$0.064	11,490	\$9,221	\$0.80	460	\$2,511	\$5.45
16 - CSU Extension Office	76,809	\$5,500	\$0.072	4,400	\$3,087	\$0.70	62	\$355	\$5.73
17 - CSU Warehouse	28,414	\$2,095	\$0.074	2,290	\$1,680	\$0.73	11	\$94	\$8.82
20 - Tri County Health	87,912	\$6,535	\$0.074	3,850	\$2,722	\$0.71	24	\$761	\$31.11
23 - Altura Plaza Building	1,407,102	\$79,204	\$0.056	107,880	\$70,816	\$0.66	3,632	\$12,419	\$3.42
24 - Centrepont Plaza	2,743,135	\$99,750	\$0.036	2,240	\$2,002	\$0.89	4,559	\$16,871	\$3.70
29 - Peoria Shops	320,958	\$17,967	\$0.056	32,140	\$23,241	\$0.72	1,851	\$8,167	\$4.41
35 - ACJC Courthouse	2,755,414	\$115,252	\$0.042	72,800	\$47,065	\$0.65	56,770	\$908,737	\$16.01
36 - ACJC Detention Center	5,517,976	\$220,556	\$0.040	285,340	\$182,715	\$0.64			
37 - ACJC Administrative II	2,017,650	\$92,155	\$0.046	17,040	\$11,077	\$0.65			
38 - Sheriff/Coroner Facility	2,472,668	\$82,399	\$0.033	14,950	\$12,203	\$0.82	3,428	\$16,188	\$4.72
<b>TOTALS:</b>	<b>22,176,787</b>	<b>\$949,411</b>	<b>\$0.043</b>	<b>637,890</b>	<b>\$425,902</b>	<b>\$0.67</b>	<b>78,156</b>	<b>\$1,005,070</b>	<b>\$12.86</b>

**TOTAL UTILITY COSTS:                      \$2,380,383**

Notes:

(1) This building is heated by the natural gas-fired boiler plant located in building 13 - Arapahoe Human Services.

## Project: Arapahoe County Building: 01-Administration Building

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 4001284208

Meter #(s): 44743T (old meter 12973T)

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		211,680		205,918	217,183
Feb		189,674		202,957	189,788
Mar		229,024		229,311	
Apr		235,576		218,456	
May		248,684		243,374	
Jun		265,610		248,088	
Jul		298,963		270,700	
Aug		283,165	266,959	264,710	
Sep		239,141		243,348	
Oct		227,421		232,915	
Nov				220,561	
Dec			207,428	216,466	
Totals	0	2,428,938	474,387	2,796,804	406,971

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
211,594	211,594	211,551	217,183
194,140	194,140	196,373	189,788
229,168	229,168	229,311	229,311
227,016	227,016	218,456	218,456
246,029	246,029	243,374	243,374
256,849	256,849	248,088	248,088
284,832	284,832	270,700	270,700
271,611	271,611	265,835	264,710
241,245	241,245	243,348	243,348
230,168	230,168	232,915	232,915
220,561	220,561	220,561	220,561
211,947	211,947	211,947	216,466
2,825,160	2,825,160	2,792,459	2,794,900

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 4001284208

Meter #(s): 44743T (old meter 12973T)

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		609		451	551
Feb		622		451	490
Mar		640		544	513
Apr		608		548	
May		572		564	
Jun		583		595	
Jul		594		607	
Aug		618	563	621	
Sep		589	536	567	
Oct		568		584	
Nov		536		585	
Dec			510	573	
Totals	0	6,539	1,609	6,690	1,554

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
537	537	501	551
521	521	471	490
566	566	529	513
578	578	548	548
568	568	564	564
589	589	595	595
601	601	607	607
601	601	592	621
564	564	552	567
576	576	584	584
561	561	585	585
542	542	542	573
6,804	6,804	6,670	6,798

### Natural Gas Usage Baseline

Baseline Units: therms

Account #(s): !Acct No.

Meter #(s): 0067268001 (old meter 35461508), 305461508

Total Monthly Natural Gas Usage (therms)					
Month	2001	2002	2003	2004	2005
Jan		4,370	4,050	5,080	
Feb			4,050	4,650	
Mar				3,950	
Apr				3,550	
May		1,270		2,140	
Jun		300		1,740	
Jul		310		1,010	
Aug		310	590	1,390	
Sep		370	1,960	2,220	
Oct		1,960	2,750	4,110	
Nov		3,890	4,090	4,850	
Dec	4,260	4,630	4,810	4,870	
Totals	4,260	17,410	22,300	39,560	0

The CEA Baseline is the most recent 12 months data collected

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
5,080	4,500	4,565	5,080
4,650	4,350	4,350	4,650
3,950	3,950	3,950	3,950
3,550	3,550	3,550	3,550
2,140	1,705	2,140	2,140
1,740	1,020	1,740	1,740
1,010	660	1,010	1,010
1,390	763	990	1,390
2,220	1,517	2,090	2,220
4,110	2,940	3,430	4,110
4,850	4,277	4,470	4,850
4,870	4,643	4,840	4,870
39,560	33,875	37,125	39,560

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 10407675015

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			140,532	119,396		129,964	129,964	129,964	119,396
Feb		96,393	142,847	107,644		115,628	115,628	125,246	107,644
Mar		419,651	151,822	228,209		266,561	266,561	190,016	228,209
Apr		624,828	142,500	290,000		352,443	352,443	216,250	290,000
May		859,943		538,714		699,329	699,329	538,714	538,714
Jun		930,952		648,571		789,762	789,762	648,571	648,571
Jul		922,758		833,556		878,157	878,157	833,556	833,556
Aug		897,984	1,014,593	951,542		954,706	954,706	983,068	951,542
Sep		471,973	885,017	608,644		655,211	655,211	746,831	608,644
Oct		250,175	856,579	467,627		524,794	524,794	662,103	467,627
Nov		142,655	286,451			214,553	214,553	214,553	286,451
Dec		116,134	125,388			120,761	120,761	120,761	125,388
Totals	0	5,733,446	3,745,729	4,793,903	0	5,701,869	5,701,869	5,409,633	5,205,742

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

## Project: Arapahoe County Building: 12-Arapahoe Plaza East Building

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 6000900470

Meter #(s): 28161T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		31,710		28,069	33,024
Feb		29,837		26,763	28,866
Mar		31,696		29,277	33,384
Apr		29,521		28,336	
May		29,887		28,416	
Jun		28,316		28,020	
Jul		29,369		29,354	
Aug		29,436	28,988	31,700	
Sep		27,820	27,571	29,611	
Oct		28,457	28,530	30,668	
Nov		27,995	27,337	27,862	
Dec			28,059	31,304	
Totals	0	324,044	140,485	349,380	95,274

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
33,024	30,934	30,547	33,024
28,866	28,489	27,815	28,866
33,384	31,452	31,331	33,384
28,336	28,929	28,336	28,336
28,416	29,152	28,416	28,416
28,020	28,168	28,020	28,020
29,354	29,362	29,354	29,354
31,700	30,041	30,344	31,700
29,611	28,334	28,591	29,611
30,668	29,218	29,599	30,668
27,862	27,731	27,600	27,862
31,304	29,682	29,682	31,304
360,545	351,492	349,635	360,545

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 6000900470

Meter #(s): 28161T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		72		79	78
Feb		70		73	79
Mar		70		72	80
Apr		68		72	80
May		68		71	
Jun		66		76	
Jul		66		74	
Aug		60	74	75	
Sep		60	72	76	
Oct		64	70	77	
Nov		65	71	74	
Dec		67	75	77	
Totals	0	796	362	896	317

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
78	76	79	78
79	74	76	79
80	74	76	80
80	73	76	80
71	70	71	71
76	71	76	76
74	70	74	74
75	70	75	75
76	69	74	76
77	70	74	77
74	70	73	74
77	73	76	77
917	860	900	917

### Water Usage Baseline

Baseline Units: gallons

Account #(s): 10447924016

Meter #(s):

Total Monthly Water Usage (gallons)					
Month	2001	2002	2003	2004	2005
Jan			21,657	33,275	
Feb		15,607	23,729	33,915	
Mar		14,073	23,317	49,501	
Apr		11,379	20,500	56,000	
May		62,793		63,073	
Jun		84,286		63,810	
Jul		74,206		76,159	
Aug		66,066	77,237	83,542	
Sep		38,776	74,740	57,797	
Oct		25,018	77,228	47,814	
Nov		16,977	39,065		
Dec		15,269	29,149		
Totals	0	424,450	386,622	564,886	0

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
33,275	27,466	27,466	33,275
33,915	24,417	28,822	33,915
49,501	28,964	36,409	49,501
56,000	29,293	38,250	56,000
63,073	62,933	63,073	63,073
63,810	74,048	63,810	63,810
76,159	75,183	76,159	76,159
83,542	75,615	80,390	83,542
57,797	57,104	66,269	57,797
47,814	50,020	62,521	47,814
39,065	28,021	28,021	39,065
29,149	22,209	22,209	29,149
633,100	555,273	593,399	633,100

## Project: Arapahoe County Building: 13-Arapahoe Human Services

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 3000900650

Meter #(s): 21739T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan				56,825	
Feb				53,311	
Mar				57,360	
Apr		57,279		55,422	
May		62,552		57,204	
Jun		64,490		69,488	
Jul		67,237		102,970	
Aug		63,549	77,732	83,302	
Sep		46,798	54,782	80,601	
Oct		40,333	56,687	83,325	
Nov		42,689	54,893	73,482	
Dec			56,864		
Totals	0	444,927	300,958	773,290	0

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
56,825	56,825	56,825	56,825
53,311	53,311	53,311	53,311
57,360	57,360	57,360	57,360
55,422	56,351	55,422	55,422
57,204	59,878	57,204	57,204
69,488	66,989	69,488	69,488
102,970	85,104	102,970	102,970
83,302	74,861	80,517	83,302
80,601	60,727	67,692	80,601
83,325	60,115	70,006	83,325
73,482	57,021	64,188	73,482
56,864	56,864	56,864	56,864
830,154	745,406	791,847	830,154

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 3000900650

Meter #(s): 21739T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		156		153	
Feb				153	
Mar				154	
Apr		175		154	
May		148		154	
Jun		170		142	
Jul		170		230	
Aug		160	245	200	
Sep		141	152	200	
Oct		118	152	200	
Nov		106	152	192	
Dec		130	153		
Totals	0	1,474	854	1,932	0

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
153	155	153	153
153	153	153	153
154	154	154	154
154	165	154	154
154	151	154	154
142	156	142	142
230	200	230	230
200	202	223	200
200	164	176	200
200	157	176	200
192	150	172	192
153	142	142	153
2,085	1,949	2,029	2,085

### Natural Gas Usage Baseline

Baseline Units: therms

Account #(s): 53-3441672-9

Meter #(s): 1015025

Total Monthly Natural Gas Usage (therms)					
Month	2001	2002	2003	2004	2005
Jan				7,719	6,316
Feb				6,785	5,567
Mar				4,638	5,364
Apr		2,333		3,074	
May		1,388		2,324	
Jun		587		1,054	
Jul				605	
Aug			524	873	
Sep			1,193	1,523	
Oct		3,702	3,570	4,029	
Nov		5,787	5,918	6,131	
Dec			7,347	6,336	
Totals	0	13,797	18,552	45,091	17,247

The CEA Baseline is the Most Recent Twelve Months Data Collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
6,316	7,018	7,018	6,316
5,567	6,176	6,176	5,567
5,364	5,001	5,001	5,364
3,074	2,704	3,074	3,074
2,324	1,856	2,324	2,324
1,054	821	1,054	1,054
605	605	605	605
873	699	699	873
1,523	1,358	1,358	1,523
4,029	3,767	3,800	4,029
6,131	5,945	6,025	6,131
6,336	6,842	6,842	6,336
43,196	42,792	43,976	43,196

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 10447925017

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			87,972	45,365		66,669	66,669	66,669	45,365
Feb		100,066	55,051	46,203		67,107	67,107	50,627	46,203
Mar		96,735	62,159	50,152		69,682	69,682	56,156	50,152
Apr		83,793	61,000	49,000		64,598	64,598	55,000	49,000
May		57,931		56,379		57,155	57,155	56,379	56,379
Jun		42,857		57,619		50,238	50,238	57,619	57,619
Jul		42,061		61,884		51,973	51,973	61,884	61,884
Aug		40,656	36,254	63,576		46,829	46,829	49,915	63,576
Sep		51,093	45,198	67,966		54,752	54,752	56,582	67,966
Oct		59,825	52,754	73,559		62,046	62,046	63,157	73,559
Nov		106,539	41,435			73,987	73,987	73,987	41,435
Dec		125,388	39,791			82,590	82,590	82,590	39,791
Totals	0	806,944	481,614	571,703	0	747,626	747,626	730,565	652,929

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: 14-Arapahoe Plaza West Building (County Court)**

**Electric Usage Baseline**

Baseline Units: kWh

Account #(s): 1000900566

Meter #(s): 28196T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		33,378		34,794	35,850
Feb		31,610		33,396	33,283
Mar		35,537		35,611	37,129
Apr		31,276		33,916	
May		29,858		34,476	
Jun		32,323		33,173	
Jul		33,675		34,438	
Aug		34,548	32,659	36,775	
Sep		33,689	31,629	33,108	
Oct		32,360	33,087	34,251	
Nov		32,013	33,110	33,149	
Dec			34,656	34,637	
Totals	0	360,267	165,141	411,724	106,262

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
34,674	34,674	35,322	35,850
32,763	32,763	33,340	33,283
36,092	36,092	36,370	37,129
32,596	32,596	33,916	33,916
32,167	32,167	34,476	34,476
32,748	32,748	33,173	33,173
34,057	34,057	34,438	34,438
34,661	34,661	34,717	36,775
32,809	32,809	32,369	33,108
33,233	33,233	33,669	34,251
32,757	32,757	33,130	33,149
34,647	34,647	34,647	34,637
403,204	403,204	409,567	414,185

**Electric Demand Baseline**

Baseline Units: kW

Account #(s): 1000900566

Meter #(s): 28196T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		72		68	70
Feb		74		70	73
Mar		71		70	71
Apr		75		68	72
May		68		68	
Jun		68		68	
Jul		68		66	
Aug		68	64	68	
Sep		71	63	67	
Oct		70	66	70	
Nov		63	65	60	
Dec		76	66	60	
Totals	0	844	324	803	286

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
70	70	69	70
72	72	72	73
71	71	71	71
72	72	70	72
68	68	68	68
68	68	68	68
67	67	66	66
67	67	66	68
67	67	65	67
69	69	68	70
63	63	63	60
67	67	63	60
821	821	809	813

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 10447928011

Meter #(s):

Total Monthly Water Usage (gallons)					
Month	2001	2002	2003	2004	2005
Jan			93,729	84,070	
Feb		127,148	105,356	73,237	
Mar		121,102	82,515	80,338	
Apr		103,448	56,000	79,000	
May		121,149		72,459	
Jun		123,810		65,238	
Jul				67,931	
Aug			70,932	68,305	
Sep			83,169	50,508	
Oct		67,439	94,632	44,136	
Nov		61,228	89,682		
Dec		62,000	92,075		
Totals	0	787,324	768,090	685,222	0

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
88,900	88,900	88,900	84,070
101,914	101,914	89,297	73,237
94,652	94,652	81,427	80,338
79,483	79,483	67,500	79,000
96,804	96,804	72,459	72,459
94,524	94,524	65,238	65,238
67,931	67,931	67,931	67,931
69,619	69,619	69,619	68,305
66,839	66,839	66,839	50,508
68,736	68,736	69,384	44,136
75,455	75,455	75,455	89,682
77,038	77,038	77,038	92,075
981,895	981,895	891,087	866,979



**Project: Arapahoe County**  
**Building: 15-Federal Warehouse**

**Electric Usage Baseline**

Baseline Units: kWh

Account #(s): 6000925178

Meter #(s): 32895T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		36,103		39,654	37,311
Feb		28,911		42,136	34,722
Mar		35,167		43,853	36,331
Apr		36,993		42,014	
May		39,162		47,936	
Jun		47,062		53,937	
Jul		59,580		69,872	
Aug		51,035		63,752	
Sep		45,055	34,726	53,977	
Oct		40,974	38,008	52,079	
Nov		36,655	30,706	41,840	
Dec			32,454	39,374	
Totals	0	456,697	135,894	590,424	108,364

The CEA Baseline is Average of all data collected

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
37,689	37,689	38,483	37,311
35,256	35,256	38,429	34,722
38,450	38,450	40,092	36,331
39,504	39,504	42,014	42,014
43,549	43,549	47,936	47,936
50,500	50,500	53,937	53,937
64,726	64,726	69,872	69,872
57,394	57,394	63,752	63,752
44,586	44,586	44,352	53,977
43,687	43,687	45,044	52,079
36,400	36,400	36,273	41,840
35,914	35,914	35,914	39,374
527,655	527,655	556,098	573,145

**Electric Demand Baseline**

Baseline Units: kW

Account #(s): 6000925178

Meter #(s): 32895T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		120		109	106
Feb		118		105	96
Mar		118		92	105
Apr		123		147	
May		124		158	
Jun		146		158	
Jul		178		166	
Aug		170	153	151	
Sep		162	132	138	
Oct		118	124	116	
Nov		108	78	98	
Dec	98		89	108	
Totals	98	1,485	576	1,546	307

The CEA Baseline is Average of all data collected

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
112	112	108	106
106	106	101	96
105	105	99	105
135	135	147	147
141	141	158	158
152	152	158	158
172	172	166	166
158	158	152	151
144	144	135	138
119	119	120	116
95	95	88	98
98	98	99	108
1,537	1,537	1,531	1,547

**Natural Gas Usage Baseline**

Baseline Units: dth

Account #(s): 53-3441672-9

Meter #(s): 1299336

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		273		293	237
Feb		246		325	181
Mar		189		139	178
Apr		40		106	
May		16		30	
Jun		1		6	
Jul				1	
Aug				0	
Sep		3	20	2	
Oct		101	54	12	
Nov		254	239	151	
Dec			332	245	
Totals	0	1,123	645	1,310	596

The CEA Baseline is Average of all data collected

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
268	268	265	237
251	251	253	181
169	169	159	178
73	73	106	106
23	23	30	30
4	4	6	6
1	1	1	1
0	0	0	0
8	8	11	2
56	56	33	12
215	215	195	151
289	289	289	245
1,357	1,357	1,348	1,149

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 10411460011

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			3,133	4,853		3,993	3,993	3,993	4,853
Feb		2,295	949	6,881		3,375	3,375	3,915	6,881
Mar		59,721	3,141	18,364		27,075	27,075	10,753	18,364
Apr		97,759	4,500	24,500		42,253	42,253	14,500	24,500
May		135,920		45,809		90,865	90,865	45,809	45,809
Jun		147,619		55,238		101,429	101,429	55,238	55,238
Jul		131,933		79,157		105,545	105,545	79,157	79,157
Aug		118,918	99,831	95,102		104,617	104,617	97,467	95,102
Sep		52,863	88,757	61,186		67,602	67,602	74,972	61,186
Oct		17,404	87,018	47,288		50,570	50,570	67,153	47,288
Nov		8,393	20,679			14,536	14,536	14,536	20,679
Dec		6,015	1,388			3,702	3,702	3,702	1,388
Totals	0	778,840	309,396	438,378	0	615,562	615,562	471,195	460,445

The CEA Baseline is Average of all data collected

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

## Project: Arapahoe County Building: 16-CSU Extension Office

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 3000856826

Meter #(s): 11579T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		5,343		4,865	5,793
Feb		5,274		4,893	4,542
Mar		6,089		4,954	5,016
Apr		6,383		5,364	
May		7,765		6,076	
Jun		9,602		7,280	
Jul		10,109		9,041	
Aug		9,304	8,067	4,774	
Sep		6,937	5,394	6,437	
Oct		5,298	5,462	6,301	
Nov		5,249	5,340	6,681	
Dec			4,994	5,911	
Totals	0	77,353	29,257	72,577	15,351

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
5,334	5,334	5,329	5,793
4,903	4,903	4,718	4,542
5,353	5,353	4,985	5,016
5,874	5,874	5,364	5,364
6,921	6,921	6,076	6,076
8,441	8,441	7,280	7,280
9,575	9,575	9,041	9,041
7,382	7,382	6,421	4,774
6,256	6,256	5,916	6,437
5,687	5,687	5,882	6,301
5,757	5,757	6,011	6,681
5,453	5,453	5,453	5,911
76,936	76,936	72,476	73,216

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 3000856826

Meter #(s): 11579T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		22		18	21
Feb		23		18	19
Mar		24		18	18
Apr		22		20	22
May		22		26	
Jun		26		27	
Jul		27		30	
Aug		32	28	29	
Sep		28	23	26	
Oct		24	19	22	
Nov		21	18	20	
Dec		22	19	18	
Totals	0	293	107	272	80

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
20	20	20	21
20	20	19	19
20	20	18	18
21	21	21	22
24	24	26	26
27	27	27	27
29	29	30	30
30	30	29	29
26	26	25	26
22	22	21	22
20	20	19	20
20	20	19	18
279	279	274	278

### Natural Gas Usage Baseline

Baseline Units: dth

Account #(s): 53-3441672-9

Meter #(s): 481873

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		71		77	60
Feb		61		71	43
Mar		55		51	35
Apr		31		40	
May		23		32	
Jun		8		19	
Jul		3		11	
Aug		7	1	17	
Sep		17	3	20	
Oct		42	27	30	
Nov		55	60	61	
Dec			76	66	
Totals	0	373	167	495	138

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
69	69	69	60
58	58	57	43
47	47	43	35
36	36	40	40
28	28	32	32
14	14	19	19
7	7	11	11
8	8	9	17
13	13	12	20
33	33	29	30
59	59	61	61
71	71	71	66
443	443	453	434

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 10403740013

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			6,683	4,381		5,532	5,532	5,532	4,381
Feb		3,672	6,169	3,932		4,591	4,591	5,051	3,932
Mar		3,877	6,464	4,794		5,045	5,045	5,629	4,794
Apr		3,621	6,000	5,000		4,874	4,874	5,500	5,000
May		5,540		5,325		5,433	5,433	5,325	5,325
Jun		6,190		5,238		5,714	5,714	5,238	5,238
Jul		9,640		5,626		7,633	7,633	5,626	5,626
Aug		11,689		5,780		8,735	8,735	5,780	5,780
Sep		8,814		6,271		7,543	7,543	6,271	6,271
Oct		7,614	3,263	6,831		5,903	5,903	5,047	6,831
Nov		6,525	4,170			5,348	5,348	5,348	4,170
Dec		6,478	4,627			5,553	5,553	5,553	4,627
Totals	0	73,660	37,376	53,178	0	71,904	71,904	65,900	61,975

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: 17-CSU Warehouse**

**Electric Usage Baseline**

Baseline Units: kWh

Account #(s): 8000856838

Meter #(s): 2351236

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		2,465		2,567	1,790
Feb		2,241		2,335	1,832
Mar		2,566		2,250	2,090
Apr		2,160		1,966	
May		2,200		1,946	
Jun		2,258		1,840	
Jul		2,691		2,203	
Aug		2,430		2,362	
Sep		2,342	2,214	2,109	
Oct		2,627	2,428	2,005	
Nov		2,623	2,531	2,231	
Dec			2,544	2,143	
Totals	0	26,603	9,717	25,957	5,712

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
2,274	2,274	2,179	1,790
2,136	2,136	2,084	1,832
2,302	2,302	2,170	2,090
2,063	2,063	1,966	1,966
2,073	2,073	1,946	1,946
2,049	2,049	1,840	1,840
2,447	2,447	2,203	2,203
2,396	2,396	2,362	2,362
2,222	2,222	2,162	2,109
2,353	2,353	2,217	2,005
2,462	2,462	2,381	2,231
2,344	2,344	2,344	2,143
27,121	27,121	25,854	24,517

**Natural Gas Usage Baseline**

Baseline Units: dth

Account #(s): 53-3441672-9

Meter #(s): 391242

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		55		48	43
Feb		46		40	36
Mar		43		25	38
Apr		17		12	
May		9		7	
Jun		5		3	
Jul		5		3	
Aug		4		3	
Sep		5	4	3	
Oct		20	5	12	
Nov		41	29	32	
Dec			43	43	
Totals	0	250	81	231	117

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
49	49	46	43
41	41	38	36
35	35	32	38
15	15	12	12
8	8	7	7
4	4	3	3
4	4	3	3
4	4	3	3
4	4	4	3
12	12	9	12
34	34	31	32
43	43	43	43
253	253	231	235

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 10403741014

Meter #(s):

Total Monthly Water Usage (gallons)					
Month	2001	2002	2003	2004	2005
Jan			804	998	
Feb		2,754	949	983	
Mar		1,899	741	723	
Apr		1,034	500	500	
May		678		501	
Jun		476		476	
Jul		502		511	
Aug		508	525	525	
Sep		514	520	847	
Oct		544	544	1,051	
Nov		466	809	1,625	
Dec		463	925	1,908	
Totals	0	9,838	6,317	10,648	0

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
901	901	901	998
1,562	1,562	966	983
1,121	1,121	732	723
678	678	500	500
590	590	501	501
476	476	476	476
507	507	511	511
519	519	525	525
627	627	684	847
713	713	798	1,051
967	967	1,217	1,625
1,099	1,099	1,417	1,908
9,760	9,760	9,228	10,648

## Project: Arapahoe County Building: 20-Tri County Health

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 4000225125

Meter #(s): 25086T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		5,731		5,684	5,817
Feb		5,597		5,125	4,981
Mar		6,181		5,637	5,382
Apr		6,516		6,202	
May		8,182		7,566	
Jun		9,584		8,398	
Jul		10,986		9,260	
Aug		10,491		9,024	
Sep		8,621	8,130	7,348	
Oct		7,017	6,705	6,369	
Nov		6,041	5,563	5,976	
Dec			5,623	6,057	
Totals	0	84,947	26,021	82,646	16,180

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
5,744	5,744	5,751	5,817
5,234	5,234	5,053	4,981
5,733	5,733	5,510	5,382
6,359	6,359	6,202	6,202
7,874	7,874	7,566	7,566
8,991	8,991	8,398	8,398
10,123	10,123	9,260	9,260
9,758	9,758	9,024	9,024
8,033	8,033	7,739	7,348
6,697	6,697	6,537	6,369
5,860	5,860	5,770	5,976
5,840	5,840	5,840	6,057
86,246	86,246	82,650	82,380

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 4000225125

Meter #(s): 25086T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		20		23	19
Feb		20		20	19
Mar		20		20	19
Apr		26		26	20
May		31		35	
Jun		34		35	
Jul		34		28	
Aug		34		32	
Sep		34	31	32	
Oct		19	22	27	
Nov		20	20	22	
Dec		20	20	19	
Totals	0	312	93	319	77

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
21	21	21	19
20	20	20	19
20	20	20	19
24	24	23	20
33	33	35	35
35	35	35	35
31	31	28	28
33	33	32	32
32	32	32	32
23	23	25	27
21	21	21	22
20	20	20	19
313	313	312	307

### Natural Gas Usage Baseline

Baseline Units: dth

Account #(s): 53-3441672-9

Meter #(s): 298402

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		88		83	75
Feb		71		66	50
Mar		59		34	45
Apr		25		19	
May		11		14	
Jun		6		6	
Jul		7		5	
Aug		7		4	
Sep		10	7	6	
Oct		36	20	20	
Nov		59	49	49	
Dec			76	76	
Totals	0	379	152	382	170

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
82	82	79	75
62	62	58	50
46	46	40	45
22	22	19	19
13	13	14	14
6	6	6	6
6	6	5	5
6	6	4	4
8	8	7	6
25	25	20	20
52	52	49	49
76	76	76	76
404	404	377	369

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 01000048570, 01000048570

Meter #(s):

Total Monthly Water Usage (gallons)					
Month	2001	2002	2003	2004	2005
Jan			3,386	2,752	1,722
Feb			3,339	1,198	1,556
Mar		1,000	1,802	1,703	
Apr		968	3,049	1,974	
May		1,508	2,271	2,040	
Jun		1,630	645	1,648	
Jul		2,707	2,351	3,388	
Aug		2,957	3,570	3,388	
Sep		1,957	2,234	1,648	
Oct		3,725	2,990	3,407	
Nov		3,106	1,624	1,648	
Dec		1,319	341		
Totals	0	20,877	27,602	24,794	3,278

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
2,620	2,620	2,237	1,722
2,031	2,031	1,377	1,556
1,502	1,502	1,753	1,703
1,997	1,997	2,512	1,974
1,940	1,940	2,156	2,040
1,308	1,308	1,147	1,648
2,815	2,815	2,870	3,388
3,305	3,305	3,479	3,388
1,946	1,946	1,941	1,648
3,374	3,374	3,199	3,407
2,126	2,126	1,636	1,648
830	830	830	341
25,794	25,794	25,137	24,463

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: 23-Altura Plaza Building**

**Electric Usage Baseline**

Baseline Units: kWh  
 Account #(s): 9002393124  
 Meter #(s): 31141T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		136,358		121,640	121,594
Feb		121,328		112,652	103,244
Mar		120,842		115,320	112,618
Apr		108,257		112,883	
May		117,060		120,411	
Jun		121,281		122,653	
Jul		134,723		139,482	
Aug		125,370		138,135	
Sep		109,073	113,074	126,767	
Oct		99,878	107,998	120,855	
Nov		98,443	108,126	119,468	
Dec			116,975	126,428	
Totals	0	1,292,613	446,173	1,476,694	337,456

The CEA Baseline is the most recent twelve months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
121,594	126,531	121,617	121,594
103,244	112,408	107,948	103,244
112,618	116,260	113,969	112,618
112,883	110,570	112,883	112,883
120,411	118,736	120,411	120,411
122,653	121,967	122,653	122,653
139,482	137,103	139,482	139,482
138,135	131,753	138,135	138,135
126,767	116,305	119,921	126,767
120,855	109,577	114,427	120,855
119,468	108,679	113,797	119,468
126,428	121,702	121,702	126,428
1,464,538	1,431,591	1,446,945	1,464,538

**Electric Demand Baseline**

Baseline Units: kW  
 Account #(s): 9002393124  
 Meter #(s): 31141T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		280		272	272
Feb		260		276	272
Mar		264		272	228
Apr		288		272	276
May		288		288	
Jun		280		324	
Jul		296		344	
Aug		292		312	
Sep		276	304	308	
Oct		252	268	320	
Nov		252	272	320	
Dec		252	252	272	
Totals	0	3,280	1,096	3,580	1,048

The CEA Baseline is the most recent twelve months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
272	275	272	272
272	269	274	272
228	255	250	228
276	279	274	276
288	288	288	288
324	302	324	324
344	320	344	344
312	302	312	312
308	296	306	308
320	280	294	320
320	281	296	320
272	259	262	272
3,536	3,406	3,496	3,536

**Natural Gas Usage Baseline**

Baseline Units: dth  
 Account #(s): !Acct No.  
 Meter #(s): 601275967

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		489	495	1,816	
Feb			1,083	1,167	
Mar		477		516	
Apr		269		501	
May		194		415	
Jun		134		370	
Jul		156		453	
Aug		190	477	630	
Sep		124	809	753	
Oct		301	923	1,490	
Nov		492	1,094	1,833	
Dec	476	501	1,301		
Totals	476	3,327	6,182	9,944	0

The CEA Baseline is the most recent twelve months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
1,816	933	1,156	1,816
1,167	1,125	1,125	1,167
516	497	516	516
501	385	501	501
415	305	415	415
370	252	370	370
453	305	453	453
630	432	554	630
753	562	781	753
1,490	905	1,207	1,490
1,833	1,140	1,464	1,833
1,301	759	901	1,301
11,245	7,600	9,443	11,245



## Water Usage Baseline

Baseline Units: gallons

Account #(s): 20703-16332

Meter #(s): 40390840

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			110,310	231,312		231,312	170,811	170,811	231,312
Feb		93,803	159,457	188,690		188,690	147,317	174,074	188,690
Mar		111,548	244,963	157,555		157,555	171,355	201,259	157,555
Apr		137,177	240,402	247,231		247,231	208,270	243,817	247,231
May		170,500	244,036	322,300		322,300	245,612	283,168	322,300
Jun		219,529		347,233		347,233	283,381	347,233	347,233
Jul		283,367		387,367		387,367	335,367	387,367	387,367
Aug		300,303	259,742	459,150		459,150	339,732	359,446	459,150
Sep		235,831	224,684	414,267		414,267	291,594	319,476	414,267
Oct		156,452	212,109	361,683		361,683	243,415	286,896	361,683
Nov		114,888	215,586	318,155		318,155	216,210	266,871	318,155
Dec		108,463	196,791			196,791	152,627	152,627	196,791
Totals	0	1,931,861	2,108,080	3,434,943	0	3,631,734	2,805,691	3,193,045	3,631,734

The CEA Baseline is the most recent twelve months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

## Project: Arapahoe County Building: 24-Centrepoint Plaza

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 1503487587

Meter #(s): 22021T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan					260,048
Feb				571,192	230,963
Mar				270,714	252,724
Apr				215,531	
May				211,119	
Jun		194,897		213,078	
Jul		223,186		224,479	
Aug		215,876		222,248	
Sep		195,671		210,752	
Oct		232,614		215,706	
Nov				230,257	
Dec				256,230	
Totals	0	1,062,244	0	2,841,306	743,735

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
260,048	260,048	260,048	260,048
401,078	401,078	401,078	230,963
261,719	261,719	261,719	252,724
215,531	215,531	215,531	215,531
211,119	211,119	211,119	211,119
203,988	203,988	213,078	213,078
223,833	223,833	224,479	224,479
219,062	219,062	222,248	222,248
203,212	203,212	210,752	210,752
224,160	224,160	215,706	215,706
230,257	230,257	230,257	230,257
256,230	256,230	256,230	256,230
2,910,237	2,910,237	2,922,245	2,743,135

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 1503487587

Meter #(s): 22021T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan				645	641
Feb				615	605
Mar				578	580
Apr				578	
May		495		578	
Jun		670		617	
Jul		573		625	
Aug		673		581	
Sep		526		578	
Oct		542		532	
Nov		552		627	
Dec				654	
Totals	0	4,031	0	7,208	1,826

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
643	643	643	641
610	610	610	605
579	579	579	580
578	578	578	578
537	537	578	578
644	644	617	617
599	599	625	625
627	627	581	581
552	552	578	578
537	537	532	532
590	590	627	627
654	654	654	654
7,150	7,150	7,202	7,196

### Natural Gas Usage Baseline

Baseline Units: dth

Account #(s): 53-3441672-9

Meter #(s): 1309638

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan					34
Feb				23	29
Mar				17	29
Apr				15	
May				16	
Jun		12		12	
Jul		13		13	
Aug		18		14	
Sep		29		14	
Oct		61		15	
Nov				16	
Dec				17	
Totals	0	133	0	172	92

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
34	34	34	34
26	26	26	29
23	23	23	29
15	15	15	15
16	16	16	16
12	12	12	12
13	13	13	13
16	16	14	14
22	22	14	14
38	38	15	15
16	16	16	16
17	17	17	17
248	248	215	224

## Water Usage Baseline

Baseline Units: gallons

Account #(s): 199313-132082

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan			68,683	116,409		116,409	92,546	92,546	116,409
Feb			74,489	121,020		121,020	97,755	97,755	121,020
Mar			83,309	127,429		127,429	105,369	105,369	127,429
Apr			113,574	217,067		217,067	165,321	165,321	217,067
May			189,084	450,652		450,652	319,868	319,868	450,652
Jun			309,858	608,281		608,281	459,070	459,070	608,281
Jul			560,076	767,500		767,500	663,788	663,788	767,500
Aug			734,000	847,328		847,328	790,664	790,664	847,328
Sep		318,644	760,397	677,306		677,306	585,449	718,852	677,306
Oct		166,536	589,437	354,273		354,273	370,082	471,855	354,273
Nov		70,656	225,037	156,870		156,870	150,854	190,954	156,870
Dec		63,393	114,772			114,772	89,083	89,083	114,772
Totals	0	619,229	3,822,716	4,444,135	0	4,558,907	3,889,849	4,165,125	4,558,907

The CEA Baseline is most recent 12 Months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.



## Water Usage Baseline

Baseline Units: gallons

Account #(s): 1041

Meter #(s):

Total Monthly Water Usage (gallons)									
Month	2001	2002	2003	2004	2005	CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Jan		124,000	116,194	99,923		99,923	113,372	108,059	99,923
Feb		102,933	61,419	147,319		147,319	103,890	104,369	147,319
Mar		213,352	118,887	187,883		187,883	173,374	153,385	187,883
Apr		176,442	108,357	181,875		181,875	155,558	145,116	181,875
May		136,273	128,820			128,820	132,547	132,547	128,820
Jun		210,771	110,323	123,600		123,600	148,231	116,962	123,600
Jul		122,229	144,000	137,541		137,541	134,590	140,771	137,541
Aug		140,357	130,250	206,059		206,059	158,889	168,155	206,059
Sep		126,043	123,750	135,714		135,714	128,502	129,732	135,714
Oct		86,800	142,000	200,571		200,571	143,124	171,286	200,571
Nov		94,800	122,667	133,714		133,714	117,060	128,191	133,714
Dec			72,333	168,000		168,000	120,167	120,167	168,000
Totals	0	1,534,000	1,379,000	1,722,199	0	1,851,019	1,629,304	1,618,740	1,851,019

The CEA Baseline is the most recent twelve months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

## Project: Arapahoe County Building: 35-ACJC Courthouse

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 3002636248

Meter #(s): 44203T (old meter 12368T)

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		179,898		200,878	202,551
Feb		164,296		202,969	172,659
Mar				234,751	
Apr				234,674	
May		197,796		248,888	
Jun		209,448		247,557	
Jul		231,635		293,663	
Aug		239,517	314,971	276,365	
Sep		227,389		228,143	
Oct		205,013		214,985	
Nov		183,400	202,782	201,979	
Dec			193,783	199,199	
Totals	0	1,838,392	711,536	2,784,051	375,210

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
202,551	194,442	201,715	202,551
172,659	179,975	187,814	172,659
234,751	234,751	234,751	234,751
234,674	234,674	234,674	234,674
248,888	223,342	248,888	248,888
247,557	228,503	247,557	247,557
293,663	262,649	293,663	293,663
276,365	276,951	295,668	276,365
228,143	227,766	228,143	228,143
214,985	209,999	214,985	214,985
201,979	196,054	202,381	201,979
199,199	196,491	196,491	199,199
2,755,414	2,665,597	2,786,730	2,755,414

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 3002636248

Meter #(s): 44203T (old meter 12368T)

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		411		509	514
Feb		430		489	513
Mar		432		492	532
Apr		422		491	
May		509		504	
Jun		478		540	
Jul		564		569	
Aug		551	580	544	
Sep		553	522	539	
Oct		517		479	
Nov		532	504	526	
Dec		532	435	489	
Totals	0	5,931	2,041	6,171	1,559

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
514	478	512	514
513	477	501	513
532	485	512	532
491	457	491	491
504	507	504	504
540	509	540	540
569	567	569	569
544	558	562	544
539	538	531	539
479	498	479	479
526	521	515	526
489	485	462	489
6,240	6,080	6,178	6,240

### Natural Gas Usage Baseline

Baseline Units: dth

Account #(s): !Acct No.

Meter #(s): 405046133

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		691	677	968	
Feb			762	887	
Mar				754	
Apr		374		671	
May		340		456	
Jun		90		402	
Jul		44		273	
Aug		164	194	371	
Sep		366	525	387	
Oct		574	659	602	
Nov		609	816	677	
Dec	655	702	952	832	
Totals	655	3,954	4,585	7,280	0

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
968	779	823	968
887	825	825	887
754	754	754	754
671	523	671	671
456	398	456	456
402	246	402	402
273	159	273	273
371	243	283	371
387	426	456	387
602	612	631	602
677	701	747	677
832	785	892	832
7,280	6,451	7,213	7,280

**Project: Arapahoe County**  
**Building: 13500 E. Fremont**

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 1124

Meter #(s):

Total Monthly Water Usage (gallons)				
Month	2001	2002	2003	2004
Jan		325,615		425,622
Feb		295,965		514,533
Mar		317,197		565,324
Apr		312,337		563,143
May		302,100		383,824
Jun		317,550		486,176
Jul		325,342		667,161
Aug		388,134	1,008,665	537,484
Sep		428,044	838,190	679,355
Oct		280,975	840,217	538,909
Nov		203,950	825,881	409,091
Dec			783,212	
Totals	0	3,497,209	4,296,165	5,770,622

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
425,622	375,619	425,622	425,622
514,533	405,249	514,533	514,533
565,324	441,261	565,324	565,324
563,143	437,740	563,143	563,143
383,824	342,962	383,824	383,824
486,176	401,863	486,176	486,176
667,161	496,252	667,161	667,161
773,075	644,761	773,075	537,484
758,773	648,530	758,773	679,355
689,563	553,367	689,563	538,909
617,486	479,641	617,486	409,091
783,212	783,212	783,212	783,212
7,227,892	6,010,457	7,227,892	6,553,834

The CEA Baseline is the Average of the last two years data received.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

## Project: Arapahoe County Building: 36-ACJC Detention Center

### Electric Usage Baseline

Baseline Units: kWh

Account #(s): 4002636224, 8002636236

Meter #(s): 14207T, 76942S

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		452,856		452,687	453,980
Feb		401,573		426,998	411,708
Mar				464,851	
Apr				449,165	
May		445,283		468,214	
Jun		456,242		466,091	
Jul		520,313		503,173	
Aug		503,902	481,523	513,825	
Sep		461,274		468,494	
Oct		445,775		462,990	
Nov		415,968	448,554	433,440	
Dec			448,503	422,045	
Totals	0	4,103,186	1,378,580	5,531,973	865,688

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
453,980	453,174	453,334	453,980
411,708	413,426	419,353	411,708
464,851	464,851	464,851	464,851
449,165	449,165	449,165	449,165
468,214	456,749	468,214	468,214
466,091	461,167	466,091	466,091
503,173	511,743	503,173	503,173
513,825	499,750	497,674	513,825
468,494	464,884	468,494	468,494
462,990	454,383	462,990	462,990
433,440	432,654	440,997	433,440
422,045	435,274	435,274	422,045
5,517,976	5,497,220	5,529,610	5,517,976

### Electric Demand Baseline

Baseline Units: kW

Account #(s): 4002636224, 8002636236

Meter #(s): 14207T, 76942S

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		726		722	728
Feb		708		716	731
Mar		737		773	747
Apr		754		779	
May		762		833	
Jun		856		888	
Jul		898		906	
Aug		924	909	857	
Sep		865	851	874	
Oct		779		769	
Nov		698	786	757	
Dec		698	715	726	
Totals	0	9,405	3,261	9,600	2,206

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
728	725	725	728
731	718	724	731
747	752	760	747
779	767	779	779
833	798	833	833
888	872	888	888
906	902	906	906
857	897	883	857
874	863	863	874
769	774	769	769
757	747	772	757
726	713	721	726
9,595	9,528	9,623	9,595

### Natural Gas Usage Baseline

Baseline Units: dth

Account #(s): 54-3441672-9

Meter #(s): 1353953, 0067271401 (old meter 304832582), 0067893101 (old meter 903992823)

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan		3,792	3,119	3,420	2,216
Feb			3,166	3,310	1,714
Mar		3,807		2,765	1,846
Apr		2,324		2,617	
May		1,999		1,928	
Jun				1,768	
Jul				1,359	
Aug			1,059	1,595	
Sep		1,506	1,734	1,760	
Oct		3,100	2,090	2,218	
Nov		3,180	2,635	2,918	
Dec	3,194	3,404	3,197	3,360	
Totals	3,194	23,112	17,000	29,018	5,776

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
3,137	3,137	2,818	2,978
2,730	2,730	2,512	2,621
2,806	2,806	2,306	2,556
2,471	2,471	2,617	2,617
1,964	1,964	1,928	1,928
1,768	1,768	1,768	1,768
1,359	1,359	1,359	1,359
1,327	1,327	1,327	1,595
1,667	1,667	1,747	1,760
2,469	2,469	2,154	2,218
2,911	2,911	2,777	2,918
3,289	3,289	3,279	3,360
27,898	27,898	26,592	27,678



**Project: Arapahoe County**  
**Building: 13500 E. Fremont**

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 1124

Meter #(s):

Total Monthly Water Usage (gallons)				
Month	2001	2002	2003	2004
Jan		2,630,600		2,756,486
Feb		2,492,029		4,021,000
Mar		2,700,215		4,314,714
Apr		3,092,762		4,984,286
May		3,345,929		3,368,529
Jun		3,838,466		4,151,471
Jul		4,008,319		4,564,677
Aug		3,534,581	4,057,744	4,210,161
Sep		2,793,990	3,908,260	5,095,161
Oct		2,916,460	3,440,068	4,572,727
Nov			3,143,869	3,977,273
Dec			3,462,680	3,475,000
Totals	0	31,353,351	18,012,621	49,491,485

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
2,756,486	2,693,543	2,756,486	2,756,486
4,021,000	3,256,515	4,021,000	4,021,000
4,314,714	3,507,465	4,314,714	4,314,714
4,984,286	4,038,524	4,984,286	4,984,286
3,368,529	3,357,229	3,368,529	3,368,529
4,151,471	3,994,969	4,151,471	4,151,471
4,564,677	4,286,498	4,564,677	4,564,677
4,210,161	3,934,162	4,133,953	4,210,161
5,095,161	3,932,470	4,501,711	5,095,161
4,572,727	3,643,085	4,006,398	4,572,727
3,977,273	3,560,571	3,560,571	3,977,273
3,475,000	3,468,840	3,468,840	3,475,000
49,491,485	43,673,871	47,832,636	49,491,485

The CEA Baseline is the Most Recent 12 Months data received.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: 37-ACJC Administrative II**

**Electric Usage Baseline**

Baseline Units: kWh

Account #(s): 7002636152

Meter #(s): 41435T (old meter 74910A)

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan		157,715		152,791	149,668
Feb		125,628		145,204	123,955
Mar		143,495		163,857	137,823
Apr		164,500		166,962	
May		178,334		183,024	
Jun		194,898		185,588	
Jul		213,389		204,313	
Aug		202,560	211,383	202,649	
Sep		188,637	182,508	187,481	
Oct		164,921	172,601	170,057	
Nov		147,778	151,850	153,399	
Dec			154,078	152,731	
Totals	0	1,881,855	872,420	2,068,056	411,446

The CEA Baseline is Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
153,391	153,391	151,230	149,668
131,596	131,596	134,580	123,955
148,392	148,392	150,840	137,823
165,731	165,731	166,962	166,962
180,679	180,679	183,024	183,024
190,243	190,243	185,588	185,588
208,851	208,851	204,313	204,313
205,531	205,531	207,016	202,649
186,209	186,209	184,995	187,481
169,193	169,193	171,329	170,057
151,009	151,009	152,625	153,399
153,405	153,405	153,405	152,731
2,044,230	2,044,230	2,045,907	2,017,650

**Electric Demand Baseline**

Baseline Units: kW

Account #(s): 7002636152

Meter #(s): 41435T

Total Monthly Electric Demand (kW)					
Month	2001	2002	2003	2004	2005
Jan		398		322	406
Feb		384		336	403
Mar		341		358	403
Apr		348		362	403
May		350		382	
Jun		451		396	
Jul		451		403	
Aug		396	463	398	
Sep		451	466	389	
Oct		451	374	389	
Nov		451	370	389	
Dec		451	334	389	
Totals	0	4,923	2,007	4,513	1,615

The CEA Baseline is Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
375	375	364	406
374	374	370	403
367	367	381	403
371	371	383	403
366	366	382	382
424	424	396	396
427	427	403	403
419	419	431	398
435	435	428	389
405	405	382	389
403	403	380	389
391	391	362	389
4,757	4,757	4,662	4,750

**Natural Gas Usage Baseline**

Baseline Units: therms

Account #(s): 53-3441672-9

Meter #(s): FC24679

Total Monthly Natural Gas Usage (therms)					
Month	2001	2002	2003	2004	2005
Jan		3,340		2,472	3,292
Feb		2,957		2,029	2,623
Mar		2,939		1,907	2,661
Apr		1,835		1,611	
May		1,365		1,342	
Jun		541		773	
Jul		163		650	
Aug		214	422	841	
Sep		161	932	897	
Oct		1,114	1,500	977	
Nov		2,623	1,734	2,320	
Dec			2,366	3,238	
Totals	0	17,252	6,954	19,057	8,576

The CEA Baseline is the most recent 12 months data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
3,292	3,035	2,882	3,292
2,623	2,536	2,326	2,623
2,661	2,502	2,284	2,661
1,611	1,723	1,611	1,611
1,342	1,354	1,342	1,342
773	657	773	773
650	407	650	650
841	492	632	841
897	663	915	897
977	1,197	1,239	977
2,320	2,226	2,027	2,320
3,238	2,802	2,802	3,238
21,225	19,594	19,483	21,225

**Project: Arapahoe County**  
**Building: Administration II**

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 1124

Meter #(s):

Total Monthly Water Usage (gallons)					Average All Average Last 2 Most Recent 12			
Month	2001	2002	2003	2004	CEA Baseline	Data	Years	Months
Jan		61,118		40,216	50,667	50,667	40,216	40,216
Feb		56,581		68,267	62,424	62,424	68,267	68,267
Mar		69,308		66,305	67,807	67,807	66,305	66,305
Apr		73,568		75,429	74,499	74,499	75,429	75,429
May		54,900		50,706	52,803	52,803	50,706	50,706
Jun		63,702		65,294	64,498	64,498	65,294	65,294
Jul		54,977		58,839	56,908	56,908	58,839	58,839
Aug		62,413	67,422	57,290	62,375	62,375	62,356	57,290
Sep		55,695	57,329	63,871	58,965	58,965	60,600	63,871
Oct		57,031	61,356	64,182	60,856	60,856	62,769	64,182
Nov			61,679	61,818	61,749	61,749	61,749	61,818
Dec			52,784	52,000	52,392	52,392	52,392	52,000
Totals	0	609,293	300,570	724,217	725,943	725,943	724,922	724,217

The CEA Baseline is Average All data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: ACJC Irrigation**

**Water Usage Baseline**

Baseline Units: gallons

Account #(s): 1124

Meter #(s):

Total Monthly Water Usage (gallons)						Average All Average Last 2 Most Recent 12			
Month	2001	2002	2003	2004	2005	CEA Baseline	Data	Years	Months
Jan				838		838	838	838	838
Feb				3,667		3,667	3,667	3,667	3,667
Mar				42,333		42,333	42,333	42,333	42,333
Apr				150,000		150,000	150,000	150,000	150,000
May				390,471		390,471	390,471	390,471	390,471
Jun				723,529		723,529	723,529	723,529	723,529
Jul		628,397		865,000		746,699	746,699	865,000	865,000
Aug		778,422	709,277	624,258		703,986	703,986	666,768	624,258
Sep		558,542	547,565	727,742		611,283	611,283	637,654	727,742
Oct		232,329	543,693	186,364		320,795	320,795	365,029	186,364
Nov		1,167	1,060	23,636		8,621	8,621	12,348	23,636
Dec			995	16,000		8,498	8,498	8,498	16,000
Totals	0	2,198,857	1,802,590	3,753,838	0	3,710,720	3,710,720	3,866,135	3,753,838

The CEA Baseline is the Average of All Data Collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

**Project: Arapahoe County**  
**Building: 38-Sheriff/Coroner Facility**

**Electric Usage Baseline**

Baseline Units: kWh  
 Account #(s): 7901224416  
 Meter #(s): 41579T

Total Monthly Electric Usage (kWh)					
Month	2001	2002	2003	2004	2005
Jan					233,435
Feb				224,985	205,024
Mar				209,333	222,636
Apr				199,959	
May				202,483	
Jun				194,728	
Jul				204,941	
Aug				203,837	
Sep			191,878	191,029	
Oct				190,813	
Nov				185,731	
Dec				238,052	
Totals	0	0	191,878	2,245,891	661,095

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
233,435	233,435	233,435	233,435
215,005	215,005	215,005	205,024
215,985	215,985	215,985	222,636
199,959	199,959	199,959	199,959
202,483	202,483	202,483	202,483
194,728	194,728	194,728	194,728
204,941	204,941	204,941	204,941
203,837	203,837	203,837	203,837
191,454	191,454	191,454	191,029
190,813	190,813	190,813	190,813
185,731	185,731	185,731	185,731
238,052	238,052	238,052	238,052
2,476,423	2,476,423	2,476,423	2,472,668

**Natural Gas Usage Baseline**

Baseline Units: dth  
 Account #(s): 53-3441672-9  
 Meter #(s): 1454533

Total Monthly Natural Gas Usage (dth)					
Month	2001	2002	2003	2004	2005
Jan				235	197
Feb				276	176
Mar				144	141
Apr				169	105
May				77	
Jun				63	
Jul				76	
Aug		26		58	
Sep		27	45	67	
Oct			62	93	
Nov		180		164	
Dec		300	212	278	
Totals	0	533	319	1,700	619

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
216	216	216	197
226	226	226	176
143	143	143	141
137	137	137	105
77	77	77	77
63	63	63	63
76	76	76	76
42	42	58	58
46	46	56	67
78	78	78	93
172	172	164	164
263	263	245	278
1,539	1,539	1,539	1,495

**Water Usage Baseline**

Baseline Units: gallons  
 Account #(s): 125775  
 Meter #(s):

Total Monthly Water Usage (gallons)					
Month	2001	2002	2003	2004	2005
Jan				93,314	
Feb				121,580	
Mar				97,456	
Apr				131,250	
May		593,982		406,200	
Jun		574,821		540,733	
Jul		593,982		669,949	
Aug		593,982	610,438	567,118	
Sep		558,054	486,563	365,571	
Oct		420,714	218,000	199,571	
Nov		98,314	112,258	138,857	
Dec		83,257	96,142		
Totals	0	3,517,106	1,523,401	3,331,599	0

The CEA Baseline is the Average of all data collected.

The initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
93,314	93,314	93,314	93,314
121,580	121,580	121,580	121,580
97,456	97,456	97,456	97,456
131,250	131,250	131,250	131,250
500,091	500,091	406,200	406,200
557,777	557,777	540,733	540,733
631,966	631,966	669,949	669,949
590,513	590,513	588,778	567,118
470,063	470,063	426,067	365,571
279,428	279,428	208,786	199,571
116,476	116,476	125,558	138,857
89,700	89,700	89,700	96,142
3,679,614	3,679,614	3,499,371	3,427,741

# 3

## Data on Present Facilities

Data important to energy use at Arapahoe County is covered in this section of the report. The data was collected on a building-by-building basis. Each building was visited by a survey team to collect data and to identify potential opportunities for energy cost reduction. Areas of concern encompassed factors that impact the usage of thermal energy and electrical energy. The survey considered building envelopes, heating, ventilation, and air conditioning (HVAC) equipment, lighting, miscellaneous equipment, process equipment, etc. Information was collected on building use schedules as well as HVAC equipment usage and lighting schedules. Available plans and HVAC control drawings for each building were reviewed to augment data collected during the survey work. In addition, energy usage information was assembled from a tabulation of utility bills. Table 3-1 shows the list of buildings involved in the report, the square feet of each building, as well as that building's page number in this section.

A complete inventory of the lighting fixtures is located in the Appendix. All of the EMCS' existing and proposed new operating schedules and temperature setpoints may be found in the Standards of Control located in the Appendix. All other information regarding building control, equipment, and operation is presented on the following pages.

**Table 3-1**  
**List of Buildings**

<i>Building Name</i>	<i>Square Feet</i>	<i>Pg. #</i>
01 – Administration Building	140,263	3-3
12 – Arapahoe Plaza East Building	20,957	3-10
13 – Arapahoe Human Services	54,678	3-13
14 – Arapahoe Plaza West Building (County Court)	20,880	3-17
15 – Federal Warehouse	75,073	3-20
16 – CSU Extension Office	5,309	3-23
17 – CSU Warehouse	9,476	3-25
20 – Tri County Health	8,398	3-27
23 – Altura Plaza Building	74,675	3-29

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**Data on Present Facilities 3-2**

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<i><b>Building Name</b></i>	<i><b>Square Feet</b></i>	<i><b>Pg. #</b></i>
24 – Centrepont Plaza	105,662	3-34
29 – Peoria Shops	25,008	3-36
35 – ACJC Courthouse	148,522	3-39
36 – ACJC Detention Center	291,955	3-44
37 – ACJC Administrative II	91,110	3-50
38 – Sheriff/Coroner Facility	125,055	3-54

## 01 - ADMINISTRATION BUILDING

### I. General Description

- A. Gross Square Footage: 140,263 Sq. Ft.
- B. Year of Original Construction: 1977
- C. General Construction Information: This four story building has exterior walls constructed of architectural concrete, batt insulation, and a 5/8" gypsum board interior. The exterior glass is typically single pane. The windows on the east side of the building have recently been retrofitted to double pane tinted windows. The roof is constructed of built-up roofing on top of 4 1/2" rigid insulation, and pre-cast concrete.
- D. Building Schedules: The building is occupied by the County staff and visitors between 6:00 am to 6:00 pm, Monday through Friday.



### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Administration Building is general office equipment, which includes personal computers, printers, faxes, etc.

### IV. Heating, Ventilation, and Air Conditioning

- A. Heating System: The Administration Building produces heating hot water from three boilers located in the first floor mechanical room. The heating hot water is distributed to the heating coils located in the reheat boxes via two hot water pumps. The hot water system is piped so that the hot water return may be preheated by two heat recovery condensers located in the building's two water-cooled chillers. The heat recovery is achieved by taking the heat from the compressor and transferring it to the hot water loop via the chiller's condenser. Additionally, the heating plant provides hot water to a non-operational snow melting system that contains a heat exchanger with two circulating pumps, and a domestic hot water heat exchanger.
  - 1. Hot Water Boilers: B-1 and B-2 are natural gas fired, atmospheric, hot water boilers. B-3 is an electric hot water boiler. The boilers supply hot water to the heating coils in the variable air volume reheat boxes, the snow melt system, and the domestic hot water heat exchanger. B-1 and B-2 operate throughout the entire year in order to provide hot water to the domestic hot water heat exchanger. B-3 is not used. Additional information about the hot water boilers is listed in the table below.

01 - Administration Building - Hot Water Boilers

Equip ID	Mfgr	Model	Fuel	Input MBH	Output MBH	Pressure (psig)	kW
B-1	Peerless	211-8-WTG	NG	1470	1178	N/A	N/A
B-2	Peerless	211-8-WTG	NG	1470	1178	N/A	N/A
B-3	Indeeco	56UWC-375-U-A	Elect.	N/A	N/A	160	375

N/A – The nameplate data was not available during the time of the survey.

- Hot Water Pumps: The two hot water pumps (P-3 and P-4) are centrifugal, constant volume pumps located in mechanical room G90.1. Each pump circulates water through its own heat recovery condenser, the boilers, and the hot water coils. The pumps operate in parallel. The first pump comes on whenever the outside air temperature falls below 66°F. The second pump comes on when the outside air temperature falls below 50°F. Additional information about the hot water pumps is listed in the table below.

01 - Administration Building - Hot Water Pumps

Equip ID	Pump Data				Motor Data				
	Mfgr.	Model	GPM	Head (Ft.)	Mfgr.	Model	HP	Amps	Volts
P-3	Armstrong	2E 4030	160	N/A	Lincoln	N/A	7.5	20.4/10.2	230/460
P-4	Armstrong	2E 4030	160	N/A	Lincoln	N/A	7.5	20.4/10.2	230/460

N/A – The nameplate data was not available during the time of the survey.

- Cooling System: The Administration Building utilizes two water-cooled, heat recovery chillers to cool the building. The chilled water is distributed to the chilled water coils, located in the air handling units, via two chilled water pumps.
  - Water-Cooled, Heat Recovery Chillers: Both chillers (CH-1 and CH-2) contain two sets of condensers, one for the cooling tower, and one for the heat recovery system. The condenser for the cooling tower rejects heat from the compressor through the cooling tower. During the heating season, the condenser for the heat recovery system preheats the hot water return by transferring the heat from the compressor to the hot water return. Both chillers operate when the chilled water pumps are turned on via a digital time clock. Additional information about the chillers is listed in the table below.

01 - Administration Building - Chillers

Equip ID	Mfgr	Model	Output Clg.	Refrigerant	Compressor Data				
			Capacity (tons)		Qty	Mfgr	Model	LRA	Volts
CH-1	Carrier	09RP0702B9-1	130	R-22	4	Totaline	6E275TL360	506	208/230
CH-2	Carrier	09RP0702B9-1	130	R-22	4	Totaline	6E275TL360	506	208/230

N/A – The nameplate data was not available during the time of the survey.



2. Chilled Water Pumps: The chilled water pumps (P-1 and P-2) are constant volume, centrifugal pumps located in Mechanical Room G90.1. Both pumps are scheduled to operate from 7:30am to 10pm, Monday through Friday, as governed by a digital time clock. Both pumps were on during the time of the survey. Additional information about the chilled water pumps is listed in the table below.

**01 - Administration Building - Chilled Water Pumps**

Equip ID	Pump Data				Motor Data					Location
	Mfgr	Model	GP M	Head (Ft.)	Mfgr	Model	HP	Amps	Volts	
P-1	Armstrong	AE 4030	420	80	Baldor	EN2333T	15	37/18.5	230/460	Mech. Rm G90.1
P-2	Armstrong	819359-002	420	80	Lincoln	N/A	15	40/20	230/460	Mech. Rm G90.1

N/A – The nameplate data was not available during the time of the survey.

3. Cooling Tower:

CT-1 is a single cell cooling tower with a propeller fan. This is an older unit, small due to the low wet bulb temperatures typical of Denver. The fill did not have a large amount of solids deposition. There is a water-treatment metering pump in place that administers biocides to control algae and bacteria growth. Also, an acid cleaner is used to control scaling resulting from the deposition to dissolved solids. The tower is mounted in a concrete walled courtyard that shields the tower from wind driven drift. The cooling tower is located outside while the tower basin is located in the basement. The cooling tower was found to be in very poor, decayed condition during the time of the survey. Water was flowing out the top of the tower onto the ground and into a drain. Additional information about the cooling tower is listed in the table below.

**01 - Administration Building - Cooling Tower**

Equip ID	Mfgr.	Model	Fan HP
CT-1	Marley	NC-8605	10

4. Condenser Water Pumps: The condenser water pumps (P-5 and P-6) are constant volume, centrifugal pumps located in Mechanical Room G90.1. Additional information about the condenser water pumps is listed in the table below.

**01 - Administration Building - Condenser Water Pumps**

Equip ID	Pump Data				Motor Data					Location
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts	
P-5	Armstrong	4E 4030	420	80	Lincoln	N/A	15	40/20	230/460	Mech. Rm G90.1
P-6	Armstrong	4E 4030	420	80	Lincoln	N/A	15	40/20	230/460	Mech. Rm G90.1

N/A – The nameplate data was not available during the time of the survey.

## C. Distribution Systems:

1. AH-1 and AH-2: These are constant volume, single zone systems located in storage closets on the second floor. They condition the small hearing room (AH-1) and the large hearing room (AH-2) on the second floor. Each unit is equipped with a supply air fan, a chilled/hot water cooling/heating coil, and mixed air dampers. The cooling/heating coil has one supply line and one return line. The supply line is connected to both the building's hot water supply header and the chilled water supply header. The return line is connected to both the building's hot water return header and the chilled water return header. All four lines are controlled by two-way pneumatic valves which modulate to maintain the space temperature setpoint as governed by the space thermostat. The supply air fan on each unit is scheduled to operate from 7:30 am to 10 pm, Monday through Friday, as governed by the same digital time clock that controls the chilled water pumps. The mixed air dampers are controlled by electric actuators. Additional information that was obtained from the drawings is listed in the table below.

01 - Administration Building - Air Handling Units

Equip ID	Area Served	Mfgr	Supply Fan			
			CFM	HP	Amps	Volts
AH-1	Meeting Room	Trane	2,250	1.5	N/A	N/A
AH-2	Hearing Room	Trane	9,600	5	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

2. AH-3 and AH-4: These are variable air volume reheat systems that serve the majority of the building. Each unit is equipped with a supply air fan, chilled water cooling coil, mixed air dampers, and a return/exhaust air fan. The supply air fans have inlet guide vanes that have been locked to the 100% open position. Each supply fan is controlled by a variable frequency drive, which modulates to maintain the supply air duct static pressure setpoint. The conditioned air is distributed to the spaces via system and fan powered VAV boxes. The cooling coils are not equipped with control valves. The mixed air dampers are controlled by pneumatic actuators, which modulate to maintain the mixed air temperature setpoint. Each unit is equipped with an electric unit heater that is used to preheat the outside air. The electric unit heater on AH-3 was not working during the time of the survey. The supply air fan on each unit is scheduled to operate from 7:30 am to 10 pm, Monday through Friday, as governed by the same digital time clock that controls the chilled water pumps. The return/exhaust air fan does not have a variable frequency drive and runs constantly at full load during occupied periods.

## 01 - Administration Building - Air Handling Units

Equip ID	Mfgr.	Model	Supply Fan				Return Fan			
			CFM	HP	Amps	Volts	CFM	HP	Amps	Volts
AH-3	Carrier	39EH90	65000	75	184/92	230/460	N/A	10	N/A	N/A
AH-4	Carrier	39EH90	65000	75	184/92	230/460	N/A	10	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

- Liebert Units: These units are direct expansion split systems, with electric heat, which serve the computer areas. These units operate 24 hours a day, seven days a week. The condensing units are located outside by the docking area. Additional information about these units is listed in the table below.

## 01 - Administration Building - Liebert Units

Equip ID	Mfgr.	Model	Supply Fan				Compressor Fans				Location
			CFM	HP	Amps	Volts	Qty	RLA	LRA	Volts	
Liebert-1	Liebert	FH245A-A00	N/A	7.5	11	460	2	17.8	99	N/A	G80.16
Liebert-2	Liebert	FH245A-A00	N/A	7.5	11	460	2	17.8	99	N/A	G80.16

N/A – The nameplate data was not available during the time of the survey.

## V. Miscellaneous HVAC Equipment

## A. Domestic Hot Water:

- The domestic hot water system utilizes a hot water heat exchanger to supply the building with domestic hot water. The heat exchanger is embedded in a domestic hot water storage tank. The heat exchanger has a pump that circulates hot water from the heating hot water system, as well as another pump to deliver the domestic hot water from the storage tank to the building. Additional information on these pumps is listed in the table below.

## 01 - Administration Building - DHW Pumps

Equip ID	Pump Data				Motor Data				Location
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	
DHWP-1	Armstrong	N/A	N/A	N/A	N/A	N/A	1/6	3.6/1.75	Mech. Rm G90.1
HX Pump	B&G	M10532K10	N/A	N/A	N/A	N/A	1/4	3.6	Mech. Rm G90.1

N/A – The nameplate data was not available during the time of the survey.

## B. Snow Melt System:

- The snow melt system, which is currently non-operational, contains a heat exchanger, two circulation pumps, a three-way pneumatic valve that controls the flow to the snow melt areas, and a two-way pneumatic valve, which modulates the hot water flow from the boiler to maintain the hot water supply temperature to the snow melt zones.

## VI. Water Usage

- A. Overview: There are three primary modes of water use: sanitary, cooling tower makeup, and irrigation. Other minor uses include an ice machine, drinking water fountains, janitorial use, and boiler makeup water. All services share one meter which is read monthly. The owner installed a water meter to monitor irrigation usage before the 2005 irrigation season commenced.

There is significant public use (up to 1500 visitors per day per facilities staff) of this building as there is a motor vehicle license bureau that serves the public. The assumed length of each visit is less than ½ hour.

- B. Plumbing Fixtures, general

The commodes are all flush-valve actuated, wall-mounted models with no markings to indicate gallons per flush. No leaks or maintenance problems were observed during the survey. The urinals are all flush-valve actuated, wall-mounted models with no markings to indicate gallons per flush. These units had a large, deep bowl with a large water spot, suggestive of a high usage fixture.

Lavatory faucets are primarily Chicago brand units in good condition. Measured flow rates through these faucets ranged from 1.75 to 2.5 gallons per minute (GPM), average: 2.2 GPM.

Each floor had two small kitchenettes with small stainless steel sinks and gooseneck faucets. There is a small residential type kitchen on the ground floor with a faucet and the Scotsman Ice Machine

Each floor has two janitorial closets with utility faucets.

**01 – Administration Building– Plumbing Fixtures**

Commodes:		Urinals	Faucets			
Flush Valve 1.6 GPF	Flush Valve 3.5 GPF	2.0 GPF	GPM average	Total Lavatory	Metered	Kitchen (break)
0	44	21	2.2	32	0	9

- C. Modeling Notes: The commode and urinal flush rates are the expected flush rates given the apparent age of the units and the lack of identifying labels on the bowls and the fixtures. Given the staffing and visitor levels and normal frequency of use, and comparing the model to the bills, the actual water usage does not support the flush rates listed above. The billing reflects the use of 1.6 GPF commodes and 1 GPF urinals.

- D. Cooling Tower Water Use:

General: Water usage in cooling towers results from evaporation, drift, and sump purging. Evaporative losses are necessary to the function of the tower: evaporation cools the water that is pumped from the condenser and this is how the heat from the building is pumped outside. Drift is the carrying of water droplets away from the tower by the action of the cooling tower fan and wind. Sump purging is necessary to reduce the accumulation of salts in the cooling tower

water system. Evaporation results in the concentration of salts (dissolved solids) in the water medium, reducing the ability of water to evaporate and resulting in the deposition of salts in the tower fill reducing the efficacy of the tower. The sump is purged periodically to reduce the total dissolved solids to maintain optimal water quality in the system.

**E. Irrigation:**

**General:** There are two large lawn areas served by impact rotor popup sprayers spaced 50 to 60 feet on center, staggered in a diamond pattern. Smaller areas are served with smaller rotor popup sprinklers and shrubs are served with popup sprinklers and/or a drip system. There are two Rainmaster brand digital timers that control the frequency, duration, and sequencing of the various zones. There are no automatic controls for sensing wind, soil moisture, or rainfall. Schedule is altered by the staff if rainfall occurs that is sufficient to moisten the lawn and irrigation is not needed and if the staff is present to do so. According to facilities staff there is little or no problem with vandalism.

**Area Served:** The grounds include 135,191 square feet (3.10 acres) total area, consisting primarily of temperate climate grass lawn area and shrubbery areas bordering walkways and parking lots and with several larger deciduous and evergreen trees.

**Notes:** The lawns are boarded by sloped areas, varying the exposure to sunlight. The irrigation system appears to be installed with inadequate regard to the variation in sun exposure resulting in south facing slopes showing drought stress before others areas.

## 12 - ARAPAHOE PLAZA EAST BUILDING

### I. General Description

- A. Gross Square Footage: 20,957 Sq. Ft.
- B. Year of Original Construction: Unknown; Most recently remodeled 2001
- C. General Construction Information: This one story building has exterior walls constructed of brick veneer, ¾" plywood, 4" R-11 batt insulation, and a 5/8" gypsum board interior. The windows are aluminum frame, double-paned with a tinted finish. No information is available for the roof.
- D. Building Schedules: The building is occupied from 7:30 am to 5:00 pm, Monday through Friday. The custodial staff works from 4:00 pm to 12:30 am, Monday through Friday.



### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Arapahoe Plaza East Building is general office equipment, which includes personal computers, printers, faxes, etc.

### IV. Heating, Ventilation, and Air Conditioning

- A. Heating System: The Arapahoe Plaza East Building receives heating hot water from the boiler system located in the Arapahoe Human Services Building. The heating hot water is distributed to the hot water heating coils located in the variable volume reheat boxes via two hot water pumps that are also located in the Arapahoe Human Services Building. Information about the boilers and hot water system is located in the Arapahoe Human Services Building section of this document.
- B. Cooling System: The Arapahoe Plaza East Building receives chilled water from the Arapahoe Human Services Building. The chilled water is distributed to the chilled water cooling coils located in the air handling units. Information about the chillers and chilled water pumps is located in the Arapahoe Human Services Building section of this document.
- C. Distributions Systems:
  - 1. AHU-E1 and AHU-E2: These are variable air volume reheat systems that serve the entire East building. Each unit is equipped with a supply air fan, a chilled water cooling coil, mixed air dampers, and inlet guide vanes. The supply air volume is controlled by the inlet guide vanes, which modulate to maintain the supply air duct static pressure setpoint. The conditioned air is distributed to the spaces via fan powered VAV boxes. The chilled water cooling coil is controlled by either a two-way or three-

way pneumatic valve which modulates to control the discharge air temperature setpoint. The mixed air dampers are controlled by pneumatic actuators, which modulate to maintain mixed air temperature setpoint. There is also a hot water unit heater located in the mechanical room that preheats the mixed air. The supply air fan on each unit is scheduled to operate from 6 am to 10 pm on Monday through Friday, and 8 am to 4:30 pm on Saturday and Sunday as governed by a digital time clock and confirmed using run time loggers. Additional information about the air handling units is listed in the table below.

**12 - Arapahoe Plaza East Building - Air Handling Units**

Equip ID	Area Served	Mfgr	Supply Fan			
			CFM	HP	Amps	Volts
AHU-E1	E. Bldg-Level 1	Trane	14,000	15	40.5-38/19	208-230/460
AHU-E2	E. Bldg-Level 2	Trane	15,000	15	40.5-38/19	208-230/460

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water:

- Domestic hot water is produced by an electric hot water heater that is located in the Arapahoe Plaza East Building. Additional information about the electric hot water heater is listed in the table below.

**12 - Arapahoe Plaza East Building - DHW Heaters**

Equip ID	Mfgr	Gallons	kW	Volts
DHW-E1	N/A	20	15	208

N/A – The nameplate data was not available during the time of the survey.

B. Exhaust Fans:

- There are multiple exhaust fans located on the roof which serve the restrooms.

VI. Water Use

- A. Overview: The two modes of water use are sanitary service for the Arapahoe Plaza East Building and irrigation service for all three buildings on Arapahoe Plaza. Other minor uses include janitorial use and boiler makeup water. All services share one meter, and the meter is read monthly.

The services provided by the offices in this building draw visitors at a rate of 100 per day and it is assumed that the length of stay is ½ hour.

B. Plumbing Fixtures, general

There are a variety of commodes: flush gravity tank type and pressure assisted type (Sloan Flushmate ®) floor-mounted models with varying gallons per flush. No leaks or maintenance problems were observed during the survey. The urinals are all flush-valve actuated wall-mounted models with no markings to indicate



gallons per flush. Lavatory faucets are in good condition and have a metering valve that limit the amount of time of flow. The flow rates averaged 2 GPM. Each floor has a small kitchenette with stainless steel sinks and gooseneck faucets. Each floor has two janitorial closets with utility faucets.

#### 12 - Arapahoe Plaza East– Plumbing Fixtures

Commodos:			Urinals	Faucets			
Tank 1.6 GPF	Tank 3.5 GPF	Flush Mate 1.6 GPF	2.0 GPFM	GPM average	Total Lavatory	Metered	Kitchen (break)
1	7	3	2	2	9	9	2

#### C. Irrigation:

General: There are several lawn areas served by popup sprinklers. There are two Rainmaster brand digital timers that control the frequency, duration, and sequencing of the various zones. There are no automatic controls for sensing wind, soil moisture, or rainfall. The schedule is altered by the staff if rainfall occurs that is sufficient to moisten the lawn and irrigation is not needed and if the staff is present to do so. There is little or no problem with vandalism.

Sidewalks intersect the irrigation areas, and many of these areas are narrow strips between the street and sidewalks. This configuration increases the potential for waste due to over-spray onto sidewalks and roadways. There is a 2-foot wide strip of grass between the north edge of the parking lot and the sidewalk that is difficult to water without wasting water on to the parking lot.



### 13 - ARAPAHOE HUMAN SERVICES

#### I. General Description

- A. Gross Square Footage: 54,678 Sq. Ft.
- B. Year of Original Construction: Unknown
- C. General Construction Information: This three story building has exterior walls constructed of brick veneer, 3/4" plywood, 4" R-11 batt insulation, and a 5/8" gypsum board interior. The windows are aluminum frame, double-paned with a tinted finish. No information is available for the roof.
- D. Building Schedules: The majority of the building is occupied from 7:30 am to 5:00 pm, Monday through Friday. The sheriff substation is occupied 24 hours a day, seven days a week. The custodial staff works from 4:30 pm to 1:00 am, Monday through Friday.



#### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

#### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Arapahoe Human Services Building is general office equipment, which includes personal computers, printers, faxes, etc.

#### IV. Heating, Ventilation, and Air Conditioning

- A. Heating Plant: The Arapahoe Human Services Building produces heating hot water from two boilers located in the basement mechanical room. The heating hot water is distributed to the heating coils located in the reheat boxes via two hot water pumps.
  - 1. Hot Water Boilers: B-1 and B-2 are natural gas fired, atmospheric, hot water boilers that are located in the basement mechanical room. The boilers supply hot water to the heating coils in the variable air volume reheat boxes throughout the three Arapahoe Plaza buildings. Additional information about the boilers is listed in the table below.

**13 - Arapahoe Human Services - Hot Water Boilers**

Equip ID	Mfgr	Model	Fuel	Input MBH	Output MBH
B-1	Weil Mclain	LGB-1B	NG	2,210	1,790
B-2	Weil Mclain	LGB-1B	NG	2,210	1,790

- 2. Hot Water Pumps: The two hot water pumps (HWP-1 and HWP-1A) are constant volume, centrifugal pumps located in the basement mechanical room. HWP-1 and HWP-1A operate in parallel. Both pumps were off during the time of the survey. Additional information about the pumps is listed in the table below.

## 13 - Arapahoe Human Services - Hot Water Pumps

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
HWP-1	N/A	FE2510E2F1F2L6	300	76	Magnetek	LF1-841000	10	24/12	208-230/460
HWP-1A	N/A	FE2510E2F1F2L6	300	76	Magnetek	LF1-841000	10	24/12	208-230/460

N/A – The nameplate data was not available during the time of the survey.

- B. Central Cooling Plant: The Arapahoe Human Services Building uses two chillers to cool the building. The chilled water is distributed to the chilled water coils, located in the air handling units, via two chilled water pumps per chiller.

- Chillers: CH-E1 and CH-W1 are air-cooled chillers with 4 reciprocating compressors each. They are located on the east (CH-E1) and west (CH-W1) side of the Arapahoe Human Services Building above the parking garage. The chillers supply chilled water to all three Arapahoe Plaza buildings via four chilled water pumps. Additional information about the chillers is listed in the table below.

## 13 - Arapahoe Human Services - Chillers

Equip ID	Mfgr	Model	EWT (F)	LWT (F)	EAT (F)	Capacity (tons)	Max kW	Volts
CH-E1	Carrier	30GB150	60	40	105	140	190	460
CH-W1	Carrier	30GB175	60	40	105	160	220	460

- Chilled Water Pumps: CWP-1, CWP-1A, CWP-2, and CWP-2A are constant volume, centrifugal chilled water pumps located in the parking garage. CWP-1 and CWP-1A circulate chilled water from chiller CH-W1 to the chilled water cooling coils in the west side of the Arapahoe Human Services building, and in the entire Arapahoe Plaza West Building. CWP-2 and CWP-2A circulate chilled water from chiller CH-E1 to the chilled water cooling coils in the east side of the Arapahoe Human Services Building, and the entire Arapahoe Plaza East Building. Additional information on these pumps is listed in the table below.

## 13 - Arapahoe Human Services - Chilled Water Pumps

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
CWP-1	N/A	N/A	205	45	N/A	N/A	7.5	19.2/9.6	230/460
CWP-1A	N/A	N/A	205	45	N/A	N/A	7.5	19.2/9.6	230/460
CWP-2	N/A	N/A	230	40	Magnetek	LF1-84050C	5	13/6.5	208-230/460
CWP-2A	N/A	N/A	230	40	Magnetek	LF1-84050C	5	13/6.5	208-230/460

N/A – The nameplate data was not available during the time of the survey.

- C. Distributions Systems:

- AHU-SE1, AHU-SE2, AHU-SW1, and AHU-SW2: These are variable air volume, reheat systems that serve the entire Arapahoe Human Services

Building. Each unit is equipped with a supply air fan, a chilled water cooling coil, mixed air dampers, and inlet guide vanes. The supply air volume is controlled by the inlet guide vanes, which modulate to maintain the supply air duct static pressure setpoint. The conditioned air is distributed to the spaces via fan powered VAV boxes. The chilled water cooling coil is controlled by either a two-way or three-way pneumatic valve which modulates to control the discharge air temperature setpoint. The mixed air dampers are controlled by pneumatic actuators, which modulate to maintain the mixed air temperature setpoint. There is also a hot water unit heater located in the mechanical room that preheats the mixed air. The supply air fan on each unit is governed by a stand-alone Johnson Controls System. The operating schedules programmed into the Johnson Controls System were inaccessible during the time of the survey. Additional information about the air handling units is listed in the table below.

**13 - Arapahoe Human Services - Air Handling Units**

Equip ID	Area Served	Mfgr	Supply Fan			
			CFM	HP	Amps	Volts
AHU-SE1	S. Bldg - E. 1st	Trane	12,000	15	40.5-38/19	208-230/460
AHU-SE2	S. Bldg - E. 2nd	Trane	15,000	15	40.5-38/19	208-230/460
AHU-SW1	S. Bldg - W. 1st	Trane	12,000	15	40.5-38/19	208-230/460
AHU-SW2	S. Bldg - W. 2nd	Trane	24,500	30	78/37	208-230/460

## V. Miscellaneous HVAC Equipment

### A. Domestic Hot Water:

- Domestic hot water is produced by electric hot water heaters that are located in the Arapahoe Human Services Building. Additional information about the electric hot water heaters is listed in the table below.

**13 - Arapahoe Human Services - DHW Heaters**

Equip ID	Mfgr	Gallons	kW	Volts
DHW-SW-1	N/A	20	15	208
DHW-SW-2	N/A	20	15	208

N/A – The nameplate data was not available during the time of the survey.

### B. Air Compressor:

- There is an air compressor located in the basement mechanical room. The compressor provides compressed air to the pneumatic controls located throughout the three Arapahoe Plaza buildings. Additional information about the air compressor is listed in the table below.

**13 - Arapahoe Human Services - Air Compressor**

Equip ID	Mfgr	No. of Motors	HP	Amps	Volts
Air Comp-1	N/A	2	2	5.6/2.8	230/460

N/A – The nameplate data was not available during the time of the survey.

## C. Exhaust Fans:

- There are multiple exhaust fans located on the roof which serve the restrooms.

## VI. Water Usage

- A. Overview: The primary mode of water use in the Human Service Building is for sanitary services. Other minor uses include janitorial uses and boiler makeup water. All services share one meter which is read monthly.

The services provided by the offices in this building draw visitors at a rate of 500 per day and it is assumed that the length of stay is ½ hour.

## B. Plumbing Fixtures, general

There are a variety of commodes: flush gravity tank type and pressure assisted type (Sloan Flushmate ®) floor-mounted models with varying gallons per flush. No leaks or maintenance problems were observed. The urinals are all flush-valve actuated wall-mounted models with no markings to indicate gallons per flush. Lavatory faucets are good condition and have a metering valve that limit the amount of time of flow. The flow rates measured averaged approximately 2 GPM. There are several small kitchenettes with stainless steel sinks and gooseneck faucets. Each floor has two janitorial closets with utility faucets.

**13 - Arapahoe Plaza Human Services – Plumbing Fixtures**

Commodos:			Urinals	Faucets			
Tank 1.6 GPF	Tank 3.5 GPF	Flush Mate 1.6 GPF	2.0 GPF	GPM average	Total Lavatory	Metered	Kitchen (break)
0	9	10	5	2	11	11	5

## 14 - ARAPAHOE PLAZA WEST BUILDING (COUNTY COURT)

### I. General Description

- A. Gross Square Footage: 20,880 Sq. Ft.
- B. Year of Original Construction: Unknown
- C. General Construction Information: This one story building has exterior walls constructed of brick veneer, 3/4" plywood, 4" R-11 batt insulation, and a 5/8" gypsum board interior. The windows are aluminum frame, double-paned with a tinted finish. No information is available for the roof.
- D. Building Schedules: The building is occupied from 8:00 am to 5:00 pm, Monday through Friday. The custodial staff works from 4:00 pm to 12:30 am, Monday through Friday.



### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Arapahoe Plaza West Building is general office equipment, which includes personal computers, printers, faxes, etc.

### IV. Heating, Ventilation, and Air Conditioning

- A. Heating System: The Arapahoe Plaza West Building receives heating hot water from the boilers in the Arapahoe Human Services Building. The heating hot water is distributed to the hot water heating coils located in the variable volume reheat boxes. Information about the boilers and hot water pumps is located in the Arapahoe Human Services Building section of this document.
- B. Cooling System: The Arapahoe Plaza West Building receives chilled water from the Chiller (CH-W1) located by the Arapahoe Human Services Building. The chilled water is distributed to the chilled water cooling coils located in the air handling units via two chilled water pumps that are located in the parking garage. Information about the chillers and chilled water pumps is located in the Arapahoe Human Services section of this document.
- C. Distributions Systems:
  - 1. AHU-W1 and AHU-W2: These are variable air volume, reheat systems that serve the entire West building. Each unit is equipped with a supply air fan, a chilled water cooling coil, mixed air dampers, and inlet guide vanes. The supply air volume is controlled by the inlet guide vanes, which modulate to maintain the supply air duct static pressure setpoint. The conditioned air is distributed to the spaces via fan powered VAV boxes. The chilled water cooling coil is controlled by either a two-way or three-

way pneumatic valve which modulates to control the discharge air temperature setpoint. The mixed air dampers are controlled by pneumatic actuators, which modulate to maintain the mixed air temperature setpoint. There is also a hot water unit heater located in the mechanical room that preheats the mixed air. The supply air fan on each unit is scheduled to operate 24 hours a day on Monday through Friday, and 4 am to 6 pm on Saturday and Sunday, as governed by a digital time clock and confirmed using run time loggers. Additional information about the air handling units is listed in the table below.

**14 - Arapahoe Plaza West Building - Air Handling Units**

Equip ID	Area Served	Mfgr	Supply Fan			
			CFM	HP	Amps	Volts
AHU-W1	W. Bldg-Level 1	Trane	14,000	15	40.5-38/19	208-230/460
AHU-W2	W. Bldg-Level 2	Trane	14,000	15	40.6/20.3	230/460

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water:

- Domestic hot water is produced by an electric hot water heater that is located in the Arapahoe Plaza West Building. Additional information about the electric hot water heater is listed in the table below.

**14 - Arapahoe Plaza West Building - DHW Heaters**

Equip ID	Mfgr	Gallons	kW	Volts
DHW-W1	N/A	20	15	208

N/A – The nameplate data was not available during the time of the survey.

B. Exhaust Fans:

- There are multiple exhaust fans located on the roof which serve the restrooms.

VI. Water Use

- A. Overview: The primary mode of water use in the Human Service Building is for sanitary services. Other minor uses include janitorial uses and boiler makeup water. All services share one meter which is read monthly.

The services provided by the offices in this building draw visitors at a rate of 500 per day, and it is assumed that the length of stay is ½ hour.

B. Plumbing Fixtures, general

There are a variety of commodes: flush gravity tank type and pressure assisted type (Sloan Flushmate ®) floor-mounted models with varying gallons per flush. No leaks or maintenance problems were observed. The urinals are all flush-valve actuated wall-mounted models with no markings to indicate gallons per flush. Lavatory faucets are good condition. The faucets for public use have metering valves that limit the amount of time of flow. The flow rates measured averaged

less than 2 GPM. There are several small kitchenettes with stainless steel sinks and gooseneck faucets. Each floor has two janitorial closets with utility faucets.

**14 - Arapahoe Plaza West Building – Plumbing Fixtures**

Commodes:			Urinals	Faucets			
Tank 1.6 GPF	Tank 3.5 GPF	Flush Mate 1.6 GPF	2.0 GPF	GPM average	Total Lavatory	Metered	Kitchen (break)
0	18	1	2	2	17	7	0



**15 - FEDERAL WAREHOUSE****I. General Description**

- A. Gross Square Footage: 75,073 Sq. Ft.
- B. Year of Original Construction: Unknown
- C. General Construction Information: This one story building was an existing retail hardware store. No drawings are available for a detailed shell description; however, from the site visit, the exterior walls are constructed of brick veneer. The few windows are double-paned with a tinted finish. The roof appears to be constructed of built-up roofing on top of rigid insulation and pre-cast concrete.
- D. Building Schedules: The building is occupied from 7:00 am to 4:30 pm, Monday through Friday.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the Federal Warehouse is voting poll equipment that is rarely used.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The Federal Warehouse receives heating from natural gas fired rooftop units.
- B. Cooling System: The Federal Warehouse receives cooling from direct expansion cooling coils in rooftop units.
- C. Distribution Systems:
  - 1. Rooftop Units: There are ten rooftop units that serve the Federal Warehouse. Each unit is equipped with a supply fan, a natural gas fired heating burner, a direct expansion cooling coil, and manual outside air dampers. Each rooftop unit, except for RTU-10, is controlled by a programmable thermostat. RTU-10 is controlled by a non-programmable thermostat. Additional information about the rooftop units is listed in the table below.

**15 - Federal Warehouse – Rooftop Units**

Equip ID	Location	Mfgr	Model	Supply Fan				Compressor		
				CFM	HP	Amps	Volts	Qty	Amps	Volts
RTU-1	SE Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-2	NE Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-3	NE Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-4	S Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-5	E Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A



**15 - Federal Warehouse – Rooftop Units**

Equip ID	Location	Mfgr	Model	Supply Fan				Compressor		
				CFM	HP	Amps	Volts	Qty	Amps	Volts
RTU-6	N Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-7	SW Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-8	W Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-9	NW Roof	Rheem	N/A	N/A	3	8.4/4.2	230/460	2	50	N/A
RTU-10	SW Roof	Trane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

**V. Miscellaneous HVAC Equipment****A. Domestic Hot Water:**

- There are two small domestic hot water heaters that serve the faucets in the restrooms which were inaccessible during the survey.

**B. Dust Collector:**

- The dust collector was used for the shop area. It is currently not being used.

**C. Exhaust Fans:**

- There are several exhaust fans located on the roof which serve the restrooms and shop areas.

**VI. Water Use**

- Overview: Water uses in the Federal Warehouse Plaza are for irrigation and sanitary services. All services share one meter. The meter is read monthly.

This building is used as a venue for training staff and election workers so the sanitary water use is not easily determined.

**B. Plumbing Fixtures, general**

The restrooms used by trainees and voting management staff are outfitted with up-to-date water conserving fixtures.

Lavatory faucets are good condition and are hand operated fixtures running 2.5 GPM.

**15 – Federal Warehouse – Plumbing Fixtures**

Commodities:		Urinals		Faucets		
Tank	Flush Valve	1.0 GPF	2.0 GPF	GPM average	Total Lavatory	Metered
3.5	1.6 GPF					
5	5	1	1	2.5	4	2

C. Irrigation:

General: There is one Rainmaster brand digital timer that controls the frequency, duration, and sequencing of the various zones. There are no automatic controls for sensing wind, soil moisture, or rainfall. Schedule is altered by the staff if rainfall occurs that is sufficient to moisten the lawn and irrigation is not needed, and if the staff is present to do so. There is little or no problem with vandalism.

Area Served: The grounds include 67,000 square feet (1.54 acres) total area, consisting primarily of temperate climate grass lawn area and shrubbery areas bordering walkways and parking lots and with several larger deciduous and evergreen trees. The lawn area is long and narrow, bordered by parking lots, roadways, and walkways, increasing the potential for waste from wind driven drift and misaligned spray heads.

**16 - CSU EXTENSION OFFICE****I. General Description**

- A. Gross Square Footage: 5,309 Sq. Ft.
- B. Year of Original Construction: 1960
- C. General Construction Information: This is a one story office facility. No original drawings were recovered to determine building shell make up. Exterior walls have brick veneer and windows are single pane.
- D. Building Schedules: The building is occupied from 8:00 am to 4:30 pm, Monday through Friday.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the CSU Extension Office is general office equipment, which includes personal computers, printers, faxes, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The CSU Extension Office receives heating from two natural gas fired air handling units.
- B. Cooling System: The CSU Extension Office receives cooling from two direct expansion cooling air handling units.
- C. Distribution Systems:
  - 1. Air Handling Units: There are two air handling units that serve the CSU Extension Office. Each unit is equipped with a supply fan, a natural gas fired burner, a direct expansion cooling coil, and manual outside air dampers. Each unit operates from 7 am to 5:30 pm, seven days a week, as governed by a programmable thermostat. Additional information about the air handling units is listed in the table below.

**16 - CSU Extension Office – Air Handling Units**

Equip ID	Mfgr	Model	Supply Fan				Compressor			Heating	
			CFM	HP	Amps	Volts	Qty	Amps	Volts	Input MBH	Output MBH
RTU-1	Carrier	48TFE014-A-511	4700	5	15	208	2	146	N/A	160	260
RTU-2	Carrier	48TFE008-A-511	2800	3	5.8	208	2	91	N/A	143	143

N/A – The nameplate data was not available during the time of the survey.

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water:

1. There is one natural gas fired domestic hot water heater that serves the CSU Extension Office.

**17 - CSU WAREHOUSE****I. General Description**

- A. Gross Square Footage: 9,476 Sq. Ft.
- B. Year of Original Construction: 1974
- C. General Construction Information: This is a one story facility that is seldom used. No original drawings were recovered to determine building shell make up. Exterior walls are concrete block veneer, and the roof appears to be built-up.
- D. Building Schedules: The building is rarely occupied. It is used to host small events a few times per year. It is mostly used for storage.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The only miscellaneous equipment found at the CSU Warehouse was two vending machines and a popcorn maker.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The CSU Warehouse receives heating from ten natural gas fired unit heaters and one rooftop unit.
- B. Cooling System: The CSU Warehouse receives cooling from one rooftop unit.
- C. Distribution Systems:
  - 1. Rooftop Unit: The rooftop unit serves the office. It contains a supply fan, a natural gas fired burner, a direct expansion cooling coil, and manual outside air dampers. The rooftop unit is controlled by a non-programmable thermostat that was found to be in the off position during the time of the survey. Additional information about the rooftop unit is listed in the table below.

**17 - CSU Warehouse - Rooftop Unit**

Equip ID	Mfgr	Model	Supply Fan				Compressor			Heating	
			CFM	HP	Amps	Volts	Qty	Amps	Volts	Input MBH	Output MBH
RTU-1	Rheem	N/A	N/A	0.25	2.4	N/A	1	71	208/230	75	N/A

N/A – The nameplate data was not available during the time of the survey.

- 2. Unit Heaters: There are ten natural gas fired unit heaters which serve the large open areas. Each unit is controlled by its own non-programmable thermostat that was set at 50°F during the time of the survey. Additional information about the unit heaters is listed in the table below.

**17 - CSU Warehouse – Unit Heaters**

<b>Equip ID</b>	<b>Mfgr</b>	<b>Model</b>	<b>Input MBH</b>	<b>Output MBH</b>
UH-1 thru 10	Modine	N/A	75	60

N/A – The nameplate data was not available during the time of the survey.

**V. Miscellaneous HVAC Equipment****A. Domestic Hot Water**

1. The CSU Warehouse has one small electric hot water heater which serves the restroom faucets.

## 20 - TRI COUNTY HEALTH

### I. General Description

- A. Gross Square Footage: 8,398 Sq. Ft.
- B. Year of Original Construction: 1980
- C. General Construction Information: This three story building has exterior walls constructed of brick veneer, 3/4" plywood, 4" R-11 batt insulation, and a 5/8" gypsum board interior. The windows are double-paned and have mechanical shading louvers that appear to be inoperable but are fixed in a position that provides a good amount of shading. The roof is constructed of built-up roofing on top of 4 1/2" rigid insulation and pre-cast concrete.
- D. Building Schedules: The building is occupied from 8:00 am to 5:00 pm, Monday through Friday.



### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Tri County Health building is general hospital equipment and general office equipment, which includes personal computers, printers, faxes, etc.

### IV. Heating, Ventilation, and Air Conditioning

- A. Heating System: The Tri County Health building receives heating from furnaces and rooftop units.
- B. Cooling System: The Tri County Health building receives cooling from furnaces and rooftop units.
- C. Distribution Systems:
  - 1. Furnaces: There are five furnaces that serve the Tri County Health building. Four units (AC-1, F-3, F-4, and F-6) are located in room 17 in the basement, and one unit (F-5) is located in room 113 on the first floor. Each furnace is equipped with a supply fan, a natural gas fired burner, a direct expansion cooling coil, and manual outside air dampers. The condensing units for each of the direct expansion cooling coils are located on the roof. The furnaces are controlled by non-programmable thermostats. Additional information about the furnaces is listed in the table below.

## 20 - Tri County Health - Furnaces

Equip ID	Mfgr	Model	Area Served	Outdoor Motor				Compressor		
				CFM	HP	Amps	Volts	Qty	Amps	Volts
AC-1	Carrier	28AC048000	3rd Floor NW	N/A	N/A	N/A	N/A	1	N/A	N/A
F-3	Trane	TXC060CJHPCO	1st Floor Center Core	N/A	0.25	1.3	200/230	1	14.7	200/230
F-4	Trane	TXC061C5HPCO	1st Floor SW	N/A	0.25	1.3	200/230	1	14.7	200/230
F-5	Trane	TXC037C4HPCO	N/A	N/A	0.25	1.3	200/230	1	14.7	200/230
F-6	Trane	TXC050C4HPDO	3rd Floor NE	N/A	0.25	1.3	200/230	1	14.7	200/230

N/A – The nameplate data was not available during the time of the survey.

2. Rooftop Units: These four units are constant volume rooftop units with direct expansion cooling, natural gas fired heating, except RTU-4 which has electric heating and manual outside air dampers. The units are controlled by non-programmable thermostats. Additional information about the rooftop units is listed in the table below.

## 20 - Tri County Health - Rooftop Units

Equip ID	Location	Mfgr	Model	Condenser			Compressor			Heating	
				Qty	HP	Amps	Qty	HP	Amps	Input MBH	Output MBH
RTU-1	North Side	Carrier	48GL036300BA	1	0.2	1	1	N/A	18	75	N/A
RTU-2	SE Corner	Carrier	48TFF006-A-511	1	N/A	0.6	1	N/A	114	120	150
RTU-3	SE Corner	York	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RTU-4	Upper Roof	Day & Night	559EJ030	1	N/A	N/A	1	N/A	72	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

## V. Miscellaneous HVAC Equipment

## A. Domestic Hot Water

1. Domestic hot water is produced by a natural gas fired hot water heater. It has a ¼ hp circulation pump plugged into a wall outlet. Additional information on the domestic hot water heater is listed in the table below.

## 20 - Tri County Health - DHW Heater

Equip ID	Mfgr	Gal	Gal/Hr	Input MBH	Volts
DHWH	AMS	75	N/A	75.1	N/A

N/A – The nameplate data was not available during the time of the survey.

## B. Exhaust Fans:

1. There are two exhaust fans located on the roof which serve the restrooms.



## 23 - ALTURA PLAZA BUILDING

### I. General Description

- A. Gross Square Footage: 74,675 Sq. Ft.
- B. Year of Original Construction: 1972
- C. General Construction Information: This six story building has exterior walls constructed of brick veneer, 3/4" plywood, 4" R-11 batt insulation, and a 5/8" gypsum board interior. The windows are double-paned with a tinted finish. The roof is constructed of built-up roofing on top of 2" rigid insulation, and pre-cast concrete.
- D. Building Schedules: The majority of the building is occupied from 7:00 am to 6:00 pm, Monday through Friday. The District Attorney's office and the Juvenile Diversion office are occupied from 7:00 am to 9:00 pm, Monday through Friday.



### II. Lighting

- A. An inventory of lighting is presented in the Appendix.

### III. Miscellaneous Equipment

- A. The majority of miscellaneous equipment found in the Altura Plaza Building is general office equipment, which includes personal computers, printers, faxes, etc.

### IV. Heating, Ventilation, and Air Conditioning

- A. Heating Plant: Heating is provided to most of the building by two hot water boilers (B-1 and B-2). The boilers provide hot water to water source heat pumps which are located throughout the entire building.
  - 1. Hot Water Boilers: B-1 and B-2 are natural gas fired, atmospheric, hot water boilers which provide heating water to the water source heat pumps (WSHP's), the penthouse unit heaters, the basement fan coil unit, and the hot water preheat coils in the basement heat pumps.

**23 - Altura Plaza Building - Hot Water Boilers**

Equip ID	Mfgr	Model	Fuel	Input MBH	Output MBH
B-1	Ajax	WGH-3000	NG	3,000	2,400
B-2	Ajax	WGH-1375	NG	3,000	2,400

N/A – The nameplate data was not available during the time of the survey.

- 2. WSHP Circulation Pumps: There are two WSHP circulation pumps (P-1 and P-2) which circulate water from the boiler and the evaporative cooler to the water source heat pumps located throughout the building. The two pumps operate in parallel and run 24 hours a day, seven days a week. Hot water is circulated to the penthouse unit heaters and the heating coils located in the basement units by two smaller circulating pumps.

**23 - Altura Plaza Building – Hot Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
P-1	N/A	N/A	590	60	N/A	N/A	15	41/20.5	460
P-2	N/A	N/A	590	60	N/A	N/A	15	41/20.5	460

N/A – The nameplate data was not available during the time of the survey.

- B. Central Cooling Plant: The Altura Plaza Building receives cooling from an evaporative cooler. The evaporative cooler provides condenser water to the water source heat pumps.

- Evaporative Cooler: The evaporative cooler is equipped with two fans which cycle to maintain the WSHP loop water supply temperature setpoint of 82°F-85°F. It is located in the penthouse. Nameplate data was not available during the time of the survey. Mechanical drawings indicate that the unit is a Singer #1850 with two 15 hp fan motors.

- C. Distribution Systems

- Water Source Heat Pumps: There are 54 water source heat pumps located throughout the building. Each water source heat pump is equipped with a compressor and a supply fan. The compressor on each unit cycles to maintain the space temperature setpoint as governed by the non-programmable thermostat. The building receives ventilation from the makeup air unit described later in this section. Additional information about the WSHP's is listed in the table below.

**23 - Altura Plaza Building - Water Source Heat Pumps**

Equip ID	Quantity	CFM	Clg. Tons
CC520	17	1,600	4
CC400	26	1,200	3
VWS-1028	8	4,000	10
VWS-818	3	3,000	8

N/A – The nameplate data was not available during the time of the survey.

- Fan Coil Unit: FCU-1 is a constant volume unit located in the basement mechanical room that serves the fitness center. FCU-1 is equipped with a supply fan and a hot water heating coil. The supply fan on this units runs 24 hours a day, seven days a week. The hot water heating coil is controlled by a two-way valve which modulates to maintain the space temperature setpoint as governed by the space thermostat. Additional information about the fan coil unit is listed in the table below.

**23 - Altura Plaza Building – Fan Coil Unit**

Equip ID	Location	Mfgr	Model	Supply Fan				Compressor		
				CFM	HP	Amps	Volts	Qty	Amps	Volts
FCU-1	Bsmt Mech Rm	N/A	N/A	N/A	1.5	4.8/2.4	208-230/460	X	X	X

N/A – The nameplate data was not available during the time of the survey.

3. HW Preheat Heat Pumps: AHU-B3 and AHU-B5 are constant volume units located in the basement mechanical rooms. AHU-B3 serves a conference room in the basement. AHU-B5 serves the Sheriff's area in the basement. They are water source heat pumps with hot water preheat coils. Additional information about these units is listed in the table below.

**23 - Altura Plaza Building – HW Preheat Units**

Equip ID	Location	Mfgr	Model	Supply Fan				Compressor		
				CFM	HP	Amps	Volts	Qty	Amps	Volts
AHU-B3	Bsmt Mech Rm	Westinghouse	N/A	N/A	1	1.8	440/480	1	78	N/A
AHU-B5	Bsmt Mech Rm	Westinghouse	N/A	N/A	1	1.8	440/480	1	78	N/A

N/A – The nameplate data was not available during the time of the survey.

4. Makeup Air Unit: MAU-1 is located on the roof. It is equipped with a supply air fan and a natural gas fired burner. This unit provides ventilation air to the water source heat pumps located throughout the building. This unit operates 24 hours a day, seven days a week. The natural gas fired burner is not controlled and was observed to be on at outside air temperatures above 80°F. Additional information about the makeup air unit is listed in the table below.

**23 - Altura Plaza Building - Makeup Air Unit**

Equip ID	Location	Mfgr	Model	Supply Fan			
				CFM	HP	Amps	Volts
MAU-1	Roof	Hastings	N/A	7,950	5	14.4	N/A

N/A – The nameplate data was not available during the time of the survey.

**V. Miscellaneous HVAC Equipment****A. Domestic Hot Water:**

1. Domestic hot water for the faucets in the restrooms is produced by a natural gas fired hot water heater that is located in the penthouse boiler room. Additional information on the domestic hot water heater is listed in the table below.

**23 – Altura Plaza Building - DHW Heater**

Equip ID	Mfgr	Gal	Gal/Hr	Input MBH	Volts
DHWH	State	82	N/A	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

**B. Exhaust Fans:**

1. There are multiple exhaust fans located throughout the building which serve the restrooms.

**VI. Water Use**

- A. Overview:** The primary mode of water use in the Altura Plaza is for sanitary services, indirect evaporative cooling tower makeup water, and irrigation cooling. Other minor uses include janitorial uses and boiler makeup water. All services share one meter which is read monthly.

In addition to the normal staffing levels (145), there are an average of 1600 visitors per day, some of whom (jurors) stay for 8 hours. For the purposes of modeling the building, there are 1600 visitors per day with an average stay of 2 hours.

**B. Plumbing Fixtures, general**

The commodes are a variety of units — tank flush, flush-valve actuated, china, and stainless steel “comby” units in the holding cells. No leaks or maintenance problems were observed during the survey. The urinals are all flush-valve actuated, wall-mounted 1.0 and 2 GPF models. Lavatory faucets are in good condition. The flow rates measured averaged 2 GPM. There are 4 small kitchenettes with stainless steel sinks and gooseneck faucets in the break and jury rooms. Each floor has one janitorial closet with utility faucets. There are 14 lab sinks in dental and medical clinics on the upper floors. There are two shower rooms with two showers each for staff use of the ground floor. These are rarely used.

Commodos:					Urinals		Faucets				
Tank 1.6 GPF	Tank 3.5 GPF	Flush Valve 1.6 GPF	Flush Valve 3.5 GPF	Comby 3.6 GPF	1.0 GPF	1.0 GPF	GPM average	Total Lavatory	Showers (<2.5 GPM)	Lab Sinks	Kitchen (break)
1	15	24	12	3	5	8	2	55	2	17	4

Note: Lavatory count does not include comby units.

- C. Cooling Tower Water Use:** This is an indirect evaporative cooler; the water in the cooling tower does not go to the chiller. There is a closed loop circulating water from the tower to the heat pumps distributed through the building and back. An open-loop water circulation system sprays water over fill; a fan enhances the evaporative effect. The evaporation, brought about by the open loop, cools the

water in the closed loop to the heat pumps. There is a water-treatment metering pump in place that administers biocides to controls algae and bacteria growth. Also, an acid cleaner may be used to control scaling resulting from the deposition of dissolved solids. The tower is enclosed in a sheet metal plenum within the building and, therefore, wind driven drift is not a factor.

**D. Irrigation:**

General: There are relatively small lawn areas served by popup sprinklers. There is a Rainmaster brand digital timer that controls the frequency, duration, and sequencing of the various zones. There are no automatic controls for sensing wind, soil moisture, or rainfall. Schedule is altered by the staff if rainfall occurs that is sufficient to moisten the lawn and irrigation is not needed and if the staff is present to do so. There are occasional problems with vandalism. Sidewalks intersect the irrigation areas, and many of the areas are narrow strips between the street and sidewalks. This configuration increases the potential for waste due to over-spray onto sidewalk and roadways.

**24 – CENTREPOINT PLAZA****I. General Description**

- A. Gross Square Footage: 105,662 Sq. Ft.
- B. Year of Original Construction: 2002
- C. General Construction Information: No architectural drawings were recovered for this facility.
- D. Building Schedules: The building is occupied from approximately 6:00 am to 7:00 pm, Monday through Friday. A few areas are occupied for longer periods in the evenings; some areas as late as 10:00 pm. There are also some areas that are occupied on the weekends.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the Centrepoint Plaza building is general office equipment, which includes personal computers, printers, faxes, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The Centrepoint Plaza building receives heating from electric reheat boxes.
- B. Cooling System: The Centrepoint Plaza building receives cooling from rooftop units.
- C. Distribution Systems:
  - 1. RTU-1 to RTU-4: These units are variable air volume reheat systems. They are equipped with a supply fan, a return fan, a direct expansion cooling coil, a natural gas fired burner, mixed air dampers, and electric reheat VAV boxes. The supply air volume is controlled by a variable frequency drive, which modulates to maintain the supply air duct static pressure setpoint. The direct expansion cooling coil maintains the cooling discharge air temperature setpoint. The natural gas fired heating coil maintains the discharge air temperature setpoint. The conditioned air is distributed to the spaces via fan powered, electric reheat VAV boxes. The mixed air dampers are controlled by electric actuators, which modulate to maintain the mixed air temperature setpoint. These units are controlled through the Invensys energy management system. The rooftop units are scheduled to operate from 5 am to 11 pm on Monday through Friday, and from 8 am to 4:30 pm on Saturday and Sunday. Also, only two of the units run at a time. Two units serve one supply air duct header in order to achieve 100% redundancy. Additional information on the rooftop units is listed in the table below.

24 – Centrepont Plaza - Rooftop Units

Equip ID	Mfgr	Model	Condenser			Compressor			Supply Fan	Return Fan
			Qty	HP	Amps	Qty	HP	Amps	HP	HP
RTU-1	McQuay	RPS105CLA	9	1	2	4	25	214	60	30
RTU-2	McQuay	RPS105CLA	9	1	2	4	25	214	60	30
RTU-3	McQuay	RPS105CLA	9	1	2	4	25	214	60	30
RTU-4	McQuay	RPS105CLA	9	1	2	4	25	214	60	30

## VII. Miscellaneous HVAC Equipment

## A. Domestic Hot Water:

- Domestic hot water is produced by a natural gas fired hot water heater. Additional information about the natural gas fired hot water heater is listed in the table below.

24 – Centrepont Plaza - DHW Heater

Equip ID	Mfgr	Gallons	Input MBH
DHWH-1	N/A	125	208

N/A – The nameplate data was not available during the time of the survey.

## B. Exhaust Fans:

- There are multiple exhaust fans located throughout the building which serve the restrooms.

**29 - PEORIA SHOPS****I. General Description**

- A. Gross Square Footage: 25,008 Sq. Ft.
- B. Year of Original Construction: 1973
- C. General Construction Information: This facility is used primarily for county vehicle repair and washing. There were no drawings recovered for this facility. The exterior walls appear to be pre-cast concrete, and windows are single pane with reflective coating. Ten large garage doors are utilized often as vehicles are pulled in and out frequently.
- D. Building Schedules: The building is open from 6:00 am to 4:30 pm, Monday through Friday. Crews work on a 4/10 schedule during the Summer and 5/8 during the Winter. This building is occupied 24 hours a day when it snows.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the Peoria Shops is automotive repair equipment.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The Peoria Shops receives heating from rooftop units, unit heaters, and makeup air units.
- B. Cooling System: The Peoria Shops receives cooling from the rooftop units.
- C. Distribution Systems:
  - 1. Rooftop Units: RTU-1 and RTU-2 are constant volume rooftop units with direct expansion cooling, natural gas fired heating, and manual outside air dampers. RTU-3 is natural gas heating only. Each unit is controlled by a non-programmable thermostat. RTU-1 serves the second floor offices. RTU-2 and RTU-3 serve the first floor offices. Additional information on the rooftop units is listed in the table below.

**29 - Peoria Shops - Rooftop Units**

Equip ID	Location	Mfgr	Model	Condenser			Compressor			Heating	
				Qty	HP	Amps	Qty	HP	Amps	Input MBH	Output MBH
RTU-1	West Unit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RTU-2	South Unit	Lennox	GCS16-513-125-1Y	1	0.25	2	1	N/A	90	125	N/A
RTU-3	North Unit	Carrier	48EG008D	X	X	X	X	X	X	112.5	22.5

N/A – The nameplate data was not available during the time of the survey.



2. Makeup Air Units: MAU-1, MAU-2, MAU-4 are constant volume systems with natural gas heating. During the survey, MAU-2's heating looked to be disabled. The units provide makeup air to the shop areas. MAU-1 is controlled by a non-programmable thermostat. MAU-2 is controlled by an on/off switch. MAU-4 is controlled by a twist timer and thermostat. Additional information about the makeup air units is listed in the table below.

**29 - Peoria Shops - Makeup Air Units**

Equip ID	Location	Mfgr	Model	Supply Fan			Heating	
				CFM	HP	Amps	Input MBH	Output MBH
MAU-1	SE Corner	Reznor	PCB-175	21,950	15	N/A	2,190	1,401
MAU-2	NE Corner	Reznor	PEB250-6-20E	4,000	2	N/A	N/A	N/A
MAU-4	NE Corner	Reznor	RGB-350	3,000	2	7	350	213

N/A – The nameplate data was not available during the time of the survey.

3. Unit Heaters: There are six, natural gas fired, unit heaters that provide additional heat to the shop areas. Each unit is controlled by a non-programmable thermostat.

#### V. Miscellaneous HVAC Equipment

##### A. Domestic Hot Water:

1. Domestic hot water is produced by a natural gas fired hot water heater that is located in the second floor locker room. Additional information on the domestic hot water heater is listed in the table below.

**29 - Peoria Shops - DHW Heater**

Equip ID	Mfgr	Gal	Gal/Hr	Input MBH	Volts
DHWH-1	Rheem	75	N/A	125	N/A

N/A – The nameplate data was not available during the time of the survey.

2. Vehicle Washer: There is a vehicle washer that utilizes a natural gas fired heater to produce hot water to power wash the maintenance vehicles and police vehicles.

##### B. Exhaust Fans:

1. There are eight exhaust fans that serve the restrooms, locker rooms, and shop areas at Peoria Shops.

## VI. Water Use

- A. Overview: The primary mode of water use is for road maintenance, vehicle washing services, and sanitary services. All services share one meter which is read monthly.

Staffing levels are at 56 with many of the staff off site during much of the day.

- B. Plumbing Fixtures, general

The commodes are flush-valve actuated, china units in the ground floor restroom and second floor locker rooms. No leaks or maintenance problems were observed during the survey. The urinals are all flush-valve actuated, wall-mounted 2 GPF models. Lavatory faucets are good condition. One lavatory is a gang spigot foot operated hand-washing station operating at 4 GPM (measured). The other faucets are hand operated fixtures running 2 GPM (measured). There is a utility sink in the shop. There are two shower rooms with two showers each for staff use in the locker room floor.

**29 – Peoria Shop – Plumbing Fixtures**

Commodities:	Urinals	Faucets			
Flush Valve 3.5 GPF	2.0 GPF	GPM avg	Total Lavatory	Metered	Showers (<2.5 GPM)
6	2	2	4	0	2

Note: Lavatory count does not include gang hand wash station.

- C. Maintenance Water Use:

Vehicle washing: There is an outdoor truck/car washing area on a concrete pad adjacent to the truck maintenance bays. There is a filtration system installed to catch wash water and remove sediments and organics from the wastewater before it is drained to the storm sewer. All of the county vehicles are washed here — police cars, road maintenance trucks, road strip painting trucks, construction equipment, and county staff vehicles.

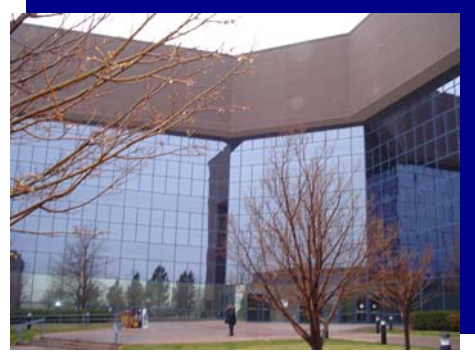
Road maintenance: There are four mobile sweep sweepers that go out once a day with 250 gallons of water on board. If subsequent fills are needed, they are filled from a hydrant; 150 working days per year.

There are three 4000-gallon tankers that are topped off daily that are used at construction sites (i.e. to wet down construction sites for dust control). It was assumed that each truck goes out once a day, four day per week with an average of 1000 gallons used each trip, 150 working days per year.

There are 3 road patch trucks with 50-gallons tanks that fill up once a day.

**35 - ACJC COURTHOUSE****I. General Description**

- A. Gross Square Footage: 148,522 Sq. Ft.
- B. Year of Original Construction: 1986
- C. General Construction Information: This four story building has exterior walls constructed of face brick with through-wall flashing, 4" batt insulation, vapor barrier, and a 5/8" gypsum board interior. The windows are double-paned with a tinted finish. The roof is constructed of elastic sheet roofing on rigid insulation over steel deck.
- D. Building Schedules: The building is occupied from 6:00 am to 8:00 pm, Monday through Friday. Also, some of the judges work in their offices on the weekends as well. The custodial staff works from 4:30 pm to 1:00 am, Monday through Friday.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the ACJC District Courthouse building is general office equipment, which includes personal computers, printers, faxes, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating Plant: The ACJC District Courthouse produces heating hot water from two natural gas boilers located in the basement mechanical room. The heating hot water is distributed to the heating coils located in the reheat boxes via two hot water pumps. The heating plant is controlled by the Siemens Apogee control system.

- 1. Hot Water Boilers: B-1 and B-2 are natural gas fired hot water, atmospheric boilers that are located in the basement boiler room. The boilers supply hot water to the heating coils in the variable air volume reheat boxes located throughout ACJC Courthouse building. The boilers are enabled when the outside air temperature falls below 68°F, and are disabled when the outside air temperature rises above 72°F. Additional information about the boilers is listed in the table below.

**35 - ACJC Courthouse - Hot Water Boilers**

Equip ID	Mfgr	Model	Fuel	Input MBH	Output MBH
B-1	Ajax	2000	NG	2000	N/A
B-2	Ajax	2000	NG	2000	N/A

N/A – The nameplate data was not available during the time of the survey.

2. Hot Water Pumps: P-1 and P-2 are constant volume, centrifugal pumps, which are located in the boiler room. The pumps operate in parallel. Additional information about the hot water pumps is listed in the table below.

**35 - ACJC Courthouse - Hot Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
P-1	Alias Chalmers	N/A	250	N/A	N/A	N/A	15	42/21	230/460
P-2	Alias Chalmers	N/A	250	N/A	N/A	N/A	15	42/21	230/460

N/A – The nameplate data was not available during the time of the survey.

- B. Central Cooling Plant: The ACJC Courthouse utilizes one chiller and an evaporative cooling system to cool the entire building. The chilled water is distributed to the chilled water coils, located in the air handling units, via two chilled water pumps. The cooling plant is controlled by the Siemens Apogee control system.
1. Chiller: CH-1 is a water-cooled, screw chiller with two compressors located in the chiller room in the basement. Each compressor has its own water cooled condenser. The chiller provides chilled water to cooling coils located in the air handling units. Additional information about the chiller is listed in the table below.

**35 - ACJC Courthouse - Chiller**

Equip ID	Mfgr	Model	Capacity (tons)	Refrigerant	Mfgr	Model	HP	Amps	Volts
CH-1	Bohn	HWSC135A	135	R-22	Hitachi	6001SC-H	75	95	460
					Bohn	060ASC10	60	78	460

N/A – The nameplate data was not available during the time of the survey.

2. Chilled Water Pumps: P-3 and P-4 are constant volume, centrifugal pumps, which are located in the chiller room in the basement. The pumps operate in parallel and circulate chilled water from the chiller to the cooling coils. Additional information about the chilled water pumps is listed in the table below.

**35 - ACJC Courthouse - Chilled Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
P-3	Alias Chalmers	N/A	330	N/A	US Elect	N/A	15	42/21	230/460
P-4	Alias Chalmers	N/A	330	N/A	US Elect	N/A	15	42/21	230/460

N/A – The nameplate data was not available during the time of the survey.

3. Evaporative Cooler: EC-1 is an evaporative cooler located in the penthouse mechanical room. The evaporative cooler serves the condensers in CH-1. Additional information about the evaporative cooler is listed in the table below.

**35 - ACJC Courthouse – Evaporative Cooler**

			Fan Motor			Spray Pump		
Equip ID	Mfgr	Model	HP	Amps	Volts	Hp	Amps	Volts
EC-1	Evapco	N/A	20	58/29	230/460	1.5	5-5.6/2.8	230/460

N/A – The nameplate data was not available during the time of the survey.

4. Condenser Water Pumps: P-8 and P-9 are constant volume, centrifugal pumps, which are located in the chiller room in the basement. The pumps operate in parallel and circulate condenser water from the evaporative cooler to the chiller. Additional information about the condenser water pumps is listed in the table below.

**35 - ACJC Courthouse - Condenser Water Pumps**

	Pump Data				Motor Data				
Equip ID	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
P-8	Allis Chalmers	N/A	390	N/A	US Elect	N/A	15	42/21	230/460
P-9	Allis Chalmers	N/A	390	N/A	US Elect	N/A	15	42/21	230/460

N/A – The nameplate data was not available during the time of the survey.

**C. Distribution Systems:**

1. AH-1: This is a constant volume, single zone unit located in the basement that serves the parking garage. The unit is equipped with a supply fan, a hot water heating coil, and outside air dampers. The hot water heating coil is equipped with coil bypass dampers and a three-way valve that modulate to maintain the space temperature setpoint. The unit is 100% outside air and is rarely used. AH-1 is controlled by the Siemens Apogee control system. Additional information about this unit is listed in the table below.

**35 - ACJC Courthouse - Air Handling Unit**

				Supply Fan			
Equip ID	Location	Mfgr	Model	CFM	HP	Amps	Volts
AH-1	Basement	McQuay	LHD-114D	12,000	7.5	24-21.6/10.3	230/460

N/A – The nameplate data was not available during the time of the survey.

2. AHU-1 and AHU-2: These units are variable air volume reheat systems located in the penthouse mechanical room that serve the majority of the building. Each unit is equipped with a vane axial supply fan, a vane axial return fan, and a chilled water cooling coil. The vane axial supply and return fans vary the air flow to maintain static pressure. A heat recovery

system is utilized to pre-cool the outside air stream using evaporative cooling coils. The heat recovery system has caused major scaling on the interior walls and coils of the air handlers. The heat recovery system has currently been turned off and abandoned in place so that the maintenance staff can clean up the air handlers and their coils. AHU-1 and AHU-2 are controlled by the Siemens Apogee control system. Additional information about the air handling units is listed in the table below.

**35 - ACJC Courthouse - Air Handling Units**

Equip ID	Location	Mfgr	Model	Supply Fan				Return Fan			
				CFM	HP	Amps	Volts	CFM	HP	Amps	Volts
AHU-1	Penthouse	Joy	54-26-1770-CP	90,000	100	240/120	230/460	70,000	30	39	N/A
AHU-2	Penthouse	Joy	54-26-1770-CP	90,000	100	240/120	230/460	70,000	30	39	N/A

N/A – The nameplate data was not available during the time of the survey.

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water:

- Domestic hot water is produced by a natural gas fired hot water heater that is located in the basement boiler room. The domestic hot water heater is equipped with two circulation pumps and a storage tank. Additional information on the domestic hot water heater is listed in the table below.

**35 - ACJC Courthouse - DHW Heater**

Equip ID	Mfgr	Gal/Hr	Input MBH	Volts	Circ Pump HP
HWB-1	Jarco	636.4	700	208	1/3

B. Exhaust Fans:

- There are multiple exhaust fans located throughout the building which serve the restrooms.

VI. Water Use

- A. Overview: The primary mode of water use in the ACJC is for sanitary services, cooling tower makeup water, and evaporative cooling. Other minor uses include janitorial use and boiler makeup water. All services share one meter which is read monthly.

There are an average of 1500 visitors per day, some of whom (jurors) stay for 8 hours. For the purposes of modeling the building, there are 1500 visitors per day with an average stay of 2 hours.

B. Plumbing Fixtures, general

The commodes include a variety of units, tank flush, flush-valve actuated, china, and stainless steel “comby” units in the holding cells. No leaks or maintenance problems were observed during the survey. The urinals are all flush-valve actuated, wall-mounted 1.0 GPF models, with a number of units with infrared sensor activated automatic flushometers. Lavatory faucets are in good condition.

The flow rates averaged more than 3 GPM (measured). There are 14 small kitchenettes with stainless steel sinks and gooseneck faucets in the jury rooms. Each floor has one janitorial closet with utility faucets.

Commodities:					Urinals		Faucets			
Tank 1.6 GPF	Tank 3.5 GPF	Flush Valve 1.6 GPF	Flush Valve 3.5 GPF	Comby 3.6 GPF	1.0 GPF	2.0 GPF Auto	GPM average	Total Lavatory	Metered	Kitchen (break)
3	39	2	35	10	6	8	3.	77	0	14

- C. Cooling Tower Water Use: This is an indirect evaporative cooler; the water in the cooling tower does not go to the chiller. There is a water-treatment metering pump in place that administers biocides to controls algae and bacteria growth. Also, an acid cleaner may be used to control scaling resulting from the deposition to dissolved solids. The tower is enclosed in a sheet metal plenum within the building; and, therefore, wind driven drift is not a factor.

Water Quality: The water supply for the cooling tower is very hard. This results in a large amount of water being wasted to maintain acceptable levels of dissolved solids and to preserve the efficacy of the tower fill. The existing chemical representative stated the tower is currently set up at 1.7 cycles. The bleed line from the tower was measured at approximately 4 GPM and was observed at various times to be dumping water at this rate during the occupied period.



**36 - ACJC DETENTION CENTER****I. General Description**

- A. Gross Square Footage: 291,955 Sq. Ft.
- B. Year of Original Construction: 1986
- C. General Construction Information: This two story building has exterior walls constructed of pre-cast concrete, 4" batt insulation, vapor barrier, and a 5/8" gypsum board interior. The windows are double-paned with a tinted finish. The roof is constructed of elastic sheet roofing on rigid insulation over steel deck.
- D. Building Schedules: The building is occupied 24 hours a day, seven days a week for the entire year.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the ACJC Detention Center is general office equipment and Audio/Video equipment, which includes personal computers, printers, faxes, etc. Audio/Video equipment includes TVs, VCRs, monitoring equipment, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating Plant: The ACJC Detention Center produces heating hot water from three natural gas boilers located in the basement mechanical room. The heating hot water is distributed to the heating coils located in the rooftop units via three hot water pumps. The heating plant is controlled by the Siemens Apogee control system.
  - 1. Hot Water Boilers: B-1A, B-1B, and B-1C are natural gas fired, forced draft, hot water boilers. The boilers are staged to satisfy the hot water temperature setpoint temperature. The boilers are enabled when the outside air temperature falls below 68°F, and are disabled when the outside air temperature rises above 72°F. Additional information about the boilers is listed in the table below.

**36 - ACJC Detention Center - Hot Water Boilers**

Equip ID	Mfgr	Model	Fuel	Max Input MBH	Max Output MBH	Blower HP
B-1A	Cleaver Brooks	M4-700-4000	NG	6,000	3,200	3
B-1B	Cleaver Brooks	M4-700-4000	NG	6,000	3,200	3
B-1C	Cleaver Brooks	M4-700-4000	NG	6,000	3,200	3

N/A – The nameplate data was not available during the time of the survey.



2. Hot Water Pumps: The hot water pumps (P-1A, P-1B, and P-1C) are constant volume, centrifugal pumps, which are located in the basement mechanical room. P-1A is the primary, P-1B is the secondary, and P-1C is the standby. Additional information about the pumps is listed in the table below.

**36 - ACJC Detention Center - Hot Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
P-1A	Alias Chalmers	N/A	500	75	US Elec	N/A	15	39.2/19.6	230/460
P-1B	Alias Chalmers	N/A	500	75	US Elec	N/A	15	39.2/19.6	230/460
P-1C	Alias Chalmers	N/A	500	75	US Elec	N/A	15	39.2/19.6	230/460

N/A – The nameplate data was not available during the time of the survey.

- B. Cooling System: The ACJC Detention Center is cooled by evaporative (swamp) coolers and packaged rooftop units. Each of the cooling units is controlled by the Siemens Apogee control system.
- C. Distribution Systems
1. Swamp Coolers: These units are constant volume single zone systems that are located on the roof. They contain a supply fan, a return fan, a direct/indirect evaporative cooling coil, two condenser fans, a hot water heating coil, and mixed air dampers. The evaporative cooling coils maintain the cooling space temperature setpoint. The hot water heating coil is controlled by a three-way electric valve which modulates to maintain the space temperature setpoint. The mixed air dampers are controlled by an electric actuator, which modulates to maintain the mixed air temperature setpoint. The units serve Pods 1, 3, 4, and 6. Additional information about the swamp coolers is listed in the table below.

**36 - ACJC Detention Center - Swamp Coolers**

Equip ID	Location	Mfgr	Model	Supply Fan				Return Fan		
				CFM	HP	Amps	Volts	HP	Amps	Volts
AHU-1	Pod 1	DesChamps	PIDC/H-6	6,000	5	N/A	N/A	3	N/A	N/A
AHU-2	Pod 1	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-3	Pod 1	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-4	Pod 1	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-1	Pod 3	DesChamps	PIDC/H-6	6,000	5	N/A	N/A	3	N/A	N/A
AHU-2	Pod 3	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-3	Pod 3	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-4	Pod 3	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-1	Pod 4	DesChamps	PIDC/H-6	6,000	5	N/A	N/A	3	N/A	N/A
AHU-2	Pod 4	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-3	Pod 4	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-4	Pod 4	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A

## 36 - ACJC Detention Center - Swamp Coolers

Equip ID	Location	Mfgr	Model	Supply Fan				Return Fan		
				CFM	HP	Amps	Volts	HP	Amps	Volts
AHU-1	Pod 6	DesChamps	PIDC/H-6	6,000	5	N/A	N/A	3	N/A	N/A
AHU-2	Pod 6	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-3	Pod 6	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A
AHU-4	Pod 6	DesChamps	PIDC/H-6	16,000	10	25/12.5	N/A	7.5	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

- VAV Rooftop Units: RTU-1, RTU-2, and RTU-3 are variable air volume reheat systems. They are equipped with a supply fan with inlet guide vanes, a direct expansion cooling coil, mixed air dampers, and fan powered VAV boxes. The supply air volume is controlled by the inlet guide vanes, which modulate to maintain the supply air duct static pressure setpoint. The conditioned air is distributed to the spaces via fan powered VAV boxes. The direct expansion cooling coil maintains the cooling discharge air temperature setpoint. The mixed air dampers are controlled by electric actuators, which modulate to maintain the mixed air temperature setpoint. Additional information about the rooftop units is listed in the table below.

## 36 - ACJC Detention Center – VAV Rooftop Units

Equip ID	Location	Mfgr	Model				Condenser			Compressor		
				HP	Amps	Volts	Qty	HP	Amps	Qty	HP	Amps
RTU-1	Roof-Medical Area	Alton	AV-522	N/A	N/A	N/A	6	1	2	2	N/A	52.2
RTU-2	Roof-Medical Area	Alton	AU-271	10	25.2/12.6	230/460	4	1	2	1	N/A	59
RTU-3	Roof-Library	Alton	AU-271	10	25.2/12.6	230/460	4	1	2	1	N/A	59

N/A – The nameplate data was not available during the time of the survey.

- Rooftop Units: These rooftop units (RTU-5, RTU-8A thru 8D, RTU-18, RTU-20A, RTU-20B, RTU-36A, and RTU-36B) are constant volume single zone systems. These units are equipped with a supply fan, a direct expansion cooling coil, a hot water heating coil, and mixed air dampers. The supply fan, economizer, cooling coil, and heating coil modulate in sequence to maintain the space temperature setpoint. Additional information about the rooftop units is listed in the table below.

## 36 - ACJC Detention Center – Constant Volume Rooftop Units

Equip ID	Location	Mfgr	Model				Condenser			Compressor		
				HP	Amps	Volts	Qty	HP	Amps	Qty	HP	Amps
RTU-5	Roof-JAC	Lennox	LGA060SH1G	1.5	2.8	N/A	1	0.3	1.3	1	N/A	55
RTU-8A	Roof-Computer Rm	Lennox	LGA150SH2G	3	4.8	N/A	2	0.3	1.3	2	N/A	70
RTU-8B	Roof-Multi-Purpose	Lennox	LGA150SH2G	3	4.8	N/A	2	0.3	1.3	2	N/A	70
RTU-8C	Roof-Admin	Lennox	LGA150SH2G	3	4.8	N/A	2	0.3	1.3	2	N/A	70
RTU-8D	Roof-Admin	Lennox	LGA150SH2G	3	4.8	N/A	2	0.3	1.3	2	N/A	70
RTU-18	Roof-Pod 5	McQuay	RPS0180SW	7.5	10.8	460	2	1.5	2.6	1	20	31
RTU-20A	Roof-Pod 5	McQuay	RPS020CSW	10	14	460	2	1.5	2.6	1	25	39
RTU-20B	Roof-Pod 5	McQuay	RPS020CSW	10	14	460	2	1.5	2.6	1	25	39
RTU-36A	Roof-Pod 2	McQuay	RPS036CLW	20	25	460	4	1.5	2.6	1	40	71
RTU-36B	Roof-Pod 2	McQuay	RPS036CLW	20	25	460	4	1.5	2.6	1	40	71

N/A – The nameplate data was not available during the time of the survey.

4. **Heat Recovery Unit:** This unit is a constant volume heat recovery system that serves the kitchen area. It contains a supply fan, an evaporative cooling coil, hot water heating coil, and an exhaust fan. The evaporative cooling coils maintain the cooling discharge air temperature setpoint. The hot water heating coil is controlled by a three-way electric valve which modulates to maintain the heating discharge air temperature setpoint. The heat recovery part of the unit was inaccessible during the time of the survey. Additional information about the heat recovery unit is listed in the table below.

## 36 - ACJC Detention Center - Heat Recovery Unit

Equip ID	Location	Mfgr	Model	Supply Fan				Exhaust Fan		
				CFM	HP	Amps	Volts	HP	Amps	Volts
HR-1	Roof-Kitchen	DesChamps	N/A	N/A	20	60/30	230/460	N/A	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

5. **Makeup Air Unit:** This unit is a constant volume single zone make up air unit that serves the kitchen area. It contains a supply fan, an evaporative cooling coil, and a natural gas burner. The evaporative cooling coil cycles to maintain the cooling space temperature setpoint. The natural gas heating burner cycles to maintain the heating space temperature setpoint. Additional information about the makeup air unit is listed in the table below.

## 36 - ACJC Detention Center - Makeup Air Unit

Equip ID	Location	Mfgr	Model	Supply Fan			
				CFM	HP	Amps	Volts
MUA-1	Roof-Kitchen	Reznor	RPB400-8	N/A	N/A	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

6. AC Unit: This is a constant volume unit that serves the classification office. It contains a supply fan, a direct expansion cooling coil, a natural gas fired burner, and manual outside air dampers. Additional information about the condensing unit is listed in the table below.

## 36 - ACJC Detention Center - AC Unit

Equip ID	Location	Mfgr	Model	CFM	HP	Amps	Volts	Compressor	
								Qty	Amps
CU-1	Roof-Classification	Carrier	48GX-03006050	N/A	N/A	2.1	208-230	1	63

N/A – The nameplate data was not available during the time of the survey.

7. BC-1: This unit is a constant volume cooling system that serves the visitation area. The unit provides direct expansion cooling only and has manual outside air dampers. Additional information about the cooling unit is listed in the table below.

## 36 - ACJC Detention Center - Conditioning Unit

Equip ID	Location	Mfgr	Model	Motors			
				CFM	HP	Amps	Volts
BC-1	Roof-Visitation	MagicAire	60-BVXW/EEA	N/A	1.5	4.6	208

N/A – The nameplate data was not available during the time of the survey.

8. Furnace: This unit is located in the maintenance/warehouse building and serves the office areas. It is equipped with a supply fan, a direct expansion cooling coil, a natural gas fired burner, and manual outside air dampers. It is controlled by a non-programmable thermostat. Additional information about this unit is listed in the table below.

## 36 - ACJC Detention Center - Furnace

Equip ID	Location	Mfgr	Model	Heating				Condenser			Compressor	
				Input MBH	Output MBH	Amps	Volts	Qty	HP	Amps	Qty	Amps
F-1	Mech-Warehouse	Carrier	58PAV111-20	110	89	14.4	N/A	1	0.25	1.9	1	19.7

N/A – The nameplate data was not available during the time of the survey.

9. Infrared Heaters: There are three natural gas-fired infrared heaters that provide heating to the Maintenance/Warehouse building's bomb bay and generator room. The units cycle to maintain the space temperature

setpoint as governed by the non-programmable thermostats located in each of the spaces.

10. Unit Heaters: There are six gas fired unit heaters located in the Maintenance/Warehouse building. These units serve the storage area of the warehouse and the warehouse mezzanine. They are controlled by non-programmable thermostats. Two units are currently not being used.

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water

1. Domestic hot water for the ACJC Detention Center is produced by five natural gas fired, force draft, hot water boilers, which are located in the ACJC Detention Center's basement mechanical room. Four units produce 140°F for faucets and showers. One unit is used to produce hot water for the kitchen and laundry facilities which also has a storage tank. The Maintenance/Warehouse building also has a natural gas fired domestic hot water heater. Additional information about the domestic hot water heaters is listed in the table below.

**36 - ACJC Detention Center - DHW Heaters**

Equip ID	Mfgr	Gal	Input MBH	Motors			
				Motor 1 HP	Motor 2 HP	Amps	Volts
B-3	Turbopower Gas	1,750	2,800	5	X	11.5/5.7	230/460
B-4	PVI	1,750	2,800	1.5	1.5	18/9	115/230
B-5	PVI	1,750	2,800	1.5	1.5	18/9	115/230
B-6	Turbopower Gas	1,250	3,200	1.5	1.5	18/9	115/230
Laundry DHWH	Turbopower Gas	1,000	500	0.3	X	10	115
Warehouse	A.O. Smith	30	32	X	X	X	X

B. Generators

1. There are two backup generators that are located in the Maintenance/Warehouse building.

C. Exhaust Fans

1. There are multiple exhaust fans located throughout the building which serve the restroom and kitchen areas.

**37 - ACJC ADMINISTRATIVE II****I. General Description**

- A. Gross Square Footage: 91,110 Sq. Ft.
- B. Year of Original Construction: 1989
- C. General Construction Information: This three story building has exterior walls constructed of face brick with through-wall flashing, 4" batt insulation, vapor barrier, and a 5/8" gypsum board interior. The windows are double-paned with a tinted finish. The roof is constructed of elastic sheet roofing on rigid insulation over steel deck.
- D. Building Schedules: The building is occupied from approximately 5:00 am to 8:00 pm, Monday through Friday. The custodial staff works from 4:30 pm to 1:00 am, Monday through Friday.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the ACJC Administrative II building is general office equipment, which includes personal computers, printers, faxes, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating Plant: The ACJC Administrative II building produces heating hot water from two boilers located in the first floor mechanical room. The heating hot water is distributed to the heating coils located in the reheat boxes via two hot water pumps. The heating plant is controlled by the Siemens Apogee control system.
  - 1. Hot Water Boilers: B-1 and B-2 are natural gas fired, atmospheric, hot water boilers. The boilers supply hot water to the heating coils in the variable air volume reheat boxes. The boilers are enabled when the outside air temperature falls below 68°F, and are disabled when the outside air temperature rises above 72°F. Additional information is listed in the table below.

**37 - ACJC Administrative II - Hot Water Boilers**

Equip ID	Mfgr	Model	Fuel	Input MBH	Output MBH
B-A	Ajax	WGH-1375	NG	1,375	1,100
B-B	Ajax	WGH-1375	NG	1,375	1,100

- 2. Hot Water Pumps: The two hot water pumps (HWP-1 and HWP-2) are constant volume, inline pumps located in the basement mechanical room.

HWP-1 and HWP-2 operate in parallel. Additional information about the pumps is listed in the table below.

**37 - ACJC Administrative II - Hot Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
HWP-1	Taco	N/A	120	65	N/A	N/A	5	13.3/6.65	230/460
HWP-2	Taco	N/A	120	65	N/A	N/A	5	13.3/6.65	230/460

N/A – The nameplate data was not available during the time of the survey.

- B. Central Cooling Plant: The ACJC Administrative II building uses two chillers to cool the building. The chilled water is distributed to the chilled water coils located in the air handling units via two chilled water pumps. The cooling plant is controlled by the Siemens Apogee control system.

- Chillers: A-1 and A-2 are air-cooled, reciprocating chillers located outside. Each unit has two compressors and twelve condenser fans. The chillers supply chilled water to the chilled water coils located in the air handling units. Additional information about the chillers is listed in the table below.

**37 - ACJC Administrative II - Chillers**

Equip ID	Mfgr	Model	Condenser				Compressor		
			Qty	HP	Amps	Volts	Qty	Amps	Volts
A-1	Trane	CGACD121RANLL603RCAGDMH	12	1	1.8	460	2	98	460
A-2	Trane	CGACD121RANLL603RCAGDMH	12	1	1.8	460	2	98	460

- Chilled Water Pumps: The two chilled water pumps (CHW-1 and CHW-2) are constant volume, inline pumps located in the basement mechanical room. The pumps operate in parallel. Additional information about the chilled water pumps is listed in the table below.

**37 - ACJC Administrative II - Chilled Water Pumps**

Equip ID	Pump Data				Motor Data				
	Mfgr	Model	GPM	Head (Ft.)	Mfgr	Model	HP	Amps	Volts
CHW-1	Taco	N/A	550	65	Unimount	N/A	15	39.2/19.6	460
CHW-2	Taco	N/A	550	65	Unimount	N/A	15	39.2/19.6	460

N/A – The nameplate data was not available during the time of the survey.

- C. Distribution Systems:

- AHU-1 thru AHU-6: These are variable air volume reheat systems located throughout the building. Each unit is equipped with a supply air fan with inlet guide vanes, a chilled water cooling coil, and mixed air dampers. The inlet guide vanes modulate to maintain the supply air duct



static pressure setpoint. The chilled water cooling coil is controlled by a three-way electric valve which modulates to control the discharge air temperature setpoint. The mixed air dampers are controlled by electric actuators, which modulate to maintain the mixed air temperature setpoint. The conditioned air is distributed to the spaces via fan powered VAV boxes. Each air handling is controlled by the Siemens Apogee control system. AHU-3 and AHU-5 currently operate 24 hours a day, seven days a week in order to condition some computer equipment rooms. Additional information about the air handling units is listed in the table below.

**37 - ACJC Administrative II - Air Handling Units**

Equip ID	Location	Mfgr	Model	Supply Fan			
				CFM	HP	Amps	Volts
AHU-1	West-1st Floor	N/A	N/A	N/A	15	32.4/16.2	230/460
AHU-2	East-1st Floor	N/A	N/A	N/A	15	32.4/16.2	230/460
AHU-3	West-2nd Floor	N/A	N/A	N/A	15	32.4/16.2	230/460
AHU-4	East-2nd Floor	N/A	N/A	N/A	15	32.4/16.2	230/460
AHU-5	West-3rd Floor	N/A	N/A	N/A	15	32.4/16.2	230/460
AHU-6	East-3rd Floor	N/A	N/A	N/A	15	32.4/16.2	230/460

N/A – The nameplate data was not available during the time of the survey.

2. Unit Heaters: These four units are natural gas fired heaters located in the basement mechanical rooms. Additional information about the unit heaters is listed in the table below.

**37 - ACJC Administrative II - Unit Heaters**

Equip ID	Mfgr	MBH
UH-1	Trane	50.9
UH-2	Trane	50.9
UH-3	Trane	15
UH-4	Trane	15

3. Garage Unit: This is a constant volume, single zone system that serves the parking garage in the basement. The unit is equipped with a supply fan and an electric heating element. The supply fan and electric heating element cycle to maintain the space temperature setpoint as governed by the non-programmable thermostat.

V. Miscellaneous HVAC Equipment

A. Domestic Hot Water

1. Domestic hot water is produced by a natural gas fired hot water heater that is located in the basement mechanical room. Additional information on the domestic hot water heater is listed in the table below.



**37 - ACJC Administrative II - DHW Heaters**

Equip ID	Mfgr	Gal	Gal/H r	Input MBH	Volts
DHWH	A.O. Smith	71	116.4	120	N/A

N/A – The nameplate data was not available during the time of the survey.

**B. Exhaust Fans**

- There are multiple exhaust fans located throughout the building which serve the restrooms.

**VI. Water Use**

- A. Overview: The primary mode of water use in the Administration Building 2 is for sanitary services. Other minor uses include janitorial uses and boiler makeup water. All services share one meter which is read monthly.

The services provided by the offices in this building draw visitors at a rate of 150 per day, and it is assumed that the length of stay is ½ hour.

**B. Plumbing Fixtures, general**

The commodes are all flush-valve actuated, wall-mounted models with no markings to indicate gallons per flush. No leaks or maintenance problems were observed. The urinals are all flush-valve actuated, wall-mounted models with no markings to indicate gallons per flush. Lavatory faucets are in good condition. The flow rates averaged more than 3 GPM (measured). There are two small kitchenettes with stainless steel sinks and gooseneck faucets. Each floor has one janitorial closet with utility faucets.

**37 – Administration Building 2 – Plumbing Fixtures**

Commodes:			Urinals	Faucets			
Tank 1.6 GPF	Tank 3.5 GPF	Flush Valve 3.5 GPF	2.0 GPF	GPM average	Total Lavatory	Metered	Kitchen (break)
0	0	1	6	3.1	2.8	0	2

**38 – SHERIFF/CORONER FACILITY****I. General Description**

- A. Gross Square Footage: 125,055 Sq. Ft.
- B. Year of Original Construction: 2002
- C. General Construction Information: No architectural drawings were recovered for this facility.
- D. Building Schedules: The building is occupied from approximately 6:00 am to 5:00 pm, Monday through Friday. The building does have areas that are occupied 24 hours a day, seven days a week. The custodial staff works from 4:00 pm to 1:00 am, Monday through Friday.

**II. Lighting**

- A. An inventory of lighting is presented in the Appendix.

**III. Miscellaneous Equipment**

- A. The majority of miscellaneous equipment found in the Sheriff/Coroner Facility is general office equipment, which includes personal computers, printers, faxes, etc.

**IV. Heating, Ventilation, and Air Conditioning**

- A. Heating System: The Sheriff/Coroner Facility receives heating from rooftop units.
- B. Cooling System: The Sheriff/Coroner Facility receives cooling from rooftop units.
- C. Distribution Systems:
  - 1. VAV Rooftop Units: These units are variable air volume reheat systems. They are equipped with a supply fan, a return fan, a direct expansion cooling coil, a natural gas fired burner, mixed air dampers, and electric VAV reheat boxes. The supply air volume is controlled by a variable frequency drive, which modulates to maintain the supply air duct static pressure setpoint. The direct expansion cooling coil maintains the cooling discharge air temperature setpoint. The natural gas fired heating coil maintains the discharge air temperature setpoint. The conditioned air is distributed to the spaces via fan powered, electric VAV reheat boxes. The mixed air dampers are controlled by electric actuators, which modulate to maintain the mixed air temperature setpoint. These units are controlled through the Trane Tracer Summit energy management system. Also, only two of the units run at a time. Two units serve one supply air duct header in order to achieve 100% redundancy. Additional information on the rooftop units is listed in the table below.

**38 – Sheriff/Coroner Facility – VAV Rooftop Units**

Equip ID	Mfgr	Model	Condenser			Compressor			Supply Fans		Return Fan
			Qty	HP	Amps	Qty	HP	Amps	Qty	HP	HP
RTU-1	Trane	SFHSC90	8	1	1.8	2	N/A	18.2	2	50	25
RTU-2	Trane	SFHSC90	8	1	1.8	2	N/A	18.2	2	50	25
RTU-3	Trane	SFHSC90	8	1	1.8	2	N/A	18.2	2	50	25
RTU-4	Trane	SFHSC90	8	1	1.8	2	N/A	18.2	2	50	25

N/A – The nameplate data was not available during the time of the survey.

2. **Rooftop Units:** These units are constant volume single zone systems. They are equipped with a supply fan, a direct expansion cooling coil, a natural gas fired burner, and mixed air dampers. The supply fan maintains the space temperature setpoint. The direct expansion cooling coil maintains the cooling discharge air temperature setpoint. The natural gas fired burner maintains the heating discharge air temperature setpoint. The mixed air dampers are controlled by electric actuators, which modulate to maintain the mixed air temperature setpoint. These units are controlled through the Trane Tracer Summit energy management system. They serve the Northeast corner of the second floor. Additional information on the rooftop units is listed in the table below.

**38 – Sheriff/Coroner Facility - Rooftop Units**

Equip ID	Mfgr	Model	Supply Fan		Condenser			Compressor		
			CFM	HP	Qty	HP	Amps	Qty	HP	Amps
RTU-5	Trane	YCD-180	6,000	5	2	0.5	1.6	2	N/A	118
RTU-6	Trane	YCD-180	6,000	5	2	0.5	1.6	2	N/A	118

N/A – The nameplate data was not available during the time of the survey.

3. **Liebert Units:** These units are direct expansion split systems, with electric heat. These units operate 24 hours a day, seven days a week. Additional information on the Liebert units is listed in the table below.

**38 – Sheriff/Coroner Facility - Liebert Units**

Equip ID	Mfgr.	Model	Supply Fan			
			CFM	HP	Amps	Volts
CRAC-1	Liebert	N/A	N/A	5	N/A	N/A
CRAC-2	Liebert	N/A	N/A	5	N/A	N/A
CRAC-3	Liebert	N/A	N/A	5	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

4. **Makeup Air Unit:** This unit is equipped with a supply fan, a direct expansion cooling coil, and a natural gas fired burner. The direct expansion cooling coil cycles to maintain the cooling space temperature setpoint. The natural gas fired burner cycles to maintain the heating space temperature setpoint. This unit serves the autopsy area. Additional information about the makeup air unit is listed in the table below.

**38 – Sheriff/Coroner Facility - Makeup Air Unit**

Equip ID	Mfgr.	Model	Supply Fan			
			CFM	HP	Amps	Volts
MAU-1	Engineered Air	FW-224/DJ-60	4,800	5	N/A	N/A

N/A – The nameplate data was not available during the time of the survey.

V. **Miscellaneous HVAC Equipment**

A. **Domestic Hot Water:**

1. Domestic hot water is produced by a natural gas fired hot water heater. Additional information about the natural gas fired hot water heater is listed in the table below.

**38 – Sheriff/Coroner Facility - DHW Heater**

Equip ID	Mfgr	Gallons	Input MBH
DHWH-1	AO Smith	400	1500

B. **Exhaust Fans:**

1. There are multiple exhaust fans located throughout the building which serve the restrooms.

# 4

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## Energy Conservation Measures

The following section contains descriptions of the Energy Conservation Measures (ECM's). These ECM's were developed with at least one of three goals in mind. Those goals were: 1) reduce utility and operational costs, 2) resolve existing operational problems, and 3) improve the working environment. Not all of the ECM's analyzed proved to be cost effective and, therefore, are not recommended for the program. However, the ECM's recommended herein proved to be viable and will address and achieve the stated goals.

A list of all ECM's analyzed is shown in Table 4.1. Table 4.1 includes many comprehensive energy conservation measures. Each measure was analyzed in a preliminary fashion. Most ECM's were evaluated in detail. Some were not evaluated in detail, based on preliminary analysis results and feedback from the Arapahoe County staff.

Tables 4.2 through 4.16 show costs and savings of all ECM's investigated. ECM's as part of the recommended program can be found in the Executive Summary.

The final proposed scope is shown in the Executive Summary, Section 1, of this report.

**Table 4.1**  
**Analyzed Energy Conservation Measures for**  
**ARAPAHOE COUNTY**

		Analyzed ECM's																										
Building	Gross Floor Area	1 - Lighting Energy Efficiency Upgrades	2 - Water Conservation Measures	2a - Water Conservation Measures with Waterless Urinals	3 - Upgrade/Install New EMCS	4 - Install Programmable Thermostats	5 - Replace the Existing Chillers and Cooling Tower	6 - Replace the Existing Natural Gas-Fired Boilers	7 - Install a New VFD on the Existing Exhaust Fan	8 - Install a VFD on Existing Vane Axial Fan	9 - Replace Air-Cooled Chillers with Water-Cooled Chillers	10 - Install an AC Unit to Serve Computer Equipment Room	11 - Variable Flow WSHP System	12 - Water Softener	13 - Install Waterside Economizer	14 - Chilled Water Storage	15 - Combined Heat & Power (CHP)	16 - Irrigation Control System Upgrade	17 - Programmable Flush Valve Controls	18 - Install Water Reclaim System	19 - Laundry Conservation	20 - Replace DHW HX with a New DHW Heater	21 - Change Natural Gas Utility Provider	22 - Remove Existing Fire Pumps	23 - Energy Resource Conservation Manager	24 - Replace Cooling Tower	25 - Retro commissioning	26 - Replace Modlines and Install VAV boxes, Diffusers, Controls
01 - Administration Building	140,263	X	X	X	X		X	X	X						X	X		X				X			X			X
12 - Arapahoe Plaza East Building	20,957	X	X	X	X													X						X				
13 - Arapahoe Human Services	54,678	X	X	X	X			X			X								X				X		X			
14 - Arapahoe Plaza West Building (County Court)	20,880	X	X	X	X													X						X				
15 - Federal Warehouse	75,073	X	X	X	X	X																		X				
16 - CSU Extension Office	5,309	X	X	X																					X			
17 - CSU Warehouse	9,476	X	X																						X			
20 - Tri County Health	8,398	X	X		X	X																			X			
23 - Altura Plaza Building	74,675	X	X	X	X			X					X					X						X				
24 - Centrepont Plaza	105,662	X		X	X																				X		X	
29 - Peoria Shops	25,008	X	X	X	X	X														X					X			
35 - ACJC Courthouse	148,522	X	X	X	X			X		X				X				X						X	X	X	X	
36 - ACJC Detention Center	291,955	X	X	X	X			X						X			X	X	X		X			X	X			
37 - ACJC Administrative II	91,110	X	X	X	X			X			X	X		X				X					X		X			
38 - Sheriff/Coroner Facility	125,055	X		X	X																				X		X	
Gross Floor Area Total	1,197,021																											

SHADED PROJECTS ARE INCLUDED IN THE RECOMMENDED PROGRAM

Table 4.2  
ECM Summary Table – 01 Administration

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalons	Annual Irrigation Savings Kgalons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
01 - ADMINISTRATION BUILDING														
1	Lighting Energy Efficiency Improvements	172,101	54.5	125,062	(1,322)	0	0	16,593	(838)	0	0	2,760	18,515	9.3
2	Water Conservation Measures	46,934	0.0	0	0	470.6	0.0	0	0	2,522	0	0	2,522	18.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	62,182	0.0	0	0	669	0.0	0	0	3,588	0	0	3,588	17.3
3	Install New/Upgrade the Existing EMCS	189,038	0.0	218,866	11,548	0.0	0.0	12,845	7,331	0	0	0	20,176	9.4
5	Replace the Existing Chillers and Cooling Tower	1,172,832	54.1	79,870	0	0.0	0.0	10,052	0	0	0	0	10,052	116.7
6	Replace the Existing Natural Gas Fired Boilers	166,914	(1.7)	(5,038)	1,851	0.0	0.0	(585)	1,175	0	0	0	590	282.9
7	Install a New VFD on Existing Exhaust Fan	31,006	0.0	18,915	0	0.0	0.0	1,110	0	0	0	0	1,110	27.9
13	Waterside Economizer	81,635	52.2	46,637	0	0.0	0.0	6,433	0	0	0	0	6,433	12.7
14	Chilled Water Storage	0	0.0	0	0	0.0	0.0	0	0	0	0	0	0	0
16	Irrigation Control System Upgrade	9,988	0.0	0	0	0.0	126.9	0	0	0	680	(120)	560	17.8
20	Replace DHW HX with new DHW Heater	25,810	0.0	0	2,158	0.0	0.0	0	1,370	0	0	0	1,370	18.8
23	Energy Resource Conservation Management Program	9,229	0.0	22,742	701	0.0	0.0	1,335	445	0	0	0	1,780	5.2
26	Replace Existing Moduline Boxes w/ VAV Terminal Units	2,015,547	0.0	0	0	0.0	0.0	0	0	0	0	0	0	0
TOTAL OF RECOMMENDED ECMs		3,983,216	159.1	507,055	14,936	1,140	127	47,783	9,483	6,110	680	2,640	66,697	59.7

Table 4.3  
ECM Summary Table – 12 Arapahoe Plaza East

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalons	Annual Irrigation Savings Kgalons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
12 - ARAPAHOE PLAZA EAST BUILDING														
1	Lighting Energy Efficiency Improvements	19,519	6.1	16,471	(165)	0	0	1,998	(105)	0	0	10	1,903	10.3
2	Water Conservation Measures	6,656	0.0	0	0	81.0	0.0	0	0	434	0	0	434	15.3
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	8,108	0.0	0	0	118.9	0.0	0	0	637	0	0	637	12.7
3	Install New/Upgrade the Existing EMCS	73,176	0.0	76,871	2,516	0.0	0.0	4,512	1,597	0	0	0	6,109	12.0
16	Irrigation Control System Upgrade	9,988	0.0	0	0	0.0	126.9	0	0	0	680	(550)	130	76.7
23	Energy Resource Conservation Management Program	1,379	0.0	3,398	89	0.0	0.0	199	56	0	0	0	255	5.4
TOTAL OF RECOMMENDED ECMs		118,826	6.1	96,740	2,439	200	127	6,709	1,549	1,071	680	(538)	9,471	12.5

## Energy Conservation Measures 4-4

Table 4.4  
ECM Summary Table – 13 Arapahoe Human Services

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
13 - ARAPAHOE HUMAN SERVICES														
1	Lighting Energy Efficiency Improvements	44,031	13.1	35,863	(379)	0	0	4,324	(241)	0	0	59	4,142	10.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	13,657	0.0	0	0	279.1	0.0	0	0	1,496	0	0	1,496	9.1
3	Install New/Upgrade the Existing EMCS	192,336	0.0	132,023	4,300	0.0	0.0	7,748	2,730	0	0	0	10,478	18.4
6	Replace the Existing Natural Gas Fired Boilers	156,742	0.0	-3,120	769	0.0	0.0	-183	488	0	0	0	305	514.1
21	Change Natural Gas Utility Provider	0	0.0	0	0	0.0	0.0	0	3,540	0	0	0	3,540	0.0
23	Energy Resource Conservation Management Program	3,598	0.0	8,865	231	0.0	0.0	520	147	0	0	0	667	5.4
TOTAL OF RECOMMENDED ECMs		420,390	13	173,632	4,922	488	0	12,409	6,664	2,615	0	59	21,747	19.3

Table 4.5  
ECM Summary Table – 14 Arapahoe Plaza West

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
14 - ARAPAHOE PLAZA WEST BUILDING (COUNTY COURT)														
1	Lighting Energy Efficiency Improvements	17,823	5.9	12,717	(128)	0	0	1,743	(81)	0	0	213	1,875	9.5
2	Water Conservation Measures	13,657	0.0	0	0	247.2	0.0	0	0	1,325	0	0	1,325	10.3
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	15,109	0.0	0	0	305.1	0.0	0	0	1,635	0	0	1,635	9.2
3	Install New/Upgrade the Existing EMCS	58,216	0.0	71,285	5,076	0.0	0.0	4,184	3,222	0	0	0	7,406	7.9
23	Energy Resource Conservation Management Program	1,374	0.0	3,385	88	0.0	0.0	199	56	0	0	0	255	5.4
TOTAL OF RECOMMENDED ECMs		106,179	5.9	87,387	5,036	552	0	6,125	3,197	2,960	0	213	12,495	8.5



## Energy Conservation Measures 4-5

Table 4.6  
ECM Summary Table – 15 Federal Warehouse

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
15 - FEDERAL WAREHOUSE														
1	Lighting Energy Efficiency Improvements	18,056	7.0	15,823	(159)	0	0	2,125	(119)	0	0	129	2,134	8.5
2	Water Conservation Measures	4,495	0.0	0	0	8.2	0.0	0	0	44	0	0	44	102.2
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	6,552	0.0	0	0	18.5	0.0	0	0	99	0	0	99	66.2
3	Install New/Upgrade the Existing EMCS	23,465	0.0	13,513	1,662	0.0	0.0	793	1,246	0	0	0	2,039	11.5
4	Install Programmable Thermostats	550	0.0	13,513	1,662	0.0	0.0	793	1,246	0	0	0	2,039	0.3
23	Energy Resource Conservation Management Program	4,940	0.0	12,172	318	0.0	0.0	714	238	0	0	0	952	5.2
TOTAL OF RECOMMENDED ECMs		58,057	7.0	55,021	3,483	27	0	4,425	2,611	143	0	129	7,308	7.9

Table 4.7  
ECM Summary Table – 16 CSU Extension

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
16 - CSU EXTENSION OFFICE														
1	Lighting Energy Efficiency Improvements	6,241	2.0	5,784	(61)	0	0	688	(45)	0	0	46	689	9.1
2	Water Conservation Measures	3,717	0.0	0	0	29.7	0.0	0	0	159	0	0	159	23.4
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	4,443	0.0	0	0	34.8	0.0	0	0	187	0	0	187	23.8
TOTAL OF RECOMMENDED ECMs		14,400	2.0	5,784	-61	65	0	688	-45	346	0	46	1,035	13.9

Table 4.8  
ECM Summary Table – 17 CSU Warehouse

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
17 - CSU WAREHOUSE														
1	Lighting Energy Efficiency Improvements	5,753	0.4	531	(6)	0	0	40	(4)	0	0	6	42	136.3
2	Water Conservation Measures	259	0.0	0	0	0.8	0.0	0	0	4	0	0	4	64.8
TOTAL OF RECOMMENDED ECMs		6,012	0.4	531	-6	1	0	40	-4	4	0	6	46	130.1

## Energy Conservation Measures 4-6

Table 4.9  
ECM Summary Table – 20 Tri County Health

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
20 - TRI COUNTY HEALTH														
1	Lighting Energy Efficiency Improvements	11,012	4.2	10,584	(106)	0	0	1,337	(80)	0	0	342	1,598	6.9
2	Water Conservation Measures	0	0.0	0	0	0.0	0.0	0	0	0	0	0	0	
3	Install New/Upgrade the Existing EMCS	21,668	0.0	6,828	1,166	0.0	0.0	401	874	0	0	0	1,275	
4	Install Programmable Thermostats	2,477	0.0	6,828	1,166	0.0	0.0	401	874	0	0	0	1,275	1.9
23	Energy Resource Conservation Management Program	553	0.0	1,362	36	0.0	0.0	80	27	0	0	0	107	5.2
TOTAL OF RECOMMENDED ECMs		35,710	4.2	25,603	2,261	0	0	2,218	1,695	0	0	342	4,255	8.4

Table 4.10  
ECM Summary Table – 23 Altura Plaza

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalloons	Annual Irrigation Savings Kgalloons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
23 - ALTURA PLAZA BUILDING														
1	Lighting Energy Efficiency Improvements	89,736	61.5	159,641	0	0	0	19,820	0	0	0	2,821	22,641	4.0
2	Water Conservation Measures	26,622	0.0	0	0	320.0	0.0	0	0	1,597	0	0	1,597	16.7
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	41,333	0.0	0	0	515.4	0.0	0	0	2,572	0	0	2,572	16.1
3	Install New/Upgrade the Existing EMCS	162,874	0.0	262,098	55,360	0.0	0.0	15,383	35,143	0	0	0	50,526	3.2
6	Replace the Existing Natural Gas Fired Boilers	208,672	0.0	(1,402)	1,729	0.0	0.0	(82)	1,098	0	0	0	1,016	205.4
11	Variable Flow Water Source Heat Pump Circulation Loop	49,878	0.0	21,540	0	0.0	0.0	1,264	0	0	0	0	1,264	39.5
16	Irrigation Control System Upgrade	7,471	0.0	0	0	0.0	22.7	0	0	0	113	-119	-6	
23	Energy Resource Conservation Management Program	4,914	0.0	12,108	373	0.0	0.0	711	237	0	0	0	948	5.2
TOTAL OF RECOMMENDED ECMs		591,501	61.5	453,984	57,462	835	23	37,095	36,478	4,169	113	2,702	80,558	7.3

## Energy Conservation Measures 4-7

Table 4.11  
ECM Summary Table – 24 Cetrepointe Plaza

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS					Simple Payback (Years)	
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)		Total (\$)
24 - CENTREPOINT PLAZA														
1	Lighting Energy Efficiency Improvements	35,152	10.2	35,183	(353)	0	0	3,953	(285)	0	0	0	3,668	9.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	17,979	0.0	0	0	397	0.0	0	0	1,981	0	0	1,981	9.1
23	Energy Resource Conservation Management Program	6,953	0.0	15,907	415	0	0.0	1,005	335	0	0	0	1,340	5.2
25	Retro Commissioning	29,723	0.0	237,292	(4,540)	0.0	0.0	14,999	(3,664)	0	0	0	11,335	2.6
TOTAL OF RECOMMENDED ECMs		89,807	10.2	288,382	(4,478)	397	0	19,958	(3,614)	1,981	0	0	18,325	4.9

Table 4.12  
ECM Summary Table – 29 Peoria Shops

		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgallons	Annual Irrigation Savings Kgallons	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
29 - PEORIA SHOPS														
1	Lighting Energy Efficiency Improvements	16,715	5.4	16,327	(164)	0	0	1,868	(104)	0	0	349	2,113	7.9
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	5,878	0.0	0	0	67.1	0.0	0	0	877	0	0	877	6.7
3	Install New/Upgrade the Existing EMCS	20,987	0.0	6,053	8,615	0.0	0.0	355	5,469	0	0	0	5,824	3.6
4	Install Programmable Thermostats	2,477	0.0	6,053	8,615	0.0	0.0	355	5,469	0	0	0	5,824	0.4
18	Water Reclaim	52,181	-6.6	-2,793	0	576.0	0.0	-1,277	0	7,528	0	-1,280	4,971	10.5
23	Energy Resource Conservation Management Program	1,646	0.0	4,055	125	0.0	0.0	238	79	0	0	0	317	5.2
TOTAL OF RECOMMENDED ECMs		99,883	-1.2	29,696	17,190	643	0	1,539	10,913	8,405	0	-931	19,926	5.0

Table 4.13  
ECM Summary Table – 35 ACJC Courthouse

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
35 - ACJC COURTHOUSE														
1	Lighting Energy Efficiency Improvements	160,935	69.8	220,825	0	0	0	24,825	0	0	0	5,114	29,938	5.4
2	Water Conservation Measures	54,195	0.0	0	0	389	0.0	0	0	5,090	0	0	5,090	10.6
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	66,175	0.0	0	0	508	0.0	0	0	6,644	0	0	6,644	10.0
3	Install New/Upgrade the Existing EMCS	368,278	0.0	74,515	4,922	0	0.0	4,373	3,125	0	0	0	7,498	49.1
6	Replace the Existing Natural Gas Fired Boilers	189,207	0.0	-8,023	7,294	0	0.0	(471)	4,630	0	0	0	4,159	45.5
8	Install a New VFD on Existing Vane Axial Fan	117,393	0.0	226,190	0	0	0.0	13,275	0	0	0	0	13,275	8.8
12	Water Softener	35,093	0.0	0	0	2,624	0.0	0	0	34,295	0	-5,805	28,490	1.2
13	Waterside Economizer	70,123	0.0	0	0	0	0.0	0	0	0	0	0	0	
23	Energy Resource Conservation Management Program	9,773	0.0	24,081	742	0	0.0	1,413	471	0	0	0	1,884	5.2
24	New Cooling Tower	216,088	3.9	6,587	0	0	0.0	1,048	0	0	0	0	1,048	206.1
TOTAL OF RECOMMENDED ECMs		1,287,260	74	544,175	12,959	3,522	0	44,464	8,226	46,029	0	-691	98,028	13.1

Table 4.14  
ECM Summary Table – 36 ACJC Detention Center

Building and ECM Number & Name	Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS						Simple Payback (Years)	
							Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)		
36 - ACJC DETENTION CENTER														
1	Lighting Energy Efficiency Improvements	158,033	55.2	278,489	(2,796)	0	0	25,724	(1,775)	0	0	3,148	27,096	5.8
2	Water Conservation Measures	151,960	0.0	0	1,261	1,582	0	0	800	24,769	0	0	25,569	5.9
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	181,245	0.0	0	0	2,771	0	0	0	43,388	0	0	43,388	4.2
3	Install New/Upgrade the Existing EMCS	548,787	0.0	0	0	0	0	0	0	0	0	0	0	
6	Replace the Existing Natural Gas Fired Boilers	1,011,294	0.0	0	23,459	0	0	0	14,892	0	0	0	14,892	67.9
12	Water Softener	344,359	0.0	0	0	3,094	0	0	0	48,459	0	-9,080	39,379	8.7
15	Install a Cogeneration Plant	864,354	146.0	1,278,960	-112,661	0	0	99,870	-71,518	0	0	-26,280	2,072	417.1
16	Irrigation Control System Upgrade	19,519	0.0	0	0	0	306	0	0	0	2,395	-825	1,570	12.4
17	Programmable Flush Valve Controls	739,681	0.0	0	0	3,615	0	0	0	56,616	0	0	56,616	13.1
19	Laundry Conservation	52,492	0.0	0	1,276	440	0	0	810	6,888	0	0	7,698	6.8
23	Energy Resource Conservation Management Program	19,211	0.0	47,337	1,459	0.0	0.0	2,778	926	0	0	0	3,704	5.2
TOTAL OF RECOMMENDED ECMs		4,090,935	201.2	1,604,786	-88,002	11,502	306	128,372	-55,865	180,120	2,395	(33,037)	221,985	18.4

Table 4.15  
ECM Summary Table – 37 ACJC Administrative II

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
37 - ACJC ADMINISTRATIVE II														
1	Lighting Energy Efficiency Improvements	196,219	62.2	210,550	(2,225)	0	0	22,933	(1,666)	0	0	3,638	24,905	7.9
2	Water Conservation Measures	26,311	0.0	0	0	151	0.0	0	0	1,978	0	0	1,978	13.3
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	34,298	0.0	0	0	220.5	0.0	0	0	2,882	0	0	2,882	11.9
3	Install New/Upgrade the Existing EMCS	216,659	0.0	18,671	1,970	0.0	0.0	1,096	1,477	0	0	0	2,573	84.2
6	Replace the Existing Natural Gas Fired Boilers	134,459	-0.7	-6,467	1,783	0.0	0.0	-504	1,337	0	0	0	833	161.3
10	Install A/C Units to Serve Computer Equipment Rooms	83,981	0.0	37,602	2,356	0.0	0.0	2,207	1,766	0	0	0	3,973	21.1
12	Water Softener	19,016	0.0	0	0	0.0	0.0	0	0	0	0	(2,720)	(2,720)	
13	Waterside Economizer	239,426	60.2	56,236	0	-67.2	0.0	7,564	0	-878	0	-5,000	1,686	142.0
23	Energy Resource Conservation Management Program	5995.1	0.0	14,772	386	0.0	0.0	867	289	0	0	0	1,156	5.2
TOTAL OF RECOMMENDED ECMs		956,363	122	331,364	4,270	305	0	34,164	3,203	3,982	0	(4,082)	37,267	25.7

Table 4.16  
ECM Summary Table – 38 Sheriff/Coroner Facility

Building and ECM Number & Name		Installed Cost (\$)	Monthly KW Savings	Annual KWH Savings	Annual Gas Savings Therms	Annual Water & Sewer Savings Kgalions	Annual Irrigation Savings Kgalions	COST SAVINGS						Simple Payback (Years)
								Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Irrigation (\$)	Operational (\$)	Total (\$)	
38 - SHERIFF/CORONER FACILITY														
1	Lighting Energy Efficiency Improvements	42,927	12.9	39,353	(395)	0	0	4,497	(287)	0	0	0	4,210	10.2
2a	Water Conservation Measures w/ Waterless Urinal Retrofit	17,979	0.0	0	0	180.0	0.0	0	0	1,175	0	0	1,175	15.3
23	Energy Resource Conservation Management Program	8,229	0.0	20,276	545	0.0	0.0	1,190	397	0	0	0	1,587	5.2
25	Retro Commissioning	20,916	0.0	227,590	(6,766)	0.0	0.0	13,357	(4,923)	0	0	0	8,434	2.5
TOTAL OF RECOMMENDED ECMs		90,049	12.9	287,219	(6,616)	180	0	19,045	(4,813)	1,175	0	0	15,407	5.8

**ECM Number:** 1

**ECM Title:** Lighting Energy Efficiency Upgrades

**ECM 1a:** Electronic Ballasts and T8 Lamps



**ECM Description:**

Arapahoe County utilizes fluorescent fixtures containing a combination of standard and energy saving T12 lamps. Standard magnetic core and coil ballasts are used to operate these lamps. This ECM considers retrofitting the existing fluorescent fixtures with T8 lamps and electronic ballasts at the following facilities:

- |                              |                            |
|------------------------------|----------------------------|
| (01) Administration Building | (12) Plaza East Building   |
| (13) Human Services          | (14) Plaza West Building   |
| (15) Federal Warehouse       | (16) CSU Extension Office  |
| (17) CSU Warehouse           | (20) Tri-County Health     |
| (29) Peoria Shop             | (23) Altura Plaza Building |
| (36) Detention Center        | (37) Administrative II     |
| (35) Courthouse              |                            |

The combination of T8 lamps and electronic ballasts is the most technologically advanced fluorescent lighting system available. It has been proven to be approximately 40% more energy efficient than the conventional T12 lamps and magnetic ballasts. The electronic ballasts operate at high frequencies to reduce the power requirements, while maintaining the appropriate light level. Electronic ballasts also reduce the tendency of fluorescent lamps to flicker or ballasts to hum. T8 lamps also use rare earth phosphor minerals, which provide superior color rendition similar to the familiar energy saver or warm white lamps.



Magnetic ballasts can control a maximum of 2 lamps, and electronic ballasts can control up to 4 lamps. This reduces the number of ballasts purchased, by allowing a ballast to operate more than 2 lamps. Some areas that have luminaires mounted end-to-end can be tandem ballasted. Tandem ballasted fixtures house the ballast in one luminaire, while operating lamps in one, or more, of the nearby luminaires.

In addition to energy savings, this lighting ECM creates maintenance savings as well. The proposed T8 lamps and electronic ballasts will replace existing older lamps and ballasts. The new lamps and electronic ballasts have expected lives of approximately 24,000 hours and 25 years, respectively. They are 100% guaranteed by the manufacturer for 3 years (lamps) and 5 years (ballasts).

Chevron Energy Solutions recommends retrofitting T12 fluorescent luminaires with the T8 system. The T8 lamps fit in the existing standard T12 bi-pin sockets without luminaire modification. Recommended replacement lamps are as follows:

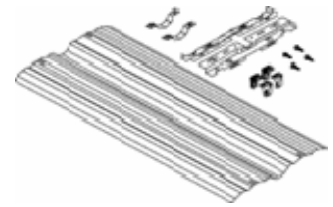
- 20 watt, 2-foot, T12 lamps replaced with 17 watt T8 lamps
- 34 watt and 40 watt, 4-foot, T12 lamps replaced with 32 watt T8 lamps
- 60 watt, 75 watt, 110 watt, 8-foot, T12 lamps with two 32 watt T8 lamps mounted end-to-end.

These retrofits will reduce the energy consumption of these luminaires, while maintaining the appropriate light level and quality.

**ECM 1b:** Specular Reflectors, Electronic Ballasts, and T8 Lamps

**ECM Description:**

The buildings listed below utilize recessed luminaires that contain fluorescent T12 lamps, either linear or U-tube. Magnetic core and coil ballasts operate these lamps. The most common recessed luminaire contains 4 standard 4-foot T12 lamps with two magnetic ballasts.



(01) Administration Building	(12) Plaza East Building
(13) Human Services	(14) Plaza West Building
(15) Federal Warehouse	(16) CSU Extension Office
(17) CSU Warehouse	(29) Peoria Shop
(38) Sheriff/Coroner Facility	(23) Altura Plaza Building
(24) Centrepont Plaza	(36) Detention Center
(37) Administrative II	(35) Courthouse



The lighting industry has seen continued advances in the field of light reflection, which has resulted in the introduction of specular reflectors. With the specular reflector system, up to half of the lamps and ballasts can be removed without reducing the light level at the work surface. A reflective surface is installed in the fixture to make up for the loss of illumination due to lamp removal. This reflects more of the remaining light back into the room.

Each specular reflector is custom designed using sophisticated optical engineering and computer-aided design. The reflector is bent at optimum angles for each fixture type. The enhanced aluminum material optimizes reflectivity and overall performance. The reflector produces uniform lighting that is comfortable and aesthetically pleasing without changing the appearance of existing fixtures. Trapped light is redirected in such a way that the fixture actually appears to still have all bulbs active. Use of this reflector causes almost all of the light energy within a fixture to be transmitted as usable light. Resulting light levels are less diverse because of the reflector's geometric design. This induces even distribution of light and reduces glare.

This ECM considers retrofitting luminaires with specular reflectors, T8 lamps, and electronic ballasts. Experience shows that fixture wattages may be reduced by half with little or no noticeable loss of light intensity at the working level. Listed below are the typical lighting fixtures and the proposed retrofit for each:

- The existing 2' x 4' luminaires containing three to four standard, 4-foot, T12 lamps and two ballasts, will be retrofitted with two 4-foot T8 lamps, an enhanced aluminum reflector, and one 2-lamp electronic ballast.
- The existing 2' x 4' luminaires located in an end-to-end configuration, and containing three to four standard, 4-foot, T12 lamps and two ballasts, will be retrofitted with each fixture

containing two, 4-foot, T8 lamps, and an enhanced aluminum reflector, with one 4-lamp electronic ballast installed in one luminaire and tandem wired to the second luminaire.

- The existing 2' x 2' luminaires containing two, T12, U-tube lamps and one ballast will be retrofitted with two, 2-foot, T8 lamps, an enhanced aluminum reflector, and one 2-lamp electronic ballast.

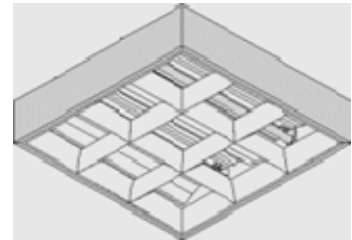


**ECM 1c:** Incandescent to New Fluorescent Fixtures with Electronic Ballasts and T8 Lamps**ECM Description:**

The buildings listed below utilize incandescent luminaires in a wide variety of areas.

(01) Administration Building	(14) Plaza West Building
(15) Federal Warehouse	(16) CSU Extension Office
(17) CSU Warehouse	(20) Tri-County Health
(29) Peoria Shop	(23) Altura Plaza Building
(36) Detention Center	(37) Administrative II
(35) Courthouse	

This ECM considers replacing selected high wattage incandescent fixtures that have significant operating hours with new fluorescent fixtures containing new T8 lamps and electronic ballasts. This ECM also considers replacing selected luminaires that currently use the less common 8' T12 fluorescent lamps.



While standard incandescent sources provide desirable qualities such as instant light, good color rendition, low replacement cost, and ease of control in dimming situations, they are the least efficient type of light source currently available. The typical life of an incandescent bulb ranges between 750 and 1,000 hours, and the typical efficacy of the incandescent source is 20 lumens per watt. Of the total input power, only 10% emerges as visible light. The typical efficacy of a T8 fluorescent luminaire is 80 to 100 lumens per watt, and lamps have an average life of 20,000 hours, which results in reduced maintenance cost.

With this higher efficacy, a lower wattage fluorescent fixture can provide light levels of the same or greater intensity as a higher wattage incandescent fixture. Due to advanced technology, the new T8 system is an excellent replacement because it is the most efficient fluorescent system available. Electronic ballasts operating at high frequencies reduce the power needed to produce the same or greater amount of light; and more efficient T8 lamps, along with new fixture design, allow more usable light to exit the fixture.

In summary, due to the long life of the fluorescent lamps as compared to the incandescent lamps, the energy maintenance savings, as well as improved lighting quality, this retrofit is highly recommended for all of the buildings analyzed.

**ECM 1d:** Incandescent to Compact Fluorescent.

**ECM Description:**

The buildings listed below utilize incandescent luminaires in a wide variety of areas.

(01) Administration Building	(16) CSU Extension Office
(20) Tri-County Health	(23) Altura Plaza Building
(36) Detention Center	(37) Administrative II
(35) Courthouse	

Incandescent sources provide such desirable qualities as instant light, good color rendition, low replacement cost, and ease of control in dimming situations. However, they are the least efficient type of light source currently available. The typical life of an incandescent bulb ranges between 750 and 1,000 hours, with an efficacy of 20 lumens per watt. Incandescent lamps only allow 10% of the total input power as visible light.



Compact fluorescent lamps are significantly more efficient. They typically have an efficacy of 50 to 70 lumens per watt, and have an average rated lamp life of 10,000 hours. Long lamp life results in reduced maintenance costs associated with lamp replacements. The more efficient compact fluorescent lamp can provide the same light levels as higher wattage incandescent lamps, without sacrificing lighting quality.

Recommended replacement lamps are as follows:

- 60 watt, 65 watt, 75 watt, incandescent lamp replaced with 15 watt, two piece spiral screw-in compact fluorescent lamp
- 100 watt, incandescent lamp replaced with 23 watt, two piece spiral screw-in compact fluorescent lamps

This ECM considers replacing all incandescent lamps with screw-in compact fluorescent lamps. This requires the installation of new lamps and ballasts into the existing luminaires, and may require the removal of the existing fixture.

**ECM 1e:** New Fixtures with Hardwire Ballasts and Compact Fluorescent Lamps**ECM Description:**

Currently, the buildings listed below utilize high wattage incandescent luminaires in various locations.

(01) Administration Building	(12) Plaza East Building
(14) Plaza West Building	(20) Tri-County Health
(23) Altura Plaza Building	(36) Detention Center

Incandescent lamps provide such desirable qualities as instant light, good color rendition, low replacement cost, and ease of control in dimming situations. However, they are the least efficient, and have the shortest lamp life, of any light source on the market. The typical life of an incandescent lamp ranges between 750 and 1,000 hours, with an efficacy of 20 lumens per watt. Only 10% of the total input power emerges as visible light.



Compact fluorescent lamps are significantly more efficient than standard incandescent lamps. Typically, compact fluorescents have an efficacy of 50 to 70 lumens per watt, and an average rated lamp life of 10,000 hours. A longer lamp life results in reduced maintenance costs associated with lamp replacements. Compact fluorescent lamps can provide the same, if not greater, light levels as higher wattage incandescent lamps.



Recommended replacement lamps and fixtures are as follows:

- 60, 75 watt, incandescent lamp replaced with square fixture, two-2 piece plug in 13 watt compact fluorescent lamps
- 60 watt, incandescent lamp replaced with decorative wall mount fixture, two-13 watt compact fluorescent lamps

This ECM considers replacing selected high wattage incandescent fixtures with new fluorescent fixtures. With the retrofit of new fixtures with compact fluorescent lamps and hardwire ballasts, the same amount of light will be delivered for around one-fourth of the energy.

**ECM 1f: Incandescent to Halogen****ECM Description:**

Incandescent PAR lamps are currently being used at the Arapahoe County Plaza East Building.



While incandescent sources provide desirable qualities such as instant light, good color rendition, low replacement cost, and ease of control in dimming situations, they are the least efficient and shortest-lived type of light source now on the market. The typical life of an incandescent lamp ranges between 750-1000 hours, with an efficacy of 20 lumens per watt. Of the total input power, only 10% emerges as visible light.

Tungsten halogen PAR lamps are a more efficient light source, with an efficacy as high as 50 lumens per watt. The typical lamp life is from 2,000 to 4,000 hours. With a higher efficacy, a lower wattage tungsten halogen lamp can provide light levels of the same intensity as a higher wattage incandescent lamp, while the increased life span reduces maintenance costs. Another benefit of the tungsten halogen retrofit is that these lamps are available in compatible sizes and shapes as incandescent PAR lamps, reducing installation costs normally associated with retrofitting these fixture types.

This ECM considers retrofitting selected existing incandescent luminaires with tungsten halogen PAR lamps in areas where the desired lighting control or conditions cannot be achieved through current compact fluorescent technology.

**ECM 1g: Metal Halide to New Fluorescent Fixtures****ECM Description:**

Metal Halide lamps are currently being used at the following Arapahoe County Buildings.



Can Fixture – Compact Fluorescent Lamp

- (36) Detention Center                      (37) Administrative II
- (35) Courthouse

The standard Metal Halide (MH) lamps provide desirable qualities such as 100 lumens per watt, higher light levels with less wattage, and a lamp life of 15,000-20,000 hours. However, the MH fixture generates heat, (which, when located inside a building, can cause air conditioners to run more often; and when used in exterior lighting, can cause lenses to burn out quicker, depending on the fixture type). A typical Metal Halide lamp has a high lumen depreciation of 40 % and a restrike period of approximately 2 to 5 minutes. Metal Halide lamps will be retrofitted with electronic ballasts and either T8 fluorescent lamps or compact fluorescent lamps.

The T8 fluorescent luminaire provides nearly the same efficacy as the Metal Halide at 80 to 100 lumens per watt, and also has a greater average life of 24,000 hours. T8 Fluorescent lamps are instant start on/off, and are the most efficient fluorescent system available. Electronic ballasts operating at high frequencies reduce the power needed to produce the same or greater amount of light; and more efficient T8 lamps, along with new fixture design and reflector additions, allow more usable light to exit the fixture. Use of an aluminum reflector will cause almost all of the light energy within a fixture to be transmitted as usable light. Light levels will be less diverse and, thus, induce even light distribution and reduce glare.

While compact fluorescent lamps have an efficacy of only 50 to 70 lumens per watt, they have an average rated lamp life of 10,000 - 15,000 hours. Metal Halide lamps start to decay rapidly at 12,000-15,000 hours, yet compact fluorescent lamps produce a constant lumen output during an average life cycle. Compact fluorescent lamps are instant on/off and, therefore, do not have a restrike period.

Recommended replacement lamps and fixtures are as follows:

- 150 watt, Metal Halide lamp replaced with new 2' x 2' troffer, two-17 watt T8 lamps with enhanced aluminum reflector
- 150 watt, Metal Halide lamp replaced with new can fixture, two-18 watt compact fluorescent lamps

Due to the quicker restrike period, constant lumen output, and elimination of heat produced by metal halide lamps, this retrofit is highly recommended for the aforementioned buildings.

**ECM 1h:** New L.E.D. Exit Fixtures**ECM Description:**

The buildings listed below utilize exit signs that are illuminated by incandescent lamps, with varying wattages.



(17) CSU Warehouse	(20) Tri-County Health
(29) Peoria Shop	(36) Detention Center
(37) Administrative II	(35) Courthouse

Incandescent sources provide such desirable qualities as instant light, good color rendition, and low replacement cost. However, they are the least efficient types of luminaire on the market. The typical lamp life of an incandescent exit light bulb ranges from 2,000 to 3,000 hours, with an efficacy light source rating of 20 lumens per watt. Only 10% of the total input power emerges as visible light in an incandescent lamp.

Chevron ES recommends replacing these fixtures with a Light Emitting Diode (LED) type exit fixture. LED exit fixtures meet or exceed IES standards for exit lighting levels, while using only 2 watts of energy. The LED exit fixtures have a five-year warranty and a twenty-five year projected life. This will reduce nearly all maintenance labor and material costs associated with replacing bulbs.

**ECM 1i: Install Motion Sensors****ECM Description:**

The Administrative II building has areas that are unoccupied during portions of the normal workday; and during this unoccupied time, the lights are left on. The 2<sup>nd</sup> and 3<sup>rd</sup> floors do not have light switches; thus, each floor is controlled by circuit breakers, and lighting can be only on or off for the entire floor. Office and hallway lights are always on, as long as a single occupant is present on that floor. Weekend periods increase the need for motion sensors because of minimal occupancy. With the addition of motion sensors, any unnecessary lighting in areas not occupied can be eliminated. Motion sensors will also reduce maintenance costs associated with labor and lamp replacement. This ECM considers installing motion or occupancy sensors in these areas to turn off the lights when the area is unoccupied.



Occupancy sensors are devices that detect motion within a space. They automatically turn off or adjust building lighting when a space is unoccupied for time periods typically greater than 6 to 10 minutes. They have the option of being adjustable for any amount of time, such that lighting can be turned off as little as seconds, and as high as hours after an area has been unoccupied. In addition, the sensors can be configured so that they can either turn the systems on manually or automatically depending on the occupant's preference.



The devices being installed will use either ultrasonic, passive infrared, or a combination of both technologies. The selection of the technology is based upon the best application for the space being controlled.

Ultrasonic sensors emit a low intensity, inaudible sound into the area being monitored. Motion is detected when the movements in the coverage area causes a Doppler shift in the reflected sound waves. Ultrasonic sensors are especially sensitive to minor occupant motion, but do not respond to audible sound. Due to the volumetric coverage pattern, these sensors often do not require a fully clear view to detect motion in the area to be controlled. Passive infrared sensors detect the changes in temperature that are created when a person moves within the field of view of the sensor. These sensors read the difference between the heat emitted by a human body and the temperature of the background space. When a person moves into or out of the field of view, the sensor detects motion by the change in the temperature it is sensing. Passive infrared sensors must have a clear view of the area to be controlled to operate effectively.

Sensors are effective in reducing unnecessary energy usage. Often a savings of 30% to 40% in energy usage can be realized in most commercial establishments with the properly designed installation of sensors. CES recommends installing motion sensors in locations wherever room design, primary function, lighting design, and room construction are appropriate.



**ECM Number:** 2

**ECM Title:** Water Conservation Measures

**ECM Description:**

The use of water at correctional institutions, healthcare facilities, office buildings, and other types of facilities has become more of a concern in recent years. In Colorado, this is even more of a concern due to the drought conditions and water restrictions that exist in the area.

Utility charges for potable water and sewage are now increasing at a rate greater than other utilities (electricity and natural gas). Consequently, retrofits have been developed for toilets to reduce the water required for each flush. These devices can reduce water usage by up to 50% per flush. Flush toilets and urinals are a major potable water user at Arapahoe County.

**Replace Toilets with Ultra Low Flush Models**

This measure replaces the toilets at certain sites that have a high sanitary water use and where water cost saving justifies replacement. Replacement of china and flush valve (or tank) is indicated in order to ensure proper operation. In general, the newer buildings have lower domestic usage due to newer existing equipment. Below is a tabulation of buildings where toilet replacement was evaluated, the total toilet count and recommended replacement.

Analysis indicated that changing all fixtures (toilets, urinals and faucets) was cost prohibitive. (For a discussion of analysis, see below.) Presently, urinal and faucet flow rates are relatively low. Replacing them garners little in the way of savings, and relatively high cost makes replacing them cost prohibitive. Also, half the population uses toilets exclusively and 60% of the toilets are assigned to that half. The return on investment for toilet replacement is enhanced by relatively high water billing rates.

**Table 1: Toilet Replace Schedule:**

Building	Total Count	Style to be replaced			Total Quantity To Be Replaced
		3.5 GPF Tank	3.5 GPF Flush Valve	3.5 GPF Comby	
Administration #1	44	0	0	0	44
Arapahoe Plaza (A/D works)	11	7	0	0	7
Arapahoe Plaza (Human Services)	19	9	0	0	9
Arapahoe Plaza (County Court)	19	18	0	0	18
CSU Extension Office	4	0	0	0	0
CSU Ware House	1	0	0	0	0
Federal Blvd Warehouse	10	0	0	0	5
Tri County Health	8	0	0	0	0
Administration #2	32	32	0	0	32



Building	Total Count	Style to be replaced			Total Quantity To Be Replaced
		3.5 GPF Tank	3.5 GPF Flush Valve	3.5 GPF Comby	
ACJC District Court	79	39	35	0	74
P.J. Sullivan Detention Center	71	0	71	0	71
P.J. Sullivan Detention Center (Comby)	413	0	0	413	0
County Shops:	6	0	0	0	6
Altura Plaza	55	15	12	0	27
Sheriff Coroner	39	0	0	0	0
Centrepont	45	0	0	0	0
	856	120	118	413	293

Note: Thirty existing Comby's at the P.J. Sullivan Detention Center have already been replaced with 1.6 GPF Combys.

#### **Administration #1:**

This is a modern building with toilets that appear to have older units. The calculations comparing the billing rate to the expected use rate given the staffing levels, visitor demand, and normal frequency of use indicate that the fixtures are probably low usage units. However, low flow units can be installed to achieve savings to justify their installation.

#### **Arapahoe Plaza: (A/D Works):**

This building has both 1.6 GPF and 3.5 tank type gravity toilets and ultra low flush (ULF) pressure-assisted toilets. This measure concerns replacing the gravity units with new pressure-assisted toilets.

#### **Arapahoe Plaza (Human Services):**

This building has both 3.5 tank type gravity toilets and ultra low flush (ULF) pressure-assisted toilets. This measure concerns replacing the gravity units with new pressure-assisted toilets.

#### **Arapahoe Plaza (County Court):**

This building has 3.5 tank type gravity toilets and one ultra low flush (ULF) pressure assisted toilet. This measure concerns replacing the gravity units with new pressure-assisted toilets.

#### **CSU Extension:**

There are four 3.5 GPF toilet fixtures in this building. With a low population-to-toilet ratio and low year-round usage, changing the toilet fixtures is not justified based on water cost savings.

#### **CSU Warehouse:**

The one toilet in this building is a 1.6 GPF tank, gravity flush unit. With a low flush rate and low/sporadic population levels changing the toilet fixture is not justified based on water cost savings. However, it would be prudent to frequently (monthly) check for leakage using dye tablets designed for that purpose. Flapper valves in the bottom of tanks fail slowly, and "phantom" leaks

resulting from flapper failure can waste a substantial amount of water, especially because the rest room is seldom used.

**Federal Warehouse:**

The model showed low usage. There are two sets of restrooms, one serving the elections staff and training center and the other serving the maintenance staff. The former set of restrooms has been recently remodeled and requires no upgrades. The maintenance restrooms are seldom used. No change is recommended based on cost savings realized from reduced flush rates. However, it would be prudent to frequently (monthly) check for leakage using dye tablets designed for that purpose. Flapper valves in the bottom of tanks fail slowly, and “phantom” leaks resulting from flapper failure can waste a substantial amount of water, especially because the rest room is seldom used.

**Tri-County Health Center:**

The toilets in this building are older 3.5 GPF units. Given the high staffing and visitor levels, changing them would save substantial amounts of water. However, the water company classification of this building determines the billing rate with a minimum charge based on a minimum usage. The building never exceeds the minimum usage rate, so changing the toilets is not justified based on water cost savings. However, it would be prudent to frequently (monthly) check for leakage using dye tablets designed for that purpose. Flapper valves in the bottom of tanks fail slowly, and “phantom” leaks resulting from flapper failure can waste a substantial amount of water.

**Administration #2:**

This building has 3.5 tank type gravity toilets. This measure replaces the gravity units with new pressure-assisted toilets.

**ACJC – District Court:**

This building has both 3.5 GPF and 1.6 GPF tank type gravity toilets as well as ULF and 3.5 GPF flush valve toilets. This measure considers replacing the 3.5 GPF gravity units with new pressure-assisted toilets and also replacing the 3.5 flush valve units with ULF flush valve units.

**P. J. Sullivan Detention Center:**

This facility has a large number of fixtures with different population types. The visitors and staff and low security prison population use vitreous china fixtures with 3.5 GPF flush valves. The prison population has stainless steel combination units (combys) rated at 3.5 GPF. This measure replacing the vitreous china units with 1.6 GPF units.

The comby units are relatively expensive and the population-to-fixture is very low. Nevertheless, the inmates are at the facility for most of the day, and there are occasional intentional floods that are disruptive, costly to clean up, and waste water. This measure considers replacing the existing comby units with ULF models that have a flood control feature that mitigates intentional flooding. A detailed description of these units is located in ECM 17.

### County Shops:

These fixtures are all low-use flush models, and changing the toilets is not justified based on water cost savings.

### Altura Plaza:

This building has both 3.5 GPF and 1.6 GPF tank type gravity toilets, ULF, and 3.5 GPF flush valve toilets. This measure considers replacing the gravity units with new pressure-assisted toilets and also replacing the 3.5 flush valve units with ULF flush valve units.

### Sheriff/Coroner:

This building has all ULF fixtures installed.

### Centrepont:

This building has all ULF fixtures installed.

### Replace Urinals with Ultra Low Flush Models:

Replacing the urinals that have higher flush rates with ULF urinals can save water. This measure involves replacing or retrofitting the urinal flush valve and the vitreous china bowl with a ULF fixture assembly.



Building	Total Count	Style to be replaced			Total Quantity To Be Replaced
		2 GPF	1 GPF	1 GPF Auto Flush	
Administration #1	21	21	0	0	0
Arapahoe Plaza (A/D works)	2	2	0	0	0
Arapahoe Plaza (Human Services)	5	5	0	0	0
Arapahoe Plaza (County Court)	2	2	0	0	0
CSU Extension Office	1	0	0	0	0
CSU Ware House	0	0	0	0	0
Federal Blvd Warehouse	2	0	0	0	0
Tri County Health	2	0	0	0	0
Administration #2	6	6	0	0	0
ACJC District Court	9	0	0	0	0
P.J. Sullivan Detention Center	22	22	0	0	22
P.J. Sullivan Detention Center (Comby)	0	0	0	0	0
County Shops:	2	0	0	0	0
Altura Plaza	13	0	0	0	0
Sheriff Coroner	10	0	0	0	0
Centrepont	12	0	0	0	0
	109	58	0	0	22

**Replace Urinals with Waterless Models:**

Waterless urinals are gaining acceptance among facilities managers, especially in areas where water costs are high. The technology is several years old now, and there is a successful track record that has been established encompassing ease of maintenance, water savings, and user acceptance. The system requires that maintenance staff and management learn how to perform the simple and regular tasks as part of regular cleaning schedule. Cleaning is not any more time consuming than a standard urinal and maintaining trap becomes a regular part of the cleaning routine. Staff and management make this adjustment easily. Patrons will be puzzled by the lack of something to do, but will not notice anything else different, visually or odor-wise, from the standard urinal.

Building	Total Count	Style to be replaced			Total Quantity To Be Replaced
		2 GPF	1 GPF	1 GPF Auto Flush	
Administration #1	21	21	0	0	21
Arapahoe Plaza (A/D works)	2	2	0	0	2
Arapahoe Plaza (Human Services)	5	5	0	0	5
Arapahoe Plaza (County Court)	2	2	0	0	2
CSU Extension Office	1	0	0	0	0
CSU Ware House	0	0	0	0	0
Federal Blvd Warehouse	2	0	0	0	2
Tri County Health	2	0	0	0	0
Administration #2	6	6	0	0	6
ACJC District Court	9	0	1	8	9
P.J. Sullivan Detention Center	22	22	0	0	0
P.J. Sullivan Detention Center (Comby)	0	0	0	0	0
County Shops:	2	0	2	0	0
Altura Plaza	13	5	8	0	13
Sheriff Coroner	10	0	10	0	10
Centrepont	12	0	12	0	12
	109	57	31	8	80

In determining the savings for this measure, the annual cost for up keep on the special traps used by the system is included in the savings calculation.

The new urinal shall cover the scar left by the old unit. The water supply shall be removed and capped inside the wall cavity and the wall penetration hole covered with an acceptable, removable cover plate. Waste connection is simple change out.

**ECM Number:** 3

**ECM Title:** Install New/Upgrade Energy Management System

**ECM Description:**

This ECM investigates installing an Energy Management Control System (EMCS) to control the heating, ventilation, and air conditioning (HVAC) equipment at specified buildings included in this study for Arapahoe County. Sites included in this study which presently do not have EMCS control are:

*Administration Building # 01*  
*Arapahoe Plaza East Building #12*  
*Arapahoe Human Services Building #13*  
*Arapahoe Plaza West Building #14*  
*Federal Warehouse Building #15*  
*Tri-County Health Building #20*  
*Altura Plaza Building #23*  
*Peoria Shops Building #29*

Sites included in this study that have EMCS control are:

*ACJC Courthouse Building # 35 - Siemens*  
*ACJC Detention Center Building # 36 - Siemens*  
*ACJC Administration II Building #37 - Siemens*  
*Centrepont Building #24 - Invensys*  
*Sheriff/Coroner Building #38 - Trane Tracer Summit*

A listing of the equipment and devices to be controlled by the EMCS is given in the Appendix.

The proposed EMCS will provide supervisory control on some equipment, while providing direct digital control (DDC) on other equipment. For supervisory control equipment, the EMCS will enable the unit during occupied hours; and the existing local controls will control the unit and maintain space temperature. The EMCS will cycle the equipment during unoccupied hours to maintain a setback temperature.

With the DDC system, all existing controllers will be controlled by the EMCS. In most cases, the existing pneumatic actuators and valves will be reused. The EMCS will provide the control logic and signals, while the pneumatics system will provide actual modulation. Any new HVAC equipment installed as part of the energy program will have DDC control with electronic controls (no pneumatics).

Features and criteria associated with the implementation of this ECM are as follows:



- Building Controllers with Ethernet connectivity. Tri-County Health Building #20 does not have Ethernet connectivity; the controller will have a modem installed as well as Ethernet.
- Workstation pc's with the latest controls software version licensed to Arapahoe County (separate licenses for each) will be provided and installed at Administration I Building, Arapahoe Human Services Building and Altura Plaza Building.
- Laptop computer with the latest controls software version licensed to Arapahoe County will be provided.
- AutoCAD floor plans of each site.
- All air handling units (AHU's) will have the capability of being enabled/disabled by the EMCS. Most pumps, heating, cooling, and exhaust systems will be shut off in the buildings when they are not occupied. During unoccupied times the space temperature will be allowed to drop as low as 55°F in the heating season and remain off in the cooling season. Specific areas of each building should be set back whenever they are not occupied.
- Chilled water pumps will be enabled/disabled by the EMCS, and the chilled water supply and return temperatures monitored. Actual control of the chilled water from chillers will be controlled by the existing chiller controls.
- Loop pumps and hot water pumps will be enabled/disabled by the EMCS, and the water supply and return temperatures monitored.
- The EMCS will provide outside air lockout temperatures for pumps and equipment. The heating hot water pumps should be completely shut off when the outside air temperature is greater than 60°F. This will save natural gas, steam, and electricity, and can help to minimize overheating in crowded areas of the buildings. This concept also applies to the cooling systems. The chilled water pumps would be off until the outside air temperature reaches 50°F. These temperature set points will be adjustable and cooling and heating will occur simultaneously on no occasions.
- Existing dampers and valves and their associated operators are assumed functional. The new EMCS will control these valves; and if the DDC system is installed, it will also control all the dampers.
- Each building will utilize an Optimal Start routine that will determine the time to start the equipment in order to bring the building up to the set-point temperature before the occupied period. The software will use the space temperature sensors to "learn" when to start the equipment based on the outside air temperature.
- New low voltage control and communication wire for the EMCS will be plenum rated when installed above drop ceilings. When ceiling access is not possible, wire will be run in conduit. New wire in mechanical rooms below 8 feet AFF shall be in EMT.
- Any asbestos abatement is excluded.
- Smoke detector repair/installation in AHU's is not included.

This system will also allow all equipment controlled in these buildings to be monitored on a PC from different locations.

The HVAC equipment will be scheduled according to the occupancy schedule of the spaces, as listed in the Appendix. It is imperative that facility personnel verify the equipment schedules with

the occupied schedules at least once a year. Failing to maintain these schedules will prevent a large portion of the energy savings from materializing. All of the schedules will be adjustable from the central location. In areas that require 24 hour per day operation, the equipment will operate 24 hours per day.

Another important step related to the implementation of the EMCS is training for the facility staff. Included in the initial cost of the EMCS is scheduled training for the appropriate facility personnel. Basic trouble-shooting and component replacement will be discussed. This will give the maintenance staff the ability to repair most future EMCS problems (i.e., fewer outside contractor service calls and expenses). In addition, the occupants of the building will be informed on the new temperature controls; and a procedure for permanent schedule changes and adjusting temperature set points will be established.

The installation contractor will provide a complete 1-year material and labor warranty for all EMCS components. Chevron Energy Solutions will perform a point-by-point commissioning during the installation to ensure that the EMCS works properly.

**Arapahoe County will be responsible for the following items:**

1. Maintaining temperatures and operating schedules as detailed in Standards of Control in the Appendix of this CEA Report. If changes in these values are required, Chevron Energy Services will need to be notified so that the impact of energy usage can be accounted for.
2. For maintaining and repairing the EMCS after the 1-year material and labor warranty expires.
3. For installing and maintaining the Ethernet LAN (phone line in Tri-County Health) in and to each building for EMCS communications.

All electrical installations will comply with the National Electric Code, the equipment shall be UL or ETL (or other approved insurance organization) listed, and the overall installation will conform to all Uniform Building Codes.

**ECM Number:** 4

**ECM Title:** Install Programmable Thermostats

**ECM Description:**

Currently, the furnaces, the rooftop units, and unit heaters at building 20-Tri County Health and building 29-Peoria Shops are controlled by manual thermostats which control the units at one set temperature 24 hours per day during the heating and cooling seasons.

Most of the units, except for one at building 15-Federal Warehouse, are already equipped with programmable thermostats. Also, one of the existing programmable thermostats was found to be broken during the time of survey.

Thermostats are available which can be programmed to turn the heating temperatures down to 55° F and turn the cooling systems off during selected times each day of the week. Such devices save energy by not keeping temperatures at the occupied setpoint when the building is unoccupied.

This ECM concerns installing programmable thermostats on the furnaces, rooftop units, and unit heaters located at the facilities listed above. Installing these thermostats will decrease electrical and natural gas energy consumption while maintaining comfort during occupied times in each building. A programmable thermostat will be installed that will allow 7-day scheduling and multiple operating time periods each day.

The schedules and space temperature setpoints that each of the new thermostats shall be set to are shown in the Standards of Control which is located in the Appendix.



**ECM Number:** 5a

**ECM Title:** Replace the Existing Chillers and Cooling Tower

**ECM Description:**

Currently, cooling is provided to building 01-Administration Building by two water-cooled, reciprocating chillers that have heat recovery capabilities. Each chiller is equipped with two different condensers. The first condenser is piped to a cooling tower which transfers the heat generated by the compressors to the outdoors. The second condenser is piped to the building's hot water system which transfers the heat generated by the compressors to the hot water return line, preheating the hot water before it re-enters the boilers. This type of chilled water system works best when there is a need for chilled water throughout the entire winter, which is not the case at this facility. The four main air handling units in this building are equipped with air-side economizers which can be utilized during the winter to provide cooling, instead of the chillers. This type of chilled water system has caused some operational problems due to the complexity of the system. For example, the hot water return water flows through the heat recovery condenser at all times — there are no valves installed to enable the hot water return to bypass the condenser. This causes the chiller to operate in heat recovery mode whenever the hot water pumps are running, which may not always be the ideal time for the heat recovery condenser to be running. The chiller operates at a lower efficiency using the heat recovery condenser since the water temperature entering the condenser is a lot hotter than the water coming from the cooling tower, thus causing the chiller to consume more energy. The chillers have also reached the end of their useful lives and their efficiencies have started to deteriorate.



The picture above shows one of the heat recovery chillers. Beginning from the floor, you can see the cooling tower condenser, the heat recovery condenser, the four reciprocating compressors, and the evaporator on top.

Also, the cooling tower has reached the end of its useful life. The cooling tower is starting to physically fall apart. During the time of survey, it was found that the cooling tower was leaking an extraordinary amount of water. Some clamps have been put in place by the maintenance staff in order to stop the leaking, but the cooling tower still leaks. The continuous leaking not only wastes water, it also wastes all of the chemicals that were purchased to treat the water.



The picture above shows the clamps that are being used to hold the cooling tower together.



The picture above shows the water leaking out of the top of the cooling tower.

This ECM concerns replacing both water-cooled chillers and the cooling tower, which includes the following scope of work:

1. Remove the two existing water-cooled, heat recovery chillers and cooling tower.
2. Furnish and install two new water-cooled chillers and a new cooling tower of similar capacity.

3. The two new chillers shall be installed in a new mechanical room located in the parking garage. The construction of the new 24'x24' mechanical room shall be included. The new mechanical room shall conform to all building and mechanical codes which includes, but is not limited to, a refrigerant monitoring system and two SCBA units.
4. The new cooling tower shall be located outside at the same location of the existing cooling tower.
5. Furnish and install all of the necessary chilled water and condenser water piping for the new chilled water system, including pipe insulation. The existing piping shall be reused to the greatest extent possible. The existing chilled water and condenser water pumps shall remain to be reused.
6. All electrical work necessary for the new chillers and cooling tower installation shall be included.
7. All of the new controls for the new chillers and cooling tower shall be included.
8. The new chilled water system shall be fully commissioned and balanced.

The implementation of this ECM shall produce significant electrical savings since the efficiency of the chillers will be greatly increased. A new cooling tower will also contribute to the efficiency of the chillers since it will be able to produce cooler condenser water temperatures. Also, significant water savings and chemical treatment savings shall be achieved by replacing the cooling tower. The water savings and chemical treatment savings were difficult to accurately calculate, so they are not accounted for in the ECM Summary Table.

The existing heat recovery system shall be eliminated with the installation of the new chillers.

**ECM Number:** 6

**ECM Title:** Replace the Existing Natural-Gas Fired Boilers

**ECM Description:**

The existing boilers listed in the table below are equipped with atmospheric burners, which is not the most efficient type of burner available. Also, these boilers are starting to reach the end of their useful lives.

Building	Existing Boiler Data		
	ID:	MBH In:	MBH Out:
01-Administration Building	B-1	1,470	1,178
01-Administration Building	B-2	1,470	1,178
13-Arapahoe Human Services	B-1	2,210	1,790
13-Arapahoe Human Services	B-2	2,210	1,790
23-Altura Plaza Building	B-1	3,000	2,400
23-Altura Plaza Building	B-2	3,000	2,400
35-ACJC Courthouse	B-1	2,000	N/A
35-ACJC Courthouse	B-2	2,000	N/A
36-ACJC Detention Center	B-1	6,000	3,200
36-ACJC Detention Center	B-2	6,000	3,200
36-ACJC Detention Center	B-3	6,000	3,200
36-ACJC Detention Center	B-4	2,800	N/A
36-ACJC Detention Center	B-5	2,800	N/A
37-ACJC Administrative II	B-1	1,375	1,100
37-ACJC Administrative II	B-2	1,375	1,100

Note: The boiler isolation valves at building 37-ACJC Administrative II are dysfunctional. In order to perform maintenance on these boilers, the entire heating hot water system must be drained.

This ECM concerns replacing each of the existing natural gas-fired boilers with new natural gas fired boilers. The replacement boilers shall be equipped with high efficiency, forced draft burners which will increase the boilers' fuel efficiency by approximately 5% to 10%. The installation of the new boilers shall include the following:



1. The existing boilers shall be removed and replaced with one natural gas fired, forced draft, hot water boiler of similar capacity.
2. Existing natural gas piping and accessories shall be reused to the greatest extent possible.
3. Existing piping and valves shall be reused to the greatest extent possible. The existing boiler isolation valves at building 37-ACJC Administrative II shall be replaced.
4. Existing boiler stack and housekeeping pads shall be reused.
5. Existing hot water system accessories (i.e. pumps, expansion tank, shot feeder, etc.) shall be reused.
6. All of the safeties and controls necessary for the new boiler to operate satisfactorily shall be provided.
7. This ECM also includes the replacement of the domestic hot water heaters at building 23-Altura Plaza Building, building 35-ACJC Courthouse, and building 37-ACJC Administrative II. These heaters need to be replaced in conjunction with the boilers since the heaters share a flue with the boilers. The new heaters shall be equipped with forced draft burners so that they can overcome the flue pressure that shall be induced by the new boilers' forced draft burner.

The replacement of these boilers with new higher efficiency boilers will reduce maintenance costs and natural gas usage.

Also, two of the three heating hot water boilers at building 36 – ACJC Detention Center are being replaced under a separate contract. The natural gas savings that will result from these replacements have been calculated and included in this project.

**ECM Number:** 7

**ECM Title:** Install a New VFD on the Existing Exhaust Fan

**ECM Description:**

The two main air handling units (AH-3 and AH-4) at building 01-Administration Building are variable air volume reheat systems. Each of the air handling units is equipped with a supply fan and a return/exhaust fan. The supply fan's speed is controlled by a variable frequency drive (VFD) which modulates the speed of the supply fan to maintain the supply air duct static pressure setpoint. The return/exhaust fan is a constant volume fan that operates at 100% of its capacity at all times.

This ECM concerns installing a VFD on the return/exhaust fan motor. The new VFD shall modulate the speed of the return/exhaust fan to maintain the building at a slightly positive static pressure. All of the necessary controls for the new VFD are also included in this ECM.

The implementation of this ECM shall result in significant fan motor savings since the return/exhaust fan shall no longer operate at 100% of its capacity when the building's load is less than 100%. Also, with the installation of the VFD, the fan's motor has a built-in "soft-start" system that significantly reduces stress on the motor, bearings, and couplings of the unit.

**ECM Number:** 8

**ECM Title:** Install a VFD on Existing Vane Axial Fan

**ECM Description:**

The two main fan systems (AHU-1 and AHU-2) at building 35-ACJC Courthouse are variable air volume (VAV) reheat systems that utilize vane axial fans to vary the air flow. The vanes, within the supply and return fans, modulate according to static air pressure requirements in the conditioned space. However, the speed of the fans can be better controlled with the installation of variable frequency drives (VFD's).

This ECM concerns installing VFD's on both the supply fan and return fan motors for both AHU-1 and AHU-2. The modulating vanes will be fixed to the full open position to allow the VFD full control of fan speed and corresponding supply air volume. All of the necessary controls and safeties for the new VFD's shall be included.

The installation of this ECM will reduce short term maintenance costs, and over the years will not increase maintenance costs above the current level. The locking of the existing vanes in place will eliminate any future maintenance on them. Also, with the installation of the VFD, the fan's motor has a built-in "soft-start" system that significantly reduces stress on the motor, bearings, and couplings of the unit.

The energy savings associated with this ECM are a result of the maintenance staff cleaning up the existing evaporative cooling, heat recovery systems in each air handling unit. The heat recovery coils and evaporative cooling pads became so "scaled up" from the hard water that the supply fan and return fans had to operate at 100% of their capacities in order to deliver the appropriate amount of conditioned air to the spaces. So, now that the pressure in the system has been reduced by cleaning up the coils and pads, the air flow can be modulated down via the new VFD's.



**ECM Number:** 9

**ECM Title:** Replace Air-Cooled Chillers with Water-Cooled Chillers

**ECM Description:**

The chilled water systems at building 13-Arapahoe Human Services and building 37-ACJC Administrative II utilize two air-cooled chillers to produce chilled water. The arid climate in the Denver, Colorado region results in very low humidity and low outside air wet bulb temperatures. These climate conditions make it ideal for evaporative cooling. Even though the air-cooled chillers are in good condition and were found to be functioning properly during the time of survey, replacing them with water-cooled chillers would create an opportunity to utilize evaporative cooling via a cooling tower.

This ECM concerns replacing the air-cooled chillers at both of the sites above with water-cooled chillers, which includes the following scope of work:

1. The removal of the existing air-cooled chillers. The existing chilled water pumps shall remain to be reused. The existing chilled water piping shall also remain to be reused to the greatest extent possible.
2. The installation of two water-cooled chillers at each site.
3. The installation of a new cooling tower, which includes the construction of an enclosure around the cooling tower.
4. The installation of condenser pumps. There will be two pumps installed at each site in order to achieve 100% redundancy.
5. The installation of all of the new condenser water piping.
6. All of the controls for each piece of new equipment.
7. All electrical work necessary for the new chillers and cooling tower installation shall be included.
8. The new chilled water system shall be fully commissioned and balanced.

The implementation of this ECM shall result in electrical energy savings since a water-cooled chiller operates at a much higher efficiency than an air-cooled chiller.

The savings and payback potential for this ECM do not warrant the implementation of this ECM. The existing chillers do not use enough electrical energy to produce significant energy savings.



**ECM Number:** 10

**ECM Title:** Install an A/C Unit to Serve Computer Equipment Room

**ECM Description:**

There are a total of six computer equipment rooms located throughout building 37-ACJC Administrative II that require cooling 24 hours a day, seven days a week throughout the entire year. Therefore, two (AHU-3 and AHU-5) of the six air handling units that provide cooling to the entire building must operate 24 hours a day, seven days a week in order to condition the six computer equipment rooms.

This ECM includes installing direct expansion cooling, split systems to serve each of the six computer equipment rooms. Each unit shall be controlled by a space thermostat that will cycle the unit on and off to maintain the space cooling temperature setpoint. The condensing units for each of the cooling systems shall be located on the roof.

The implementation of this ECM shall result in both electric savings and natural gas savings. Electric savings will occur by turning off AHU-3 and AHU-5's supply fans at night. Also, the chiller, chilled water pumps, and hot water pumps may be turned off at night too. Natural gas savings shall occur by not having to heat the cold outside air to 55°F at night during the wintertime.

**ECM Number:** 11

**ECM Title:** Variable Flow WSHP System

**ECM Description:**

Building 23-Altura Plaza Building utilizes a water source heat pump (WSHP) system to heat and cool the building. The WSHP circulation pump circulates water throughout the entire building continuously. Much of the time, more water is circulated than is necessary to handle the actual building heating and cooling loads. This ECM considers installing variable frequency drives (VFD's) on the WSHP circulation pumps.

Each of the WSHP's shall be retrofitted with On-Off shut off valves in the circulation lines. When a heat pump zone is not calling for heating or cooling (the WSHP is off), the valve closes. Because less water flow is required, the WSHP loop is transformed into a variable flow system. In a variable flow system, the VFD on the WSHP circulation pump shall modulate to maintain the water pressure setpoint in the WSHP loop. This will ensure that the circulation pump only delivers as much water as is necessary to meet the load at any particular time.

Variable flow systems offer tremendous savings in electrical energy, especially during unoccupied hours. Flow during these times is reduced to a preset minimum (approximately 20 percent) to eliminate wasted horsepower and energy consumption.

The VFD installation shall include start up services and any required control system modifications.

**ECM Number:** 12

**ECM Title:** Install Water Softener

**ECM Description:**

Water that contains calcium and magnesium is "hard." While many natural water supplies contain a certain amount of these two elements, most supplies range from 3 grains per gallon (gpg) to 50 gpg (or 51.3 mg/l to 855 mg/l). These substances leave a "film" or scale on surfaces that the water touches. If left untreated, hard water will form lime scaling in pipes, water heaters, boilers, air conditioning systems, etc., causing inefficiency and sometimes even permanent damage. For example, in water heaters just one-sixteenth of an inch of scale can reduce the heater's efficiency by up to 11%, because scale acts as an insulating material and thus lowers heat conduction.

Hard water is probably the most common water quality problem found in the Denver area. According to the Water Quality Association of the United States, hard water is water that contains dissolved hardness minerals above 1 gpg.

Levels of hardness have been established.

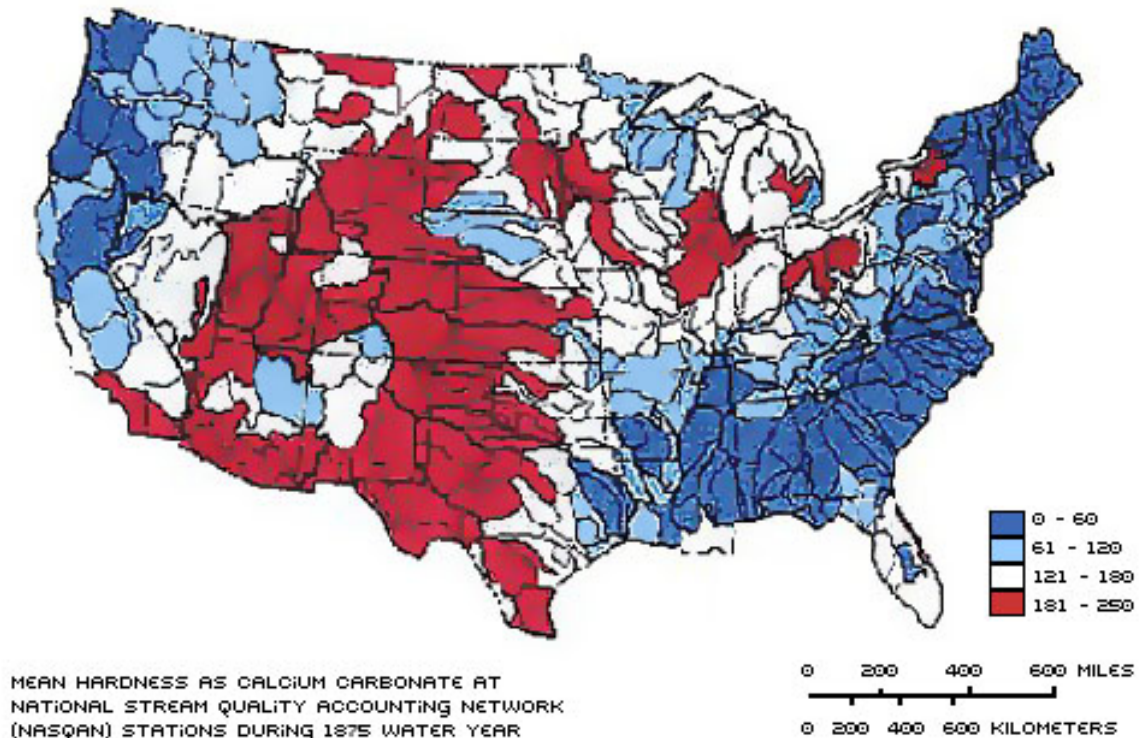
Soft Water - less than 1 grain per gallon

Slightly hard - 1 to 3.5 grains per gallon

Moderately hard - 3.5 to 7 grains per gallon

Hard - 7 to 10.5 grains per gallon

Very Hard - 10.5 and higher grains per gallon



A recent water sample conducted during this survey indicated that the grains per gallon at the Arapahoe County Justice Center is **12 grains per gallon**.

The evaporative cooling air handlers at the Justice Center are riddled with problems due to the hard water. The coil sections have an abundance of scale which has restricted airflow, allowed spray nozzles to leak excessively, increased water usage, and decreased overall system efficiency. The following pictures illustrate the level of mineral build-up within the typical evaporative cooling section:



As shown in these photos, the scale build up has almost rendered this equipment inoperable. Airflows have been restricted in the coil sections in the Courthouse air handlers that the staff has had to open service doors to allow return air to be released as to relieve air pressure. The 'Munter' pads used in the direct evaporative cooling sections of these air handlers have also historically needed to be replaced much too frequently. The mineral build-up in these pads is dramatic if not changed frequently. The most recent change required at least four inmates to remove each pad as they had collected many pounds of scale.



To reduce scale build-up on the equipment the facilities, the staff has been forced to reduce the amount of cycles of the water to be "recycled". Typically, cooling towers and evaporative cooling sections in air handlers are able to re-use water before it is drained off the system. To reduce the amount of scale build-up in the equipment, water is washed through continuously as if it were almost a once-thru cycle. This not only wastes water but also chemicals induced into the system for biocide control. It was mentioned that approximately 30 gallons of chemical is used every two weeks in the Courthouse cooling tower alone. During the survey, the bleed line of the cooling tower was measured to be dumping an average of 4 gallons per minute. This is excessive waste.



The hard water has not only affected the open loop system, but it has degraded much of the heating water equipment as well. Both the domestic and heating hot water boilers at the Detention Center have been scaling up over the years, and their efficiencies have dropped as is indicated by the excessive stack temperatures recorded to be in excess of 450° F indicating low efficiencies. The zone tempering valves have a failure rate of approximately two years as opposed to the 12 to 15 year life span they should attain.

Not only does the hard water make mechanical equipment inefficient, it does not clean as effectively as soft water either. It may take up to 15 additional pounds of detergent per 1,000 gallons of water that has 10 grains per gallon (gpg) of hardness to clean effectively. Hard water can also result in the formation of soap curd that adheres to linen fibers, glassware, dishes, and other products and leaves an itchy or sticky build-up behind.

There are only two practical ways to treat hard water: Chemical treatment or mechanical treatment. In chemical treatment, various detergents and other substances are used to "cover up" or hide some of the negative effects of hard water. Using mechanical treatment, hardness minerals are physically removed from the water. The most common mechanical way to soften water is through the use of an ion exchange water softener. This device uses an ion exchange process to replace hardness minerals in the water with some other substance. The vast majority of water softening equipment today uses the exchange of hardness minerals for sodium.

The process consists of flowing the hard water over a bed of plastic resin beads. On each bead, slight electric charges hold sodium ions on the surface of the bead. However, these beads also have the ability to attract and hold hardness minerals. As hard water flows through the water softener, it passes around the plastic beads. The hardness minerals (ions) in the water have a greater attraction to the bead than the sodium on the bead. Therefore, they attach themselves to the bead; and in the process, they displace the sodium ions — thus, the name ion exchange. Hardness ions are exchanged for sodium ions.

Eventually, the plastic resin bead will be covered with hardness ions. When this occurs, the removal of hardness will be diminished. The water softener in this condition is known as having "exhausted" resin. In order to remove additional hardness from the water, a means must be found to clean the resin beads of accumulated hardness ions. This is accomplished by a process called regeneration. A brine solution is introduced into the resin tank. The extreme concentration of sodium ions in the brine solution scrub the hardness ions from the resin beads. The resin material is then flushed with clean water and the excess brine and accumulated hardness is flushed away, leaving the beads ready to remove additional hardness.

This ECM considers installing water softeners in the Administration II building, Courthouse, and the Detention Center. In both the Admin and Courthouse buildings, the water softener station will be installed in close proximity of the entry the domestic water entry to the building and will treat all of the mechanical make-up and domestic water within each facility. There will be two water softener stations installed at the Detention Center. One system will handle the domestic and heating hot water loads, and the other will be installed to soften water to the evaporative cooling air handlers serving the pods 1, 3, 4, & 6.

### **Efficiency Advantages of Using Soft Water:**

- Use less soap and other cleaning products
- Softening the hot water improves heating efficiencies of hot water, which lowers fuel consumption.
- Soft water extends service life of equipment (drinking fountains, dishwashers, shower heads, etc.).
- Maintenance on the various fixtures, which scale up due to high hardness, would be reduced.
- Heating hard water in the water heater forms hardness scale. This scale plugs plumbing and builds up on the inside of water heaters. It can cause increased electric or gas bills, and may lead to early failure of the equipment with costly replacement necessary.
- Soap scum is difficult to remove and stays on your skin after bathing or showering. It clogs skin pores and coats hair. This residue may be a breeding ground for bacteria, and could cause rough, red hands, skin irritation, and skin discomfort.

Hardness minerals may cause unwanted taste in cooked foods such as vegetables and cause cloudy ice cubes.

**ECM Number:** 13

**ECM Title:** Install Waterside Economizer

**ECM Description:**

At present, the chillers and the cooling tower in building 01-Administration Building are operated during low outside ambient air conditions. The chillers are needed for various reasons during these times but specifically because interior loads are greater than what the air-side economizers can handle. The cooling tower can be used to cool the chilled water to cold deck temperatures without operating the chillers. Cooling the chilled water with the cooling tower can be accomplished without contaminating the chilled water with condenser water by using a plate and frame heat exchanger installed in parallel with the existing chillers. Temperature controls will need to be modified to automatically use tower water for cooling whenever outside air conditions permit.

This ECM concerns installing a new waterside plate and frame heat exchanger at building 01-Administration Building. Performance specifications are as follows:

- Plate and frame heat exchanger is to be located in the mechanical room with the chillers.
- Provide new piping to interface with existing condenser water and chilled water piping. Insulate new piping to match existing piping.
- Provide two (2) three-way butterfly valves to isolate the chillers from the plate and frame heat exchanger during the economizer mode of operation.
- Connect valves to the existing control system for automatic operation/switchover from normal chiller cooling mode to tower cooling mode.
- Existing chilled water and condenser water pumps will be used to serve the heat exchanger.

The following table lists the proposed heat exchanger specifications.

Building	CHWS Temp. from HX	CHWR Temp. to HX	Evaporator Flow (GPM)	Condenser Flow (GPM)	Approach Temp.
01-Administration Building	50F	60F	840	840	4F

\*Approximate size only for this study. Final selection upon completion of engineering review.

**ECM Number:** 14

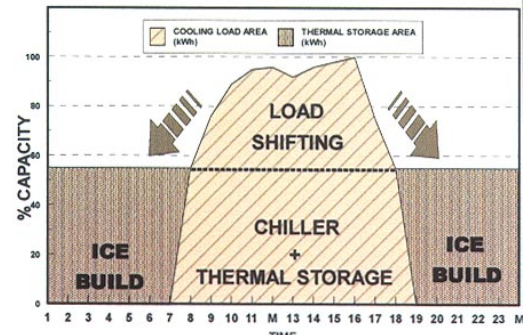
**ECM Title:** Chilled Water Storage

**ECM Description:**

Thermal Storage Overview

Thermal storage systems offer the potential for substantial operating cost savings by using off-peak electricity to produce chilled water or ice for use in cooling during peak-hours. The storage systems are most likely to be cost-effective in situations where:

- A facility's maximum cooling load is much greater than the average load
- The utility rate structure has high demand charges, ratchet charges, or a high differential between on- and off-peak energy rates



TES Load Shifting Strategy

Storage Medium

The storage medium determines how large the storage tank will be and the size and configuration of the system and components. The viable options include chilled water and ice storage systems (see **Table 1** on the following page). Overall, ice systems offer the densest storage capacity but the most complex charge and discharge equipment. Water systems offer the lowest storage density, but are the least complex.

Chilled Water

Chilled water storage systems use the sensible heat capacity of water — 1 Btu per pound per degree Fahrenheit (F) — to store cooling capacity. They operate at temperature ranges compatible with standard chiller systems and are most economical for systems greater than 2,000 ton-hours in capacity.

Ice Thermal Storage

Ice thermal storage systems use the latent heat of fusion of water — 144 Btu/lb--to store cooling capacity. To store energy at the temperature of ice requires refrigeration equipment that provides charging fluids at temperatures below the normal operating range of conventional air-conditioning equipment. Special ice-making equipment or standard chillers modified for low-temperature service are used.



With ice as the storage medium, there are several technologies available for charging and discharging storage:

External melt ice-on-coil systems use submerged pipes through which a refrigerant or secondary coolant is circulated. Ice accumulates on the outside of the pipes. Storage is discharged by circulating the warm return water over the pipes, melting the ice from the outside.

Internal melt ice-on-coil systems also feature submerged pipes on which ice is formed. Storage is discharged by circulating warm coolant through the pipes, melting the ice from the inside. The cold coolant is then pumped through the building cooling system or used to cool a secondary coolant that goes through the building's cooling system.

Internal melt ice-on-coil systems are the most commonly used type of ice storage technology in commercial applications. External melt systems are more common in industrial applications, although they can also be applied in commercial buildings and district cooling systems.

**Table 1: Comparing storage media**

Chilled water systems require the largest tanks, but they can easily interface with existing chiller systems. Ice systems use smaller tanks and offer the potential for the use of low-temperature air systems, but they require more complex chiller systems.

Storage medium	Volume (feet <sup>3</sup> /ton-hour)	Storage temperature (degrees F)	Discharge temperature (degrees F)	Strengths
Chilled water	10.7-21	39-44	41-46	Can use existing chillers; water in storage tank can do double duty for fire protection
Ice	2.4-3.3	32	34-36	High discharge rates; potential for low temperature air system

Source: E Source

## Tank Type

Storage tanks must have the strength to withstand the pressure of the storage medium, and they must be watertight and corrosion resistant. Aboveground outdoor tanks must be weather resistant. Buried tanks must withstand the weight of their soil covering and any other loads that might occur above the tank, such as the parking of cars. Tanks may also be insulated to minimize thermal losses — typically 1 to 5 percent per day. Options for tank materials include steel, concrete, and plastic.

**Steel:** Large steel tanks, holding up to several million gallons capacity, are typically cylindrical in shape and field-erected of welded plate steel. Some kind of corrosion protection, such as an epoxy coating, is usually required to protect the tank interior. Small tanks, with capacities of less than 22,000 gallons, are usually rectangular in shape and typically made of galvanized sheet steel. Cylindrical pressurized tanks are generally used to hold between 3,000 and 56,000 gallons.

**Concrete:** Concrete tanks may be precast or cast-in-place. Precast tanks are most economical in sizes of one million gallons or more. Cast-in-place tanks can often be integrated with building foundations to reduce costs. However, cast-in-place tanks are more sensitive to thermal shock. Large tanks are usually cylindrical in shape, while smaller tanks may be rectangular or cylindrical.

Steel and concrete are the most commonly used types of tanks for chilled water storage. Most external melt ice systems usually use concrete or steel tanks, internal melt systems usually use plastic or steel.

## Operating Strategies

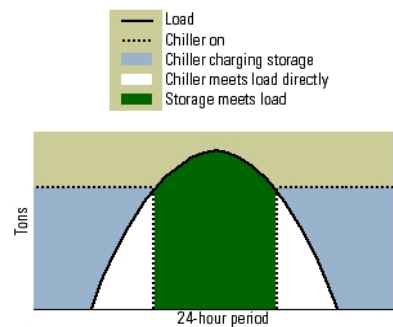
Several strategies are available for charging and discharging storage to meet cooling demand during peak hours. These are:

**Full storage:** A full-storage strategy, also called load shifting, shifts the entire on-peak cooling load to off-peak hours (see **Figure 1**). The system is typically designed to operate at full capacity during all non-peak hours to charge storage on the hottest anticipated days. This strategy is most attractive where on-peak demand charges are high or the on-peak period is short.

**Partial storage:** In the partial-storage approach, the chiller runs to meet part of the peak period cooling load, and the remainder is met by drawing from storage. The chiller is sized at a smaller capacity than the design load. Partial storage systems may be run as load-leveling or demand-limiting operations.

**Figure 1: Full-storage operating strategy**

A full-storage, or load-shifting, strategy shifts the entire on-peak cooling load to off-peak hours. This strategy is most attractive where on-peak demand charges are high or the on-peak period is short.



Source: ASHRAE Design Guide for Cool Thermal Storage

### **Administration I**

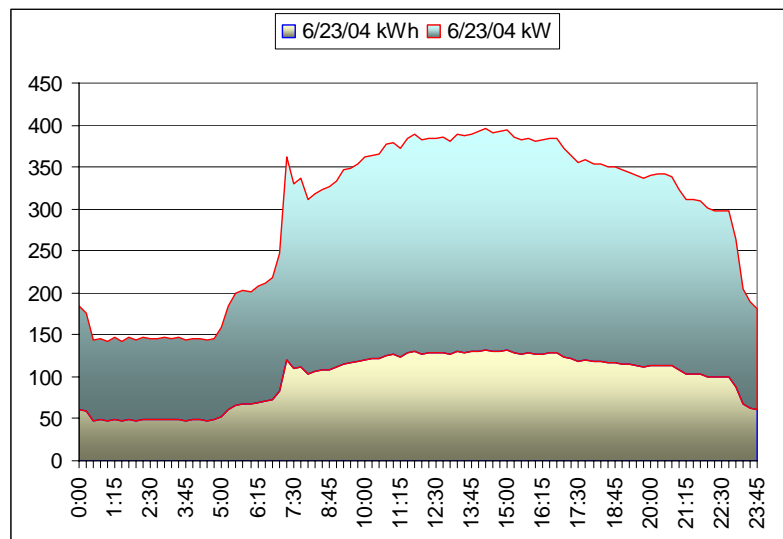
Currently, cooling at the Administration I Building is provided by an on-site water-cooled chilled water plant. These chillers are currently proposed to be replaced as described in ECM 5. This ECM can only be implemented in conjunction with ECM 5. The facility experiences high demand costs in large part to the amount of cooling produced via electric chillers. The current demand charge for electricity is \$14.16 per kilowatt and the energy charge is \$0.059 per kilowatt-hour.

This ECM investigated the installation of Thermal Energy Storage (TES) at the Administration I Building. This facility was chosen specifically because of the existing 10,000 gallon steel water storage tank located in the basement mechanical room. The tank was originally installed as part of a heat reclamation project when the building was built. The solar collecting panels on the roof were never installed due to budget constraints. The tank is currently piped into the heating water system. The facility staff also indicated that the tank has suffered several leaks. To be used in conjunction with a TES system, the existing storage tank would need to be refurbished, re-piped into the chilled water system, and re-used to store and release chilled water during optimal times of the day.

At the Administration Building, the proposed system is designed to offset the peak electrical demand of 50 tons of cooling or approximately 28 kW per billing period. Given its specific heat of 1 Btu/lb F, about 10 cu ft of water are required to absorb 12,000 Btu's and provide one ton-hour of cooling if cooling can be maintained with a 10 degree Delta T. However, the small size of this tank only produces approximately 250 ton-hours of cooling. The proposed chillers in ECM 5 would also need to be modified in order to make cold water (36-39°F).

Typically a summer load profile of a building shows a significant increase during the hotter part of the day (usually between 2 and 6 PM). This is not the case when examining a typical summer load profile as shown in the graph.

Looking at the profile, the building demand usage is relatively flat throughout the day. The load fluctuates between 350 and 400 kW between 8:00 AM and 6:00 PM. If the proposed chilled water storage system was installed, the capacity would not be sufficient to limit the peak for this duration. When the stored chilled water runs out, the existing chillers would need to be operated and, thus, eliminate any demand savings.



The cost to install TES at Admin I did not leverage enough energy savings to warrant implementation at this time. Significant demand reduction will be realized with the implementation of the lighting and new chiller plant ECM's (as described in this section) and, therefore, was given priority over TES due to higher capital return.

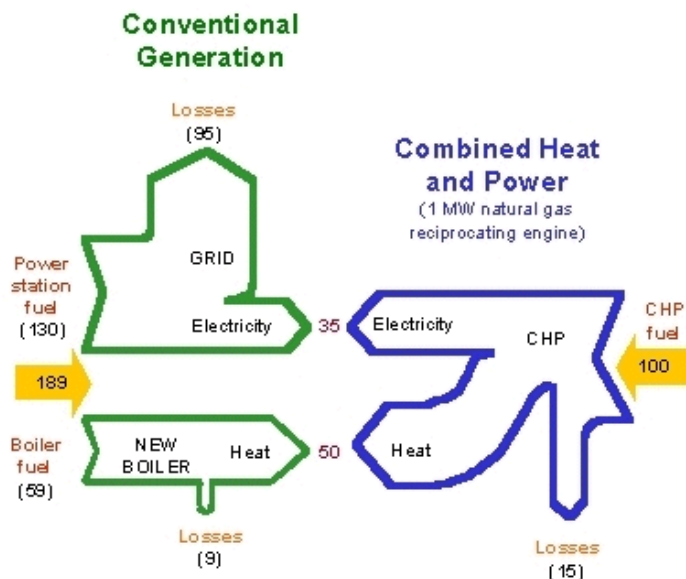
**ECM Number:** 15

**ECM Title:** Combined Heat & Power (CHP)

**ECM Description:**

The Arapahoe County Justice Center has experienced increasingly high utility costs over the past few years. This is becoming a great concern, as budgets to handle utility costs are limited and the need for expansion increases.

CES investigated many different measures such as TES (described in ECM #14) to shave the amount of peak energy used. With the high cost of energy, it became apparent that there was a good opportunity to save on operating costs by offsetting electrical use during high usage periods.



CES reviewed several potential methods of applying on-site electric generation and capturing its waste heat to be applied to other uses (combined heat and power – CHP). The use of combined heat and power was investigated at this site due to the relatively high energy and demand cost of power. The added heat available as a by-product of the electric generation can readily be used to produce heating to be distributed using the existing central plant piping to the majority of the various loads within the Detention Center.

Peak shaving of electric demand was investigated at the Detention Center. This building has a high demand profile coupled with various heating loads which is necessary to utilize the energy produced as a by-product of the electric generation. This analysis is based on existing rates and current surcharges, which have increased as of June 1, 2005 described in the Utility section of this report. There are many potential scenarios for operating the plant — including the option not to operate and revert to purchased power. The installation of this plant offers the County the ultimate in flexibility to optimize the ongoing utility cost, based on current rates as they occur.

Based on existing loads, we have chosen the prime mover in this system to be a single 400 kW natural gas fired reciprocating engine. This power will be transformed and delivered to the existing primary distribution system. The engine will provide waste heat to the existing hot water boilers. This system gives the County the flexibility of choosing how much they would like to buy from which utility. CES will work with the County to optimize the use of each piece of equipment given varying load characteristics.

The hot (900 to 1100°) exhaust from the engines is delivered to a reclaim heat boiler. Throughout the year, the reclaimed heat will be used to supplement the existing heating hot water loop, kitchen and laundry usage, as well as domestic hot water.

A major component of the generation is the use of the exhaust heat. Recovery of this heat and its use is critical for the generation to prove a viable option.

During summer peak, the proposed system eliminates approximately 400 kW of peak demand and produces a kilowatt-hour of energy for an estimated \$0.05 per kWh including maintenance. The use of this type of installation gives the District the ultimate in flexibility in controlling what type of energy source they utilize depending on market conditions.

Based on current energy cost, the most attractive control sequence would be to run the system from 5:00 AM to 10:00 PM to cover the extreme heat load times corresponding to kitchen and laundry usage.

### Benefits of On-Site Generation

- Peak shaving
- Generates power cheaper than bought from “the grid”
- Lower gas rate opportunities with higher volume
- Waste heat utilized for cooling and heating purposes
- Attractive rebates from the State
- Saves energy costs
- Keeps the County from being subject to the market of just one fuel

With all the benefits of CHP, the program is still moderately attractive in this region. This ECM is not recommended with natural gas prices still high coupled with relatively low electrical demand and energy charges. Costs and savings indicated on the above ECM Summary table are not guaranteed and are only useful for preliminary analysis.

**ECM Number:** 16

**ECM Title:** Irrigation Control System Upgrade

**ECM Description:**

The County uses Rainmaster RME Sentar digital controllers to regulate irrigation at Admin1, Arapahoe Plaza East, Altura Plaza, and the Justice Center. The controllers time the frequency and duration of irrigation cycles according to instructions programmed into the controllers by the Arapahoe County maintenance staff. There are no other sensors or controls on these systems. Therefore, the controllers turn the sprinklers on without regard to the needs of the turf.



The maintenance staff will cancel watering sessions if recent rainfall warrants a change in the schedule. This intervention can be seen in the billing records when compared to rainfall. In August 2004 there was an unusually high amount of rainfall for that month. There was a dip in the water use according to the billing records that month also. The maintenance staff confirmed that the system schedules were altered to account for the extra rainfall. Even with this attention to weather conditions, the water use is greater than what would be expected given the weather data and the type of lawn being served.

Rainmaster offers a controls upgrade (The RME Eagle) that combines all the features of the RME Sentar II with intelligent ET-based scheduling features that will reduce water usage by monitoring local weather conditions on a daily basis and altering the irrigation system accordingly. This is done with a wireless connection to the internet and the integration of recorded local weather data posted on the internet, and alters the schedule based on raw weather data. Specifically, each day, the evapotranspiration rate and rainfall data are downloaded to the controller that then accounts for these inputs when deciding the frequency and duration of watering sessions.

The evapotranspiration (ET) rate is an integration of the evaporation of water from the surface of the soil and the amount of water transpired by a plant growing in that soil. The ET rate assumes a specific plant that is used as a benchmark.

A constant specific to the plant population being served is applied to the rate to make the data relevant to the application. ET rates are affected by humidity, sunlight intensity, and wind. A lawn will need less water after a cloudy day of moderate temperatures and no wind. The proposed system will use the ET data to optimize the application, reducing water use based on real time weather data.

Another feature of the system is the web-based access to the controllers, allowing maintenance staff to monitor the system and alter schedules and sequencing from any computer terminal with a browser connected to the internet.

This Measure includes the installation of the new controllers, the wireless internet connection, setup, and training. The new controller can fit into the existing cases or new cases may be installed.

A minimum acceptable usage will be determined with the County staff and applied at each facility.



**ECM Number:** 17

**ECM Title:** Programmable Flush Valve Controls

**ECM Description:**

The prison population has stainless steel combination units (combys) with an integrated commode served by a remote flush valve (located in an adjacent wall chase) rated at 3.5 GPF. This measure investigates retrofitting the existing combys with stand alone programmable control to limit the amount of uses per inmate.

The existing comby units are expensive, and the population-to-fixture ratio is very low. Nevertheless, the inmates are at the facility for most of the day, and there are occasional intentional floods that are disruptive, costly to clean up, and waste water. This measure will add programmable controls to only allow the inmates to flush their commodes at a pre-determined frequency per hour or per day that mitigates intentional flooding and saves water usage.

The programmable controls have been used in the Pod 6A (23 hour lock down) area with much success. The Deputies especially like the fact that the commodes can be shut down before surprise searches. This control will mitigate the disruption and wasted water caused by intentional flooding as well.



The programmable controls can be added at a fraction of the cost of replacing the entire unit with low flow package. Each flush valve will need to be retrofitted to accommodate the controller. Each controller can receive up to eight inputs/outputs allowing a single controller to supervise up to four Comby units (one each lavatory and closet). This controller can be hard wired into the existing automatic door system for centralized control for each pod. This ECM has budgeted upgrading 380 Willoughby stainless steel combination units with Programmable Water Technologies stand alone controllers to allow the Sheriff's staff to limit the amount of uses per inmate.

**ECM Number:** 18

**ECM Title:** Water Reclaim

**ECM Description:**

Large amounts of water are used at the Peoria Shops for vehicle washing. All of the county vehicles are washed here: police cars, road maintenance trucks, road strip painting trucks, construction equipment, and county staff vehicles. There is a substantial amount of heavy washing that does not require potable water to accomplish. Dump beds, heavy equipment, trucks, and sweeper bins can use recycled water effectively and for a lower cost.

This ECM investigates installing a septic type (1500 gal) tank underground to catch effluent from the existing clarification system and reuse it to do heavy washing. The new system would include a new 10HP 3PH 230V pump in the shop or in a suitable out building and a zero-pressure holding tank within the shop with a 25 GPM sump pump. The underground tank will collect effluent from the existing filtration system. The sump pump pumps the collected water to the holding tank at the shop. A low voltage float switch in the holding tank controls the sump (relay installed in the shop). The high pressure wash pump draws water from the holding tank. The washer motor starts with low voltage controls, manually started from the wash station.



All water from the pad goes to the filtration system. The underground tank will be topped off and “refreshed” when the existing washing station, using potable water, is used to clean staff vehicles.

**Collection Tank Maintenance:** The County has installed an oil separator to remove oils and grease from the waste stream as required by the water authority so that the contaminants do not enter the water cycle. The oil separator, by design, causes some of the suspended solids to settle out before the water is released to the waste stream. There will be certain amount of suspended solids in the water collected by the recycled water collection tank, necessitating the periodic draining of the tank and removal of the sediment.

**ECM Number:** 19

**ECM Title:** Laundry Conservation

**ECM Description:**

Ozone laundering significantly reduces water-use, detergents, and energy usage in the washing process. Ozone, generated by passing oxygen through a high voltage arc, is used to remove insoluble materials from fabric. Ozone laundering saves resources by operating at lower temperatures, with fewer rinse cycles, less detergent, and less drying time. Ozone must be generated on-site and handled carefully since it is toxic and may cause respiratory irritation.

Ozone is the name given to a construct of the oxygen molecule where three oxygen molecules bond weakly with each other ( $O_3$ ). The weak bond is broken when an opportunity for a stronger bond presents itself. This releases a free oxygen molecule that is highly reactive and that will destroy the bonds between soil and fabric and bacterial cell walls, aiding in cleaning and sanitizing fabrics in the laundry cleaning process.

Ozone is commonly used in hospital laundry systems to clean and sanitized laundry and to reduce hot water requirements and laundry chemicals. The Arapahoe County P.J. Sullivan Detention Center has a large enough volume of laundry to justify the installation of an ozone laundry system to save laundry water and energy costs.

Water savings are realized by eliminating a high-level rinse and reducing fill levels. Energy savings are gained by using cold water to wash.

The device is a rack-mounted system, 76 inches high with a 25 x 22 inch footprint. There is an oxygen concentrator, two hydraulic metering units, two ozone generators, and a control panel. The oxygen concentrator extracts atmospheric oxygen from ambient air that is supplied to the ozone generators. The metering units inject the ozone into the wash water. The installation includes all electrical and plumbing connections.

The only maintenance necessary is periodic replacement of the oxygen concentrator. A competent maintenance person can troubleshoot and install the concentrator.

Energy Requirements: Ozone generator: 90-250VAC 1.5 – 0.6 AMP (2)

Oxygen Concentrator: 220VAC 2.75 AMP (1).

**ECM Number:** 20

**ECM Title:** Replace DHW HX with a New DHW Heater

**ECM Description:**

Domestic hot water (DHW) for building 01-Administration Building is produced by a DHW heat exchanger (HX). The “hot” side of the DHW HX is piped to the building’s heating hot water system. So, the DHW system utilizes the building’s two natural gas-fired hot water boilers for its heat source. Even though the building does not require heating hot water in the summer, the two hot water boilers must operate throughout the entire year in order to provide hot water to the DHW HX. This configuration is not very efficient since both boilers have to operate in the summer in order to satisfy the building’s DHW load, which is significantly smaller than the building’s actual heating load. Also, the two boilers are each equipped with an atmospheric burner which isn’t as efficient as a forced draft burner.



The picture above shows the DHW HX, which is inserted into the large storage tank, connected to the building’s heating hot water system.

This ECM concerns replacing the existing DHW HX and storage tank with a new natural gas-fired, DHW heater. The scope of work shall include the following:

1. The removal of the existing DHW HX and storage tank. The existing DHW piping and pumps shall remain to be reused to the greatest extent possible.
2. The two heating hot water lines that go in and out of the existing DHW HX shall be capped off.
3. A new “stand alone”, natural gas-fired DHW heater shall be installed. The new DHW heater shall be a high efficient unit equipped with a forced draft burner.
4. The installation of new gas piping to serve the new DWH heater. The new gas piping shall tie into the existing gas line that serves the two boilers.
5. The installation of the new DHW heater’s outside air vent and flue pipes.

The implementation of this ECM shall produce natural gas savings for two reasons. The first reason is that savings will be achieved during the summer since the two large boilers will no longer have to operate to serve the building's DHW load. The second reason is that savings will be achieved since the DHW will be produced from a higher efficient heating source – i.e., a forced draft burner in the new DHW heater instead of the atmospheric burners in the two boilers.

**ECM Number:** 21

**ECM Title:** Change Natural Gas Utility Provider

**ECM Description:**

There are currently two utility companies that provide natural gas to the Arapahoe County facilities — Xcel Energy and Seminole Energy Services. Seminole Energy Services provides natural gas to the facilities that use a significant amount of natural gas each year (at least 20,000 therms per year), and Xcel Energy provides natural gas to the remaining facilities. The current cost of natural gas purchased from Xcel Energy is \$0.74946/therm, and the current cost of natural gas purchased from Seminole Energy Services is \$0.63481/therm. But, Seminole Energy Services can only sell natural gas at \$0.63481/therm if the facility uses at least 20,000 therms per year. Building 13-Arapahoe Human Services currently purchases natural gas from Xcel Energy even though it has an annual natural gas consumption greater than 20,000 therms.



This ECM concerns changing the natural gas utility provider at building 13-Arapahoe Human Services from Xcel Energy to Seminole Energy Services. The changing of natural gas utility providers may occur at zero cost.

Dollar savings shall occur by implementing this ECM since the natural gas purchased from Seminole Energy Services cost less than the natural gas purchased from Xcel Energy.

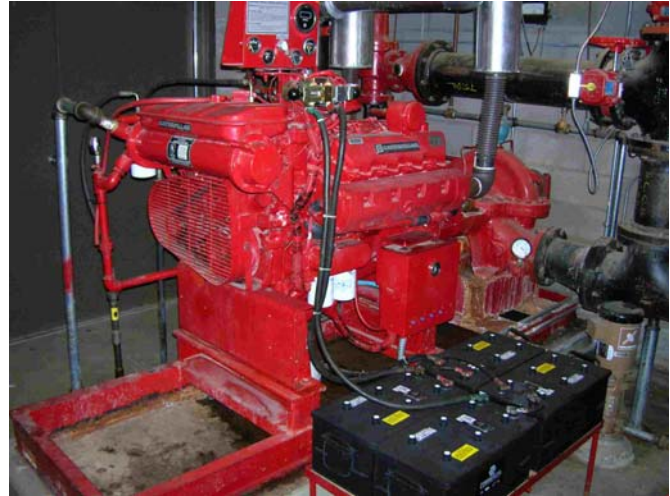
**ECM Number:** 22

**ECM Title:** Remove Existing Fire Pumps

**ECM Description:**

The existing fire pumps located in the Arapahoe Justice Center Courthouse and Detention Center were originally installed to boost low water pressure in the area in the event of a fire. When the facilities were originally built, the County's water pressure was very poor. Since then, new pumping stations have been installed in the area that have increased the system suction pressure to adequate levels.

The maintenance staff must service these pumps quarterly each year which has become a substantial time and capital expenditure.



In this ECM, a consultant will be hired to produce detailed flow calculations to see if the existing pumps are required. The cost to produce the study and removal of the pumps is included.



**ECM Number:** 23

**ECM Title:** Energy Resource Conservation Manager

**ECM Description:**

As part of the ongoing commitment to our larger customers, Chevron Energy Solutions assists in reducing energy costs by actively monitoring the installed ECM's along with the facilities operations and energy consumption. This objective can be maximized by adding an on-site Energy Resource Conservation Manager (ERCM) dedicated to this program.

The ERCM will work to ensure that the buildings are operating properly and that the energy savings are realized. While the facility staff is usually focused on occupant comfort, the ERCM will also focus on ensuring that equipment is turned off when not needed, and will work with the Customer to investigate and resolve heating and cooling problems.

In addition, the ERCM will have the time, opportunity, and in-depth knowledge of the buildings and systems that will facilitate ongoing recommendation for energy savings opportunities, whether it be additional installed equipment or behavioral modifications.

The ERCM typically has the following duties and responsibilities depending on what the customer's needs are:

- Continually monitoring the ECM's installed to ensure proper operation.
- Identify additional energy savings opportunities. Promote general energy awareness and behavioral modification strategies to generate additional savings.
- Track and quantify changes to the facility energy consumption for baseline maintenance.
- Promote the program within the Customer's staff and to the community.
- Assist Customer's maintenance staff in troubleshooting HVAC and control failures, both from the EMS operator workstations and in the mechanical rooms.
- Optimize operating sequences for energy savings. Field test control points as necessary to verify ongoing proper operation.
- Coordinate training and education for staff relating to the facility improvement measures installed, and to general energy conservative behaviors.



**ECM Number:** 24

**ECM Title:** Replace Cooling Tower

**ECM Description:**

The existing cooling tower at the Arapahoe County Justice Center Courthouse is a single cell, blow-through cooling tower, which uses a single 20 HP motor to drive the fan. The tower was originally installed to serve a 135 ton chiller located in the basement. The tower is an original model and has degraded to the point where it has become a liability. Several problems exist due to the hard water in the area as well as corrosion and a tremendous amount of scale build-up on the fill. Scale formation has its root in the evaporation of water. Evaporated water exits the system as pure vapor leaving the solids behind. The replacement (make-up) water introduces more solids which continually increase the solids concentration in the recirculated water. Left unchecked, the system would reach a point where the water could not hold all of the solids in a dissolved state. They would begin to precipitate out of the solution as scale.



To combat the high concentration of calcium carbonate (200 ppm), the service contractor has the tower set at 1.7 cycles and using approximately 30 gallons of chemical treatment every two weeks. With so few re-usable cycles, the tower, in essence, acts as a once-thru-cooling unit wasting an immense amount of water. During the survey, a 4.5 gallon bucket was filled from the bleed line in approximately one minute.

Many of the future problems will be avoided with the implementation of the building water softener (ECM 12). With the implementation of the water softener ECM, the dissolved solids will drop; and the tower will operate more efficiently, increasing the number of cycles.

Regardless of whether or not the water softener ECM is implemented, the tower needs to be replaced. Considering the amount of corrosion, the current tower is in jeopardy of a sizeable leak that could cause substantial damage to the occupied spaces below.

This ECM concerns replacing the current cooling tower with a unit that meets the existing chiller requirement for condensing water and uses less electrical energy. The benefits of replacing the cooling tower include improved reliability of chiller plant by replacing a tower that has exceeded its average useful life and lower tower operating costs. The existing condenser water pumps shall remain to be reused, and the existing condenser water piping and accessories shall be reused to the greatest extent possible.

**ECM Number:** 25

**ECM Title:** Retro Commissioning

**ECM Description:**

Retroactive commissioning is the systematic process of taking a building's existing assets and making them function properly. It is a program of performance evaluation, troubleshooting, and tune-up. When new, the HVAC equipment and Building Automation Controls were installed to meet existing requirements; but over time, these requirements have changed. Facilities personnel have had to adapt existing HVAC equipment and Building Automation Controls to meet changing performance requirements. Specified or original system performance may not exist, and/or building function or usage may have changed. As opposed to new building commissioning where performance verification of all equipment is executed, retro-commissioning can focus on known trouble spots or performance problems, spending more time on the specific problems and less time on equipment that appears to function properly.

Within Centrepont Plaza Building #24 and Sheriff/Coroner Building #38, the following is a list of items covered under retro-commissioning:

**1. Temperature Sensor Verification & Calibration.**

Verify what the sensors are reading and calibrate if needed.

**2. Static Pressure sensor Verification & Calibration.**

Verify what the sensors are reading and calibrate if needed.

**3. Discharge Air Temperature Control.**

Verify that the Building Automation System is able to control the heating and or cooling source and maintain the discharge air temperature set point.

**4. Mixed Air Damper Control.**

Verify that the Building Automation System is able to control the outside/return/relief dampers and maintain the mixed air temperature set point.

**5. Supply/Return Fan Operation.**

Verify that the Building Automation System has control of the supply and return fans.

**6. Fan Static / Pump Differential Control.**

Verify that the Building Automation System has control of the variable frequency drive and maintain the static or differential pressure set point.

**7. VAV Box Control.**

Verify that the Building Automation System is able to control the VAV box and maintain the space temperature set point.

**8. Zone Set back Control.**

Verify that the Building Automation System is programmed for zone set back.

**ECM Number:** 26

**ECM Title:** Replace Modulines, Install VAV boxes, diffusers, and add controls

**ECM Description:**

This ECM investigates retrofitting the existing Moduline airside distribution system at the Administration I facility with a modernized variable air volume delivery system. The existing Moduline boxes have reached the end of their useful life. The units continuously fail and need repair. Air quality and comfort are compromised in several areas.

Parts for the failed units are increasingly difficult to find as well. The facilities staff is forced to scrap parts off spare units. The spare units are kept in a mechanical penthouse and parts are limited. Once the spare units have been totally scrapped there will not be any more replacement parts available.

This ECM recommends replacing the existing Moduline units and replacing them with a new variable air volume retrofit kit, diffusers, and control. The scope includes re-using as much of the existing duct work as possible, specifically the main trunk lines.

**Scope of Work to include:**

1. Furnish and install a total of 208 new VAV terminals.
2. Add zone control to proposed Energy Management Control System.
3. Connect the new VAV terminals to the existing supply air trunk lines that meet the requirements of SMACNA.
4. Furnish and install 578 supply air diffusers. The new diffusers shall be 2'x2' square cone diffusers with a white enamel finish.
5. Connect the new diffusers to the new VAV terminals that meet the requirements of SMACNA.
6. Patch and repair all ceiling modifications that shall occur as a result of the new VAV terminal installations, these modifications include but are not limited to the following:
  - Furnish and install a new 2'x2' ceiling tile and 2' long T-Bar next to each of the new supply air diffusers.
  - Furnish and install a new 2'x4' ceiling tile at all locations that had an existing Moduline VAV diffuser and 1'x4' ceiling tile that do not have a new 2'x2' ceiling tile and supply air diffuser.
  - All sheet rock work necessary to install the new VAV terminals and diffusers by the elevator areas.
  - Any necessary steel ceiling modifications.
7. The existing supply air trunk ducts will be checked for leaks and sealed where necessary.
8. Test and balance each of the new VAV terminals to their specified minimum and maximum air flows and shall leave the terminals at the maximum flow setting.

# **Measurement and Verification Plan & Savings Calculation Methods Outline**

# Measurement and Verification (M&V) Plan and Savings Calculation Methods Outline

## 1. Executive Summary / M&V Overview & Proposed Savings Calculations

### 1.1 Proposed Annual Savings Overview

Table 1: Proposed Annual Savings Overview

ECM	Total Energy Savings (MBTU/Yr)	Electric Energy Savings (kWh/Yr)	Electric Demand Savings (kW/Yr)*	Natural Gas Savings (Therms/Yr)	Water Savings (KGal/Yr)	Irrigation Savings (Kgal/Yr)	Total Energy & Water Cost Savings Yr 1 (\$/Yr)	Other Energy Related O&M Cost Savings (Year 1 (\$/Yr))	Total Cost Savings Yr 1 (\$/Yr)
1	3,196	1,176,356	368	-8,187	0	0	126,125	18,583	144,708
2	126	0	0	1,261	1,641	0	26,349	0	26,349
2a	0	0	0	0	3,212	0	22,709	0	22,709
3	11,485	854,329	0	85,692	0	0	104,766	0	104,766
4	1,234	26,394	0	11,443	0	0	9,138	0	9,138
5a	273	79,870	54	0	0	0	10,052	0	10,052
5b	0	0	0	0	0	0	0	0	0
6a	3,540	-20,930	-2	36,117	0	0	21,611	0	21,611
6b	0	0	0	0	0	0	0	0	0
7	65	18,915	0	0	0	0	1,110	0	1,110
8	772	226,190	0	0	0	0	13,275	0	13,275
9	0	0	0	0	0	0	0	0	0
10	364	37,602	0	2,356	0	0	3,973	0	3,973
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	5,718	0	82,754	-17,605	65,149
13	159	46,637	52	0	0	0	6,433	0	6,433
14	0	0	0	0	0	0	0	0	0

15	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	433	3,075	-945	2,130	
17	0	0	0	0	3,615	0	0	56,616	0	56,616	
18	-10	-2,793	-7	0	576	0	0	6,251	-1,280	4,971	
19	128	0	0	1,276	440	0	0	7,698	0	7,698	
20	216	0	0	2,158	0	0	0	1,370	0	1,370	
21	0	0	0	0	0	0	0	3,619	0	3,619	
22	0	0	0	0	0	0	0	0	0	0	
23	1,201	190,460	0	5,508	0	0	0	14,953	0	14,953	
24	22	6,587	4	0	0	0	0	1,048	0	1,048	
25	456	464,882	0	-11,306	0	0	0	19,770	0	19,770	
26	0	0	0	0	0	0	0	0	0	0	
Total Savings	23,227	3,104,500	469	126,317	15,203	433	542,694	-1,247	541,448		
1st Year Guaranteed Cost Savings: \$541,448											
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms											
* Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings.											

### 1.1.1 Site Use and Savings Overview (Optional)

Table 1A: Site Use and Savings Overview (Optional)

01 - ADMINISTRATION BUILDING	Total Energy (MBTU/Yr)	Electric Energy (kWh)/Yr	Electric Demand (kW/Yr)*	Natural Gas (Therms/Yr)	Water (KGal/Yr)	Irrigation (KGal/Yr)
Proposed Project Savings:	3,224	507,055	159	14,936	669	127
Usage for Entire Site**:	13,495	2,794,900	6,798	39,560	5,206	
% Total Site Usage Saved:	23.89%	18.14%	2.34%	37.76%	12.86%	-
Project Square Footage (SF):	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
Total Site Square Footage (SF):	140,263	140,263	140,263	140,263	140,263	140,263
% Total Site Area Affected:	11.72%	11.72%	11.72%	11.72%	11.72%	11.72%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

12 - ARAPAHOE PLAZA EAST BUILDING	Total Energy (MBTU/Yr)	Electric Energy (kWh)/Yr	Electric Demand (kW/Yr)*	Natural Gas (Therms/Yr)	Water (KGal/Yr)	Irrigation (KGal/Yr)
Proposed Project Savings:	574	96,740	6	2,439	119	0
Usage for Entire Site**:	1,231	360,545	917		633	
% Total Site Usage Saved:	46.65%	26.83%	0.66%	-	18.78%	-
Project Square Footage (SF):	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
Total Site Square Footage (SF):	20,957	20,957	20,957	20,957	20,957	20,957
% Total Site Area Affected:	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						



<b>13 - ARAPAHOE HUMAN SERVICES</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	1,018	176,752	13	4,152	279	0
<b>Usage for Entire Site**:</b>	7,153	830,154	2,085	43,196	653	
<b>% Total Site Usage Saved:</b>	14.24%	21.29%	0.63%	9.61%	42.75%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	54,678	54,678	54,678	54,678	54,678	54,678
<b>% Total Site Area Affected:</b>	4.57%	4.57%	4.57%	4.57%	4.57%	4.57%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms						
* Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>14 - ARAPAHOE PLAZA WEST BUILDING (COUNTY COURT)</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	802	87,453	6	5,036	305	0
<b>Usage for Entire Site**:</b>	1,414	414,185	813		867	
<b>% Total Site Usage Saved:</b>	56.74%	21.11%	0.72%	-	35.19%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	20,880	20,880	20,880	20,880	20,880	20,880
<b>% Total Site Area Affected:</b>	1.74%	1.74%	1.74%	1.74%	1.74%	1.74%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms						
* Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>15 - FEDERAL WAREHOUSE</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	324	41,508	7	1,821	19	0
<b>Usage for Entire Site**:</b>	3,105	573,145	1,547	11,490	460	
<b>% Total Site Usage Saved:</b>	10.43%	7.24%	0.46%	15.85%	4.03%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	75,073	75,073	75,073	75,073	75,073	75,073
<b>% Total Site Area Affected:</b>	6.27%	6.27%	6.27%	6.27%	6.27%	6.27%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>20 - TRI COUNTY HEALTH</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	174	18,774	4	1,095	0	0
<b>Usage for Entire Site**:</b>	650	82,380	307	3,690	24	
<b>% Total Site Usage Saved:</b>	26.70%	22.79%	1.37%	29.68%	0.00%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	8,398	8,398	8,398	8,398	8,398	8,398
<b>% Total Site Area Affected:</b>	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>23 - ALTURA PLAZA BUILDING</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	7,222	432,444	62	57,462	515	0
<b>Usage for Entire Site**:</b>	15,786	1,464,538	3,536	107,880	3,632	
<b>% Total Site Usage Saved:</b>	45.75%	29.53%	1.74%	53.26%	14.19%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	74,675	74,675	74,675	74,675	74,675	74,675
<b>% Total Site Area Affected:</b>	6.24%	6.24%	6.24%	6.24%	6.24%	6.24%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>24 - CENTREPOINT PLAZA</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	536	288,382	10	-4,478	397	0
<b>Usage for Entire Site**:</b>	9,586	2,743,135	7,196	2,240	4,559	
<b>% Total Site Usage Saved:</b>	5.60%	10.51%	0.14%	-199.90%	8.71%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	105,662	105,662	105,662	105,662	105,662	105,662
<b>% Total Site Area Affected:</b>	8.83%	8.83%	8.83%	8.83%	8.83%	8.83%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>29 - PEORIA SHOPS</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	938	23,642	-1	8,576	636	0
<b>Usage for Entire Site**:</b>	4,309	320,958	740	32,140	1,851	
<b>% Total Site Usage Saved:</b>	21.77%	7.37%	-0.16%	26.68%	34.34%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	25,008	25,008	25,008	25,008	25,008	25,008
<b>% Total Site Area Affected:</b>	2.09%	2.09%	2.09%	2.09%	2.09%	2.09%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>35 - ACJC COURTHOUSE</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	3,153	544,175	74	12,959	3,132	0
<b>Usage for Entire Site**:</b>	16,684	2,755,414	6,240	72,800	6,554	
<b>% Total Site Usage Saved:</b>	18.90%	19.75%	1.18%	17.80%	47.79%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	148,522	148,522	148,522	148,522	148,522	148,522
<b>% Total Site Area Affected:</b>	12.41%	12.41%	12.41%	12.41%	12.41%	12.41%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>36 - ACJC DETENTION CENTER</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	2,907	47,337	0	27,455	8,731	306
<b>Usage for Entire Site**:</b>	46,510	5,517,976	9,595	276,775	49,491	3,754
<b>% Total Site Usage Saved:</b>	6.25%	0.86%	0.00%	9.92%	17.64%	8.15%
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	291,955	291,955	291,955	291,955	291,955	291,955
<b>% Total Site Area Affected:</b>	24.39%	24.39%	24.39%	24.39%	24.39%	24.39%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms						
* Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

<b>37 - ACJC ADMINISTRATIVE II</b>	<b>Total Energy (MBTU/Yr)</b>	<b>Electric Energy (kWh)/Yr</b>	<b>Electric Demand (kW/Yr)*</b>	<b>Natural Gas (Therms/Yr)</b>	<b>Water (KGal/Yr)</b>	<b>Irrigation (KGal/Yr)</b>
<b>Proposed Project Savings:</b>	1,366	275,128	62	4,270	221	0
<b>Usage for Entire Site**:</b>	9,009	2,017,650	4,750	21,225	724	
<b>% Total Site Usage Saved:</b>	15.16%	13.64%	1.30%	20.12%	30.45%	-
<b>Project Square Footage (SF):</b>	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
<b>Total Site Square Footage (SF):</b>	91,110	91,110	91,110	91,110	91,110	91,110
<b>% Total Site Area Affected:</b>	7.61%	7.61%	7.61%	7.61%	7.61%	7.61%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms						
* Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

SERIFF/CORONER FACILITY	Total Energy (MBTU/Yr)	Electric Energy (kWh)/Yr	Electric Demand (kW/Yr)*	Natural Gas (Therms/Yr)	Water (KGal/Yr)	Irrigation (KGal/Yr)
Proposed Project Savings:	319	287,219	13	-6,616	180	0
Usage for Entire Site**:	9,934	2,472,668		14,950	3,428	
% Total Site Usage Saved:	3.21%	11.62%	-	-44.26%	5.25%	-
Project Square Footage (SF):	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021	1,197,021
Total Site Square Footage (SF):	125,055	125,055	125,055	125,055	125,055	125,055
% Total Site Area Affected:	10.45%	10.45%	10.45%	10.45%	10.45%	10.45%
MBTU=10 <sup>6</sup> BTU .003413 MBTU/kWh .1 MBTU/therms  * Annual electric demand savings (kW/Yr) is the sum of the monthly demand savings. ** Most Recent 12 Months of Utility Data.						

## 1.2 M&V Approach Summary

Table 2: M&V Plan Summary for each facility

Building	Electric	Gas	Water	Notes
01 - Administration Building	C	C	A	5
12 - Arapahoe Plaza East	A	N/A	A	
13 - Arapahoe Human Services	C	C	A	
14 - Arapahoe Plaza West	A	N/A	A	
15 - Federal Warehouse	A	Calculated	A	1
20 - Tri County Health	A	Calculated	N/A	1
23 - Altura Plaza Building	C	C	A	
24 - Centrepont Plaza	A	Calculated	A	2
29 - Peoria Shops	A	Calculated	A	1, 3
35 - ACJC Courthouse	C	C	C	
36 - ACJC Detention Center	A	A	C	4, 6
37 - ACJC Administrative II	C	C	A	
38 - Sheriff/Coroner Facility	A	Calculated	A	2

### Notes

- (1) Lighting to be option A, Programmable Thermostat Savings to be calculated.
- (2) Lighting to be option A, Retro Commissioning (ECM 25) to be calculated.
- (3) A flow meter will be installed to measure water recovery measure (ECM 18).
- (4) Ozone laundry ECM to be calculated (ECM 19).
- (5) Water ECM 2 is Option A, ECM 16 is calculated.
- (6) Water ECM 2, 12, & 17 are Option C, ECM 16 is calculated.

\* M&V Options include A, B, C & D. Guidelines include M&V Guidelines: Measurement & Verification for Federal Energy Projects, Version 2.2

([http://www.eere.energy.gov/financing/superespcs\\_mvresources.cfm](http://www.eere.energy.gov/financing/superespcs_mvresources.cfm) : International Performance Measurement & Verification Protocol (IPMVP) Volume I March 2002 ([www.imvp.org](http://www.imvp.org)).

## 2. Whole Project Data / Global Assumptions

### 2.1 Risk & Responsibility

#### 2.1.1 Summarize allocation of responsibility for key items related to M&V

- Refer to contract for details regarding risk allocation.

### 2.2 Energy, Water, and Operations & Maintenance (O&M) Rate Data

#### 2.2.1 Detail baseline energy & water rates

Building:	Electric		Nat. Gas \$/Therm:	Water \$/Kgal:
	\$/kW:	\$/kWh:		
01 – Administration Building	\$14.16	\$0.05869	\$0.63481	\$5.36
12 – Arapahoe Plaza East Building	\$14.16	\$0.05869	\$0.63481	\$5.36
13 – Arapahoe Human Services	\$14.16	\$0.05869	\$0.63481	\$5.36
14 – Arapahoe Plaza West Building (County Court)	\$14.16	\$0.05869	\$0.63481	\$5.36
15 – Federal Warehouse	\$14.16	\$0.05869	\$0.74946	\$5.36
16 – CSU Extension Office	\$14.16	\$0.05869	\$0.74946	\$5.36
17 – CSU Warehouse (Summer)	0.00	\$0.07900	\$0.74946	\$5.36
17 – CSU Warehouse (Winter)	0.00	\$0.07512	\$0.74946	\$5.36
20 – Tri County Health	\$14.16	\$0.05869	\$0.74946	(1)
23 – Altura Plaza Building	\$14.16	\$0.05869	\$0.63481	\$4.99
24 – Centrepont Plaza	\$14.16	\$0.06321	\$0.80714	\$4.99
29 – Peoria Shops	\$14.16	\$0.05869	\$0.63481	\$13.07
35 – ACJC Courthouse	\$14.16	\$0.05869	\$0.63481	\$13.07
36 – ACJC Detention Center (Main Building)	\$14.16	\$0.05869	\$0.63481	\$15.66
36 – ACJC Detention Center (Warehouse)	\$14.16	\$0.05869	\$0.74946	\$13.07
37 – ACJC Administrative II	\$14.16	\$0.05869	\$0.74946	\$13.07
38 – Sheriff/Coroner Facility	\$14.16	\$0.05869	\$0.72763	\$6.53

#### 2.2.2 Provide performance period rate adjustment factors for energy, water, and O&M cost savings, if used.

- Contracted at 2.5% escalated annually



## 2.3 Schedule & Report for Reporting for Verification Activities

### 2.3.1 Define requirements for witnessing of measurements during:

- Baseline - Chevron ES will conduct all M&V activities. Facility personnel will be invited to observe and sign-off of all measurement activities. If County declines offer to observe or sign-off measurements data will not be invalidated.
- Post-installation verification activities - Chevron ES will conduct all M&V activities. Facility personnel will be invited to observe and sign-off of all measurement activities. If County declines offer to observe or sign-off measurements data will not be invalidated.

### 2.3.2 Define schedule of verification reporting activities

Table 3: Schedule of Verification Reporting Activities

Item	Recommended Time of Submission	Owner's review & acceptance period
Final Commissioning Plan	45 days after EMS contractor is under contract	15 days
Post-installation Report	45 days after measurements	15 days
Commissioning Report	45 days after Final Completion of Project	15 days
Annual Report	90 days after years end	15 days

### 2.3.3 Define content and format of reports:

- Post-installation report

Use Post-Installation Report Outline<sup>1</sup>

#### Reports to be Prepared

1. Pre-retrofit measurement report. One report prepared within 30 days of completion of the pre-retrofit measurements. The report will include the names of the measurement team

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<sup>1</sup> Electronic copy of Post-Installation Report Outline is available through <http://atcam.lbl.gov/mv>.

and any observers, the results of all measurements, any exceptions or anomalies associated with the measurements.

2. Post-retrofit measurement report. One report prepared within 30 days of completion of the post-retrofit measurements. The report will include the names of the measurement team and any observers, the results of all measurements, any exceptions or anomalies associated with the measurements.
3. As-built documentation provided by Chevron Energy Solutions' construction team will document the description and location of all retrofits. As-built documentation will be provided as detailed in the Agreement.
4. A preliminary monthly savings report will be generated to communicate the energy (water) savings performance of all ECM's. Each report will include:
  - \* Baseline consumption for the month
  - \* Actual consumption for the month
  - \* Dollar savings for the month
  - \* Baseline consumption year to date
  - \* Actual consumption year to date
  - \* Unit savings year to date
  - \* Dollar savings year to date
  - \* Comparison of all ECM savings in aggregate against prorated guaranteed savings
  - \* Quantification of any known adjustments that impact the reported energy (water) savings. Open-book analysis.
5. Commissioning Report: As each energy conservation measure nears completion of construction, it will be commissioned. All commissioning efforts will be conducted by CES and its subcontractors, and will be witnessed by County personnel. The commissioning plan will confirm proper installation of the equipment as well as confirm proper functional performance of the equipment.

A Final Commissioning Plan will be submitted and approved by the County before implementation. While CES will execute and submit one commissioning report at completion of construction, it is highly suggested that the County repeat commissioning of the controls and mechanical systems periodically, preferably once per year.

6. A final annual savings report will be generated to communicate the energy (water) savings performance of all ECM's. Each annual report will include:
  - \* Baseline consumption year to date
  - \* Actual consumption year to date
  - \* Unit savings year to date
  - \* Dollar savings year to date
  - \* Comparison of all ECM savings in aggregate against a prorated guaranteed savings.

- \* Quantification of any known adjustments that impact the report energy (water) savings. Open-book analysis.
- \* Sign-off form asking for County's agreement with the savings calculations including baseline adjustments.
- \* Computation of an energy savings shortfall payment to be issued by Chevron Energy Solutions if savings fall short of the annual guaranteed energy savings.

## **2.4 Operations, Preventive Maintenance, Repair, and Replacement Reporting Requirements**

- 2.4.1 Define Government and ESCO reporting requirements
- Operating and maintenance requirements for equipment installed in this project will be included in the O&M Manuals to be provided at the end of the project. There are no ongoing reporting requirements.

## **2.5 Construction Period Savings**

- 2.5.1 Provide overview of how construction period savings will be calculated, if applicable.
- None

## **2.6 Status of Rebates**

- None

## **2.7 Dispute Resolution**

- 2.7.1 Describe plan for resolving disputes regarding issues such as baseline, baseline adjustment, energy savings calculation, and the use of periodic measurements.
- Addressed in Section 23 of the Energy Performance Contract.

### **3. Measurement and Verification General Approach — Detailed Description of Option C M&V**

#### **3.1 Standard Energy Management Descriptions & Definitions**

- 3.1.1 **M&V Commencement Date:** “M&V Commencement Date” shall be the first day of the month following both: 1) The signed Certificate of Final Completion, and 2) Chevron ES’ receipt of the Contract Amount.
- 3.1.2 **Construction Period:** The “Construction Period” is the period beginning with the first day of the month that equipment is first installed and continuing until the M&V Commencement Date.
- 3.1.3 **Measurement Year:** A “Measurement Year” is each one-year period following the M&V Commencement Date.
- 3.1.4 **EC Savings:** The energy conservation savings, or “EC Savings”, having units of dollars (\$), are those savings achieved through the reduction in energy consumption, demand, energy rates, maintenance, or materials through the implementation of the Scope of Work.
- 3.1.5 **Energy Savings Term:** The “Energy Savings Term” shall be the number of Measurement Years shown in Schedule R or until the termination of this Contract.
- 3.1.6 **Savings Measurement & Verification Plan:** The “Savings Measurement & Verification Plan” is the scope of work defined in this schedule and provides for the quantification of EC Savings for the purpose of meeting the Guaranteed Savings.
- 3.1.7 **Projected Energy Savings:** “Projected Energy Savings” are those savings expected from the installation and continued operation of the Scope of Work.
- 3.1.8 **Termination of Guaranteed Savings:** If the Contract is terminated, the Guaranteed Savings shall also be terminated. Should such termination occur on a date other than at the beginning of a Measurement Year, Chevron ES shall have no Guaranteed Savings for a partial year.
- 3.1.9 **Energy Unit Savings:** The savings in units of energy, power, water, etc., achieved through the reduction in energy consumption, demand, through the implementation of the Scope of Work as defined and calculated in herein.
- 3.1.10 **Baselines:** In determining Baselines, Chevron ES identified some of the factors which may affect energy use for the Facilities, including but not limited to: hours and levels of occupancy; adjustments in labor force; building use and operational procedures; temperature, humidification, and ventilation levels; installed lighting and scheduled use; building construction and size; general level of repair and efficiency of heating and air conditioning equipment and other energy-using equipment; and amount of heating and air

conditioning and other energy-using equipment. After consideration of those factors and certain other anomalous use of the Facilities, Chevron ES establishes initial Baselines. It is understood that due to changes in factors affecting energy use, the Baselines may be revised from time to time as detailed in this Schedule. In addition, data collected during the period before construction may indicate a change of the energy use pattern at the facility and require a change to the Baselines. Chevron ES shall notify the Customer, in writing, of all such changes.

- 3.1.11 **Base Energy Rates:** The “Base Energy Rates”, having units of dollars per energy unit, are presented herein and shall be used by Chevron ES to calculate the EC Savings.

## **3.2 Guaranteed Savings Terms and Conditions**

- 3.2.1 The Customer shall maintain all Scope of Work installed under this Contract in a manner consistent with the manufacturer's or Chevron ES' recommended maintenance schedules and procedures from the time of Substantial Completion. Chevron ES shall, if it deems necessary, inspect the Facilities annually.
- 3.2.2 For the purpose of determining EC Savings, Chevron ES shall prepare reports, take on-site measurements, monitor building automation systems, and/or additional work as required by and detailed in the Savings Measurement & Verification Plan.
- 3.2.3 The Customer acknowledges and consents to Chevron ES' right to monitor EC Savings and energy management performance by conducting on-site measurements, including, but not limited to, reading meters and installing and observing on-site monitoring equipment. The Customer shall cooperate fully with any such measures instituted by Chevron ES pursuant to this Subsection. Chevron ES shall not institute any measures that unreasonably interfere with the business of Customer conducted at the Facilities. At Chevron ES' request, to facilitate Chevron ES' monitoring of the Scope of Work, the Customer, at its expense, shall cause a dedicated telephone line to be installed at each location of the Customer's Facilities designated by Chevron ES for communication between Scope of Work and Chevron ES. Customer shall pay all monthly service charges and fees for such dedicated telephone line, except that Chevron ES shall pay the monthly fees for long distance service from Chevron ES' office to the Customer's Facilities.
- 3.2.4 For the purpose of determining EC Savings, Customer shall cooperate with Chevron ES by providing utility information, changes in factors affecting energy use, and/or additional information as requested by Chevron ES personnel.
- 3.2.5 **Savings Guarantee:** Subject to changes in factors affecting energy use, Chevron ES guarantees that the Customer will realize total EC Savings during the Energy Savings Term of not less than the Guaranteed Savings.
- **Guarantee Payment:** Should the Customer's total EC Savings during any Measurement Year be less than the Guaranteed Savings for that year, Chevron ES guarantees that it shall pay to the Customer, within 30 days of the acceptance of

the annual energy savings report, the difference between the Guaranteed Savings for such year and the total EC Savings for that Measurement Year, not to exceed the guarantee amount. If in the judgment of the Customer, Customer would benefit from additional energy services or energy saving retrofits, Customer and Chevron ES may mutually agree upon such services or retrofits in lieu of Guarantee Payment. For the purposes of this Contract, such services or retrofits actually delivered by Chevron ES will be considered a Guarantee Payment for that Measurement Year.

- Excess Savings: For each Measurement Year in which the EC Savings exceed the Guaranteed Savings, the Excess Savings shall be the difference. Excess savings shall be fully retained by Customer and shall not be used to cover shortfalls in other years.

### 3.2.6 Changes in Factors Affecting Energy Use

- The Customer shall notify Chevron ES in writing within ten (10) business days of any change in any factor that affects the Baselines as set forth. Chevron ES will determine the effect that any such change will have on EC Savings and present to the client a written analysis of the effects of the changes. Changes that are long term or permanent will be reflected in a change to the Baseline. Temporary changes that affect energy use will be calculated and added to the corresponding month's EC savings.
- If a change in any of the factors involved in the Baseline occurs and results in a reduction of EC Savings, then the level of dollar energy savings to be guaranteed by Chevron ES will be decreased by the same amount.
- Customer and Chevron ES may from time to time desire to make changes for the express purpose of increasing EC Savings. It is agreed that these changes will only be made with the written consent of both parties, which will not be unreasonably withheld. The Baseline will not be adjusted to reflect any changes agreed to under this subparagraph. If Chevron ES elects to pay for the cost of any such changes that would not unreasonably interfere with the conduct of Customer's business, and the Customer does not consent to the changes, then the Baseline will be adjusted upward by the amount of savings projected from the changes.
- During the Energy Savings Term when the effect on savings can not be accurately determined due to construction or major changes, Projected Energy Savings for the facility will be used for the period of such changes and until the effect of the changes can be determined by Chevron ES.
- Chevron ES has the right to charge the Customer for work required to assess the effect on savings for any large scale changes, including, but not limited to, building additions, new buildings, and new or changed HVAC equipment, that require more than forty (40) hours per year to be spent in calculating their effect on the energy savings. Such hours will be billed at current Chevron ES engineering rates. Before initiating such work, Chevron ES will notify the Customer in writing of the intent and cost associated with the work. The Customer will, within 45 days in writing, notify Chevron ES with permission to

proceed or, alternatively at no charge, to stipulate that the Projected Energy Savings for the existing facility in question be used as Energy Use Savings for the purpose of meeting the guarantee. If Chevron ES does not receive written notice within 45 days, the Projected Energy Savings for the existing facility in question will be used as EC Savings until such time that the Customer approves the work, as long as the scope of the work has not changed.

- If the Customer fails to notify Chevron ES of changes in factors affecting energy use or fails to supply Chevron ES with requested information that is required for the calculation of saving in a timely manner, EC Savings for the period will be equal to those Projected Energy Savings for the period. If information for the period in question is supplied at a later date, the EC Savings will be modified only if the calculated savings for the period exceed the Projected Energy Savings for that period of time.
- Any changes made by Chevron ES to the Baselines or savings calculations, as outlined in this contract, shall be presented to the Customer for approval. The Customer shall have 30 days to approve or question the changes in writing. If Chevron ES does not receive notice in writing within 30 days, the changes will be considered contractually valid and implemented as proposed. If the Customer notifies Chevron ES within 30 days of their non-approval of the changes, Chevron ES will work with the client to answer any questions or make any necessary corrections.
- The Customer agrees that Chevron ES shall have the right, with or without prior notice, to inspect the facilities to determine if the Customer is complying and shall have complied with its obligations as set forth above. In the event that any inspection discloses that the Customer has failed on the date of the inspection to be in compliance with any items set forth above, then the Guaranteed Energy Savings shall be assumed to have been achieved for and with respect to the portion of the Energy Savings Period during which such failure shall have existed.

### **3.3 Calculation of EC Savings**

- 3.31 Energy Savings Report: Annually within 90 days after receipt of all needed information for each Measurement Year during the Energy Savings Term, Chevron ES shall submit an annual energy savings report with a precise calculation of the EC Savings to the Customer, unless additional information is needed to accurately calculate the EC Savings, in which case the Customer shall be notified of such a situation within the 90 day period.
- 3.32 Four different types of EC Savings are identified under this Contract: (a) Energy Use Savings, (b) Fuel Switch Savings, (c) Energy Rate Reduction Savings, and (d) Stipulated Non-Energy Savings. Total EC Savings will be determined by adding together the Energy Use Savings, Fuel Switch Savings, Energy Rate Reduction Savings, Operational Reduction Savings, and any calculation of an adjustment to the savings due to changes in factors affecting energy use for each period.
  - Energy Use Savings are those savings achieved through reductions in energy use, energy demand, water, and other commodities. Chevron ES will calculate the Energy Unit Savings as detailed in the Savings Measurement and Verification

Plan. The Energy Unit Savings will then be multiplied by the applicable Base Energy Rates set forth herein. The dollar amount determined by such calculation shall be the Energy Use Savings for such period.

- Fuel Switch Savings are those savings achieved by switching to a more economical source of energy on a cost per unit of energy basis. The Fuel Switch Rate (dollars saved per unit of new fuel used) will be calculated by Chevron ES and presented herein and shall not be escalated for purposes of calculating savings. Fuel Switch Savings shall be computed for each period by multiplying the Fuel Switch Rate by the number of units of new fuel consumed for that period.
- Energy Rate Reduction (ERR) Savings are those savings achieved through either improving the rate from local utility company, direct purchase of a commodity, or bulk purchase of commodity. An ERR savings rate (dollars saved per unit of applicable energy) will be calculated by Chevron ES and presented herein. ERR Savings shall be computed for each period by multiplying the ERR savings rate by the number of units of energy consumed for that period. There will be no Energy Rate Reduction Savings calculation or penalty if the current energy rate exceeds the Base Energy Rate. There will be no ERR Savings calculation unless an energy rate reduction has been achieved either directly or indirectly by Chevron ES.
- Stipulated Non-energy Savings are achieved through reduction in non-energy cost due to the implementation of the Scope of Work identified by Chevron ES, to be calculated as set forth herein.

### **3.4 Savings Measurement & Verification Plan**

The following details the methodologies and calculations to be used in determining the Energy Unit Savings under this Contract.

3.4.1 M&V Option A: This option allows for the energy savings to be predicted, measured, and agreed upon between the Customer and Chevron ES. One time measurements and stipulated parameters are used to quantify savings that are stipulated for the term of the Contract.

- Chevron ES will supply a one-time report to the Customer detailing the measurements and calculation of savings. If the calculated savings fall short of those expected, Chevron ES will have the opportunity to remedy the short fall and re-measure and calculate the results. Such work will be done at Chevron ES' expense and shall not be unreasonably denied by the Customer, as long as such work does not interfere with the Customer's use of the Facilities. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

3.4.2 M&V Option C: Option C verification techniques calculate savings by comparing the post-retrofit overall energy use in a building or facility with pre-retrofit energy Baselines. This methodology captures all of the savings under a particular meter, and requires ongoing monitoring of the facilities.



- The monthly Energy Unit Savings are calculated by subtracting the monthly post-retrofit consumption from the corresponding monthly Baseline consumption, and presented in ongoing reports. During the Construction Period, Option C Energy Unit Savings will be calculated each month.
- Energy Savings Term  
Except for where Projected Savings are to be utilized as detailed in this contract, for each Facility's Baseline, Energy Unit Savings will be calculated by subtracting the post implementation current month's usage from the Baseline usage for that month. The specific equations for calculating the unit savings are as follows:

Baseline Usage - Current Usage = Energy Unit Savings

Current Usage = Total units (i.e. kWh, kW, ccf, therms, gals, etc.) from the current post-implementation utility bills or other calibrated measuring device, for all meters of that type that measure the usage used to derive the Baseline.

Baseline Usage: The pre-Construction Period usage, as detailed below, revised from time-to-time as detailed in this Contract.

- Baselines and Projected Savings:

## 01 - Administration

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	211,594	29,716	537	4	5,080	1,586	129,964	0
Feb	194,140	29,716	521	4	4,650	1,586	115,628	0
Mar	229,168	29,716	566	4	3,950	1,586	266,561	0
Apr	227,016	54,793	578	22	3,550	911	352,443	0
May	246,029	54,793	568	22	2,140	911	699,329	0
Jun	256,849	54,793	589	22	1,740	911	789,762	0
Jul	284,832	54,793	601	22	1,010	911	878,157	0
Aug	271,611	54,793	601	22	1,390	911	954,706	0
Sep	241,245	54,793	564	22	2,220	911	655,211	0
Oct	230,168	29,716	576	4	4,110	1,586	524,794	0
Nov	220,561	29,716	561	4	4,850	1,586	214,553	0
Dec	211,947	29,716	542	4	4,870	1,586	120,761	0
Totals	2,825,160	507,055	6,804	159	39,560	14,980	5,701,869	0

## 13 - Arapahoe Plaza Human Services

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	56,825	14,729	153	1.1	6,316	805	66,669	0
Feb	53,311	14,729	153	1.1	5,567	805	67,107	0
Mar	57,360	14,729	154	1.1	5,364	412	69,682	0
Apr	55,422	14,729	154	1.1	3,074	609	64,598	0
May	57,204	14,729	154	1.1	2,324	19	57,155	0
Jun	69,488	14,729	142	1.1	1,054	19	50,238	0
Jul	102,970	14,729	230	1.1	605	19	51,973	0
Aug	83,302	14,729	200	1.1	873	19	46,829	0
Sep	80,601	14,729	200	1.1	1,523	19	54,752	0
Oct	83,325	14,729	200	1.1	4,029	412	62,046	0
Nov	73,482	14,729	192	1.1	6,131	412	73,987	0
Dec	56,864	14,729	153	1.1	6,336	609	82,590	0
Totals	830,154	176,752	2,085	13.1	43,196	4,160	747,626	0

### 23 - Altura Plaza

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	121,594	36,037	272	5.1	18,160	11,449	231,312	0
Feb	103,244	36,037	272	5.1	11,670	11,449	188,690	0
Mar	112,618	36,037	228	5.1	5,160	5,740	157,555	0
Apr	112,883	36,037	276	5.1	5,010	8,594	247,231	0
May	120,411	36,037	288	5.1	4,150	31	322,300	0
Jun	122,653	36,037	324	5.1	3,700	31	347,233	0
Jul	139,482	36,037	344	5.1	4,530	31	387,367	0
Aug	138,135	36,037	312	5.1	6,300	31	459,150	0
Sep	126,767	36,037	308	5.1	7,530	31	414,267	0
Oct	120,855	36,037	320	5.1	14,900	5,740	361,683	0
Nov	119,468	36,037	320	5.1	18,330	5,740	318,155	0
Dec	126,428	36,037	272	5.1	13,010	8,594	196,791	0
Totals	1,464,538	432,445	3,536	62	112,450	57,462	3,631,734	0

In the proforma (schedule R) of this contract these savings are eliminated after year 5 as a contingency plan if the County no longer owns this facility. If the County however does continue to own this facility throughout the contract term these savings will continue to be counted toward the generated performance contract savings.

### 35 - ACJC Courthouse

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	202,551	45,348	514	6.2	9,680	2,505	425,622	156,618
Feb	172,659	45,348	513	6.2	8,870	2,505	514,533	156,618
Mar	234,751	45,348	532	6.2	7,540	1,284	565,324	313,236
Apr	234,674	45,348	491	6.2	6,710	1,894	563,143	156,618
May	248,888	45,348	504	6.2	4,560	62	383,824	313,236
Jun	247,557	45,348	540	6.2	4,020	62	486,176	313,236
Jul	293,663	45,348	569	6.2	2,730	62	667,161	469,854
Aug	276,365	45,348	544	6.2	3,710	62	773,075	469,854
Sep	228,143	45,348	539	6.2	3,870	62	758,773	313,236
Oct	214,985	45,348	479	6.2	6,020	1,284	689,563	156,618
Nov	201,979	45,348	526	6.2	6,770	1,284	617,494	156,618
Dec	199,199	45,348	489	6.2	8,320	1,894	783,212	156,618
Totals	2,755,414	544,175	6,240	74	72,800	12,959	7,227,900	3,132,357

### 36 - ACJC Detention Center

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	453,980	0	728	0	31,370	0	2,756,486	727,613
Feb	411,708	0	731	0	27,300	0	4,021,000	727,613
Mar	464,851	0	747	0	28,060	0	4,314,714	727,613
Apr	449,165	0	779	0	24,710	0	4,984,286	727,613
May	468,214	0	833	0	19,640	0	3,368,529	727,613
Jun	466,091	0	888	0	17,680	0	4,151,471	727,613
Jul	503,173	0	906	0	13,590	0	4,564,677	727,613
Aug	513,825	0	857	0	13,270	0	4,210,161	727,613
Sep	468,494	0	874	0	16,670	0	5,095,161	727,613
Oct	462,990	0	769	0	24,690	0	4,572,727	727,613
Nov	433,440	0	757	0	29,110	0	3,977,273	727,613
Dec	422,045	0	726	0	32,890	0	3,475,000	727,613
Totals	5,517,976	0	9,595	0	278,980	0	49,491,485	8,731,353

### 37 - ACJC Administration II

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	153,391	22,927	375	5.2	3,292	809	50,667	0
Feb	131,596	22,927	374	5.2	2,623	809	62,424	0
Mar	148,392	22,927	367	5.2	2,661	421	67,807	0
Apr	165,731	22,927	371	5.2	1,611	615	74,499	0
May	180,679	22,927	366	5.2	1,342	32	52,803	0
Jun	190,243	22,927	424	5.2	773	32	64,498	0
Jul	208,851	22,927	427	5.2	650	32	56,908	0
Aug	205,531	22,927	419	5.2	841	32	62,375	0
Sep	186,209	22,927	435	5.2	897	32	58,965	0
Oct	169,193	22,927	405	5.2	977	421	60,856	0
Nov	151,009	22,927	403	5.2	2,320	421	61,749	0
Dec	153,405	22,927	391	5.2	3,238	615	52,392	0
Totals	2,044,230	275,128	4,757	62	21,225	4,270	725,943	0

3.4.3 Calculated Savings: When the cost, complexity, or uncertainty of savings measurements are high as compared to the projected savings, the Customer and Chevron ES may agree to stipulate the projected Energy Unit Savings as being achieved, without any measurements being taken.

- For the Stipulated Option, the Energy Unit Savings presented in a subsequent section will be agreed to occur each year of the Contract.

### 3.5 Base Energy Rates

EC Savings shall be calculated using the Base Energy Rates or actual energy rates for that meter, whichever results in greater EC Savings. Actual energy rates will be calculated at the end of each Contract year using utility billing information for that Contract Year and using the same methodology as was employed to determine the Base Energy Rate in the Comprehensive Energy Analysis Report.

The Base Energy Rates listed here are to be increased each year on a cumulative basis by two and one half percent (2.5%) beginning on the first anniversary of the M&V Commencement Date and continuing on the first day of each Contract Year thereafter. The energy rates can be found in Section 2.2.1.

### 3.6 Stipulated Non-Energy \$ Savings

The following dollar savings have been calculated by the Customer from the installation of the EC measures and have been agreed to by the Customer and will not be measured. The sum of these savings each measurement year will be added to the EC savings for that Measurement Year for all facilities.

Measurement Year	Maintenance Reallocation
1	\$90,000
2	\$92,250
3	\$94,556
4	\$96,920
5	\$99,343
6	\$101,827
7	\$104,372
8	\$106,982
9	\$109,656
10	\$112,398
11	\$115,208
12	\$118,088

## **4. ECM 1 – Lighting Improvements**

### **4.1 Overview of ECM and M&V plan for ECM**

This M&V plan applies to the following buildings: Arapahoe Plaza East, Arapahoe Plaza West, Federal Warehouse, Tri County Health, Centrepont Plaza, Peoria Shops, ACJC Detention Center, Sheriff/Coroner Facility. Lighting retrofits are being implemented in other buildings, but those buildings have Option C electrical and natural gas M&V which will capture the lighting savings and heating penalty.

- 4.1.1 The Arapahoe County Facilities utilize fluorescent fixtures containing a combination of standard and energy saving T12 lamps with standard magnetic core and coil ballasts and a limited number of electronic T12 ballasts. This ECM considers replacing the existing T12 lamps and ballasts with T8 lamps and electronic ballasts and retrofitting some existing four-lamp and two-lamp U-tube fluorescent fixtures with specular reflectors, electronic ballasts, and T8 straight lamps. Incandescent lamps which have significant operating hours will be retrofitted with screw-in or hard-wired compact fluorescent retrofit kits with lamps and ballasts into the existing luminaire. In some instances new fixtures will replace existing fixtures. Some of the existing mercury vapor (MV) fixtures will be retrofitted with metal halide (MH) pulse-start lamp and ballast retrofit kits. All existing incandescent exit sign fixtures to be replaced with new Light Emitting Diode (LED) exit sign fixtures

Option A Method will be used to measure and verify the electricity savings from this retrofit. This method requires utilizing Xcel Energy standard tables to establish the baseline electricity consumption of the existing lighting systems and the post-retrofit electrical consumption of the new lighting systems. Operating hours for each usage type classification will be measured.

- 4.1.2 FEMP Method LE-A-02
- 4.1.3 The intent of this measurement plan is to verify baseline and post retrofit power and operating hours.

### **4.2 Energy Baseline Development**

- 4.2.1 Variables Affecting Baseline Energy Use
- The only variables affecting baseline energy use will be measured or stipulated. Power consumption of fixtures before and after will be stipulated per XCEL Energy's standard table for the Custom Efficiency Program. Hours of runtime will be measured on a sampling basis using run time data loggers.
- 4.2.2 Define key system performance factors characterizing the baseline conditions

- A sampling of light level measurements will be taken to confirm pre lighting levels and post compliance with IES standards.

#### 4.2.3 N/A

#### 4.2.4 Baseline Data Collected

- Baseline Period: Lighting fixtures will be grouped according to run-time type and measured on a sampling basis.
- Metering Plan: Industry standard data run time loggers will be used to measure run time hours for a two week period. The hours measured will be averaged by usage group per week and then multiplied by 26 to determine annual hours per usage group.
  - Up to ten usage groups will be defined and 11 different measurements will be taken for each usage group. This will give statistically valid sampling. Usage groups will include: corridors, office bays, individual offices, restrooms, storage areas, conference rooms, lounges, mechanical rooms, stairwells, lobbies, and large meeting rooms. The actual quantity and location of measurements in each facility will be randomly selected by CES and County personnel.

#### 4.2.5 Data Analysis Performed

- Calculations and Adjustments
  - Baseline Period: Annual kW baselines will be developed by applying the XCEL lighting tables to the total fixture population. Annual kWh baselines will be developed by multiplying the power calculations by the annual operating hours.
  - Post-installation Period: Annual post-retrofit kW consumption will be developed by applying the XCEL lighting tables to the total post-retrofit fixture population. Annual kWh consumption will be developed by multiplying the post-retrofit power calculations by the annual operating hours.

### 4.3 Energy Savings Calculations

#### 4.3.1 The energy savings calculation has two main components: reduced electrical usage and increased natural gas consumption through the heating penalty.

The lighting retrofits will remain installed for the duration of the guarantee term. Retrofits are homogeneous throughout the project's included facilities.

Post-retrofit kWh consumption will be subtracted from the baseline kWh consumption to determine the energy unit savings. Post-retrofit kW consumption per room will be subtracted from the baseline kW. This product will be multiplied by a

diversity factor as shown in the Comprehensive Energy Analysis to determine the on-peak demand savings.

**Annual Cost Savings:** Annual energy cost savings will be determined by multiplying the energy unit and demand savings by the contractual base energy and demand rates as detailed in the Agreement. To be conservative, no credit will be taken for the air conditioning credit. CES reserves the right to add this credit to the savings calculations, as approved by Arapahoe County, should CES fall short of guaranteed energy savings. For all buildings with natural gas heat, the kWh saved per year shall be multiplied by 0.01004 to arrive at the heating penalty in therms of natural gas. This value was derived per the equation below. This heating penalty will not be applied to the Arapahoe Plaza East and West Buildings, as the heating penalty will be captured in the Option C measurements for the Arapahoe Human Services Building.

$$3413 \text{ btu/kW} / .85 \text{ heat system efficiency} \times (1 \text{ therm}/100,000 \text{ btu}) \times .25 \text{ (assumes 1/4 of annual btus get replaced by heating system)} = .01004 \text{ Therms/kWh}$$

- 4.3.2 **Annual Cost Savings:** Annual electrical cost savings will be determined by multiplying each the demand and energy unit by the contractual base demand and energy rates as detailed in the Agreement. The following is an example for the Arapahoe Plaza East Facility:

Total Annual Savings (kWh): 16,471

Total Monthly Savings (kW): 6.07

Total Annual Savings (therms): (165)

Rate (Section 2.2.1): \$14.16/kW    \$0.05869/kWh    \$0.63481/therm

Total Savings:

$$(16,471 \times .05869) + (12 \times 6.07 \times 14.16) + ((165) \times 0.63481) = \$3,588.04$$

#### **4.4 Operational & Maintenance Cost Savings**

No O&M savings were predicted for this retrofit

#### **4.5 Total Annual Measured Savings for ECM**



12 - Arapahoe Plaza East								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	33,024	1,373	78	6.1	0	-33	33,275	0
Feb	28,866	1,373	79	6.1	0	-33	33,915	0
Mar	33,384	1,373	80	6.1	0	-17	49,501	0
Apr	28,336	1,373	80	6.1	0	-25	56,000	0
May	28,416	1,373	71	6.1	0	0	63,073	0
Jun	28,020	1,373	76	6.1	0	0	63,810	0
Jul	29,354	1,373	74	6.1	0	0	76,159	0
Aug	31,700	1,373	75	6.1	0	0	83,542	0
Sep	29,611	1,373	76	6.1	0	0	57,797	0
Oct	30,668	1,373	77	6.1	0	-17	47,814	0
Nov	27,862	1,373	74	6.1	0	-17	39,065	0
Dec	31,304	1,373	77	6.1	0	-25	29,149	0
Totals	360,545	16,471	917	72.8	0	-165	633,100	0

14 - Arapahoe Plaza County Court								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	34,674	1,065	70	5.9	0	-26	88,900	0
Feb	32,763	1,065	72	5.9	0	-26	101,914	0
Mar	36,092	1,065	71	5.9	0	-13	94,652	0
Apr	32,596	1,065	72	5.9	0	-19	79,483	0
May	32,167	1,065	68	5.9	0	0	96,804	0
Jun	32,748	1,065	68	5.9	0	0	94,524	0
Jul	34,057	1,065	67	5.9	0	0	67,931	0
Aug	34,661	1,065	67	5.9	0	0	69,619	0
Sep	32,809	1,065	67	5.9	0	0	66,839	0
Oct	33,233	1,065	69	5.9	0	-13	68,736	0
Nov	32,757	1,065	63	5.9	0	-13	75,455	0
Dec	34,647	1,065	67	5.9	0	-19	77,038	0
Totals	403,204	12,783	821	70.7	0	-128	981,895	0

15 - Federal Warehouse								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	37,689	1,319	112	7.0	2,680	-32	3,993	0
Feb	35,256	1,319	106	7.0	2,510	-32	3,375	0
Mar	38,450	1,319	105	7.0	1,690	-16	27,075	0
Apr	39,504	1,319	135	7.0	730	-24	42,253	0
May	43,549	1,319	141	7.0	230	0	90,865	0
Jun	50,500	1,319	152	7.0	40	0	101,429	0
Jul	64,726	1,319	172	7.0	10	0	105,545	0
Aug	57,394	1,319	158	7.0	0	0	104,617	0
Sep	44,586	1,319	144	7.0	80	0	67,602	0
Oct	43,687	1,319	119	7.0	560	-16	50,570	0
Nov	36,400	1,319	95	7.0	2,150	-16	14,536	0
Dec	35,914	1,319	98	7.0	2,890	-24	3,702	0
Totals	527,655	15,823	1,537	84.48	13,570	-159	615,562	0

20 - Tri County Health								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	5,744	882	21	4.2	820	-21	2,620	0
Feb	5,234	882	20	4.2	620	-21	2,031	0
Mar	5,733	882	20	4.2	460	-11	1,502	0
Apr	6,359	882	24	4.2	220	-16	1,997	0
May	7,874	882	33	4.2	130	0	1,940	0
Jun	8,991	882	35	4.2	60	0	1,308	0
Jul	10,123	882	31	4.2	60	0	2,815	0
Aug	9,758	882	33	4.2	60	0	3,305	0
Sep	8,033	882	32	4.2	80	0	1,946	0
Oct	6,697	882	23	4.2	250	-11	3,374	0
Nov	5,860	882	21	4.2	520	-11	2,126	0
Dec	5,840	882	20	4.2	760	-16	830	0
Totals	86,246	10,584	313	50.52	4,040	-106	25,794	0

<b>24 - Centrepointhe</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	260,048	2,932	643	10.2	340	-71	116,409	0
Feb	401,078	2,932	610	10.2	260	-71	121,020	0
Mar	261,719	2,932	579	10.2	230	-35	127,429	0
Apr	215,531	2,932	578	10.2	150	-53	217,067	0
May	211,119	2,932	537	10.2	160	0	450,652	0
Jun	203,988	2,932	644	10.2	120	0	608,281	0
Jul	223,833	2,932	599	10.2	130	0	767,500	0
Aug	219,062	2,932	627	10.2	160	0	847,328	0
Sep	203,212	2,932	552	10.2	220	0	677,306	0
Oct	224,160	2,932	537	10.2	380	-35	354,273	0
Nov	230,257	2,932	590	10.2	160	-35	156,870	0
Dec	256,230	2,932	654	10.2	170	-53	114,772	0
Totals	2,910,237	35,183	7,150	122.16	2,480	-353	4,558,907	0

<b>29 - Peoria Shops</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	31,395	1,353	71	5.4	538	-33	99,923	0
Feb	30,020	1,353	73	5.4	527	-33	147,319	0
Mar	29,589	1,353	68	5.4	395	-16	187,883	0
Apr	25,210	1,353	64	5.4	204	-25	181,875	0
May	25,120	1,353	60	5.4	109	0	128,820	0
Jun	25,790	1,353	56	5.4	20	0	123,600	0
Jul	26,147	1,353	59	5.4	10	0	137,541	0
Aug	25,917	1,353	62	5.4	5	0	206,059	0
Sep	23,967	1,353	61	5.4	60	0	135,714	0
Oct	26,448	1,353	65	5.4	206	-16	200,571	0
Nov	29,101	1,353	64	5.4	458	-16	133,714	0
Dec	30,367	1,353	66	5.4	634	-25	168,000	0
Totals	329,071	16,237	769	64.20	3,166	-164	1,851,019	0

### 36 - ACJC Detention Center

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	453,980	23,158	728	55.1	31,370	-558	2,756,486	0
Feb	411,708	23,158	731	55.1	27,300	-558	4,021,000	0
Mar	464,851	23,158	747	55.1	28,060	-279	4,314,714	0
Apr	449,165	23,158	779	55.1	24,710	-419	4,984,286	0
May	468,214	23,158	833	55.1	19,640	0	3,368,529	0
Jun	466,091	23,158	888	55.1	17,680	0	4,151,471	0
Jul	503,173	23,158	906	55.1	13,590	0	4,564,677	0
Aug	513,825	23,158	857	55.1	13,270	0	4,210,161	0
Sep	468,494	23,158	874	55.1	16,670	0	5,095,161	0
Oct	462,990	23,158	769	55.1	24,690	-279	4,572,727	0
Nov	433,440	23,158	757	55.1	29,110	-279	3,977,273	0
Dec	422,045	23,158	726	55.1	32,890	-419	3,475,000	0
Totals	5,517,976	277,890	9,595	661.56	278,980	-2,790	49,491,485	0

### 38 - Sheriff/Coroner Facility

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	233,435	3,279	0	12.9	2,160	-79	93,314	0
Feb	215,005	3,279	0	12.9	2,260	-79	121,580	0
Mar	215,985	3,279	0	12.9	1,430	-40	97,456	0
Apr	199,959	3,279	0	12.9	1,370	-59	131,250	0
May	202,483	3,279	0	12.9	770	0	500,091	0
Jun	194,728	3,279	0	12.9	630	0	557,777	0
Jul	204,941	3,279	0	12.9	760	0	631,966	0
Aug	203,837	3,279	0	12.9	420	0	590,513	0
Sep	191,454	3,279	0	12.9	460	0	470,063	0
Oct	190,813	3,279	0	12.9	780	-40	279,428	0
Nov	185,731	3,279	0	12.9	1,720	-40	116,476	0
Dec	238,052	3,279	0	12.9	2,630	-59	89,700	0
Totals	2,476,423	39,353	0	154.56	15,390	-395	3,679,614	0

## **4.6 Post-Installation Verification Activities**

Chevron ES will supply a one-time report to the County detailing the measurements and calculation of savings. If the calculated savings fall short of those expected, Chevron ES will have the opportunity to remedy the short fall and re-measure and calculate the results. Such work will be done at Chevron ES' expense and shall not be unreasonably denied by the County, as long as such work does not interfere with the County's use of the Facilities. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

### **4.6.1 Variables Affecting Post-installation Energy Use**

- All variables are being addressed during the baseline development stage.

### **4.6.2 Define key system performance factors characterizing the post-installation conditions**

- A sampling of light level measurements will be taken to confirm compliance with IES recommendations.

### **4.6.3 Acceptable lighting levels will be verified and included in the post installation report.**

### **4.6.4 N/A**

### **4.6.5 Post-Installation Data To Be Collected**

Lighting loggers will be placed in fixtures to confirm the accuracy of the assumed run hours shown in the CEA. The measured hours for each usage group will be averaged to obtain the hours used for savings calculations.

- As-built documentation provided by CES' construction team will document the description and location of all retrofits. As-built documentation will be provided as detailed in the Agreement.
- Post-retrofit report will be completed within 60 days of the post-retrofit measurements. This report will detail the measurements taken and the annual energy unit savings calculated from all of the measurements.

### **4.6.6 Described in Section 3.3**

## **4.7 Periodic / Interval Verification Activities**

- N/A

## **5. ECM 2 and 2a – Water Consumption Improvements**

### **5.1 Overview of ECM and M&V plan for ECM**

This M&V plan applies to the following buildings at Arapahoe County: Administration Building, Arapahoe Plaza East, Arapahoe Human Services, Arapahoe West Building, Federal Warehouse, Altura Plaza, Centrepont Plaza, Peoria Shops, ACJC Administrative Building, and Sheriff/Coroner Facility. No water measures are being implemented at Tri County Health. At the ACJC Courthouse and Detention Center, water savings are being measured via Option C which will capture water savings from these retrofits.

- 5.1.1 This ECM concerns replacing selected toilets, urinals and faucets at certain sites that have a high domestic water use and where water cost savings justifies replacement. Replacement of china and flush valve (or tank) is indicated in order to ensure proper operation.

Option A Method will be used to measure and verify the water savings from this retrofit. This method requires measuring the baseline usage per flush of the existing toilets and urinals and the post-retrofit usage per flush of the new toilets and urinals. This method also requires measuring the baseline flow rates of the existing faucets as well as the post-retrofit flow rates. Flushes per year for each toilet will be stipulated initially, and for the duration of the guarantee period, as well as annual usage hours for faucets.

An Option A approach is warranted for this retrofit because usage per flush and flow rates are easily measured using Option A techniques, savings from this ECM are very sustainable, and the cost of this measurement is in line with the projected savings.

- 5.1.2 Option A will be used to measure savings.
- 5.1.3 The intent of this measurement plan is to quantify the water and sewer cost savings associated with retrofitting or replacing existing end use fixtures with new low flow end use fixtures.

### **5.2 Energy Baseline Development**

This method requires measuring the baseline consumption of the existing system. In this case, baseline water consumption will be determined by measuring a sampling of the toilet, urinal and faucet water usage before being retrofitted.

- 5.2.1 Variables Affecting Baseline Energy Use
- The impact of weather, operating hours, and set points will not affect the accuracy of savings measurement since actual water consumption will be measured at the source.

- 5.2.2 Define key system performance factors characterizing the baseline conditions
- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.
- 5.2.3 N/A
- 5.2.4 Baseline Data Collected
- Baseline Period: Toilets, urinals and faucets will be grouped according to pre-retrofit type and measured on a sampling basis. Gallons per flush and flow rates will be measured using County-approved equipment.
    - Sample size for each pre-retrofit and post-retrofit group will be 10% or a smaller amount if statistically valid per IMPV protocol. Every effort will be made to take at least this number of measurements. Sometimes it is not possible to isolate a fixture type and thus fewer measurements will be taken. Sometimes, no measurements are possible and the gallons per flush will be taken to be equal to the expected gallons per flush presented in this report.
    - The location of each measurement will be determined in agreement with County and CES personnel.
- 5.2.5 Data Analysis Performed
- Calculations and Adjustments
    - Baseline Period: Annual water usage baselines will be developed by applying the results of pre-retrofit measurements to the total fixture population. Annual water baselines will be developed by inserting the pre-measured gallons per flush and flow rates into the appropriate water usage calibrated model as defined by usage group.
    - Pre-retrofit measurement report. One report prepared within 45 days of completion of the pre-retrofit measurements. The report will include the names of the measurement team and any observers, the results of all measurements, any exceptions or anomalies associated with the measurements.

### **5.3 Energy Savings Calculations**

- 5.3.1 The energy savings calculation has two main components: reduce water and sewer usage. There is also a minor component: thermal savings from reduced hot water usage. Thermal savings occur only at the Administration I building and the ACJC Detention Center.

- 5.3.2 An instantaneous measurement of pre-retrofit usage per flush and flow rate is representative of the system's usage at all times. The retrofits will remain installed for the duration of the guarantee term. Retrofits are homogeneous throughout the project's included facilities. The calculated annual usage per year is described in Section 4 of the Comprehensive Energy Analysis as follows:

**General:**

Domestic Water usage for each building was modeled using population figures, both staff and visitors, occupancy schedules, fixture usage rates as determined in the survey and average estimates of fixture usage. The model is then compared to the metered usage and reasonable adjustments to the model are made to reflect the metered usage. In general, the fixture rates were adjusted to bring the model rates safely below the metered rates. After matching the water model to the building use, various water conservation scenarios were applied to the model to analyze potential savings.

The water usage is determined by:

$$(\text{Number of People}) \times (\text{Fixture Rate}) \times (\text{Uses per Day}) \times (\text{Days Occupied per Year})$$

Visitor populations were also included. Visitation period was assumed to be for .5 hours for the Admin 1 A/D Works buildings and 2 hours for the Court Houses, the detention center and Altura Plaza, and then the population was normalized to an 8 hr day and added to the given population figure using the following formula:

$$(\text{Number of Hours Visitation}) \div (8 \text{ hours}) \times (\text{Visitors/Day}) = \text{Normalized Visitor Population}$$

**Fixture use rates:**

There were some adjustments made to the fixture rates to bring the modeled usage in line with the metered data. Some of the adjustments were downward (lower GPF). Some were adjusted upward; this is justified as long as all water is accounted for. Maladjusted flush valves and leaking tank valves can account for significant losses. Also, where there was a mix of fixtures, a weighted average was applied to the model, which also lowered the modeled fixture rate.

The following table illustrates the uses per day per person used in the models.

Uses per day	Inmates		Staff		Visitors		Units
	Male	Female	Male	Female	Male	Female	
Toilet	5	5	1	4	1	4	Flushes
Urinal	0	0	3	0	3	0	Flushes
Lav Faucet	1	1	0.5	0.5	0.5	0.5	Minutes
Shower (M F)		10	0	0	0	0	Minutes

\*Based on: "A Water Conservation Guide for Commercial Institutional and Industrial Users", Water Use and Conservation Bureau, New Mexico Office of the State Engineer.



Schedules are considered only to the extent that the days that the buildings are open and the building are populated.

**Schedules:**

The number of days used for the savings calculations are to only include the days that the buildings are open and the building is populated. The number of days used for the savings calculations was calculated in the following manner:

**All Buildings Except Detention Center:**

Work Days (52 wks/yr x 5 days/wk) – Holidays (13 days) – Vacation Days (21 days) = 226 Days

**Detention Center:**

365 days/year.

	Office (staff and visitors)	Detention Center
Work days	250	365
Holidays	-10	0
Vacation	-14	0
Total	226	365

**Population assumptions are listed below:**

	Population (1)	Visitors / day (2)	Quantity of toilets
Administration #1	358	1000*	44
Arapahoe Plaza (A/D works)	60	100	11
Arapahoe Plaza (Human Services)	90	500	19
Arapahoe Plaza (County Court)	30	500	19
CSU Extension Office	16	0 (3)	4
CSU Ware House	0		1
Federal Blvd Warehouse	15	15	10
Tri County Health	NA	NA	8
Administration #2	250	100	32
ACJC District Court	109	1500	79
P.J. Sullivan Detention Center	195	163	71
P.J. Sullivan Detention Center (Comby)	1215	0	413
County Shops:	35	0	6
Altura Plaza	145	1600	55
Total			772

- (1) Population figures are as given by the Maintenance Staff.
- (2) Visitor figures as per Arapahoe County Staff.
- (3) There are no public bathroom facilities.

- 5.3.3 Annual Cost Savings: Annual water cost savings will be determined by multiplying the water unit by the contractual base water and sewer rates as detailed in the Agreement. The following is an example for the Administration I Facility:

Total Annual Savings (kgals): 669.410

Rate (Section 2.2.1): \$5.36

Total Savings:  $669.41 \times 5.36 = \$3,588.04$

- 5.3.4 Annual natural gas cost savings at the Detention Center: Since Option C will be used to determine water savings in this facility the calculated water savings for the lavatory measure shall be used to determine water savings. Annual gas cost savings will be determined by multiplying the gas unit savings by the contractual gas rate as detailed in the agreement. The natural gas unit savings shall be determined by using the following equation:

S = Total Calculated Savings (Detention equals 243,643 gallons)

HWF = Hot water Fraction

DHWS = Domestic Hot Water Supply Temperature in degrees F

ST = Domestic water cold water delivery Temperature in degrees F

T = Tap temperature in degrees F

HWU = Hot water Usage

$$\text{HWF} = (\text{T} - \text{ST}) / (\text{DHWS} - \text{ST}) = (105 - 54) / (130 - 54) = 67\%$$

$$\text{HWU} = \text{S} \times \text{HWF} \text{ or } 296,839 \times 67\% = 198,882 \text{ gallons}$$

$$\text{Convert gallons to Therms} = \text{HWU} \times 8.33 \times (\text{DHWS} - \text{ST}) / 100,000 = 1,261$$

## 5.4 Operational & Maintenance Cost Savings

- No O&M savings were predicted for this retrofit

## 5.5 Total Annual Measured Savings For ECM

<b>01 - Administration</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	211,594	0	537	0	5,080	0	129,964	55,784
Feb	194,140	0	521	0	4,650	0	115,628	55,784
Mar	229,168	0	566	0	3,950	0	266,561	55,784
Apr	227,016	0	578	0	3,550	0	352,443	55,784
May	246,029	0	568	0	2,140	0	699,329	55,784
Jun	256,849	0	589	0	1,740	0	789,762	55,784
Jul	284,832	0	601	0	1,010	0	878,157	55,784
Aug	271,611	0	601	0	1,390	0	954,706	55,784
Sep	241,245	0	564	0	2,220	0	655,211	55,784
Oct	230,168	0	576	0	4,110	0	524,794	55,784
Nov	220,561	0	561	0	4,850	0	214,553	55,784
Dec	211,947	0	542	0	4,870	0	120,761	55,784
Totals	2,825,160	0	6,804	0	39,560	0	5,701,869	669,410

<b>12 - Arapahoe Plaza East</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	33,024	0	78	0.0	0	0	33,275	9,909
Feb	28,866	0	79	0.0	0	0	33,915	9,909
Mar	33,384	0	80	0.0	0	0	49,501	9,909
Apr	28,336	0	80	0.0	0	0	56,000	9,909
May	28,416	0	71	0.0	0	0	63,073	9,909
Jun	28,020	0	76	0.0	0	0	63,810	9,909
Jul	29,354	0	74	0.0	0	0	76,159	9,909
Aug	31,700	0	75	0.0	0	0	83,542	9,909
Sep	29,611	0	76	0.0	0	0	57,797	9,909
Oct	30,668	0	77	0.0	0	0	47,814	9,909
Nov	27,862	0	74	0.0	0	0	39,065	9,909
Dec	31,304	0	77	0.0	0	0	29,149	9,909
Totals	360,545	0	917	0.0	0	0	633,100	118,904

### 13 - Arapahoe Plaza Human Services

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	56,825	0	153	0.0	6,316	0	66,669	23,262
Feb	53,311	0	153	0.0	5,567	0	67,107	23,262
Mar	57,360	0	154	0.0	5,364	0	69,682	23,262
Apr	55,422	0	154	0.0	3,074	0	64,598	23,262
May	57,204	0	154	0.0	2,324	0	57,155	23,262
Jun	69,488	0	142	0.0	1,054	0	50,238	23,262
Jul	102,970	0	230	0.0	605	0	51,973	23,262
Aug	83,302	0	200	0.0	873	0	46,829	23,262
Sep	80,601	0	200	0.0	1,523	0	54,752	23,262
Oct	83,325	0	200	0.0	4,029	0	62,046	23,262
Nov	73,482	0	192	0.0	6,131	0	73,987	23,262
Dec	56,864	0	153	0.0	6,336	0	82,590	23,262
Totals	830,154	0	2,085	0.0	43,196	0	747,626	279,145

### 14 - Arapahoe Plaza County Court

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	34,674	0	70	0.0	0	0	88,900	25,422
Feb	32,763	0	72	0.0	0	0	101,914	25,422
Mar	36,092	0	71	0.0	0	0	94,652	25,422
Apr	32,596	0	72	0.0	0	0	79,483	25,422
May	32,167	0	68	0.0	0	0	96,804	25,422
Jun	32,748	0	68	0.0	0	0	94,524	25,422
Jul	34,057	0	67	0.0	0	0	67,931	25,422
Aug	34,661	0	67	0.0	0	0	69,619	25,422
Sep	32,809	0	67	0.0	0	0	66,839	25,422
Oct	33,233	0	69	0.0	0	0	68,736	25,422
Nov	32,757	0	63	0.0	0	0	75,455	25,422
Dec	34,647	0	67	0.0	0	0	77,038	25,422
Totals	403,204	0	821	0.0	0	0	981,895	305,067

<b>15 - Federal Warehouse</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	37,689	0	112	0.0	2,680	0	3,993	1,545
Feb	35,256	0	106	0.0	2,510	0	3,375	1,545
Mar	38,450	0	105	0.0	1,690	0	27,075	1,545
Apr	39,504	0	135	0.0	730	0	42,253	1,545
May	43,549	0	141	0.0	230	0	90,865	1,545
Jun	50,500	0	152	0.0	40	0	101,429	1,545
Jul	64,726	0	172	0.0	10	0	105,545	1,545
Aug	57,394	0	158	0.0	0	0	104,617	1,545
Sep	44,586	0	144	0.0	80	0	67,602	1,545
Oct	43,687	0	119	0.0	560	0	50,570	1,545
Nov	36,400	0	95	0.0	2,150	0	14,536	1,545
Dec	35,914	0	98	0.0	2,890	0	3,702	1,545
Totals	527,655	0	1,537	0	13,570	0	615,562	18,540

<b>23 - Altura Plaza</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	121,594	0	272	0.0	18,160	0	231,312	42,948
Feb	103,244	0	272	0.0	11,670	0	188,690	42,948
Mar	112,618	0	228	0.0	5,160	0	157,555	42,948
Apr	112,883	0	276	0.0	5,010	0	247,231	42,948
May	120,411	0	288	0.0	4,150	0	322,300	42,948
Jun	122,653	0	324	0.0	3,700	0	347,233	42,948
Jul	139,482	0	344	0.0	4,530	0	387,367	42,948
Aug	138,135	0	312	0.0	6,300	0	459,150	42,948
Sep	126,767	0	308	0.0	7,530	0	414,267	42,948
Oct	120,855	0	320	0.0	14,900	0	361,683	42,948
Nov	119,468	0	320	0.0	18,330	0	318,155	42,948
Dec	126,428	0	272	0.0	13,010	0	196,791	42,948
Totals	1,464,538	0	3,536	0	112,450	0	3,631,734	515,380

## 24 - Centrepointhe

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	260,048	0	643	0.0	340	0	116,409	33,075
Feb	401,078	0	610	0.0	260	0	121,020	33,075
Mar	261,719	0	579	0.0	230	0	127,429	33,075
Apr	215,531	0	578	0.0	150	0	217,067	33,075
May	211,119	0	537	0.0	160	0	450,652	33,075
Jun	203,988	0	644	0.0	120	0	608,281	33,075
Jul	223,833	0	599	0.0	130	0	767,500	33,075
Aug	219,062	0	627	0.0	160	0	847,328	33,075
Sep	203,212	0	552	0.0	220	0	677,306	33,075
Oct	224,160	0	537	0.0	380	0	354,273	33,075
Nov	230,257	0	590	0.0	160	0	156,870	33,075
Dec	256,230	0	654	0.0	170	0	114,772	33,075
Totals	2,910,237	0	7,150	0	2,480	0	4,558,907	396,900

## 29 - Peoria Shops

Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	31,395	0	71	0.0	538	1,681	99,923	4,971
Feb	30,020	0	73	0.0	527	1,681	147,319	4,971
Mar	29,589	0	68	0.0	395	840	187,883	4,971
Apr	25,210	0	64	0.0	204	1,260	181,875	4,971
May	25,120	0	60	0.0	109	0	128,820	4,971
Jun	25,790	0	56	0.0	20	0	123,600	4,971
Jul	26,147	0	59	0.0	10	0	137,541	4,971
Aug	25,917	0	62	0.0	5	0	206,059	4,971
Sep	23,967	0	61	0.0	60	0	135,714	4,971
Oct	26,448	0	65	0.0	206	840	200,571	4,971
Nov	29,101	0	64	0.0	458	840	133,714	4,971
Dec	30,367	0	66	0.0	634	1,260	168,000	4,971
Totals	329,071	0	769	0	3,166	0	1,851,019	59,656

<b>37 - ACJC Administration II</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	153,391	0	375	0.0	3,292	0	50,667	18,378
Feb	131,596	0	374	0.0	2,623	0	62,424	18,378
Mar	148,392	0	367	0.0	2,661	0	67,807	18,378
Apr	165,731	0	371	0.0	1,611	0	74,499	18,378
May	180,679	0	366	0.0	1,342	0	52,803	18,378
Jun	190,243	0	424	0.0	773	0	64,498	18,378
Jul	208,851	0	427	0.0	650	0	56,908	18,378
Aug	205,531	0	419	0.0	841	0	62,375	18,378
Sep	186,209	0	435	0.0	897	0	58,965	18,378
Oct	169,193	0	405	0.0	977	0	60,856	18,378
Nov	151,009	0	403	0.0	2,320	0	61,749	18,378
Dec	153,405	0	391	0.0	3,238	0	52,392	18,378
Totals	2,044,230	0	4,757	0	21,225	0	725,943	220,533

<b>38 - Sheriff/Coroner Facility</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	233,435	0	0	0.0	2,160	0	93,314	15,000
Feb	215,005	0	0	0.0	2,260	0	121,580	15,000
Mar	215,985	0	0	0.0	1,430	0	97,456	15,000
Apr	199,959	0	0	0.0	1,370	0	131,250	15,000
May	202,483	0	0	0.0	770	0	500,091	15,000
Jun	194,728	0	0	0.0	630	0	557,777	15,000
Jul	204,941	0	0	0.0	760	0	631,966	15,000
Aug	203,837	0	0	0.0	420	0	590,513	15,000
Sep	191,454	0	0	0.0	460	0	470,063	15,000
Oct	190,813	0	0	0.0	780	0	279,428	15,000
Nov	185,731	0	0	0.0	1,720	0	116,476	15,000
Dec	238,052	0	0	0.0	2,630	0	89,700	15,000
Totals	2,476,423	0	0	0	15,390	0	3,679,614	180,000

## 5.6 Post-Installation Verification Activities

Chevron ES will supply a one-time report to the County detailing the measurements and calculation of savings. If the calculated savings fall short of those expected, Chevron ES will have the opportunity to remedy the short fall and re-measure and calculate the results. Such work will be done at Chevron ES' expense and shall not be unreasonably denied by the County, as long as such work does not interfere with the County's use of the Facilities. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

### 5.6.1 Variables Affecting Post-installation Energy Use

- The impact of weather, operating hours, and set points will not affect the accuracy of savings measurement since actual water consumption will be measured at the source.

### 5.6.2 Define key system performance factors characterizing the post-installation conditions

- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.

### 5.6.3 See 4.6.2

### 5.6.4 N/A

### 5.6.5 Post-Installation Data To Be Collected

- Schedule: Pre-retrofit measurements will be performed before retrofits are completed. Post measurements will be completed after the retrofits are completed.
- Post-installation Period:
  - Post-retrofit fixtures will be grouped according to post-retrofit type and measured on a sampling basis. Gallons per flush and flow rates will be measured using the approved apparatus described above.
  - Sample size will consist of 10% of population or a statistically valid quantity per the latest version of the IPMVP, whichever is less.
  - Annual post-retrofit water consumption will be developed by applying the results of post-retrofit measurements to the total post-retrofit fixture population. Annual water consumption will be developed by inserting the post-retrofit gallons per flush values into the appropriate water usage calibrated models. Copies of these models can be found in the Comprehensive Energy Analysis.
  - Post-retrofit water consumption will be subtracted from the baseline water consumption to determine the water unit savings.
  - As-built documentation provided by Chevron's construction team will document the description and location of all retrofits. As-built documentation will be provided as detailed in the Agreement.
  - Post-retrofit report will be completed within 60 days of the post-retrofit measurements. This report will detail the measurements taken and the savings calculated from all of the measurements.

### 5.6.6 Described above.



## **5.7 Periodic / Interval Verification Activities**

- N/A

## **6. ECM 3 – Upgrade/Expand DDC Controls**

### **6.1 Overview of ECM and M&V plan for ECM**

This M&V plan applies to the Arapahoe Plaza East Building and the Arapahoe Plaza West Building. The ACJC Detention Center has no savings associated with this ECM and thus is not included. The two buildings covered by this plan receive heating and cooling from the Arapahoe Human Services Building, thus the only savings measure by this plan is the fan energy consumption. No demand savings are claimed for this ECM, just kwh savings.

- 6.1.1 This ECM investigates installing an Energy Management Control System (EMCS) to control the heating, ventilation, and air conditioning (HVAC) equipment at the two buildings specified above.

Option A Method will be used to measure and verify the fan electricity savings from this retrofit. This method requires stipulating the baseline operating schedules of the existing mechanical systems. The post-retrofit operating schedules will be measured to verify savings. The existing average fan energy consumption will be measured as well as the post-retrofit fan energy consumption. The performance of the system will be verified by viewing trend logs of the mechanical systems.

- 6.1.2 The intent of this measurement plan is to quantify the electrical savings associated with upgrading or expanding direct digital controls.

### **6.2 Energy Baseline Development**

Baselines will be developed by measuring motor kW at various load points and from the existing hours of operation which are stipulated in the Standards of Control.

- 6.2.1 Variables Affecting Baseline Energy Use
- Many variables such as weather, operating hours, and set point changes impact equipment consumption.
  - The variable with the biggest impact is weather. To account for this variable, heating degree days will be logged during the baseline period and also during the energy savings verification period. The heating degree days will be used as a baseline adjustment to facilitate an accurate verification of savings.
  - The reliability of the EMS to store data needed for calculations is at times not reliable. For time periods in which data is not available from the EMS, the savings shall be derived from the performance of the system to date during similar weather conditions. If there is insufficient system performance data, the savings shall be stipulated.
  - The impact of operating hours will be measured via measuring post-retrofit actual run times.

- The method in which the systems are operated is an important variable. The facilities staff is responsible for operating and maintaining the systems. If the systems are not operated or maintained properly, energy consumption will increase. Therefore, if it is determined that any part of the systems are not being operated properly during the savings verification period, the savings being derived from the part of the system that is not being operated properly shall be stipulated for the time period of improper operation.
- 6.2.2 Define key system performance factors characterizing the baseline conditions
  - Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.
- 6.2.3 N/A
- 6.2.4 Baseline Data Collected
  - Reduction in Motor Run Times:
    - Baseline Period: Motor power draw will be measured using an RMS wattmeter at various load points. The motor load will be logged for a one-month period to correlate motor load to outside air temperature. Motor run times shall be as shown in the Standards of Comfort as shown in the CEA. Motor load during the post-retrofit period will be measured over a 3 month period to correlate motor load to outside air temperature. The motor load correlation to outside air temperature will be used to derive an annual average consumption.
    - Metering Plan: The indicated wattmeter will be used to measure motor kW on an instantaneous basis at various loads.
- 6.2.5 Data Analysis Performed
  - Reduction in Motor Run Times:
    - Calculations and Adjustments
      - Actual motor run times will be logged over a 3 month period. The measured run times will be compared to the baseline period run times to determine savings.

## 6.3 Energy Savings Calculations

- 6.3.1 The energy savings calculation has one component: reduce electricity usage, not demand.  
The following is an example energy savings calculation for the Arapahoe Plaza East Facility as used in the energy audit:

Total Annual Savings (kWh): 76,871  
Rate (Section 2.2.1): \$.05869  
Total Savings: 76,871 x .05869 = \$4,511.56

6.3.2 The controls retrofits will remain installed for the duration of the guarantee term. Retrofits are homogeneous throughout the project's included facilities.

6.3.3 Annual Cost Savings:

- Reduction in Motor Run Times:  
The kWh savings shall be calculated by:

$$\text{KWh savings} = (\text{ABKW} \times \text{BSH}) - (\text{APKW} \times \text{PRH}), \text{ where}$$

ABKW = Average baseline period KW, as measured during the baseline period.

BSH = Baseline annual hours of operation, as stipulated in the Standards of Control

APKW = Average post-retrofit KW, as measured during the post-retrofit period.

PRH = Post retrofit annual hours as measured by the EMS.

## 6.4 Operational & Maintenance Cost Savings

- No O&M savings were predicted for this retrofit

## 6.5 Total Annual Measured Savings for ECM

12 - Arapahoe Plaza East								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	33,024	6,406	78	0.4	0	456	33,275	0
Feb	28,866	6,406	79	0.4	0	456	33,915	0
Mar	33,384	6,406	80	0.4	0	228	49,501	0
Apr	28,336	6,406	80	0.4	0	342	56,000	0
May	28,416	6,406	71	0.4	0	0	63,073	0
Jun	28,020	6,406	76	0.4	0	0	63,810	0
Jul	29,354	6,406	74	0.4	0	0	76,159	0
Aug	31,700	6,406	75	0.4	0	0	83,542	0
Sep	29,611	6,406	76	0.4	0	0	57,797	0
Oct	30,668	6,406	77	0.4	0	228	47,814	0
Nov	27,862	6,406	74	0.4	0	228	39,065	0
Dec	31,304	6,406	77	0.4	0	342	29,149	0
Totals	360,545	76,871	917	0.0	0	2,279	633,100	0

<b>14 - Arapahoe Plaza County Court</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	34,674	5,940	70	0.0	0	1,015	88,900	0
Feb	32,763	5,940	72	0.0	0	1,015	101,914	0
Mar	36,092	5,940	71	0.0	0	508	94,652	0
Apr	32,596	5,940	72	0.0	0	761	79,483	0
May	32,167	5,940	68	0.0	0	0	96,804	0
Jun	32,748	5,940	68	0.0	0	0	94,524	0
Jul	34,057	5,940	67	0.0	0	0	67,931	0
Aug	34,661	5,940	67	0.0	0	0	69,619	0
Sep	32,809	5,940	67	0.0	0	0	66,839	0
Oct	33,233	5,940	69	0.0	0	508	68,736	0
Nov	32,757	5,940	63	0.0	0	508	75,455	0
Dec	34,647	5,940	67	0.0	0	761	77,038	0
Totals	403,204	71,285	821	0.0	0	5,076	981,895	0

## 6.6 Post-Installation Verification Activities

Chevron ES will supply a one-time report to the County detailing the measurements and calculation of savings. If the calculated savings fall short of those expected, Chevron ES will have the opportunity to remedy the short fall and re-measure and calculate the results. Such work will be done at Chevron ES' expense and shall not be unreasonably denied by the County, as long as such work does not interfere with the County's use of the Facilities. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

### 6.6.1 Variables Affecting Post-installation Energy Use

- Same as described above for the pre-installation period.

### 6.6.2 Define key system performance factors characterizing the post-installation conditions

- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.

### 6.6.3 N/A

### 6.6.4 N/A

6.6.5 Post-Installation Data To Be Collected

This is described above.

6.6.6 Data analysis to be performed and minimum acceptance requirements.

This is described above.

**6.7 Periodic / Interval Verification Activities**

- N/A

## 7. ECM 6 – Replace the Existing Boilers

### 7.1 Overview of ECM and M&V plan for ECM

The ACJC Detention Center currently utilizes very untreated water. This water is fed into the boiler system and leads to scaled-up and inefficient boilers. This ECM involves replacing the existing boilers with new boilers.

The existing boilers have been proven to operate at a very low efficiency, with stack temperatures over 500 degrees F. Given the 24 hour operation of this facility, the savings associated with this ECM will be achieved purely by improved boiler efficiency. The guaranteed savings are 8.1% of the baseline.

Based on the situation of the building, all parties agree that the savings calculations are conservative. The calculations are located in Volume 2 of the Comprehensive Energy Analysis. The M&V plan shall consist of confirming that the new boilers operate at the modeled combustion efficiency of at least 80%. Upon confirmation that the new plant is operating at least this efficiency, the savings will be considered as having been met.

If the system does not prove to be operating at 80% combustion efficiency, the guarantee will be considered to not have been met.

36 - ACJC Detention Center								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	453,980	0	728	0.0	31,370	4,457	2,756,486	0
Feb	411,708	0	731	0.0	27,300	2,815	4,021,000	0
Mar	464,851	0	747	0.0	28,060	1,877	4,314,714	0
Apr	449,165	0	779	0.0	24,710	938	4,984,286	0
May	468,214	0	833	0.0	19,640	469	3,368,529	0
Jun	466,091	0	888	0.0	17,680	235	4,151,471	0
Jul	503,173	0	906	0.0	13,590	469	4,564,677	0
Aug	513,825	0	857	0.0	13,270	469	4,210,161	0
Sep	468,494	0	874	0.0	16,670	1,173	5,095,161	0
Oct	462,990	0	769	0.0	24,690	2,346	4,572,727	0
Nov	433,440	0	757	0.0	29,110	3,519	3,977,273	0
Dec	422,045	0	726	0.0	32,890	4,692	3,475,000	0
Totals	5,517,976	0	9,595	0	278,980	23,459	49,491,485	0

## 7.2 Savings Calculation:

The following is an example for the Detention Facility:

Total Annual Savings (therms): 23,459

Rate (Section 2.2.1): \$.63481

Total Savings:  $23,459 \times .63481 = \$14,892.01$



## **8. ECM 18 – Install Water Reclaim System**

### **8.1 Overview of ECM and M&V plan for ECM**

This ECM involves recycling some of the water used for vehicle washing at the Peoria Shops.

- 8.1.1 This ECM involves installing an underground water storage tank after the filters installed on the drain of the truck washing station. The salvaged water will be used for heavy washing. City water will continue to be used for final washing.

Option A Method will be used to measure and verify the water and sewer savings from this retrofit. The nominal amount of increased electricity usage shall be calculated as shown in the Comprehensive Energy Analysis.

- 8.1.2 The intent of this measurement plan is to quantify the water and sewer savings associated with recycling some of the existing water used for washing vehicles.

### **8.2 Energy Baseline Development**

The energy savings calculations shown in the CEA are accepted as the baseline.

- 8.2.1 Variables Affecting Baseline Energy Use
- The main variable effecting water use is the quantity of vehicles washed per month and the length of each wash.
- 8.2.2 Define key system performance factors characterizing the baseline conditions
- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.
- 8.2.3 N/A
- 8.2.4 Baseline Data Collected
- Baseline Period: The water model, as shown in the Comprehensive Energy Analysis, is accepted as the baseline condition.
  - Metering Plan: A standard water meter will be installed on the new tank to measure the actual amount of water being recycled. It will be read manually.
- 8.2.5 Data Analysis Performed
- Calculations and Adjustments

- No calculations will be performed. Metered recycled water will be compared to the projected value monthly.

### 8.3 Energy Savings Calculations

#### 8.3.1 Annual Cost Savings:

Each month, the projected volume of recycled water will be subtracted from the metered actual recycled water volume. The following is an example for this ECM:

Total Annual Savings (kgals): 576  
 Rate (Section 2.2.1): \$13.07  
 Total Savings:  $576 \times 13.07 = \$7,528.32$

There will be a slight increase in electrical usage due to a small sump pump. These savings will be stipulated (\$1,277).

### 8.4 Operational & Maintenance Cost Savings

- No O&M savings were predicted for this retrofit

### 8.5 Total Annual Measured Savings for ECM

29 - Peoria Shops								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	31,395	-233	71	-0.6	5,380	0	99,923	48,000
Feb	30,020	-233	73	-0.6	5,270	0	147,319	48,000
Mar	29,589	-233	68	-0.6	3,950	0	187,883	48,000
Apr	25,210	-233	64	-0.6	2,040	0	181,875	48,000
May	25,120	-233	60	-0.6	1,090	0	128,820	48,000
Jun	25,790	-233	56	-0.6	200	0	123,600	48,000
Jul	26,147	-233	59	-0.6	100	0	137,541	48,000
Aug	25,917	-233	62	-0.6	50	0	206,059	48,000
Sep	23,967	-233	61	-0.6	600	0	135,714	48,000
Oct	26,448	-233	65	-0.6	2,060	0	200,571	48,000
Nov	29,101	-233	64	-0.6	4,580	0	133,714	48,000
Dec	30,367	-233	66	-0.6	6,340	0	168,000	48,000
Totals	329,071	-2,793	769	-7	31,660	0	1,851,019	576,000

### 8.6 Post-Installation Verification Activities

Chevron ES will supply a one-time report to the County detailing the measurements and calculation of savings. If the calculated savings fall short of those expected, Chevron ES will

have the opportunity to remedy the short fall and re-measure and calculate the results. Such work will be done at Chevron ES' expense and shall not be unreasonably denied by the County, as long as such work does not interfere with the County's use of the Facilities. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

8.6.1 Variables Affecting Post-installation Energy Use

- Same as described above for the pre-installation period.

8.6.2 Define key system performance factors characterizing the post-installation conditions

- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.

8.6.3 N/A

8.6.4 N/A

8.6.5 Post-Installation Data To Be Collected

This is described above.

8.6.6 Data analysis to be performed and minimum acceptance requirements.

This is described above.

## **8.7 Periodic / Interval Verification Activities**

- N/A

## **9. Calculated Energy Conservation Measures**

### **9.1 Overview of ECM and M&V plan for ECM**

- 9.1.1 This plan investigates using calculations for energy savings guarantees. Descriptions of calculations and their validity used in lieu of field measurements or baseline comparisons are outlined below. Actual savings calculations can be found in Volume II of the Energy Audit.

Calculated savings are used where the cost/benefit ratio of savings guaranteed to the difficulty or time consumption to prove savings is high. Typically the savings from these ECMs are small and is obvious to all parties that savings will be achieved. All parties agree the savings calculations are conservative. Given the amount of cost it would take to confirm the small amount of savings, all parties agree to accept the savings calculation shown in the CEA upon confirmation that each measure has been properly installed.

### **9.2 Energy Baseline Development**

N/A

### **9.3 Energy Savings Calculations**

- 9.3.1 The energy savings calculation has the following components: reduce electricity, natural gas, and water usage.

9.3.2 N/A

9.3.3 Annual Cost Savings:

Operational & Maintenance Cost Savings

- No O&M savings were predicted for these retrofits

### **9.4 Total Annual Measured Savings for ECM**

- 3.4.1 The following sections outline each individual facility per ECM.

## **Administration I**

### **ECM 16 – Irrigation Control System Upgrade**

Irrigation savings are calculated using spreadsheet analysis. Calculations can be found in Volume II of the Energy Audit.

<b>01 - Administration</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	211,594	0	537	0	5,080	0	129,964	0
Feb	194,140	0	521	0	4,650	0	115,628	0
Mar	229,168	0	566	0	3,950	0	266,561	6,346
Apr	227,016	0	578	0	3,550	0	352,443	12,691
May	246,029	0	568	0	2,140	0	699,329	19,037
Jun	256,849	0	589	0	1,740	0	789,762	25,382
Jul	284,832	0	601	0	1,010	0	878,157	38,073
Aug	271,611	0	601	0	1,390	0	954,706	12,691
Sep	241,245	0	564	0	2,220	0	655,211	12,691
Oct	230,168	0	576	0	4,110	0	524,794	0
Nov	220,561	0	561	0	4,850	0	214,553	0
Dec	211,947	0	542	0	4,870	0	120,761	0
Totals	2,825,160	0	6,804	0	39,560	0	5,701,869	126,911

The following is an example for this ECM:

Total Annual Savings (kgals): 126.9

Rate (Section 2.2.1): \$5.36

Total Savings:  $126.9 \times 5.36 = \$680.18$

**Arapahoe Plaza East****ECM 23 – ERCM**

ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

<b>12 - Arapahoe Plaza East</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	33,024	283	78	0.0	0	7	33,275	0.0
Feb	28,866	283	79	0.0	0	7	33,915	0.0
Mar	33,384	283	80	0.0	0	7	49,501	0.0
Apr	28,336	283	80	0.0	0	7	56,000	0.0
May	28,416	283	71	0.0	0	7	63,073	0.0
Jun	28,020	283	76	0.0	0	7	63,810	0.0
Jul	29,354	283	74	0.0	0	7	76,159	0.0
Aug	31,700	283	75	0.0	0	7	83,542	0.0
Sep	29,611	283	76	0.0	0	7	57,797	0.0
Oct	30,668	283	77	0.0	0	7	47,814	0.0
Nov	27,862	283	74	0.0	0	7	39,065	0.0
Dec	31,304	283	77	0.0	0	7	29,149	0.0
<b>Totals</b>	<b>360,545</b>	<b>3,398</b>	<b>917</b>	<b>0.0</b>	<b>0</b>	<b>89</b>	<b>633,100</b>	<b>0</b>

The following is an example for this ECM:

Total Annual Savings (kWh): 8,865

Total Annual Savings (therms): 231

Rate (Section 2.2.1): \$0.05869/kWh \$0.63841/therm

Total Savings:  $(8,865 \times .05869) + (231 \times 0.63841) = \$667.76$

### Arapahoe Human Services

#### ECM 21 – Change Natural Gas Provider

These savings are purely monetary with no energy unit savings therefore the baseline for this ECM shall remain unchanged.

<b>13 - Arapahoe Plaza Human Services</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	56,825	0	153	0	6,316	0	66,669	0
Feb	53,311	0	153	0	5,567	0	67,107	0
Mar	57,360	0	154	0	5,364	0	69,682	0
Apr	55,422	0	154	0	3,074	0	64,598	0
May	57,204	0	154	0	2,324	0	57,155	0
Jun	69,488	0	142	0	1,054	0	50,238	0
Jul	102,970	0	230	0	605	0	51,973	0
Aug	83,302	0	200	0	873	0	46,829	0
Sep	80,601	0	200	0	1,523	0	54,752	0
Oct	83,325	0	200	0	4,029	0	62,046	0
Nov	73,482	0	192	0	6,131	0	73,987	0
Dec	56,864	0	153	0	6,336	0	82,590	0
Totals	830,154	0	2,085	0.0	43,196	0	747,626	0

The savings for this ECM result from using a cheaper gas rate. The current natural gas utility provider, Xcel Energy, at Building 13-Arapahoe Human Services charges \$0.74946/therm. The new natural gas utility provider, Seminole Energy Services, shall charge \$0.63481/therm.

The dollar savings for this ECM were calculated by taking the difference in the two utility rates (\$0.11465/therm) and multiplying it the target natural gas usage of the facility. The target natural gas usage was calculated with the following equation:

$$\text{Target Natural Gas Usage} = \text{Baseline Natural Gas Usage} - \text{Total Natural Gas Saved}$$

where,

$$\text{Total Natural Gas Saved} = \text{Total Natural Gas Saved at Building 12-Arapahoe Plaza Building} + \text{Total Natural Gas Saved at Building 13-Arapahoe Human Services} + \text{Total Natural Gas Saved at Building 14-Arapahoe Plaza West Building}$$

The following is an example for this ECM:

Baseline (therms):	43,196	
Savings Total (therms):		11,552
Target Baseline (therms):	31,644	
Rate difference:	\$0.11465/therm	

Total Savings:  $31,644 \times \$0.11465 = \$3,627.99$

Note: The natural gas-fired boilers at Building 13-Arapahoe Human Services provide heating to Buildings 12 and 14, that is why these two buildings are included in the calculation above.



**14 - Arapahoe Plaza West****ECM 23 – ERCM**

ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

<b>14 - Arapahoe Plaza County Court</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	34,674	282	70	0.0	0	7	88,900	0
Feb	32,763	282	72	0.0	0	7	101,914	0
Mar	36,092	282	71	0.0	0	7	94,652	0
Apr	32,596	282	72	0.0	0	7	79,483	0
May	32,167	282	68	0.0	0	7	96,804	0
Jun	32,748	282	68	0.0	0	7	94,524	0
Jul	34,057	282	67	0.0	0	7	67,931	0
Aug	34,661	282	67	0.0	0	7	69,619	0
Sep	32,809	282	67	0.0	0	7	66,839	0
Oct	33,233	282	69	0.0	0	7	68,736	0
Nov	32,757	282	63	0.0	0	7	75,455	0
Dec	34,647	282	67	0.0	0	7	77,038	0
Totals	403,204	3,385	821	0.0	0	88	981,895	0

The following is an example for this ECM:

Total Annual Savings (kWh): 3,385

Total Annual Savings (therms): 88

Rate (Section 2.2.1): \$0.05869/kWh \$0.63841/therm

Total Savings:  $(3,385 \times .05869) + (88 \times 0.63841) = \$254.85$

## **15 – Federal Warehouse**

ECM 4 – Programmable Thermostat

ECM 23 – ERCM

Programmable thermostat savings are calculated using a spreadsheet analysis. ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

<b>15 - Federal Warehouse</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	37,689	2,140	112	0.0	2,680	329	3,993	0
Feb	35,256	2,140	106	0.0	2,510	329	3,375	0
Mar	38,450	2,140	105	0.0	1,690	178	27,075	0
Apr	39,504	2,140	135	0.0	730	253	42,253	0
May	43,549	2,140	141	0.0	230	26	90,865	0
Jun	50,500	2,140	152	0.0	40	26	101,429	0
Jul	64,726	2,140	172	0.0	10	26	105,545	0
Aug	57,394	2,140	158	0.0	0	26	104,617	0
Sep	44,586	2,140	144	0.0	80	26	67,602	0
Oct	43,687	2,140	119	0.0	560	178	50,570	0
Nov	36,400	2,140	95	0.0	2,150	178	14,536	0
Dec	35,914	2,140	98	0.0	2,890	253	3,702	0
Totals	527,655	27,668	1,537	0	13,570	1,831	615,562	0

The following is an example for ECM 4:

Total Annual Savings (kWh): 13,513

Total Annual Savings (therms): 1,662

Rate (Section 2.2.1): \$0.05869/kWh \$0.74946/therm

Total Savings:  $(13,513 \times .05869) + (1,662 \times 0.74946) = \$2,038.68$

The following is an example for ECM 23:

Total Annual Savings (kWh): 12,172

Total Annual Savings (therms): 318

Rate (Section 2.2.1): \$0.05869/kWh \$0.74946/therm

Total Savings:  $(12,172 \times .05869) + (318 \times 0.74946) = \$952.70$

## **20 – Tri County Health**

ECM 4 – Programmable Thermostat

ECM 23 – ERCM

Programmable thermostat savings are calculated using a spreadsheet analysis. ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

<b>20 - Tri County Health</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	5,744	682	21	0.0	820	236	2,620	0
Feb	5,234	682	20	0.0	620	236	2,031	0
Mar	5,733	682	20	0.0	460	120	1,502	0
Apr	6,359	682	24	0.0	220	178	1,997	0
May	7,874	682	33	0.0	130	3	1,940	0
Jun	8,991	682	35	0.0	60	3	1,308	0
Jul	10,123	682	31	0.0	60	3	2,815	0
Aug	9,758	682	33	0.0	60	3	3,305	0
Sep	8,033	682	32	0.0	80	3	1,946	0
Oct	6,697	682	23	0.0	250	120	3,374	0
Nov	5,860	682	21	0.0	520	120	2,126	0
Dec	5,840	682	20	0.0	760	178	830	0
Totals	86,246	8,190	313	0	4,040	1,202	25,794	0

The following is an example for ECM 4:

Total Annual Savings (kWh): 6,828

Total Annual Savings (therms): 1,166

Rate (Section 2.2.1): \$0.05869/kWh \$0.74946/therm

Total Savings:  $(6,828 \times .05869) + (1,166 \times 0.74946) = \$1,274.61$

The following is an example for ECM 23:

Total Annual Savings (kWh): 1,362

Total Annual Savings (therms): 36

Rate (Section 2.2.1): \$0.05869/kWh \$0.74946/therm

Total Savings:  $(1,362 \times .05869) + (36 \times 0.74946) = \$106.92$

## **24 – Centrepointe**

ECM 23 – ERCM

ECM 25 – Retro Commissioning

ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Retro commissioning savings is calculated using Trane Trace modeling software. Savings calculations and Trace assumptions can be found in Volume II of the Energy Audit.

<b>24 - Centrepointe</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	260,048	21,100	643	0.0	340	-873	116,409	0
Feb	401,078	21,100	610	0.0	260	-873	121,020	0
Mar	261,719	21,100	579	0.0	230	-419	127,429	0
Apr	215,531	21,100	578	0.0	150	-646	217,067	0
May	211,119	21,100	537	0.0	160	35	450,652	0
Jun	203,988	21,100	644	0.0	120	35	608,281	0
Jul	223,833	21,100	599	0.0	130	35	767,500	0
Aug	219,062	21,100	627	0.0	160	35	847,328	0
Sep	203,212	21,100	552	0.0	220	35	677,306	0
Oct	224,160	21,100	537	0.0	380	-419	354,273	0
Nov	230,257	21,100	590	0.0	160	-419	156,870	0
Dec	256,230	21,100	654	0.0	170	-646	114,772	0
Totals	2,910,237	253,199	7,150	0	2,480	-4,125	4,558,907	0

The following is an example for ECM 23:

Total Annual Savings (kWh): 15,907

Total Annual Savings (therms): 415

Rate (Section 2.2.1): \$0.06321/kWh \$0.80714/therm

Total Savings:  $(15,907 \times 0.06321) + (415 \times 0.80714) = \$1,340.45$

The following is an example for ECM 25:

Total Annual Savings (kWh): 237,292

Total Annual Savings (therms): (4,540)

Rate (Section 2.2.1): \$0.06321/kWh \$0.80714/therm

Total Savings:  $(237,292 \times 0.06321) + ((4,540) \times 0.80714) = \$11,334.81$

## 29 – Peoria Shops

ECM 4 – Programmable Thermostat

ECM 23 – ERCM

Programmable thermostat savings are calculated using a spreadsheet analysis. ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

29 - Peoria Shops								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	31,395	842	71	0.0	5,380	1,733	99,923	0
Feb	30,020	842	73	0.0	5,270	1,733	147,319	0
Mar	29,589	842	68	0.0	3,950	872	187,883	0
Apr	25,210	842	64	0.0	2,040	1,303	181,875	0
May	25,120	842	60	0.0	1,090	10	128,820	0
Jun	25,790	842	56	0.0	200	10	123,600	0
Jul	26,147	842	59	0.0	100	10	137,541	0
Aug	25,917	842	62	0.0	50	10	206,059	0
Sep	23,967	842	61	0.0	600	10	135,714	0
Oct	26,448	842	65	0.0	2,060	872	200,571	0
Nov	29,101	842	64	0.0	4,580	872	133,714	0
Dec	30,367	842	66	0.0	6,340	1,303	168,000	0
Totals	329,071	23,323	769	0	31,660	8,740	1,851,019	0

The following is an example for ECM 4:

Total Annual Savings (kWh): 6,053

Total Annual Savings (therms): 8,615

Rate (Section 2.2.1): \$0.05869/kWh \$0.63481/therm

Total Savings:  $(6,053 \times .05869) + (8,615 \times 0.63481) = \$5,824.14$

The following is an example for ECM 23:

Total Annual Savings (kWh): 4,055

Total Annual Savings (therms): 125

Rate (Section 2.2.1): \$0.05869/kWh \$0.63481/therm

Total Savings:  $(4,055 \times .05869) + (125 \times 0.63481) = \$317.34$

### **36 – Detention Center**

ECM 16 – Irrigation Control System Upgrade

ECM 19 – Laundry Conservation

ECM 23 – ERCM

Irrigation and laundry conservation savings are calculated using a spreadsheet analysis. ERCM savings is calculated on a square foot basis encompassing all buildings within the scope. Savings calculations can be found in Volume II of the Energy Audit.

<b>36 - ACJC Detention Center</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Irrigation Usage Baseline gallons	Irrigation Usage Projected Savings gallons
Jan	453,980	3,945	728	0.0	31,370	228	838	0
Feb	411,708	3,945	731	0.0	27,300	228	3,667	0
Mar	464,851	3,945	747	0.0	28,060	228	42,333	15,294
Apr	449,165	3,945	779	0.0	24,710	228	150,000	30,587
May	468,214	3,945	833	0.0	19,640	228	390,471	45,881
Jun	466,091	3,945	888	0.0	17,680	228	723,529	61,174
Jul	503,173	3,945	906	0.0	13,590	228	746,699	91,761
Aug	513,825	3,945	857	0.0	13,270	228	703,986	30,587
Sep	468,494	3,945	874	0.0	16,670	228	611,283	30,587
Oct	462,990	3,945	769	0.0	24,690	228	320,795	0
Nov	433,440	3,945	757	0.0	29,110	228	8,621	0
Dec	422,045	3,945	726	0.0	32,890	228	8,498	0
Totals	5,517,976	47,337	9,595	0	278,980	2,735	3,710,720	305,870

The following is an example for ECM 16:

Total Annual Savings (kgals): 306

Rate (Section 2.2.1): \$7.83

Total Savings:  $306 \times 7.83 = \$2,395.98$

The following is an example for ECM 19:

Total Annual Savings (therms): 1,276

Rate (Section 2.2.1): \$0.63481/therm

Total Savings:  $(1,276 \times 0.63481) = \$810.02$

The following is an example for ECM 23:

Total Annual Savings (kWh): 47,337

Total Annual Savings (therms): 1,459

Rate (Section 2.2.1): \$0.05869/kWh \$0.63481/therm

Total Savings:  $(47,337 \times .05869) + (1,459 \times 0.63481) = \$3,704.40$

### **38 – Sheriff / Coroner Facility**

ECM 23 – ERCM

ECM 25 – Retro Commissioning

ECRM savings is calculated on a square foot basis encompassing all buildings within the scope. Retro commissioning savings is calculated using Trane Trace modeling software. Savings calculations and Trace assumptions can be found in Volume II of the Energy Audit.

<b>38 - Sheriff/Coroner Facility</b>								
Month	Electric Usage Baseline kWh	Electric Usage Projected Savings kWh	Electric Demand Baseline kW	Electric Demand Projected Savings kW	Natural Gas Usage Baseline therms	Natural Gas Usage Projected Savings therms	Water Usage Baseline gallons	Water Usage Projected Savings gallons
Jan	233,435	20,656	0	0.0	2,160	-1,308	93,314	0
Feb	215,005	20,656	0	0.0	2,260	-1,308	121,580	0
Mar	215,985	20,656	0	0.0	1,430	-631	97,456	0
Apr	199,959	20,656	0	0.0	1,370	-969	131,250	0
May	202,483	20,656	0	0.0	770	45	500,091	0
Jun	194,728	20,656	0	0.0	630	45	557,777	0
Jul	204,941	20,656	0	0.0	760	45	631,966	0
Aug	203,837	20,656	0	0.0	420	45	590,513	0
Sep	191,454	20,656	0	0.0	460	45	470,063	0
Oct	190,813	20,656	0	0.0	780	-631	279,428	0
Nov	185,731	20,656	0	0.0	1,720	-631	116,476	0
Dec	238,052	20,656	0	0.0	2,630	-969	89,700	0
Totals	2,476,423	247,866	0	0	15,390	-6,221	3,679,614	0

The following is an example for ECM 23:

Total Annual Savings (kWh): 20,276

Total Annual Savings (therms): 545

Rate (Section 2.2.1): \$0.05869/kWh \$0.72763/therm

Total Savings:  $(20,276 \times 0.05869) + (545 \times 0.72763) = \$1,586.56$

The following is an example for ECM 25:

Total Annual Savings (kWh): 227,590

Total Annual Savings (therms): (6,766)

Rate (Section 2.2.1): \$0.05869/kWh \$0.72763/therm

Total Savings:  $(227,590 \times 0.05869) + ((6,766) \times 0.72763) = \$8,434.11$



## **9.5 Post-Installation Verification Activities**

Chevron ES will supply a one-time report to the County detailing the calculation of savings. These calculated savings will be defined as Energy Unit Savings and will be agreed to occur each year of the Contract.

### **9.5.1 Variables Affecting Post-installation Energy Use**

- Same as described above for the pre-installation period.

### **9.5.2 Define key system performance factors characterizing the post-installation conditions**

- Post retrofit measurements and commissioning efforts will confirm the accuracy of performance.

### **9.5.3 N/A**

### **9.5.4 N/A**

### **9.5.5 Post-Installation Data to Be Collected**

This is described above.

### **9.5.6 Data analysis to be performed and minimum acceptance requirements.**

This is described above.

## **9.6 Periodic / Interval Verification Activities**

- N/A

# 6

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## Appendix

This Section is divided into four (4) separate sections: Appendix A, Appendix B, Appendix C, and Appendix D.

Appendix A – Inventory of Light Fixtures provides an inventory of all existing light fixtures within the selected buildings at Arapahoe County. Appendix B – Standards of Control provides an inventory of the Standards of Control for existing conditions and proposed new conditions on which the energy savings calculations are based. Appendix C – Points List provides the points lists per facility for the recommended energy management system. Appendix D – Weighted Average Service Life of the Project provides the weighted average life of each ECM.

# **Appendix A**

## **Inventory of Light Fixtures**

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (01) Administration

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
P001	Mech. Room	8S75CF2	2	150	0.30	250		75	18S32CF(Lo)4	104	0.21	52	0.17	0.01	21
P001	Stair P001	W34WF2	1	78	0.08	3750		293	W32WF(Lo)2	52	0.05	195	0.90	0.02	88
P001	Stair P001	R28W(CF)1	1	26	0.03	3750		98	R28W(CF)1	26	0.03	98	0.90	0.00	0
400.4	BOCC Storage Closet	W34CF2	1	78	0.08	500		39	W32CF(Lo)2	52	0.05	26	0.33	0.01	12
410.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
410.3	Office	W34CF2	1	78	0.08	2250		176	W32CF(Lo)2	52	0.05	117	0.90	0.02	53
410.3	Office	W32TF1	1	32	0.03	2250		72	W32TF1	32	0.03	72	0.90	0.00	0
410.3	Office	W17TF1	2	17	0.03	2250		77	W17TF(Lo)1	17	0.03	77	0.90	0.00	0
410.4	Conference Rm.	24T34RF3	2	117	0.23	250		59	24T32RF(R/T)2	58	0.12	29	0.17	0.02	27
410.4	Conference Rm.	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
410.4	Conference Rm.	C26R(CF)1	5	26	0.13	250		33	C26R(CF)1	26	0.13	33	0.17	0.00	0
410.5	Comm. Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
410.6	Comm. Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
410.7	Comm. Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
410.8	Comm. Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
410.9	Comm. Office	22T32RF(U)2	1	58	0.06	2250		131	22T17RF(R)2	32	0.03	72	0.90	0.02	53
410.9	Comm. Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
410.9	Open Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R/T)2	58	0.23	522	0.90	0.21	478
410.9	Open Office	24T34RF3	19	117	2.22	2250		5,002	24T32RF(R)2	58	1.10	2,480	0.90	1.01	2,270
410.9	Open Office	C45R(R30)1	5	45	0.23	2250		506	C45R(R30)1	45	0.23	506	0.90	0.00	0
410.1	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
410.1	Office	W32TF1	2	32	0.08	2250		144	W32TF1	32	0.08	144	0.90	0.00	0
410.1	Office	W17TF1	1	17	0.02	2250		38	W17TF(Lo)1	17	0.02	38	0.90	0.00	0
410.2	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
410.2	Office	W32TF1	2	32	0.06	2250		144	W32TF1	32	0.06	144	0.90	0.00	0
410.2	Elev. Lobby (by 400.8)	24T34RF3	4	117	0.47	3750		1,755	24T32RF(R)2	58	0.23	870	0.90	0.21	797
410.2	Elev. Lobby (by 400.8)	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
410.2	Elev. Lobby (by 400.8)	C13R(CF)1	3	15	0.05	3750		169	C13R(CF)1	15	0.05	169	0.90	0.00	0
400.8	Men's Restroom	14T34RF1	4	39	0.16	2250		351	14T32RF(LoT2)1	26	0.10	234	0.90	0.05	165
	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
400.7	Jan. Closet	O130C11	1	100	0.10	500		50	S32CF(Lo)1	30	0.03	15	0.33	0.02	32

Project: **Arapahoe County**

Building: **(01) Administration**

Job No.

**DWCES30219**

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
400.2	Electrical Rm.	O100C11	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.17	16
400.6	Kitchen	R60C12	1	120	0.12	2250		270	W32CF(Lo)2	52	0.05	117	0.90	138
400.6	Kitchen	C60C11	1	60	0.06	2250		135	C15R(CF)1	15	0.02	34	0.90	91
400.5	Women's Restroom	14T34RF1	4	39	0.16	2250		351	14T32RF(Lo/T2)1	26	0.10	234	0.90	105
400.5	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0
415	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	358
415	Office	W32TF1	2	32	0.06	2250		144	W32TF1	32	0.06	144	0.90	0
440	Office	24T34RF4	3	156	0.47	2250		1,053	24T32RF(R)2	58	0.17	392	0.90	595
440	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	4
441	Conference Rm.	24T34RF3	8	117	0.94	250		234	24T32RF(R)2	58	0.46	116	0.17	106
443	Conference Rm.	24T34RF3	9	117	1.05	250		263	24T32RF(R)2	58	0.52	131	0.17	120
444	Conference Rm.	24T34RF3	8	117	0.94	250		234	24T32RF(R)2	58	0.46	116	0.17	106
460	Veterans Service	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	358
460	Veterans Service	W32TF1	2	32	0.06	2250		144	W32TF1	32	0.06	144	0.90	0
465	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	358
465	Office	W32TF1	2	32	0.06	2250		144	W32TF1	32	0.06	144	0.90	0
470	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
470	Office	W32TF1	2	32	0.06	2250		144	W32TF1	32	0.06	144	0.90	0
H470	Hall (Corridor)	24T34RF3	9	117	1.35	3750		3,949	24T32RF(R)2	58	0.52	1,958	0.90	1,792
H470	Hall (Corridor)	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0
H470	Hall (Corridor)	22T34RF(U)2	1	78	0.08	3750		293	22T17RF(R)2	32	0.03	120	0.90	155
475	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
475	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	8
480	Risk Management	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
480	Risk Management	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0
480	Risk Management	14T32RF2	3	58	0.17	2250		392	14T32RF2	58	0.17	392	0.90	0
480.1	Training Rm.	24T34RF3	5	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	358
480.2	Office	24T32RF(U)2	2	58	0.12	2250		261	24T32RF(U)2	58	0.12	261	0.90	0
480.2	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.90	12
480.2	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	4
480.3	Storage-Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
480.3	Storage-Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	10

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Areas Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage (kW)	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
450.4	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
450.4	Office	W34TF1	2	34		2250	2		W32TF1	32	0.06	144	0.90	-0.06	-130
455	Kitchen	W34CF4	1	156	0.16	2250		351	W32CF(L)04	104	0.10	234	0.90	0.05	105
420	County Atty. Office Area												0.00		
420.13	Library	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	382	0.90	0.16	358
432	File Room	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.11	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.11	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
420.1	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.1	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
420.9	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.9	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.90	0.01	12
420.8	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.8	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.90	0.01	12
420.8	Office	W30TF1	1	30	0.03	2250		68	W25TF(L)01	25	0.03	56	0.90	0.00	10
420.7	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.7	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)01	25	0.05	113	0.90	0.01	20
420.6	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.6	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
420.5	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.5	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)01	25	0.05	113	0.90	0.01	20
420.4	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.4	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)01	25	0.05	113	0.90	0.01	20
420.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.3	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
420.3	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.90	0.00	6
420.2	Conference Rm.	24T34RF3	4	117	0.47	250		117	24T32RF(R)2	58	0.23	58	0.17	0.04	53
420.1	Copy Rm.	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
420.1	Copy Rm.	C13R(CF)1	2	15	0.03	2250		68	C13R(CF)1	15	0.03	68	0.90	0.00	0
H420	Corridor	24T34RF3	16	117	1.76	3750	3	6,581	24T32RF(R)2	58	0.93	3,480	0.90	0.74	2,791
H420	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
420.2	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(01) Administration**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand (kW)	Energy (kWh)
420.2	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.00	4
420.2	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.00	6
420.19	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
420.19	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.00	4
420.19	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.00	6
420.18	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
420.18	Office	W34TF1	3	34	0.10	2250		230	W32TF1	32	0.10	216	0.01	12
420.17	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
420.17	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.00	8
420.17	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.01	12
420.16	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
420.16	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.00	8
420.15	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
420.15	Office	W34TF1	3	34	0.10	2250		230	W32TF1	32	0.10	216	0.01	12
480	Lobby (Elev)	24T34RF3	3	117	0.35	3750		1,316	24T32RF(R)2	58	0.17	653	0.16	597
480	Lobby (Elev)	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.00	0
400.9	Men's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	468	0.03	69
400.9	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.00	0
400.1	Jan. Closet	O100C1	1	100	0.10	500		50	S32CF(Lo)1	30	0.03	15	0.02	32
400.11	Kitchen	R75C12	1	150	0.15	2250		338	Q13R(CF)2	31.2	0.03	70	0.11	241
400.14	Electrical Rm.	O100C1	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.01	16
400.12	Women's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	468	0.03	69
400.12	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.00	0
480	Finance Open Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.21	478
480	Finance Open Office	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.00	0
480.1	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
480.1	Office	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.05	120
480.1	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.00	8
480.1	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.00	10
480.2	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.11	239
480.2	Office	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.05	120
480.2	Office	W30TF1	3	30	0.09	2250		203	W25TF(Lo)1	25	0.08	169	0.01	30

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No: **DWCES30219**  
Building: **(01) Administration**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (KWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (KWh)		Demand (kW)	Energy (KWh)
480.3	File Storage	24T34RF3	1	117	0.12	500		59	24T32RF(R)2	58	0.06	29	0.33	0.02	27
480.4	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.4	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
480.4	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	0.00	10
480	Open Office	24T34RF3	12	117	1.40	2250		3,159	24T32RF(R)2	58	0.70	1,566	0.90	0.64	1,434
493	Payroll	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
493	Payroll	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
493	Payroll	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20
480.2	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.2	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
480.2	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	0.00	10
480.19	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.19	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
480.18	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
480.17	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
480.17	Office	W30TF1	4	30	0.12	2250		270	W25TF(Lo)1	25	0.10	225	0.90	0.02	41
480.16	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.16	Office	W30TF1	4	30	0.12	2250		270	W25TF(Lo)1	25	0.10	225	0.90	0.02	41
480.15	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.15	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
480.14	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.14	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
480.13	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.13	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
480.12	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.12	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	0.00	10
480.12	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.90	0.00	6
480.11	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.11	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20
480.1	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
480.1	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20



hrs. The demand savings are not fully claimed.

Job No. **DWCES30219**

Project: **Arapahoe County**

Building: **(01) Administration**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
480.5	Break Rm.	24T34RF3	3	117	0.31	2250	1	702	24T32RF(R)2	58	0.17	392	0.90	280
H480	Corridor (SW 80.5)	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(R)2C(LED)1	2	0.01	53	0.90	0
H480	Corridor	24T34RF3	2	117	0.23	3750		878	24T32RF(R)2	58	0.12	435	0.90	398
480.9	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
480.9	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	4
480.8	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
480.8	Office	22T34RF(U)2	1	78	0.08	2250		176	22T17RF(R)2	32	0.03	72	0.90	93
480.8	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	8
P001	Mech. Room (North)	8S75CF2	2	150	0.30	250		75	18S32CF(Lo)4	104	0.21	52	0.17	21
P001	N. Stair Tower	R13W(CF)1	2	13	0.03	3750		98	R13W(CF)1	13	0.03	98	0.90	0
P001	N. Stair Tower	W34WF2	1	78	0.08	3750		293	W32WF(Lo)2	52	0.05	195	0.90	88
310	Data Analysis Area												0.00	
310	Open Office	24T34RF4	5	156	0.78	2250		1,755	24T32RF(R)2	58	0.29	653	0.90	992
310	Open Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
310	Open Office	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0
310.1	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
310.1	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	8
310.2	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
310.2	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	10
310.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	239
310.3	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	20
300.1	Electrical Rm.	O100C1	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.17	16
300.5	Jan. Closet	O100C1	1	100	0.10	500		50	S32CF(Lo)1	30	0.03	15	0.33	32
300.2	South Stair Tower	W34WF2	1	78	0.08	3750		293	W32WF(Lo)2	52	0.05	195	0.90	88
300.2	South Stair Tower	R13W(CF)1	1	13	0.01	3750		49	R13W(CF)1	13	0.01	49	0.90	0
300.4	Kitchen	R60C12	1	120	0.12	2250		270	W32CF(Lo)2	52	0.05	117	0.90	138
300.3	Women's Restroom	15B75RF1	2	78	0.16	2250		351	15B(2517)RF1	42	0.08	189	0.90	146
300.3	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0
300.5	Men's Restroom	15B75RF1	2	78	0.16	2250		351	15B(2517)RF1	42	0.08	189	0.90	146
300.5	Lobby	C26R(CF)1	6	26	0.16	3750		585	C26R(CF)1	26	0.16	585	0.90	0
300.6	Lobby	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0
H300	Atrium Corridor	S32RF1	20	35	0.70	3750		2,625	S32RF1	35	0.70	2,625	0.90	0

hrs. The demand savings are not fully claimed.

Building: (01) Administration

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
H300	Atrium Corridor	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(R)2C(LED)1	2	0.01	53	0.90	0.00	0
H300	Atrium Corridor	S32RF1	23	35	0.81	3750		3,019	S32RF1	35	0.81	3,019	0.90	0.00	0
H300	Atrium Corridor	C26R(CF)1	12	26	0.31	3750		1,170	C26R(CF)1	26	0.31	1,170	0.90	0.00	0
H300	Atrium Wall Washer	D36W(CF)2	24	72	1.73	2250		3,888	D36W(CF)2	72	1.73	3,888	0.90	0.00	0
320	Treasure Office	24T34RF3	42	117	4.41	2250	13	9,916	24T32RF(R)2	58	2.44	5,481	0.90	1.77	3,991
320	Treasure Office	W34CF4	1	156	0.16	2250		351	W32CF(Lo)4	104	0.10	234	0.90	0.05	105
320	Treasure Office	C65Tr(R30)1	5	65	0.33	2250		731	C65Tr(R30)1	65	0.33	731	0.90	0.00	0
320.1	Conference Rm.	24T34RF3	2	117	0.16	250	2	39	24T32RF(R)2	58	0.12	29	0.17	0.01	9
320.8	Office	24T34RF3	3	117	0.27	2250	2	614	24T32RF(R)2	58	0.17	392	0.90	0.09	201
320.8	Office	W20TF1	4	20	0.08	2250		180	W17TF1	17	0.07	153	0.90	0.01	24
320.7	Office	24T34RF3	4	117	0.39	2250	2	878	24T32RF(R)2	58	0.23	522	0.90	0.14	320
320.6	Office	24T34RF3	2	117	0.08	2250	4	176	24T32RF(R)2	58	0.12	261	0.90	-0.03	-77
320.6	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
320.6	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.90	0.01	12
320.6	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20
320.1	Bookkeeping	24T34RF3	4	117	0.27	2250	5	614	24T32RF(R)2	58	0.23	522	0.90	0.04	83
320.1	Bookkeeping	24T34RF3	15	117	1.76	2250		3,949	24T32RF(R)2	58	0.87	1,958	0.90	0.80	1,792
320.1	Bookkeeping	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
320.3	File Room	8S60CF2	3	121	0.36	500		182	18S32CF(Lo)4	104	0.31	156	0.33	0.02	23
320.3	File Room	24T34RF3	1	117	0.12	500		59	24T32RF(R)2	58	0.06	29	0.33	0.02	27
320.5	Break Room	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.90	0.05	120
340	Assessor Office	24T34RF3	22	117	2.57	2250		5,792	24T32RF(R)2	58	1.28	2,871	0.90	1.17	2,629
340	Assessor Office	24T34RF3	110	117	12.87	2250		28,958	24T32RF(R)2	58	6.38	14,355	0.90	5.84	13,142
340	Assessor Office	22T34RF(U)2	11	78	0.86	2250		1,931	22T17RF(R)2	32	0.35	792	0.90	0.46	1,025
340.5	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
340.5	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20
340.3	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
340.2	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
340.2	Office	W30TF1	2	30	0.06	2250		135	W25TF(Lo)1	25	0.05	113	0.90	0.01	20
340.2	Open Office	C65Tr(R30)1	8	65	0.52	2250		1,170	C65Tr(R30)1	65	0.52	1,170	0.90	0.00	0
340.1	Conference Rm.	24T34RF3	3	117	0.35	250		88	24T32RF(R)2	58	0.17	44	0.17	0.03	40
340	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0

Project: Arapahoe County

Job No.

DWCES30219

Building: (01) Administration

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
340	Open Office	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
340	Open Office	C60R11	6	60	0.36	2250		810	C15R(CF)1	15	0.09	203	0.90	0.24	547
300.1	Men's Restroom	15B75RF1	2	78	0.16	2250		351	15B(25/17)RF1	42	0.08	189	0.90	0.06	146
300.1	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
300.13	Women's Restroom	15B75RF1	2	78	0.16	2250		351	15B(25/17)RF1	42	0.08	189	0.90	0.06	146
300.13	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
300.14	3rd N. Stair Tower	W34WF2		78	0.08	3750		293	W32WF(Lo)2	52	0.05	135	0.90	0.02	88
300.14	3rd N. Stair Tower	R13W(CF)1	1	13	0.01	3750		49	R13W(CF)1	13	0.01	49	0.90	0.00	0
300	N Elev. Lobby	C28R(CF)1	8	26	0.21	3750		780	C28R(CF)1	26	0.21	780	0.90	0.00	0
300	N Elev. Lobby	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
L00.18	Men's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	488	0.90	0.03	69
L00.18	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
L00.19	Janitor	R60C12	1	120	0.12	500		60	W32CF(Lo)2	52	0.05	26	0.33	0.02	31
L00.23	Elect.	O100C11	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.17	0.01	16
L00.20	Kitchen	O13C(CF)1	1	13	0.01	2250		29	O13C(CF)1	13	0.01	29	0.90	0.00	0
L00.21	Women's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	488	0.90	0.03	69
L00.21	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
L00.22	Stair	W34WF2	1	78	0.08	3750		293	W32WF(Lo)2	52	0.05	135	0.90	0.02	88
L00.22	Stair	R13W(CF)1	1	13	0.01	3750		49	R13W(CF)1	13	0.01	49	0.90	0.00	0
L00	N Elev. Lobby	C28R(CF)1	4	26	0.10	3750		390	C28R(CF)1	26	0.10	390	0.90	0.00	0
L01	N Elev. Lobby	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
L30.21	File Storage	W34CF2	16	78	0.86	500	10	429	W32CF(Lo)T)2	52	0.83	416	0.33	0.01	12
L30.19	Clerk File Rm.	24T34RF4	10	156	0.70	500	22	351	24T32RF(R)2	58	0.58	290	0.33	0.04	55
L30.19	Clerk File Rm.	24T34RF4	38	156	5.93	500		2,964	24T32RF(R)2	58	2.20	1,102	0.33	1.12	1,676
HL30	Corridor	24T34RF3	5	117	0.59	3750		2,194	24T32RF(R)2	58	0.29	1,088	0.90	0.27	996
HL30	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
L30.E	Clerk Storage Rm.	24T34RF3	6	117	0.70	500		351	24T32RF(R)2	58	0.35	174	0.33	0.11	159
L30.E	Clerk Storage Rm.	W34TF1	2	34	0.07	500		34	W32TF1	32	0.06	32	0.33	0.00	2
L30.D	Clerk & Recorder	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
L30.D	Clerk & Recorder	24T34RF3	9	117	1.05	2250		2,369	24T32RF(R)2	58	0.52	1,175	0.90	0.48	1,075
L30.D	Clerk & Recorder	22T34RF(U)2	1	78	0.08	2250		176	22T17RF(R)2	32	0.03	72	0.90	0.04	93
L30.E	Bookkeeping	24T34RF3	11	117	1.29	2250		2,896	24T32RF(R)2	58	0.64	1,436	0.90	0.58	1,314

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
L30.E	Bookkeeping	14T34RF2	1	78	0.08	2250		176	14T32RF(Lo)2	52	0.05	117	0.90	0.02	53
L30.F	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
L30.F	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.90	0.00	6
L30.F	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	0.00	10
L30.17	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
L30.17	Office	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.90	0.05	120
L30.17	Office	W34TF1	2	34	0.07	2250		153	W32TF1	32	0.06	144	0.90	0.00	8
L30.13	Office-Research	24T34RF3	9	117	1.05	2250		2,369	24T32RF(R)2	58	0.52	1,175	0.90	0.48	1,075
L30.A	Voter Reg-Marriage-Rec	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
L30.A	Voter Reg-Marriage-Rec	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
L30.10	Voter Reg-Marriage-Rec	24T34RF3	16	117	1.87	2250		4,212	24T32RF(R)2	58	0.93	2,088	0.90	0.85	1,912
L30.10	Voter Reg-Marriage-Rec	24T34RF3	48	117	5.62	2250		12,636	24T32RF(R)2	58	2.78	6,264	0.90	2.55	5,735
L30.10	Voter Reg-Marriage-Rec	22T34RF(U)2	1	78	0.08	2250		176	22T17RF(R)2	32	0.03	72	0.90	0.04	93
L30.5	Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
L30.4	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
L30.4	Office	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.90	0.05	120
L30.3	Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
L30.9	Office	24T34RF4	2	156	0.31	2250		702	24T32RF(R)2	58	0.12	261	0.90	0.18	397
L30.8	Office	24T34RF4	2	156	0.31	2250		702	24T32RF(R)2	58	0.12	261	0.90	0.18	397
L30.8	Office	24T34RF4	1	156	0.16	2250		351	24T32RF(R)2	58	0.06	131	0.90	0.09	199
L30.8	Office	W30TF1	1	30	0.03	2250		68	W25TF(Lo)1	25	0.03	56	0.90	0.00	10
L30.8	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.90	0.00	6
L30.2	Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
L30.6	Motor Vehicle	24T34RF3	34	117	3.98	2250		8,951	24T32RF(R)2	58	1.97	4,437	0.90	1.81	4,062
L30.6	Motor Vehicle	24T34RF3	37	117	4.33	2250		9,740	24T32RF(R)2	58	2.15	4,829	0.90	1.96	4,421
L30	Motor Vehicle	22T34RF(U)2	2	78	0.16	2250		351	24T32RF(R)2	58	0.06	144	0.90	0.08	186
L30	Motor Vehicle	X(R)2C(LED)1	1	2	0.00	8759.52		18	22T17RF(R)2	32	0.00	18	0.90	0.00	0
L30	Motor Vehicle	C26R(CF)1	39	26	1.01	2250		2,282	X(R)2C(LED)1	2	1.01	2,282	0.90	0.00	0
L30	Motor Vehicle	X(R)2C(LED)1	4	2	0.01	8759.52		70	X(R)2C(LED)1	2	0.01	70	0.90	0.00	0
L30	Motor Vehicle	S32RF1	22	35	0.77	2250		1,733	S32RF1	35	0.77	1,733	0.90	0.00	0
L30	Motor Vehicle	S32RF1	14	35	0.49	2250		1,103	S32RF1	35	0.49	1,103	0.90	0.00	0
L00.17	Storage	24T34RF4	8	156	1.25	500		624	24T32RF(R)2	58	0.46	232	0.33	0.24	353

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
L00.13	Main Elec. Fire Panel	8S75CF2	3	150	0.45	250		113	18S32CF(Lo)4	104	0.31	78	0.17	0.02	31
L00.13	Main Elec. Fire Panel	24T34RF4	1	156	0.08	250	2	20	24T32RF(R)2	58	0.06	15	0.17	0.00	5
L00.15	Tele Rm.	8S75CF2	1	150	0.15	2250		338	18S32CF(Lo)4	104	0.10	234	0.90	0.04	93
L00.16	Vending/Break Rm.	8D59PF6	1	354	0.35	2250		797	8D59PF6	354	0.35	797	0.90	0.00	0
L00.17	Atrium Stairway (lower level)	C45RH1	4	45	0.18	3750		675	C45RH1	45	0.18	675	0.90	0.00	0
L20	E. Hearing Rm.	8D59PF6	21	354	7.43	2250		16,727	8D59PF6	354	7.43	16,727	0.90	0.00	0
L20	E. Hearing Rm.	D57PF3	2	177	0.35	2250		797	D57PF3	205.2	0.41	923	0.90	-0.05	-114
L21	E. Hearing Rm.	X2W(LED)1	4	2	0.01	8759.52		70	X2C(LED)1	2	0.01	70	0.90	0.00	0
L22	E. Hearing Rm.	C75TH(R38)1	18	75	1.35	2250		3,038	C75TH(R38)1	75	1.35	3,038	0.90	0.00	0
L20.3	Video Room	W34CF4	2	156	0.31	2250		702	W32CF(Lo)4	104	0.21	468	0.90	0.09	211
L20.4	Video Room	W34CF4	2	156	0.31	2250		702	W32CF(Lo)4	104	0.21	468	0.90	0.09	211
L20.4	W. Hearing Rm.	22T32RF(Dim)U2	19	64	1.22	2250		2,736	22T17RF(R/dim)2	32	0.61	1,368	0.90	0.55	1,231
L20.4	W. Hearing Rm.	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
L20.4	W. Hearing Rm.	C18R(CF)1	10	21	0.21	2250		473	C18R(CF)1	21	0.21	473	0.90	0.00	0
L20	Entry E. Hearing Rm.	C45RH(M16)1	8	45	0.36	2250		810	C45RH(M16)1	45	0.36	810	0.90	0.00	0
L20	W. Entry	C26R(CF)1	13	26	0.34	2250		761	C26R(CF)1	26	0.34	761	0.90	0.00	0
L00.1	S. Exit	C26R(CF)1	13	26	0.34	2250		761	C26R(CF)1	26	0.34	761	0.90	0.00	0
L00.1	S. Exit	C45RH(M16)1	6	45	0.27	2250		608	C45RH(M16)1	45	0.27	608	0.90	0.00	0
L00.2	Storage	O100C11	2	100	0.20	500		100	S32CF(Lo)1	30	0.06	30	0.33	0.04	63
L00.3	Mech. Room	O100C11	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.17	0.01	16
L00.3	W. Entry	SP300WH1	1	300	0.30	2250		675	SP300WH1	300	0.30	675	0.90	0.00	0
L00.12	Men's Restroom	W32CF2	4	58	0.23	2250		522	W32CF2	58	0.23	522	0.90	0.00	0
L00.12	Men's Restroom	C13R(CF)1	1	15		2250	1		C13R(CF)1	15	0.02	34	0.90	-0.01	-30
L00.11	Jan. Closet	O100C11	1	100	0.10	500		50	S32CF(Lo)1	30	0.03	15	0.33	0.02	32
L00.10	Kitchen	R60C12	1	120	0.12	2250		270	W32CF(Lo)2	52	0.05	117	0.90	0.06	138
L00.9	Women's Restroom	W32CF2	4	58	0.23	2250		522	W32CF2	58	0.23	522	0.90	0.00	0
L00.9	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
L00.8	S. Stair Tower	W34WF1	1	42	0.04	3750		138	W32CF(Lo)1	26	0.03	98	0.90	0.01	54
L00.8	S. Stair Tower	C13W(CF)1	1	15	0.02	3750		56	C13R(CF)1	15	0.02	56	0.90	0.00	0
L00.10	Tele Lobby	C26R(CF)1	10	26	0.26	2250		525	C26R(CF)1	26	0.26	585	0.90	0.00	0
L00.10	Tele Lobby	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
G00.1	Corridor	24T34RF3	4	117	0.47	3750		1,755	24T32RF(R)2	58	0.23	870	0.90	0.21	797

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (01) Administration  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
G15	IT Storage	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	58	0.33	0.04	53
G15	IT Storage	24T34RF3	1	117	0.12	500		59	24T32RF(R)2	58	0.06	29	0.33	0.02	27
G05.1	IT Lab	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G05.1	IT Lab	24T34RF3	7	117	0.82	2250		1,843	24T32RF(R)2	58	0.41	914	0.90	0.37	836
G25	IT Conf. Rm	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
G25	IT Conf. Rm	24T34RF3	5	117	0.59	250		146	24T32RF(R)2	58	0.29	73	0.17	0.04	66
G20	Radio Rm.	8S75CF2	3	150	0.45	2250		1,013	18S32CF(Lo)4	104	0.31	702	0.90	0.12	280
G20	Radio Rm.	W34CF2	2	78	0.16	2250		351	W32CF(Lo)2	52	0.10	234	0.90	0.05	105
G20	Radio Rm.	W34CF2	1	78	0.08	2250		176	W32CF(Lo)2	52	0.05	117	0.90	0.02	53
G10	IT Training	24T34RF3	14	117	1.64	2250		3,686	24T32RF(R)2	58	0.81	1,827	0.90	0.74	1,673
G10	IT Training	C75TRI1	8	75	0.60	2250		1,350	C15R(CF)1	15	0.12	270	0.90	0.43	972
G00.12	Men's Restroom	8S75RF1	1	75	0.08	2250		169	18W32PF(Lo)4	104	0.10	234	0.90	-0.03	-59
G00.12	Men's Restroom	5S55RF1	2	55	0.11	2250		248	15S(25/17)RF1	42	0.08	189	0.90	0.02	53
G00.12	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
G00.11	Jan. Closet	O100CI1	1	100	0.10	500		50	S32CF(Lo)1	30	0.03	15	0.33	0.02	32
G00.10	Kitchen	R60C2	1	120	0.12	2250		270	W32CF(Lo)2	52	0.05	117	0.90	0.06	138
G00.9	Women's Restroom	5S55RF1	2	55	0.11	2250		248	15S(25/17)RF1	42	0.08	189	0.90	0.02	53
G00.9	Women's Restroom	8S75RF1	1	75	0.08	2250		169	18W32PF(Lo)4	104	0.10	234	0.90	-0.03	-59
G00.9	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
G00.8	Fire Sprinkler Rm.	O100CI1	2	100	0.20	250		50	S32CF(Lo)1	30	0.06	15	0.17	0.02	32
G00.6	Storage Rm.	8S75CF2	2	150	0.30	500		150	18S32CF(Lo)4	104	0.21	104	0.33	0.03	41
G00.7	Tele. Rm.	O18C(CF)1	1	18	0.02	250		5	O18C(CF)1	18	0.02	5	0.17	0.00	0
G00.5	Corridor	C26R(CF)1	4	26	0.10	3750		390	C26R(CF)1	26	0.10	390	0.90	0.00	0
G00.5	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
G00.5	S. Stair Tower	C13W(CF)1	1	15	0.02	3750		56	C13R(CF)1	15	0.02	56	0.90	0.00	0
G00.4	Elev. Equip. Rm.	O100CI1	1	100	0.10	250		25	S32CF(Lo)1	30	0.03	8	0.17	0.01	16
G30	Office	24T34RF3	4	117	0.47	2250		1,053	24T32RF(R)2	58	0.23	522	0.90	0.21	478
G30	Corridor	24T34RF3	3	117	0.35	3750		1,316	24T32RF(R)2	58	0.17	653	0.90	0.16	597
G30	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
G40	Maint. Storage	8S75CF2	3	150	0.30	500	2	150	18S32CF(Lo)4	104	0.31	156	0.33	0.00	-5
G40	Maint. Storage	8S32PF4	3	116	0.35	500		174	8S32PF4	116	0.35	174	0.33	0.00	0
G35	Kitchen	24T34RF4	3	156	0.47	2250		1,053	24T32RF(R)2	58	0.17	392	0.90	0.26	595

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (01) Administration

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
G35.1	Mech. Rm.	8S75WF2	1	150	0.15	250		38	8S32WF(L)4	104	0.10	26	0.17	0.01	10
G45	Office Services	24T32RF3	7	87	0.61	2250		1,370	24T32RF(R)2	58	0.41	914	0.90	0.18	411
G45.1	Supv. Office	24T32RF3	2	87	0.17	2250		392	24T32RF(R)2	58	0.12	261	0.90	0.05	118
G50	Quiet Room	24T34RF3	3	117	0.16	2250	5	351	24T32RF(R)2	58	0.17	392	0.90	-0.02	-37
G55	Facilities Service	24T34RF3	4	117	0.31	2250	4	702	24T32RF(R)2	58	0.23	522	0.90	0.07	162
G55.1	Office	24T34RF3	1	117	0.08	2250	1	176	24T32RF(R)2	58	0.06	131	0.90	0.02	41
G55.1	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)1	25	0.05	113	0.90	0.01	20
G55.1	Office	W20TF1	2	20	0.04	2250		90	W17TF1	17	0.03	77	0.90	0.01	12
G55.2	Office	24T34RF3	1	117	0.08	2250	1	176	24T32RF(R)2	58	0.06	131	0.90	0.02	41
G55.2	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
G55.2	Office	W30TF1	2	30	0.03	2250	1	68	W25TF(L)1	25	0.05	113	0.90	-0.02	-41
G55.3	Office	24T34RF3	2	117	0.12	2250	3	263	24T32RF(R)2	58	0.12	261	0.90	0.00	2
G55.3	Office	W34TF1	3	34	0.10	2250		230	W32TF1	32	0.10	216	0.90	0.01	12
G55.3	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)1	25	0.05	113	0.90	0.01	20
G55.4	Office	24T34RF3	1	117	0.08	2250	1	176	24T32RF(R)2	58	0.06	131	0.90	0.02	41
G55.4	Office	W34TF1	1	34	0.03	2250		77	W32TF1	32	0.03	72	0.90	0.00	4
G55.4	Office	W30TF1	2	30	0.06	2250		135	W25TF(L)1	25	0.05	113	0.90	0.01	20
G55.4	Office	W20TF1	1	20	0.02	2250		45	W17TF1	17	0.02	38	0.90	0.00	6
G55.A	Facilities Service	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
G55.B	Plan	24T32RF3	6	87	0.52	2250		1,175	24T32RF(R)2	58	0.35	783	0.90	0.16	352
G85	Facilities Service	24T34RF4	5	156	0.78	2250		1,755	24T32RF(R)2	58	0.29	653	0.90	0.44	992
G85.1	Storage	8S75CF2	3	150	0.45	500		225	18S32CF(L)4	104	0.31	156	0.33	0.04	62
G85.2	Storage	8S75CF2	1	150	0.15	500		75	18S32CF(L)4	104	0.10	52	0.33	0.01	21
G85	Corridor	24T34RF3	8	117	0.62	3750	8	2,340	24T32RF(R)2	58	0.46	1,740	0.90	0.14	540
G85	Corridor	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(R)2C(LED)1	2	0.01	53	0.90	0.00	0
G90	Maint. Storage	8S75CF2	2	150	0.30	500		150	18S32CF(L)4	104	0.21	104	0.33	0.03	41
G90.1	Chiller Rm.	S34PF2	8	78	0.52	250		156	S32CF(L)2	52	0.42	104	0.17	0.03	47
G90.1	Chiller Rm.	X2W(LED)1	1	2	0.00	8759.52		18	X2C(LED)1	2	0.00	18	0.90	0.00	0
G92	Sheriff's Substation	24T34RF4	2	156	0.31	2250		702	24T32RF(R)2	58	0.12	261	0.90	0.18	397
G00.25	Corridor	24T34RF4	4	156	0.62	3750		2,340	24T32RF(R)2	58	0.23	870	0.90	0.35	1,323
G00.25	Corridor	24T34RF3	1	117	0.12	3750		439	24T32RF(R)2	58	0.06	218	0.90	0.05	199
G00.25	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (01) Administration  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
G00.25	Corridor	8S75CF2	2	150	0.30	3750		1,125	18S32CF(Lo)4	104	0.21	780	0.90	0.08	311
G99	Office Service Storage	24T34RF4	3	156	0.47	2250		1,063	24T32RF(R)2	58	0.17	392	0.90	0.26	595
G95	Print Shop	24T34RF4	2	156	0.31	2250		702	24T32RF(R)2	58	0.12	261	0.90	0.18	397
G95	Print Shop	24T34RF4	17	156	2.65	2250		5,967	24T32RF(R)2	58	0.99	2,219	0.90	1.50	3,374
G95	Print Shop	8S75CF2	2	150	0.30	2250		675	18S32CF(Lo)4	104	0.21	468	0.90	0.08	186
G95.1	Office	24T34RF4	1	156	0.16	2250		351	24T32RF(R)2	58	0.06	131	0.90	0.09	199
G95.2	Wash Room	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G95.3	Print Area	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G95.3	Print Area	24T34RF4	9	156	1.40	2250		3,159	24T32RF(R)2	58	0.52	1,175	0.90	0.79	1,786
G00.22	Mech. Rm.	O150CI1	2	150	0.30	250		75	S32CF(Lo)2	52	0.10	26	0.17	0.03	44
G95	Corridor	24T34RF3	5	117	0.39	3750	5	1,463	24T32RF(R)2	58	0.29	1,088	0.90	0.09	338
G95	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
G00.16	Men's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	468	0.90	0.03	69
G00.16	Men's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
G00.17	Jan. Closet	O150CI1	1	150	0.15	500		75	S32CF(Lo)2	52	0.05	26	0.33	0.03	44
G00.18	Kitchen	R60CI2	1	120	0.12	2250		270	W32CF(Lo)2	52	0.05	117	0.90	0.06	138
G00.19	Women's Restroom	18T60RF2	2	121	0.24	2250		545	18S32CF(Lo)4	104	0.21	468	0.90	0.03	69
G00.19	Women's Restroom	C13R(CF)1	1	15	0.02	2250		34	C13R(CF)1	15	0.02	34	0.90	0.00	0
G00.20	Corridor	C26R(CF)1	4	26	0.10	3750		390	C26R(CF)1	26	0.10	390	0.90	0.00	0
G80.5	Suite 180 Info Service	Locked				2250			Locked		0.00	0	0.90	0.00	
G80.14	Conference Rm.	24T34RF4	3	156	0.47	250		117	24T32RF(R)2	58	0.17	44	0.17	0.04	66
G80.13	Storage	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	59	0.33	0.06	88
G80.13	Storage	24T34RF4	1	156	0.16	500		78	24T32RF(R)2	58	0.06	29	0.33	0.03	44
G80.13	Storage	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	59	0.33	0.06	88
G80.13	Storage	22T34RF(U)2	2	78	0.16	500		78	22T17RF(R)2	32	0.06	32	0.33	0.03	41
G80.12	Vestibule	24T34RF3	1	117	0.08	3750	1	293	24T32RF(R)2	58	0.06	218	0.90	0.02	68
G80.12	Vestibule	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(R)2C(LED)1	2	0.00	18	0.90	0.00	0
G80.11	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
G80.10	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
G80.9	Office	24T34RF3	1	117	0.12	2250		263	24T32RF(R)2	58	0.06	131	0.90	0.05	120
G80.9	Office	24T34RF4	2	156	0.31	2250		702	24T32RF(R)2	58	0.12	261	0.90	0.18	397
G80.9	IT Open Office	24T34RF3	66	117	7.72	2250		17,375	24T32RF(R)2	58	3.83	8,613	0.90	3.50	7,885



hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (01) Administration

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
G80.9	IT Open Office	24T34RF4	24	156	3.74	2250		8,424	24T32RF(R)2	58	1.39	3,132	0.90	2.12	4,763
G80.9	IT Open Office	22T34RF(U)2	2	78	0.16	2250		351	22T17RF(R)2	32	0.06	144	0.90	0.08	186
G80.9	IT Open Office	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(R)2C(LED)1	2	0.01	53	0.90	0.00	0
G80.15	Server Rm G80.15	24T34RF4	4	156	0.47	250	4	117	24T32RF(R)2	58	0.23	58	0.17	0.04	53
G80.15	Server Rm G80.15	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
G80.15	Server Rm G80.15	24T34RF3	6	117	0.55	250	4	137	24T32RF(R)2	58	0.35	87	0.17	0.03	45
G80.15	Server Rm G80.15	24T34RF3	35	117	4.10	250		1,024	24T32RF(R)2	58	2.03	508	0.17	0.31	465
G80.15	Server Rm G80.15	S32WF(TC)2	1	58	0.06	250		15	S32WF(TC)2	58	0.06	15	0.17	0.00	0
G80.15	Server Rm G80.15	24B34RF4	1	156	0.08	250	2	20	24B32CF(R)2	58	0.06	15	0.17	0.00	5
G80.15	Server Rm G80.15	O150W11	1	150	0.15	250		38	W32CF(Lo)2	52	0.05	13	0.17	0.01	22
G80.4	IT Open Office	24T34RF3	10	117	1.17	2250		2,833	24T32RF(R)2	58	0.58	1,305	0.90	0.53	1,195
G80.4	IT Open Office	24T34RF3	26	117	3.04	2250		6,845	24T32RF(R)2	58	1.51	3,393	0.90	1.38	3,106
G80.4	IT Open Office	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
G80.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G80.2	Conference	24T34RF3	4	117	0.47	250		117	24T32RF(R)2	58	0.23	58	0.17	0.04	53
G80.2	Conference	22T32RF(U)2	3	58	0.17	250		44	22T17RF(R)2	32	0.10	24	0.17	0.01	18
G80.2	Conference	C75RH(R30)1	3	75	0.23	250		56	C75RH(R30)1	75	0.23	56	0.17	0.00	0
G70.6	Conference Rm.	24T34RF3	3	117	0.23	250	3	59	24T32RF(R)2	58	0.17	44	0.17	0.01	14
G70.4	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
G70.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G70.2	Office	24T34RF3	2	117	0.22	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G70	Open Office Area	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G70	Open Office Area	24T34RF3	24	117	2.26	2250	14	5,090	24T32RF(R)2	58	1.39	3,132	0.90	0.78	1,762
G70	Open Office Area	22T34RF(U)2	1	78	0.08	2250		176	22T17RF(R)2	32	0.03	72	0.90	0.04	93
G70	Open Office Area	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(R)2C(LED)1	2	0.01	53	0.90	0.00	0
G70.1	Office	24T34RF3	3	117	0.35	2250		790	24T32RF(R)2	58	0.17	392	0.90	0.16	358
G70.7	Kitchen	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G70	Vestibule	C26R(CF)1	2	26	0.05	3750		195	C26R(CF)1	26	0.05	195	0.90	0.00	0
G70	Exterior	C70R(MH)1	2	78	0.08	5138.72	1	399	C70R(MH)1	78	0.16	797	0.90	-0.07	-359
G60	Human Resources	24T34RF3	7	117	0.82	2250		1,843	24T32RF(R)2	58	0.41	914	0.90	0.37	836
G60	Human Resources	X(R)2C(LED)1	1	2	0.00	8759.52	3	-35	X(R)2C(LED)1	2	0.00	18	0.90	-0.01	-47
G60.1	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**  
Building: **(01) Administration**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
G60.2	Office	24T34RF3	3	117	0.27	2250	2	614	24T32RF(R)2	58	0.17	392	0.90	0.09	201
G60.3	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G60.4	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G60.5	Office	24T34RF3	3	117	0.12	2250	6	263	24T32RF(R)2	58	0.17	392	0.90	-0.05	-115
G60.7	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G60.8	Office	24T34RF3	2	117	0.23	2250		527	24T32RF(R)2	58	0.12	261	0.90	0.11	239
G60.9	Office	24T34RF3	2	117	0.08	2250	4	176	24T32RF(R)2	58	0.12	261	0.90	-0.03	-77
G60.10	Work Room	24T34RF3	6	117	0.55	2250	4	1,229	24T32RF(R)2	58	0.35	783	0.90	0.18	401
G60.7	Hall	24T34RF3	4	117	0.35	3750	3	1,316	24T32RF(R)2	58	0.23	870	0.90	0.11	402
G60.7	Hall	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(R)2C(LED)1	2	0.00	35	0.90	0.00	0
Exterior	East Parking Lot	Q400Pq(HPS)2	9	960	8.64	5109.72		44,148	Q400Pq(HPS)2	960	8.64	44,148	0.90	0.00	0
Exterior	East Parking Lot	Q400Pq(HPS)1	3	480	1.44	5109.72		7,358	Q400Pq(HPS)1	480	1.44	7,358	0.90	0.00	0
Exterior	South West Bldg. (on Ground)	C150G(MH)1	8	180	1.44	5109.72		7,358	C150G(MH)1	180	1.44	7,358	0.90	0.00	0
Exterior	West Entrance	C100R(MH)	3			5109.72			C100R(MH)	0	0.00	0	0.90	0.00	0
Exterior	West Entrance	C150R(MH)1	3	180	0.54	5109.72		2,759	C150R(MH)1	180	0.54	2,759	0.90	0.00	0
Exterior	North Bldg	WP150W(HPS)1	5	188	0.94	5109.72		4,803	WP150W(HPS)1	188	0.94	4,803	0.90	0.00	0
Total kW: 190.87 Total kWh: 428,949.23									115.42				370.77	58.35	133,719

Project: **Arapahoe County**

Job No.

**DWCES30219**Building: **(12) Plaza East BLDG****NOTE:**

If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
240	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
239	Office	24T32RF(Lou)3	2	87	0.15	2625	1	381	24T32RF(LouR)2	59	0.12	310	0.90	0.02	64
238	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
237	Office	24T32RF(Lou)3	3	87	0.20	2625	2	533	24T32RF(LouR)2	59	0.18	465	0.90	0.02	61
236	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
235	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
234	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
233	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
232	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
231	Office	24T32RF(Lou)3	2	87	0.15	2625	1	381	24T32RF(LouR)2	59	0.12	310	0.90	0.02	64
230	Office	24T32RF(Lou)3	2	87	0.12	2625	2	305	24T32RF(LouR)2	59	0.12	310	0.90	0.00	-5
H201	Hallway	24T32RF(Lou)3	3	87	0.23	8759.52	1	2,032	24T32RF(LouR)2	59	0.18	1,550	0.90	0.05	434
H201	Hallway	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(g)2C(LED)1	6	0.01	105	0.90	0.00	0
241A	Open Office Area	24T32RF(Lou)3	9	87	0.67	2625	4	1,751	24T32RF(LouR)2	59	0.53	1,394	0.90	0.12	321
241A	Open Office Area	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(g)2C(LED)1	6	0.01	53	0.90	0.00	0
241	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
242	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(LouR)2	59	0.06	155	0.90	0.03	66
243	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
227	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(LouR)2	59	0.06	155	0.90	0.03	66
228	Office	24T32RF(Lou)3	2	87	0.12	2625	2	305	24T32RF(LouR)2	59	0.12	310	0.90	0.00	-5
229	Office	24T32RF(Lou)3	2	87	0.15	2625	1	381	24T32RF(LouR)2	59	0.12	310	0.90	0.02	64
226	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
225	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(LouR)2	59	0.06	155	0.90	0.03	66
222	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
221	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
220	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
219	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
218	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
H202	Hallway	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LouR)2	59	0.12	310	0.90	0.05	132
217	Storage	24T32RF(Lou)3	6	87	0.44	500	3	218	24T32RF(LouR)2	59	0.35	177	0.33	0.02	37
215	Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(LouR)2	59	0.12	30	0.17	0.01	13

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (12) Plaza East BLDG

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
214	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
213	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
212	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
209	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
208	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
H203	Hallway	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
216	Electrical Room	24T32RF3	2	87	0.17	250		44	24T32RF(R)2	59	0.12	30	0.17	0.01	13
215	Electrical Room	24T32RF3	1	87	0.09	250		22	24T32RF(R)2	59	0.06	15	0.17	0.00	6
218	Electrical Room	W32CF2	1	59	0.06	250		15	W32CF2	59	0.06	15	0.17	0.00	0
H204	Hallway	24T32RF(Lou)3	7	87	0.61	3875		2,360	24T32RF(Lou)2	59	0.41	1,600	0.90	0.18	684
H204	Hallway	X(g)2C(LED)1	3	6	0.02	8759.52		158	X(g)2C(LED)1	6	0.02	158	0.90	0.00	0
247	Janitor Closet	O60C1	1	60	0.06	500		30	Q13R(CF)2	31	0.03	16	0.33	0.01	13
247A	Kitchen	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
249	Men's RR	C13R(CF)2	6	31	0.19	2625		488	C13R(CF)2	31	0.19	488	0.90	0.00	0
248	Women's RR	C13R(CF)2	6	31	0.19	2625		488	C13R(CF)2	31	0.19	488	0.90	0.00	0
200	Open Office Area	24T32RF(Lou)3	17	87	1.48	2625		3,882	24T32RF(Lou)2	59	1.00	2,633	0.90	0.43	1,125
200	Open Office Area	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(g)2C(LED)1	6	0.01	53	0.90	0.00	0
201	Conference	24T32RF(Lou)3	8	87	0.70	250		174	24T32RF(Lou)2	59	0.47	118	0.17	0.03	50
201	Conference	C150R(dim)1	4	150	0.60	250		150	C90RH(R38)1	90	0.36	90	0.17	0.04	54
202	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
South	South Stair	W32WF(em)2	2	59	0.12	8759.52		1,034	W32WF(em)2	59	0.12	1,034	0.90	0.00	0
203	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
204	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
205	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
206	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
201A	Probation Waiting Rm	24T32RF(Lou)3	9	87	0.78	2625		2,055	24T32RF(Lou)2	59	0.53	1,394	0.90	0.23	595
201B	Main entry Atrium	C75RU(R38)1	8	75	0.60	2625		1,575	C50RH(R38)1	50	0.40	1,050	0.90	0.18	473
201B	Main entry Atrium	C13R(CF)2	2	31	0.06	2625		163	C13R(CF)2	31	0.06	163	0.90	0.00	0
244	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
224	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou)2	59	0.06	155	0.90	0.03	66
223	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou)2	59	0.06	155	0.90	0.03	66
	Roof Entry	W32WF2	1	59	0.06	2625		155	W32WF2	59	0.06	155	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (12) Plaza East BLDG

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
100	Open Office Area	24T32RF(Lou)3	13	87	1.13	2825		2,969	24T32RF(Lou/R)2	59	0.77	2,013	0.90	0.33	860
100	Open Office Area	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(g)2C(LED)1	6	0.01	53	0.90	0.00	0
101	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
102	Office	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(Lou/R)2	59	0.18	465	0.90	0.08	199
103	Conference Room	24T32RF(Lou)3	4	87	0.35	250		87	24T32RF(Lou/R)2	59	0.24	59	0.17	0.02	25
104	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
105	Training Room #2	24T32RF(Lou)3	9	87	0.78	2625		2,055	24T32RF(Lou/R)2	59	0.53	1,394	0.90	0.23	595
104A	Storage	24T32RF(Lou)3	1	87	0.09	500		44	24T32RF(Lou/R)2	59	0.06	30	0.33	0.01	13
105A	Storage	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
105A	Storage	24T32RF(Lou)3	1	87	0.09	500		44	24T32RF(Lou/R)2	59	0.06	30	0.33	0.01	13
105B	Electrical Room	S32PF2	1	59	0.06	250		15	S32CF2	59	0.06	15	0.17	0.00	0
106	Mechanical Closet	S32PF2	1	59	0.06	250		15	S32CF2	59	0.06	15	0.17	0.00	0
107	Women's RR	C13R(CF)2	6	31	0.19	2625		488	C13R(CF)2	31	0.19	488	0.90	0.00	0
108	Men's RR	C13R(CF)2	6	31	0.19	2625		488	C13R(CF)2	31	0.19	488	0.90	0.00	0
109	Storage	S32PF2	1	59	0.06	500		30	S32CF2	59	0.06	30	0.33	0.00	0
109A	Elevator Equipment	S32PF2	1	59	0.06	250		15	S32CF2	59	0.06	15	0.17	0.00	0
110	Work Force Center	24T32RF(Lou)3	4	87	0.35	2625		914	24T32RF(Lou/R)2	59	0.24	620	0.90	0.10	265
110	Work Force Center	24T32RF(Lou)3	43	87	3.74	2625		9,820	24T32RF(Lou/R)2	59	2.54	6,660	0.90	1.08	2,845
110	Work Force Center	X(g)2C(LED)1	3	6	0.02	8759.52		158	X(g)2C(LED)1	6	0.02	158	0.90	0.00	0
110A	Tele-Electrical Room	S34PF2	2	72	0.14	250		36	S32PF(Lou)2	52	0.10	26	0.17	0.01	9
110B	Mechanical Room	S32PF2	8	59	0.47	250		118	S32CF2	59	0.47	118	0.17	0.00	0
111	Training Room	24T32RF(Lou)3	9	87	0.78	2625		2,055	24T32RF(Lou/R)2	59	0.53	1,394	0.90	0.23	595
112	Probation Storage	S32PF2	2	59	0.12	500		59	S32PF2	59	0.12	59	0.33	0.00	0
113	Office	24T32RF(Lou)3	4	87	0.35	2625		914	24T32RF(Lou/R)2	59	0.24	620	0.90	0.10	265
114	Breakroom	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
115	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou/R)2	59	0.06	155	0.90	0.03	66
116	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou/R)2	59	0.06	155	0.90	0.03	66
117	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou/R)2	59	0.06	155	0.90	0.03	66
118	Office	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou/R)2	59	0.06	155	0.90	0.03	66
H101	Hallway	24T32RF(Lou)3	7	87	0.61	3875		2,360	24T32RF(Lou/R)2	59	0.41	1,800	0.90	0.18	684
H101	Hallway	X(g)2C(LED)1	4	6	0.02	8759.52		210	X(g)2C(LED)1	6	0.02	210	0.90	0.00	0
119	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**  
Building: **(12) Plaza East BLDG**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
120	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
121	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
122	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
123	Training Room #1	24T32RF(Lou)3	8	87	0.70	2625		1,827	24T32RF(Lou/R)2	59	0.47	1,239	0.90	0.20	529
124	Main Lobby	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
124	Main Lobby	C13R(CF)2	5	31	0.16	2625		407	C13R(CF)2	31	0.16	407	0.00	0.00	0
Total kW: 26.34 Total kWh: 64,235.56									18.82 45,935				78.13	6.07	16,471

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Job No. **DWCES0219**

Project: **Arapahoe County**

Building: **(13) Human Services**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT			Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand (kW)	Energy (kWh)
300	3rd Flr. Elev. Lobby	24T32RF3	1	87	0.06	2625	1	152	24T32RF(R)2	58	0.06	152	0.00	0
305A	Waiting Rm.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
305A	Waiting Rm.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.00	0
305A	Waiting Rm.	C13R(CF)2	3	30	0.09	2625		236	C13R(CF)2	30	0.09	236	0.00	0
305	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
306	Office	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.08	206
307	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
308	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
309	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
310	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
311	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
303A	Open Office	24T32RF3	20	87	1.68	2625	2	4,415	24T32RF(R)2	58	1.16	3,045	0.47	1,233
303A	Open Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.00	0
303	Work Room	24T32RF3	6	87	0.52	2625		1,370	24T32RF(R)2	58	0.35	914	0.16	411
300	Office Area	24T32RF3	11	87	0.96	2625		2,512	24T32RF(R)2	58	0.64	1,675	0.29	754
300B	Men's Restroom	C13C(CF)2	5	30	0.15	2625		394	C13C(CF)2	30	0.15	394	0.00	0
300B	Men's Restroom	S32RF2	1	58	0.06	2625		152	S32RF2	58	0.06	152	0.00	0
300A	Women's Restroom	C13C(CF)2	6	30	0.18	2625		473	C13C(CF)2	30	0.18	473	0.00	0
300A	Women's Restroom	S32RF2	1	58	0.06	2625		152	S32RF2	58	0.06	152	0.00	0
330	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	58	0.23	899	0.10	405
330	Corridor	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.00	0
331	Jan. Closet	C16R(CF)2	1	32	0.03	500		16	C16R(CF)2	32	0.03	16	0.00	0
331	S. Stair Tower (3rd Floor)	W32WF(em)2	1	78	0.08	3875		302	W32WF(em)2	52	0.05	202	0.02	91
331	S. Stair Tower (3rd Floor)	W34WF2	1	78	0.08	3875		302	W32WF(em)2	52	0.05	202	0.02	91
330	Break Room	24T32RF3	2	87	0.15	2625	1	341	24T32RF(R)2	58	0.12	305	0.03	69
329	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
328	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
327	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
326	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
325	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.05	137
335	Work Room	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.03	69

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (13) Human Services  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
335	Work Room	W34CF2	1	78	0.08	2625		205	W32CF(Lo)2	52	0.05	137	0.90	61
325A	Open Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	274
325A	Open Office	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0
325A	Open Office	W20TF1	1	20	0.02	2625		53	W17TF(Lo)1	17	0.02	45	0.90	7
325A	Open Office	W25TF1	1	25	0.03	2625		66	W25TF1	25	0.03	66	0.90	0
324	Conference Rm.	24T32RF3	5	87	0.44	250		109	24T32RF(R)2	58	0.29	73	0.17	33
323	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
333	File Rm.	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	58	0.12	58	0.33	26
332	File Rm.	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	13
260A	N. Stair Lobby	W34WF(em)2	1	78	0.08	3875		302	W32WF(emLo)2	52	0.05	202	0.90	91
260A	N. Stair Lobby	W34WF2	1	78	0.08	3875		302	W32WF(Lo)2	52	0.05	202	0.90	91
260A	2nd Floor Elev. Lobby	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	206
260A	2nd Floor Elev. Lobby	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0
240	Conference Rm.	24T32RF(Dim)3	6	87	0.46	250	2	116	24T32RF(R)2	58	0.35	87	0.17	26
202A	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	58	0.23	899	0.90	405
202	Break Room	24T32RF3	5	87	0.44	2625		1,142	24T32RF(R)2	58	0.29	761	0.90	343
203	Dist. Atty.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
203	Dist. Atty.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0
224	Conference Rm.	24T32RF3	4	87	0.35	250		87	24T32RF(R)2	58	0.23	58	0.17	26
224A	Open Office	24T32RF3	10	87	0.81	2625	2	2,132	24T32RF(R)2	58	0.58	1,523	0.90	548
224A	Open Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0
206	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
207	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
208	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
209	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
210	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
211	Office	24T32RF3	2	87	0.12	2625	2	305	24T32RF(R)2	58	0.12	305	0.90	0
212	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
212	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	137
211A	Corridor	24T32RF3	3	87	0.26	3875		1,011	24T32RF(R)2	58	0.17	674	0.90	303
212A	Open Office	24T32RF3	5	87	0.41	2625	1	1,066	24T32RF(R)2	58	0.29	761	0.90	274
212A	Open Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
213	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
214	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
215	Office	24T32RF3	2	87	0.12	2625	2	305	24T32RF(R)2	58	0.12	305	0.90	0.00	0
216	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
216A	Open Office	24T32RF3	7	87	0.61	2625		1,599	24T32RF(R)2	58	0.41	1,066	0.90	0.18	480
216A	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
217	Office	24T32RF3	2	87	0.06	2625	4	152	24T32RF(R)2	58	0.12	305	0.90	-0.05	-137
218	Office	24T32RF3	2	87	0.06	2625	4	152	24T32RF(R)2	58	0.12	305	0.90	-0.05	-137
220	Roof Access	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
221	Comp. Closet	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	0.01	13
219	Office	24T32RF3	2	87	0.15	2625	1	381	24T32RF(R)2	58	0.12	305	0.90	0.03	69
222A	Corridor	24T32RF3	4	87	0.29	3875	2	1,124	24T32RF(R)2	58	0.23	899	0.90	0.05	202
222	Conference Rm.	24T32RF3	1	87	0.09	250		22	24T32RF(R)2	58	0.06	15	0.17	0.00	7
223	Dead Files	24T32RF3	5	87	0.32	500	4	160	24T32RF(R)2	58	0.29	145	0.33	0.01	13
205	File Rm.	24T32RF3	4	87	0.35	500		174	24T32RF(R)2	58	0.23	116	0.33	0.03	52
240A	Corridor	24T32RF3	2	87	0.17	3875		674	24T32RF(R)2	58	0.12	450	0.90	0.05	202
240A	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
240	Conference Rm.	24T34RF(Dim)3	6	117	0.70	250		176	24T32RF(Dim)2	58	0.35	87	0.17	0.05	80
225	Oak Conference	24T32RF3	20	87	1.57	250	6	392	24T32RF(R)2	58	1.16	290	0.17	0.06	91
225	Oak Conference	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
225A	Men's Restroom	C13R(CF)2	3	30	0.09	2625		236	C13R(CF)2	30	0.09	236	0.90	0.00	0
225A	Men's Restroom	S32RF2	1	58	0.06	2625		152	S32RF2	58	0.06	152	0.90	0.00	0
225A	Jan. Closet	S32WF2	1	58	0.06	500		29	S32WF2	58	0.06	29	0.33	0.00	0
225A	Women's Restroom	C13R(CF)2	4	30	0.12	2625		315	C13R(CF)2	30	0.12	315	0.90	0.00	0
225A	Women's Restroom	S32RF2	1	58	0.06	2625		152	S32RF2	58	0.06	152	0.90	0.00	0
225A	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	58	0.23	899	0.90	0.10	405
225A	Corridor	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
232A	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	58	0.23	899	0.90	0.10	405
232A	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
232	Mechanical Rm.	S32CF2	6	58	0.35	250		87	S32CF2	58	0.35	87	0.17	0.00	0
241	Tele-Data Closet	24T32RF3	2	87	0.17	250		44	24T32RF(R)2	58	0.12	29	0.17	0.01	13
243	Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	58	0.17	87	0.33	0.03	39

hrs. The demand savings are not fully claimed.

Building: **(13) Human Services**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Numb. of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
242A	Corridor	24T32RF3	3	87	0.26	3875		1,011	24T32RF(R)2	58	0.17	674	0.90	0.08
242A	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00
244	Break Room	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05
242	Conference Rm	24T32RF(Dim)3	2	87	0.17	250		44	24T32RF(Dim)2	58	0.12	29	0.17	0.01
245	Tele-Data	S32WF2	1	58	0.06	2625		152	S32WF2	58	0.06	152	0.90	0.00
268A	Corridor	24T32RF3	3	87	0.26	3875		1,011	24T32RF(R)2	58	0.17	674	0.90	0.08
268A	Corridor	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00
268	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05
266	Visitation A	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
267	Visitation B	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
269	Visitation C	24T32RF3	6	87	0.52	2625		1,370	24T32RF(R)2	58	0.35	914	0.90	0.16
276	Audio/Visual Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
276	Audio/Visual Rm.	W34TF1	2	34	0.07	2625		179	W32TF(Lo)1	30	0.06	158	0.90	0.01
270A	Corridor	24T32RF3	6	87	0.52	3875		2,023	24T32RF(R)2	58	0.35	1,349	0.90	0.16
270A	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00
270	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	0.01
270B	Restroom	24T32RF3	1	87	0.06	2625	1	152	24T32RF(R)2	58	0.06	152	0.90	0.00
274A	Open Office	24T32RF3	9	87	0.78	2625		2,055	24T32RF(R)2	58	0.52	1,370	0.90	0.23
274A	Open Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00
274	Int. Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
280	Waiting Rm.	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10
280	Waiting Rm.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00
275	Visitation Rm.	24T34RF(Dim)3	3	117	0.70	2625		1,843	24T32RF(Dim)2	58	0.35	914	0.90	0.32
263	Visitation Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
264	Guest Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
265	Guest Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
290A	Corridor	24T32RF3	7	87	0.61	3875		2,360	24T32RF(R)2	58	0.41	1,573	0.90	0.18
290A	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00
290	Legal Dept.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05
291	Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10
292	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05
282	Resource Rm.	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (13) Human Services  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
293	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
294	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
295	Office	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
296	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
297	Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10	274
298	Open Office	24T32RF3	56	87	4.87	2625		12,789	24T32RF(R)2	58	3.25	8,526	0.90	1.46	3,837
298	Open Office	X(g)2C(LED)1	4	2	0.01	8759.52		70	X(g)2C(LED)1	2	0.01	70	0.90	0.00	0
284	Mechanical Rm.	S32PF2	4	58	0.20	250	1	51	S32PF2	58	0.23	58	0.17	0.00	-7
284	Mechanical Rm.	S32PF2	2	58	0.12	250		29	S32PF2	58	0.12	29	0.17	0.00	0
287	Jan. Closet	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	0.01	13
284A	Men's Restroom	C13R(CF)2	3	30	0.09	2625		236	C13R(CF)2	30	0.09	236	0.90	0.00	0
284A	Men's Restroom	S32RF1	1	30	0.03	2625		79	S32RF1	30	0.03	79	0.90	0.00	0
284B	Women's Restroom	C13R(CF)2	2	30	0.06	2625		158	C13R(CF)2	30	0.06	158	0.90	0.00	0
284B	Women's Restroom	S32RF1	1	30	0.03	2625		79	S32RF1	30	0.03	79	0.90	0.00	0
284B	N. Stair Lobby	W34WF(em)2	2	78	0.16	3875		605	W32WF(em)Lo2	52	0.10	403	0.90	0.05	181
284B	N. Stair Lobby	W34WF2	1	78	0.08	3875		302	W32WF(Lo)2	52	0.05	202	0.90	0.02	91
175	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
176	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
177	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
178	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
179	Office	24T32RF3	2	87	0.15	2625	1	381	24T32RF(R)2	58	0.12	305	0.90	0.03	69
180	Sprinkler Rm.	24T32RF3	1	87	0.09	250		22	24T32RF(R)2	58	0.06	15	0.17	0.00	7
181	Mechanical Rm.	S32WF2	1	58	0.06	250		15	S32WF2	58	0.06	15	0.17	0.00	0
182	Coffee Rm.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
183	Copy Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
180	Elect. Rm.	S32PF2	2	58	0.12	250		29	S32PF2	58	0.12	29	0.17	0.00	0
180	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
184	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
174	Work Room	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
170	Open Office	24T32RF3	2	87	0.12	2625	2	305	24T32RF(R)2	58	0.12	305	0.90	0.00	0
170	Open Office	24T32RF3	50	87	4.29	2625	2	11,267	24T32RF(R)2	58	2.90	7,613	0.90	1.25	3,289
170	Open Office	X(g)2C(LED)1	6	2	0.01	8759.52		105	X(g)2C(LED)1	2	0.01	105	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
199A	Corridor	24T32RF3	10	87	0.87	3875		3,371	24T32RF(R)2	58	0.58	2,248	0.90	0.26
199A	Corridor	X(g)2C(LED)1	4	2	0.01	8759.52		70	X(g)2C(LED)1	2	0.01	70	0.90	0.00
199A	Corridor	C26R(CF)2	2	52	0.10	3875		403	C26R(CF)2	52	0.10	403	0.90	0.00
199B	Women's Restroom	S32CF2	1	58	0.06	2625		152	S32CF2	58	0.06	152	0.90	0.00
199B	Women's Restroom	C18R(CF)2	3	42	0.13	2625		331	C18R(CF)2	42	0.13	331	0.90	0.00
199C	Men's Restroom	S32CF2	1	58	0.06	2625		152	S32CF2	58	0.06	152	0.90	0.00
199C	Men's Restroom	C18R(CF)2	3	42	0.13	2625		331	C18R(CF)2	42	0.13	331	0.90	0.00
199	Storage	24T32RF3	2	87	0.15	500	1	73	24T32RF(R)2	58	0.12	58	0.33	0.01
167	Jan. Closet	W32CF2	1	58	0.06	500		29	W32CF2	58	0.06	29	0.33	0.00
166	Tele-Data Rm.	24T32RF3	2	87	0.15	2625	1	381	24T32RF(R)2	58	0.12	305	0.90	0.03
165	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
164	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
163	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
160	Conference Rm.	24T32RF3	5	87	0.44	250		109	24T32RF(R)2	58	0.29	73	0.17	0.02
162	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03
142	Inform. Serv.	24T32RF3	9	87	0.75	2625	1	1,979	24T32RF(R)2	58	0.52	1,370	0.90	0.21
142	Inform. Serv.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00
143	i.S. Lab	24T32RF3	1	87	0.06	2625	1	152	24T32RF(R)2	58	0.06	152	0.90	0.00
144	Server Rm.	24T32RF3	8	87	0.67	250		167	24T32RF(R)2	58	0.46	116	0.17	0.03
144	Server Rm	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00
152	Mechanical Rm.	S32PF2	6	58	0.23	250	4	58	S32PF2	58	0.35	87	0.17	-0.02
152A	Mechanical Rm.	S32PF2	3	58	0.17	250		44	S32PF2	58	0.17	44	0.17	0.00
152B	Mechanical Rm.	S32PF2	2	58	0.09	250	1	22	S32PF2	58	0.12	29	0.17	0.00
170	Open Entry	24T32RF3	25	87	2.18	2625		5,709	24T32RF(R)2	58	1.45	3,806	0.90	0.65
170	Open Entry	X(g)2C(LED)1	4	2	0.01	8759.52		70	X(g)2C(LED)1	2	0.01	70	0.90	0.00
170	Open Entry	C18R(CF)2	3	42	0.13	2625		331	C18R(CF)2	42	0.13	331	0.90	0.00
170	Women's Restroom	C13R(CF)2	5	30	0.14	2625	1	364	C13R(CF)2	30	0.15	394	0.90	-0.01
170	Men's Restroom	C13R(CF)2	4	30	0.12	2625		315	C13R(CF)2	30	0.12	315	0.90	0.00
130	Sheriff's Office	24T32RF3	5	87	0.49	2625	1	1,294	24T32RF(R)2	58	0.35	914	0.90	0.13
130	Sheriff's Office	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00
130	Corridor	C18R(CF)2	1	42	0.04	3875		163	C18R(CF)2	42	0.04	163	0.90	0.00
132	Briefing Rm.	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10

Project: Arapahoe County

Building: (13) Human Services

Job No.

DWCES30219

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
140	Break Room	C18R(CF)2	4	42	0.17	2625		441	C18R(CF)2	42	0.17	441	0.90	0.00	0
139	Elev. Rm	S32WF2	1	58	0.06	2625		152	S32WF2	58	0.06	152	0.90	0.00	0
138	Storage	W32CF2	1	58	0.06	500		29	W32CF2	58	0.06	29	0.33	0.00	0
133	Locker	24T32RF3	1	87	0.03	2625	2	76	24T32RF(R)2	58	0.06	152	0.90	-0.03	-69
134	Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	58	0.12	58	0.33	0.02	26
135	Report Writing	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
135	Report Writing	W32TF1	5	32	0.16	2625		420	W32TF1	32	0.16	420	0.90	0.00	0
135	Report Writing	C18R(CF)2	2	42	0.08	2625		221	C18R(CF)2	42	0.08	221	0.90	0.00	0
136	Invest. Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
137	Sergeants Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
103	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	58	0.23	899	0.90	0.10	405
103	Corridor	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00	0
103	Corridor	C18R(CF)2	1	42	0.04	3875		163	C18R(CF)2	42	0.04	163	0.90	0.00	0
103	Judicial Serv.	24T32RF3	3	87	0.23	2625	1	609	24T32RF(R)2	58	0.17	457	0.90	0.05	137
103	Judicial Serv.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
105	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
105	Office	W20TF1	2	20	0.04	2625		105	W17TF(Lo)1	17	0.03	89	0.90	0.01	14
106	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
106	Office	W20TF1	2	20	0.04	2625		105	W17TF(Lo)1	17	0.03	89	0.90	0.01	14
107	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
108	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
109	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
110	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
111	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
112	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
119	File Rm.	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	58	0.12	58	0.33	0.02	26
113	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
114	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
115	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	0.01	13
117	Work Room	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
116	Conference Rm.	24T32RF3	3	87	0.26	250		65	24T32RF(R)2	58	0.17	44	0.17	0.01	20
104	Open Office & Corridors	24T32RF3	13	87	1.13	2625		2,969	24T32RF(R)2	58	0.75	1,979	0.90	0.34	891

Project: Arapahoe County

Job No.

DWCES30219

Building: (13) Human Services

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
104	Open Office & Corridors	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00	0
121A	Corridor	24T32RF3	10	87	0.87	3875		3,371	24T32RF(R)2	58	0.58	2,248	0.90	0.26	1,011
121A	Corridor	X(g)2C(LED)1	4	2	0.01	8759.52		70	X(g)2C(LED)1	2	0.01	70	0.90	0.00	0
121A	Corridor	C20R(CF)2	3	40	0.12	3875		465	C20R(CF)2	40	0.12	465	0.90	0.00	0
121A	Men's Restroom	C20R(CF)2	3	40	0.12	2625		315	C20R(CF)2	40	0.12	315	0.90	0.00	0
121A	Men's Restroom	S32WF2	1	58	0.06	2625		152	S32WF2	58	0.06	152	0.90	0.00	0
121A	Women's Restroom	C20R(CF)2	3	40	0.12	2625		315	C20R(CF)2	40	0.12	315	0.90	0.00	0
121A	Women's Restroom	S32WF2	1	58	0.06	2625		152	S32WF2	58	0.06	152	0.90	0.00	0
121A	Parking Garage	Q150W(HPS)1	19	188	3.57	8759.52		31,289	Q150W(HPS)1	188	3.57	31,289	0.90	0.00	0
121A	Parking Garage	WP150W(HPS)1	12	188	2.26	8759.52		19,761	WP150W(HPS)1	188	2.26	19,761	0.90	0.00	0
123	Records Info. Man.	24T32RF3	16	87	1.39	2625		3,654	24T32RF(R)2	58	0.93	2,436	0.90	0.42	1,096
125	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
123A	Open Office	24T32RF3	25	87	2.18	2625		5,709	24T32RF(R)2	58	1.45	3,806	0.90	0.65	1,713
123A	Open Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
123B	File Rm.	24T32RF3	19	87	1.65	500		827	24T32RF(R)2	58	1.10	551	0.33	0.17	248
123B	File Rm.	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
121	Jan. Closet	S34WF2	1	78	0.08	500		39	S32WF(L)2	52	0.05	26	0.33	0.01	12
Total kW:								191,866.17	48.00				190.40	13.71	37,677

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Job No. **DWCES30129**

Project: **Arapahoe County**

Building: **(14) Plaza West BLDG**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
101	Court Rm. C1	24T32RF3	8	87	0.70	1500		1,044	24T32RF(R)2	59	0.47	708	0.90	0.20	302
101	Court Rm. C1	S40RF2	4	86	0.34	1500		516	S32RF(LoT)2	51	0.20	306	0.90	0.13	189
101	Court Rm. C1	C25R(dim)1	10	25	0.25	1500		375	C25R(dim)1	25	0.25	375	0.90	0.00	0
101	Court Rm. C1	S40RF2	2	86	0.17	1500		258	S32RF(LoT)2	51	0.10	153	0.90	0.06	95
101	Court Rm. C1	S40RF2	1	72	0.07	1500		108	S32RF(Lo)2	52	0.05	78	0.90	0.02	27
101	Court Rm. C1	S40CF1	7	43	0.30	1500		452	S32CF(Lo)1	29	0.20	305	0.90	0.09	132
101	Court Rm. C1	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
119	Court Rm. A3	24T32RF3	10	87	0.87	1500		1,305	24T32RF(R)2	59	0.59	885	0.90	0.25	378
119	Court Rm. A3	S40RF2	4	86	0.34	1500		516	S32RF(LoT)2	51	0.20	306	0.90	0.13	189
119	Court Rm. A3	S40RF2	2	86	0.17	1500		258	S32RF(LoT)2	51	0.10	153	0.90	0.06	95
119	Court Rm. A3	S40RF2	1	72	0.07	1500		108	S32RF(Lo)2	52	0.05	78	0.90	0.02	27
119	Court Rm. A3	C25R(dim)1	10	25	0.25	1500		375	C25R(dim)1	25	0.25	375	0.90	0.00	0
119	Court Rm. A3	S40CF1	9	43	0.39	1500		581	S32CF(Lo)1	29	0.26	392	0.90	0.11	170
119	Court Rm. A3	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
120	Small Claims Court	24T34RF3	5	115	0.58	1500		863	24T32RF(R)2	59	0.30	443	0.90	0.25	378
120	Small Claims Court	22T32RF(u)2	1	59	0.06	1500		89	22T17RF(R)2	33	0.03	50	0.90	0.02	35
120	Small Claims Court	S32RF1	4	31	0.12	1500		186	S32RF1	31	0.12	186	0.90	0.00	0
120	Small Claims Court	C100R(dim)1	4	100	0.40	1500		600	C100R(dim)1	100	0.40	600	0.90	0.00	0
120	Small Claims Court	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
212	Court Rm. A1	24T32RF3	12	87	1.04	1500		1,566	24T32RF(R)2	59	0.71	1,062	0.90	0.30	454
212	Court Rm. A1	S40RF2	4	86	0.34	1500		516	S32RF(LoT)2	51	0.20	306	0.90	0.13	189
212	Court Rm. A1	S40RF2	2	86	0.17	1500		258	S32RF(LoT)2	51	0.10	153	0.90	0.06	95
212	Court Rm. A1	S40RF2	1	72	0.07	1500		108	S32RF(Lo)2	52	0.05	78	0.90	0.02	27
212	Court Rm. A1	C60R(dim)1	10	60	0.60	1500		900	C60R(dim)1	60	0.60	900	0.90	0.00	0
212	Court Rm. A1	S34CF1	9	43	0.39	1500		581	S32CF(Lo)1	29	0.26	392	0.90	0.11	170
212	Court Rm. A1	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
228	Holding Area	C18R(CF)2	3	36	0.11	2625		284	C18R(CF)2	36	0.11	284	0.90	0.00	0
237	Toilet	2W17WF2	1	33	0.03	2625		87	2W17WF2	33	0.03	87	0.90	0.00	0
237	Cell	14T32RF2	1	59	0.06	2625		155	14T32RF2	59	0.06	155	0.90	0.00	0
200	Court Rm. A2	24T32RF3	12	87	1.04	1500		1,566	24T32RF(R)2	59	0.71	1,062	0.90	0.30	454
200	Court Rm. A2	S40RF2	4	86	0.34	1500		516	S32RF(LoT)2	51	0.20	306	0.90	0.13	189

Project: Arapahoe County  
Building: (14) Plaza West BLDG

Job No. DWCES30129

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
200	Court Rm. A2	S40RF2	2	86	0.17	1500		258	S32RF(Lo)T/2	51	0.10	153	0.90	0.06	96
200	Court Rm. A2	S34RF2	1	72	0.07	1500		108	S32RF(Lo)2	52	0.05	78	0.90	0.02	27
200	Court Rm. A2	S34RF2	1	72	0.07	1500		108	S32RF(Lo)2	52	0.05	78	0.90	0.02	27
200	Court Rm. A2	C150C(dim)1	10	150	1.50	1500		2,250	C150C(dim)1	150	1.50	2,250	0.90	0.00	0
200	Court Rm. A2	X(g)2C(LED)1	4	6	0.02	8759.52		210	X(R)2C(LED)1	6	0.02	210	0.90	0.00	0
200	Court Rm. A2	S34RF1	11	43	0.47	1500		710	S32RF(Lo)1	29	0.32	479	0.90	0.14	208
200	S. Stair Tower 2nd Flr.	W34WF(em)2	1	72	0.07	3875		279	W32WF(em)Lo2	52	0.05	202	0.90	0.02	70
200	S. Stair Tower 2nd Flr.	X(g)2W(LED)1	1	6	0.01	8759.52		53	X(g)2W(LED)1	6	0.01	53	0.90	0.00	0
200	S. Stair Tower 2nd Flr.	W34WF2	3	72	0.22	3875		837	W32WF(Lo)2	52	0.16	605	0.90	0.05	209
203	Judge's Chamber	24T32RF3	4	87	0.26	2625	3	685	24T32RF(R)2	59	0.24	620	0.90	0.02	59
203	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
204	Office A2	24T32RF3	5	87	0.44	2625		1,142	24T32RF(R)2	59	0.30	774	0.90	0.13	331
233	A2 Jury Rm.	24T34RF3	5	115	0.58	500		288	24T32RF(R)2	59	0.30	148	0.33	0.08	126
234	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
235	Corridor	22T32RF(u)2	2	59	0.12	3875		457	22T17RF(R)2	33	0.07	256	0.90	0.05	181
235	Corridor	24T32RF3	2	87	0.17	3875		574	24T32RF(R)2	59	0.12	457	0.90	0.05	195
235	Corridor	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(R)2C(LED)1	6	0.01	53	0.90	0.00	0
221	Corridor	24T32RF3	7	87	0.61	3875		2,360	24T32RF(R)2	59	0.41	1,600	0.90	0.18	684
221	Corridor	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(R)2C(LED)1	6	0.01	53	0.90	0.00	0
232	Locker Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
236	Office	24T32RF3	1	87	0.08	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
205	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
206	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
207	Break Rm.	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
238A	Tele. Rm.	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
238	District Atty.	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
208	File Rm.	24T32RF3	4	87	0.35	500		174	24T32RF(R)2	59	0.24	118	0.33	0.03	50
209	A-1 Div. Office	24T32RF3	5	87	0.44	2625		1,142	24T32RF(R)2	59	0.30	774	0.90	0.13	331
210	A1 Judge's Chamber	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	59	0.24	620	0.90	0.10	285
210	A1 Judge's Chamber	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
218	A1 Jury Rm.	24T34RF3	5	115	0.58	500		288	24T32RF(R)2	59	0.30	148	0.33	0.08	126
218	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
217	Corridor	24T34RF3	1	115	0.04	3875	2	149	24T32RF(R)2	59	0.06	229	0.90	-0.02	-72
215A	Waiting Rm.	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	59	0.24	620	0.90	0.10	265
216	Conference Rm.	24T34RF3	2	115	0.23	250		58	24T32RF(R)2	59	0.12	30	0.17	0.02	25
215	Collection Inv.	24T34RF3	3	115	0.27	2625	2	704	24T32RF(R)2	59	0.18	465	0.90	0.08	216
214	Office	24T34RF3	2	115	0.15	2625	2	403	24T32RF(R)2	59	0.12	310	0.90	0.03	84
214	Atrium	C13R(CF)1	10	13	0.10	2625	2	273	C13R(CF)1	13	0.13	341	0.90	-0.02	-61
214	Atrium	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(R)2C(LED)1	6	0.01	53	0.90	0.00	0
226	Storage	O60W11	1	60	0.06	250		15	Q13R(CF)2	31	0.03	8	0.17	0.00	7
229	A2 Conference Rm.	24T34RF3	2	115	0.23	250		58	24T32RF(R)2	59	0.12	30	0.17	0.02	25
224	Women's Restroom	C13R(CF)1	4	13	0.05	2625		137	C13R(CF)1	13	0.05	137	0.90	0.00	0
225	Men's Restroom	C13R(CF)1	4	13	0.05	2625		137	C13R(CF)1	13	0.05	137	0.90	0.00	0
227	Corridor	24T32RF3	6	87	0.52	3875		2,023	24T32RF(R)2	59	0.35	1,372	0.90	0.15	586
226	Closet	O150C11	1	150	0.15	250		38	S32CF(Lo)2	52	0.05	13	0.17	0.01	22
139	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
108	Holding Area	W34CF4	2	144	0.22	2625	2	567	W32CF(Lo)4	102	0.20	536	0.90	0.01	28
109	Cell @ 2	14T34RF2	2	72	0.14	2625		378	14T32RF(Lo)2	52	0.10	273	0.90	0.04	95
104	File Rm.	24T32RF3	17	87	1.48	500		740	24T32RF(R)2	59	1.00	502	0.33	0.14	214
104	File Rm.	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
104	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
105	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
141	Storage												0.00		
112	Clerk of Ct.	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
113	File Rm.	24T32RF3	9	87	0.78	500		392	24T32RF(R)2	59	0.53	266	0.33	0.08	113
129	Corridor	24T32RF3	4	87	0.35	3875		1,349	24T32RF(R)2	59	0.24	915	0.90	0.10	391
129	Corridor	X(g)2C(LED)1	2	6	0.01	8759.52		105	X(R)2C(LED)1	6	0.01	105	0.90	0.00	0
114	Judge's Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	59	0.24	620	0.90	0.10	285
137	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
115	Clerk	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
116	A3 Div. Office	24T32RF3	6	87	0.52	2625		1,370	24T32RF(R)2	59	0.35	929	0.90	0.15	397
117	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
117	Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	59	0.24	620	0.90	0.10	265
117	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(14) Plaza West BLDG**  
Job No: **DWGES30129**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
124	Jury Rm.	24T34RF3	4	115	0.46	500		230	24T32RF(R)2	59	0.24	118	0.33	0.07	101
125	Rest Rm.	2W20WF2	1	50	0.05	2625		131	2W17WF(Lo)2	29	0.03	76	0.90	0.02	50
127	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
126	Corridor	24T32RF3	3	87	0.26	3875		1,011	24T32RF(R)2	59	0.18	686	0.90	0.08	293
126	Corridor	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(R)2C(LED)1	6	0.01	53	0.90	0.00	0
128	Conference Rm. C1	24T32RF3	1	87	0.09	250		22	24T32RF(R)2	59	0.06	15	0.17	0.00	6
130	Women's Restroom	C13R(CF)2	6	26	0.16	2625		410	C13R(CF)2	26	0.16	410	0.90	0.00	0
134	Jan. Closet														
131	Men's Restroom	C13R(CF)2	6	26	0.16	2625		410	C13R(CF)2	26	0.16	410	0.90	0.00	0
131	Closet														
135	Corridor	24T32RF3	3	87	0.26	3875		1,011	24T32RF(R)2	59	0.18	686	0.90	0.08	293
135	Corridor	X(g)2W(LED)1	1	6	0.01	8759.52		53	X(g)2W(LED)1	6	0.01	53	0.90	0.00	0
100	1st. Flr. Atrium	C18R(CF)1	5	18	0.09	2625		236	C18R(CF)1	18	0.09	236	0.90	0.00	0
100	1st. Flr. Atrium	X(g)2W(LED)1	1	6	0.01	8759.52		53	X(g)2W(LED)1	6	0.01	53	0.90	0.00	0
132	Elev. Equip. Rm.	S32CF2	1	59	0.06	250		15	S32CF2	59	0.06	15	0.17	0.00	0
122	Vest.	24T34RF3	1	115	0.12	2625		302	24T32RF(R)2	59	0.06	155	0.90	0.05	132
122	Office	24T34RF3	1	115	0.12	2625		302	24T32RF(R)2	59	0.06	155	0.90	0.05	132
121	Waiting	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
101	Waiting Rm.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
101	Waiting Rm.	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
Total kW:									Total kWh:				91.87	5.84	12,655

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (15) Federal Warehouse  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
001	Vestibule	24T32RF2	2	59	0.12	2250		266	24T32RF2	59	0.12	266	0.90	0.00	0
001	Vestibule	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(g)2C(LED)1	6	0.01	53	0.90	0.00	0
002	Main Lobby	8S32PF4	33	112	3.70	2250		8,316	8S32PF4	112	3.70	8,316	0.90	0.00	0
003	Reception Area	8S32PF4	6	112	0.67	2250		1,512	8S32PF4	112	0.67	1,512	0.90	0.00	0
003	Reception Area	8S32PF4	3	112	0.34	2250		756	8S32PF4	112	0.34	756	0.90	0.00	0
004	Computer Room	24T34RF(Lou)3	8	115	0.92	2250		2,070	24T32RF(R/Lou)2	59	0.47	1,062	0.90	0.40	907
004	Computer Room	24T40RF3	6	115	0.69	2250		1,553	24T32RF(R)2	59	0.35	797	0.90	0.30	680
004A	Office	W34CF2	2	72	0.14	2250		324	W32CF(Lo)2	52	0.10	234	0.90	0.04	81
005	Training Room	24T34RF4	16	144	2.30	2250		5,184	24T32RF(R)2	59	0.94	2,124	0.90	1.22	2,754
006	Open Office Area	8S32PF4	4	112	0.45	2250		1,008	8S32PF4	112	0.45	1,008	0.90	0.00	0
007	License plate	8S32PF4	3	112	0.34	2250		756	8S32PF4	112	0.34	756	0.90	0.00	0
007	License plate	8S32PF4	8	112	0.90	2250		2,016	8S32PF4	112	0.90	2,016	0.90	0.00	0
008	Election Machine Storage	8S32PF4	264	112	29.57	500		14,784	8S32PF4	112	29.57	14,784	0.33	0.00	0
008	Election Machine Storage	X(g)2C(LED)1	3	6	0.02	8759.52		158	X(g)2C(LED)1	6	0.02	158	0.90	0.00	0
H009	Hallway	24T32RF2	17	59	1.00	3750		3,761	24T32RF2	59	1.00	3,761	0.90	0.00	0
H009	Hallway	X(g)2C(LED)1	4	6	0.02	8759.52		210	X(g)2C(LED)1	6	0.02	210	0.90	0.00	0
010	Men RR	W34WF2	2	72	0.14	2250		324	W32WF(Lo)T2	51	0.10	230	0.90	0.04	85
010	Men RR	14T34RF2	5	72	0.36	2250		810	14T32RF(Lo)2	52	0.26	585	0.90	0.09	203
010A	Custodian	S34CF1	1	43	0.04	500		22	S32CF(Lo)1	29	0.03	15	0.33	0.00	6
011	Storage	22T32RF(u)2	1	59	0.06	500		30	22T32RF(u)2	59	0.06	30	0.33	0.00	0
011A	Women RR	14T34RF2	2	72	0.14	2250		324	14T32RF(Lo)2	52	0.10	234	0.90	0.04	81
011A	Women RR	W34WF2	1	72	0.07	2250		162	W32CF(Lo)2	52	0.05	117	0.90	0.02	41
012	South Dock	X(g)2C(LED)1	1	6	0.01	8759.52		53	X(g)2C(LED)1	6	0.01	53	0.90	0.00	0
012	South Dock	8S32PF4	12	112	1.34	2250		3,024	8S32PF4	112	1.34	3,024	0.90	0.00	0
012A	Information Tech	8S32PF4	20	112	2.24	2250		5,040	8S32PF4	112	2.24	5,040	0.90	0.00	0
013	Files Storage	8S32PF4	143	112	16.02	500		8,008	8S32PF4	112	16.02	8,008	0.33	0.00	0
013	Files Storage	8S32PF4	32	112	3.58	500		1,792	8S32PF4	112	3.58	1,792	0.33	0.00	0
013	Files Storage	8S32PF4	6	112	0.67	500		336	8S32PF4	112	0.67	336	0.33	0.00	0
014	Carpenter Shop	HB400P(MH)1	19	458	8.70	2250		19,580	HB32PF(R)6	174	3.31	7,439	0.90	4.96	10,927
014A	Prep Room	HB250P(MH/ep)1	6	295	1.77	2250		3,983	HB250P(MH/ep)1	295	1.77	3,983	0.90	0.00	0
014B	South Vestibule	S34CF2	1	72	0.07	2250		162	S32CF(Lo)2	52	0.05	117	0.90	0.02	41

Project: **Arapahoe County**

Job No. **DWGES30219**

hrs. The demand savings are not fully claimed.

Building: **(15) Federal Warehouse**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
014B	South Vestibule	X(g2C(LED)1	1	6	0.01	8759.52		53	X(g2C(LED)1	6	0.01	53	0.90	0.00	0
014C	Shop Tools	J150C(MHlep)1	1	190	0.19	2250		428	J150C(MHlep)1	190	0.19	428	0.90	0.00	0
014C	Shop Tools	J150C(MHlep)1	1	190	0.19	2250		428	J150C(MHlep)1	190	0.19	428	0.90	0.00	0
015E	Storage	24T32RF2	4	59	0.24	500		118	24T32RF2	59	0.24	118	0.33	0.00	0
015D	Men's RR	24T32RF2	3	59	0.18	2250		398	24T32RF2	59	0.18	398	0.90	0.00	0
015F	Custodian	24T32RF2	1	59	0.06	500		30	24T32RF2	59	0.06	30	0.33	0.00	0
015C	Women's RR	24T32RF2	3	59	0.18	2250		398	24T32RF2	59	0.18	398	0.90	0.00	0
015B	Lunch Room	24T32RF2	4	59	0.24	2250		531	24T32RF2	59	0.24	531	0.90	0.00	0
015A	Storage	W34WF2	2	72	0.14	500		72	W32CF(Lo)2	52	0.10	52	0.33	0.01	18
015	Receiving Area	8S32PF4	19	112	2.13	2250		4,788	8S32PF4	112	2.13	4,788	0.90	0.00	0
015	Receiving Area	8S32PF4	9	112	1.01	2250		2,268	8S32PF4	112	1.01	2,268	0.90	0.00	0
exterior	Front (east Bldg)	WP150W(MH)1	1	190	0.19	5109.72		971	WP150W(MH)1	190	0.19	971	0.90	0.00	0
exterior	Front (east Bldg)	C100R(MH)1	10	128	1.28	5109.72		6,540	C100R(MH)1	128	1.28	6,540	0.90	0.00	0
exterior	Left side (south Bldg)	WP150W(MH)1	4	190	0.76	5109.72		3,883	WP150W(MH)1	190	0.76	3,883	0.90	0.00	0
exterior	Back Side (West Bldg)	WP150W(MH)1	4	190	0.76	5109.72		3,883	WP150W(MH)1	190	0.76	3,883	0.90	0.00	0
exterior	Right Side (North Bldg)	WP150W(MH)1	4	190	0.76	5109.72		3,883	WP150W(MH)1	190	0.76	3,883	0.90	0.00	0
Total kW: 84.71									Total kWh: 115,045.27				37.20	7.04	15,823

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
 Building: **(16) CSU Extension Office**  
 Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
001	West Main Entry	D20P(CF)1	4	20	0.08	2125		170	D20P(CF)1	20	0.08	170	0.90	0.00	0
002	Office-Covelight	S34CF2	8	78	0.62	2125		1,326	S32CF(Lo)2	52	0.42	884	0.90	0.19	398
002	Office	G100P11	4	100	0.40	2125		850	G23P(CF)1	25	0.10	213	0.90	0.27	574
003	Copy Area	S34CF2	2	78	0.16	2125		332	S32CF(Lo)2	52	0.10	221	0.90	0.05	100
4/5/6	Office	W34PF2	4	78	0.31	2125		663	18W32PF(Lo)4	104	0.42	884	0.90	-0.09	-199
4/5/6	Office	W34PF2	1	78	0.08	2125		166	W32PF(Lo)2	52	0.05	111	0.90	0.02	50
4/5/6	Office	D13P(CF)2	10	26	0.26	2125		553	D13P(CF)2	26	0.26	553	0.90	0.00	0
006	Office	44B34RF6	2	234	0.47	2125		995	44B32RF(R)4	116	0.23	493	0.90	0.21	451
007	Office	44B34RF6	2	234	0.47	2125		995	44B32RF(R)4	116	0.23	493	0.90	0.21	451
008	Office	44B34RF6	1	234	0.23	2125		497	44B32RF(R)4	116	0.12	247	0.90	0.11	226
009	Office	44B34RF6	1	234	0.23	2125		497	44B32RF(R)4	116	0.12	247	0.90	0.11	226
010	Mechanical Rm	W34CF2	1	78	0.08	250		20	W32CF(Lo)2	52	0.05	13	0.17	0.00	6
011	Electrical Rm	W34CF2	1	78	0.08	250		20	W32CF(Lo)2	52	0.05	13	0.17	0.00	6
H012	Hallway	14B34PF2	1	78	0.08	3750		293	14B34PF(Lo)2	52	0.05	195	0.90	0.02	88
H012	Hallway	W32WF(Lo)2	3	52	0.16	3750		585	W32WF(Lo)2	52	0.16	585	0.90	0.00	0
013	Conference Rm	8S60PF4	4	242	0.97	250		242	18W32PF(R)4	116	0.46	116	0.17	0.08	113
013	Conference Rm	W34PF4	1	156	0.16	250		39	W32CF(Rw)2	52	0.05	13	0.17	0.02	23
013	Conference Rm	E34PF2	1	78	0.08	250		20	W32PF(Lo)2	52	0.05	13	0.17	0.00	6
014	Kitchen area	8S60CF2	2	121	0.24	3750		908	18W32PF(Lo)4	104	0.21	780	0.90	0.03	115
013	Hallway	8S60CF2	2	121	0.24	3750		908	18W32PF(Lo)4	104	0.21	780	0.90	0.03	115
015	Storage	8S60CF2	1	121	0.12	500		61	W32CF(Lo)4	104	0.10	52	0.33	0.01	8
016	Mechanical Rm	W34CF2	1	78	0.08	500		39	W32CF(Lo)2	52	0.05	26	0.33	0.01	12
017	Men RR	14B34CF2	1	78	0.08	3750		293	14B32CF(Lo)2	52	0.05	195	0.90	0.02	88
017.1	Janitor	R60CH1	1	60	0.06	3750		225	S32CF(Lo)2	52	0.05	195	0.90	0.01	27
018	Women RR	14B34CF2	1	78	0.08	3750		293	14B32CF(Lo)2	52	0.05	195	0.90	0.02	88
018	Women RR	W20WF2	1	48	0.05	3750		180	W17WF(Lo)2	32	0.03	120	0.90	0.01	54
020	Open Office	44B34RF6	6	234	1.40	3750		5,265	44B32RF(R)4	116	0.70	2,610	0.90	0.84	2,390
020	Open Office	8S75PF2	2	152	0.30	3750		1,140	18W32PF(Lo)4	104	0.21	780	0.90	0.09	324
H014	Hallway by RR	8S75PF2	2	152	0.30	3750		1,140	8S32PF(Lo)4	104	0.21	780	0.90	0.09	324
H014	Hallway by RR	R60CH1	1	60	0.06	3750		225	S32CF(Lo)2	52	0.05	195	0.90	0.01	27
Total kWh: 18,933.75									Total kW: 7.93				22.20	2.16	6,089

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**  
Building: **(17) CSU Warehouse**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (ft <sup>2</sup> )	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
001	RR	W34CF2	1	78	0.08	250		20	W32CF(Lo)2	52	0.05	13	0.17	0.00	6
002	Training/ Office	24T34RF4	6	166	0.70	250	6	176	24T32RF(R)2	58	0.35	87	0.17	0.05	80
003	Meeting Space	8S75CF2	29	152	4.41	250		1,102	8S32CF(Lo)4	104	3.02	754	0.17	0.21	313
004	Storage #1	8S75CF2	7	152	1.06	250		266	8S32CF(Lo)4	104	0.73	182	0.17	0.05	76
005	Storage #2	8S75CF2	7	152	1.06	250		266	8S32CF(Lo)4	104	0.73	182	0.17	0.05	76
005	Storage #2	X(glb)20W/2	1	40	0.04	250		10	X(glb)2W(LED)1	2	0.00	1	0.17	0.01	9
Outside	North Building	WP150W(HPS)1	2	188	0.38	5109.72		1,921	WP150W(HPS)1	188	0.38	1,921	0.90	0.00	0
Outside	West Building	WP150W(HPS)1	3	188	0.56	5109.72		2,882	WP150W(HPS)1	188	0.56	2,882	0.90	0.00	0
Total kWh: 6,642.14									Total kW: 5.81				2.80	0.37	559

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Job No. **DWCES30219**

Project: **Arapahoe County**

Building: **(20) Tri-County Health**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
200	Waiting Area	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
201	Dental	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
202	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
203	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
204	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
205	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
H200	Hallway	W34CF2	5	72	0.36	3750		1,350	W32CF(Lo)2	52	0.26	975	0.90	0.09	338
206A	Storage	W34CF4	1	144	0.14	500		72	W32CF(Lo)4	102	0.10	51	0.33	0.01	19
206B	Med.	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
206C	Exam	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
206D	RR	W34CF2	1	72	0.07	2375		171	W32CF(Lo)2	52	0.05	124	0.90	0.02	43
206D	RR	2W20WF2	1	50	0.05	2375		119	2W17WF2	33	0.03	78	0.90	0.02	36
202E	Exam	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	0.04	90
207	Dental	W34CF2	2	72	0.14	2375		342	W32CF(Lo)2	51	0.10	242	0.90	0.04	90
207	Dental	W34CF2	1	72	0.07	2375		171	W32CF(Lo)2	52	0.05	124	0.90	0.02	43
H208	Hallway	W34CF2	2	72	0.14	3750		540	W32CF(Lo)2	52	0.10	390	0.90	0.04	135
209	Kitchen	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
H211	Hallway	W34CF2	6	72	0.43	3750		1,620	W32CF(Lo)2	52	0.31	1,170	0.90	0.11	405
H210	Hallway	W34CF4	2	144	0.29	3750		1,080	W32CF(Lo)4	102	0.20	765	0.90	0.08	284
210	Office	W34CF4	4	144	0.58	2375		1,368	W32CF(Lo)4	102	0.41	969	0.90	0.15	359
210A	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
210B	Office	W34CF4	3	144	0.43	2375		1,026	W32CF(Lo)4	102	0.31	727	0.90	0.11	269
210C	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
210D	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
211	Office	W34CF4	3	144	0.43	2375		1,026	W32CF(Lo)4	102	0.31	727	0.90	0.11	269
211A	Exit	Q100R11	1	100	0.10	3750		375	Q23R(CF)1	23	0.02	86	0.90	0.07	260
212	Rest Room	W34CF2	1	72	0.07	2375		171	W32CF(Lo)2	52	0.05	124	0.90	0.02	43
212	Rest Room	2W20WF2	1	50	0.05	2375		119	2W17WF2	33	0.03	78	0.90	0.02	36
213	Rest Room	D65W11	1	52	0.05	2375		124	D15W(CF)1	15	0.02	36	0.90	0.03	79
214	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	0.08	180
214A	Reception Desk	C13R(CF)1	5	13	0.07	2375		154	C13W(CF)1	13	0.07	154	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (20) Tri-County Health

Job No. DWCES30219

Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy Demand (kWh)
215	Lobby	D65W11	2	52	0.10	2375		247	D15W(CF)1	15	0.03	71	0.90	158
215	Lobby	W34CF2	3	72	0.22	2375		513	W32CF(Lo)2	52	0.16	371	0.90	128
216	WIC Office	W34CF2	6	72	0.43	2375		1,026	W32CF(Lo)2	51	0.31	727	0.90	269
216	WIC Office	W34CF2	3	72	0.22	2375		513	W32CF(Lo)2	52	0.16	371	0.90	128
216B	RD's Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180
216A	Office	W34CF2	2	72	0.14	2375		342	W32CF(Lo)2	52	0.10	247	0.90	86
217	Mail Room	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
218	Rest Room	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
218	Rest Room	W60W12	1	120	0.12	2375		285	2W17WF(ViLo)2	29	0.03	69	0.90	195
219	Rest Room	2W20WF2	1	50	0.05	2375		119	2W17WF2	33	0.03	78	0.90	36
219	Rest Room	W34CF2	1	72	0.07	2375		171	W32CF(Lo)2	52	0.05	124	0.90	43
100	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180
101	Conference Room	W34CF4	2	144	0.29	250		72	W32CF(Lo)4	102	0.20	51	0.17	19
102	Storage	W34CF4	1	144	0.14	500		72	W32CF(Lo)4	102	0.10	51	0.33	19
103	Office	W34CF2	1	72	0.07	2375		171	W32CF(Lo)2	52	0.05	124	0.90	43
103	Office	C13R(CF)1	3	13	0.04	2375		93	C13W(CF)1	13	0.04	93	0.90	0
104	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180
105	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
106	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
106A	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
106B	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
107	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
107A	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
108	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
108A	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
108B	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
109	Fax / Copy Room	D65W11	3	52	0.16	2375		371	D15W(CF)1	15	0.05	107	0.90	237
109	Fax / Copy Room	8S75CF2	1	123	0.12	2375		292	18S32CF(Lo)4	102	0.10	242	0.90	45
H100	Hallway	W34CF2	1	72	0.07	3750		270	W32CF(Lo)2	52	0.05	195	0.90	68
H100	Hallway	X(g)6CF1	1	9	0.01	8759.52		79	X(g)62C(LED)1	6	0.01	53	0.90	24
S109	Stairway	O65W11	1	65	0.07	3750		244	W32CF(Lo)2	52	0.05	195	0.90	44
110	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
111	Nurse Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180
112	Furnace Room	O65C(R30)1	2	65	0.13	250		33	Q13R(CF)2	31	0.06	16	0.17	15
112	Furnace Room	O18W(CF)1	1	18	0.02	250		5	Q13R(CF)2	31	0.03	8	0.17	-3
113	Office	W34CF4	3	144	0.43	2375		1,026	W32CF(Lo)4	102	0.31	727	0.90	269
S300	Stairway	W34CF2	2	72	0.14	3750		540	W32CF(Lo)2	52	0.10	390	0.90	135
300	Conference Room	W34CF4	6	144	0.86	250		216	W32CF(Lo)4	102	0.61	153	0.17	57
300	Conference Room	14T34RF2	2	72	0.14	250		36	14T32RF(Lo/T)2	51	0.10	26	0.17	10
300	Conference Room	14T34RF2	1	72	0.07	250		18	14T32RF(Lo)2	52	0.05	13	0.17	5
301	Office	W34CF4	2	144	0.29	2375		684	W32CF(Lo)4	102	0.20	485	0.90	180
302	Office	W34CF2	2	72	0.14	2375		342	W32CF(Lo)2	52	0.10	247	0.90	86
303	Office	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
304	Exam Room	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
305	Exam Room	W34CF4	1	144	0.14	2375		342	W32CF(Lo)4	102	0.10	242	0.90	90
Total kW: 17.06								Total kWh: 39,040.34	11.92				76.70	10,584

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (23)Altura Plaza BLDG  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
B001	Sheriff Office	24T34RF4	2	156	0.16	8759.52	4	1,366	24T32RF(R)2	58	0.12	1,016	0.90	0.04
B002	Holding Cell	14T34RF2	2	78	0.16	8759.52		1,366	14T32RF(Lo)2	52	0.10	911	0.90	0.05
B003	Holding Cell	14T34RF2	2	78	0.16	8759.52		1,366	14T32RF(Lo)2	52	0.10	911	0.90	0.05
B004	Holding Cell	14T34RF2	2	78	0.16	8759.52		1,366	14T32RF(Lo)2	52	0.10	911	0.90	0.05
B005	Holding Cell	24T34RF4	1	156	0.16	8759.52		1,366	24T32RF(R)2	58	0.08	508	0.90	0.09
B006	Holding Cell	24T34RF4	1	156	0.16	8759.52		1,366	24T32RF(R)2	58	0.08	508	0.90	0.09
B007	Holding Cell	24T34RF4	1	156	0.08	8759.52	2	683	24T32RF(R)2	58	0.06	508	0.90	0.02
B008	Vacant	24T34RF4	9	156	1.40	500		702	24T32RF(R)2	58	0.52	261	0.33	0.26
B009	Court Room	24T34RF4	8	156	1.25	1500		1,872	24T32RF(R)2	58	0.46	696	0.90	0.71
B010	Mechanical Room	I34PF2	5	78	0.39	250		98	I32PF(Lo)2	52	0.26	65	0.17	0.02
B010	Mechanical Room	W34CF2	1	78	0.08	250		20	W32CF(Lo)2	52	0.05	13	0.17	0.00
B011	Storage Area	24T34RF4	13	156	2.03	500		1,014	24T32RF(R)2	58	0.75	377	0.33	0.38
B011A	Storage	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	58	0.33	0.06
B012	District Attorney	24T34RF4	4	156	0.62	2750		1,716	24T32RF(R)2	58	0.23	638	0.90	0.35
B013	Court Room	C65RI1	5	65	0.33	1500		488	C15R(CF)1	17	0.09	128	0.90	0.22
B013	Court Room	24T34RF4	12	156	1.87	1500		2,808	24T32RF(R)2	58	0.70	1,044	0.90	1.06
H001	Hallway	24T34RF4	9	156	1.40	4000		5,616	24T32RF(R)2	58	0.52	2,088	0.90	0.79
B014	Janitor Closet	O60CI1	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	0.01
B015	Men's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02
B015	Men's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02
B016	Women's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02
B016	Women's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02
B017	Electrical Room	O60CI1	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00
H002	Hallway	24T34RF4	3	156	0.47	4000		1,872	24T32RF(R)2	58	0.17	696	0.90	0.26
B018	Fitness Center	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26
B018	Shower Room	R60RI1	2	60	0.12	2750		330	R15R(CF)1	17	0.03	94	0.90	0.08
B018	Fitness Center	24T34RF(em)4	1	156	0.16	2750		429	24T32RF(R/em)2	58	0.06	160	0.90	0.09
B018A	Men's Lockers	W34CF2	4	78	0.31	2750		858	W32CF(LoT)2	52	0.21	572	0.90	0.09
B018A	Men's Sauna	C100RI1	1	100	0.10	2750		275	C23R(CF)1	27.5	0.03	76	0.90	0.07
B018B	Women's Lockers	W34CF2	4	78	0.31	2750		858	W32CF(LoT)2	52	0.21	572	0.90	0.09
B018B	Shower Room	R60RI1	2	60	0.12	2750		330	R15R(CF)1	17	0.03	94	0.90	0.08

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (23)Altura Plaza BLDG  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
B018B	Women's Sauna	C100R11	1	100	0.10	2750		275	C23R(CF)1	27.5	0.03	76	0.90	0.07	179
B019	Employee Breakroom	24T34RF4	16	156	2.50	2750		6,864	24T32RF(R)2	58	0.93	2,582	0.90	1.41	3,881
H003	Hallway	24T34RF4	3	156	0.47	4000		1,872	24T32RF(R)2	58	0.17	896	0.90	0.26	1,058
H003	Hallway	24T34RF(em)4	1	156	0.16	4000		624	24T32RF(R/em)2	58	0.06	232	0.90	0.09	353
S003	Stair	W34WF1	2	42	0.08	4000		336	W32WF(Lo)1	26	0.05	208	0.90	0.03	115
B020	Court Room	8S75PF2	2	151	0.30	1500		453	18S32CF(Lo)4	104	0.21	312	0.90	0.08	127
B021	Storage	24B34PF2	3	78	0.23	500		117	24B32CF(Lo)2	52	0.16	78	0.33	0.02	35
B021	Storage	O75P11	2	75	0.15	500		75	S32CF(Lo)2	52	0.10	52	0.33	0.01	21
B022	Conference	S32CF2	6	58	0.35	250		87	S32CF2	58	0.35	87	0.17	0.00	0
B022	Conference	S32CF2	3	58	0.17	250		44	S32CF2	58	0.17	44	0.17	0.00	0
B022	Conference	2S17CF2	1	32	0.03	250		8	2S17CF2	32	0.03	8	0.17	0.00	0
B023	Conference	24T34RF4	3	156	0.47	250		117	24T32RF(R)2	58	0.17	44	0.17	0.04	66
B024	Maintenance Work Room	I34PF2	2	78	0.16	500		78	I32PF(Lo)2	52	0.10	52	0.33	0.02	23
B024A	Telephone Room	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	58	0.33	0.06	88
B024B	Electrical Room / Storage	I34PF2	4	78	0.31	250		78	I32PF(Lo)2	52	0.21	52	0.17	0.02	23
B024B	Electrical Room / Storage	I34PF(em)2	1	78	0.08	250		20	I32CF(Lo/em)2	52	0.05	13	0.17	0.00	6
B025	Maintenance Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
B026	Custodian Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
100	Court Room	24T34RF4	18	156	2.81	1500		4,212	24T32RF(R)2	58	1.04	1,566	0.90	1.59	2,381
100A	Restroom	W60WI2	1	120	0.12	2750		330	2W17WF(V)2	32	0.03	88	0.90	0.08	218
100B	Restroom	W60WI2	1	120	0.12	2750		330	2W17WF(V)2	32	0.03	88	0.90	0.08	218
101	Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
101A	Jury Room	24T34RF4	4	156	0.62	500		312	24T32RF(R)2	58	0.23	116	0.33	0.12	176
101A	Jury Restroom	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
101B	Judge's Chambers	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
101C	Court Room	24T34RF4	16	156	2.50	1500		3,744	24T32RF(R)2	58	0.93	1,392	0.90	1.41	2,117
H102	Hallway	24T34RF4	4	156	0.62	4000		2,496	24T32RF(R)2	58	0.23	928	0.90	0.35	1,411
H102	Hallway	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b)2C(LED)1	2	0.00	35	0.90	0.00	0
S103	Stair	W34CF1	3	39	0.12	4000		468	W32CF(Lo)1	26	0.08	312	0.90	0.04	140
104	Waiting Room	W34CF1	2	39	0.08	2750		215	W32CF(Lo)1	26	0.05	143	0.90	0.02	64
104	Waiting Room	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b)2C(LED)1	2	0.00	35	0.90	0.00	0
104A	Lab	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(23)Altura Plaza BLDG**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
104A	Lab	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
104B	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
104C	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
104D	County Health	24T34RF4	8	156	1.25	2750		3,432	24T32RF(R)2	58	0.46	1,276	0.90	0.71	1,940
104D	County Health	24T34RF4	9	156	1.40	2750		3,861	24T32RF(R)2	58	0.52	1,436	0.90	0.79	2,183
104E	Breakroom	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
105	Mechanical Room	O100C11	1	100	0.10	250		25	S32CF(Lo)2	52	0.05	13	0.17	0.01	11
106	Main Lobby	22T34RF(U)2	13	78	1.01	2750		2,789	22T17RF(R)2	32	0.42	1,144	0.90	0.54	1,480
106	Main Lobby	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(gb)2C(LED)1	2	0.00	35	0.90	0.00	0
106A	Vestibule	C26R(CF)1	4	26	0.10	2750		286	C26R(CF)1	26	0.10	286	0.90	0.00	0
106A	Entrance/Guard Area	Q26R(CF)2	11	62.4	0.69	2750		1,888	Q26R(CF)2	62.4	0.69	1,888	0.90	0.00	0
106B	Vestibule	C26R(CF)2	2	62.4	0.12	2750		343	C26R(CF)2	62.4	0.12	343	0.90	0.00	0
107	Hallway	22T34RF(U)2	3	78	0.23	4000		936	22T17RF(R)2	32	0.10	384	0.90	0.12	497
108	Waiting Area	22T34RF(U)2	6	78	0.47	2750		1,287	22T17RF(R)2	32	0.19	528	0.90	0.25	683
109	Vestibule	22T34RF(U)2	1	78	0.08	2750		215	22T17RF(R)2	32	0.03	88	0.90	0.04	114
110	County Court Clerks	24T34RF4	46	156	7.18	2750		19,734	24T32RF(R)2	58	2.67	7,337	0.90	4.06	11,157
110	County Court Clerks	24T34RF4	16	156	2.50	2750		6,864	24T32RF(R)2	58	0.93	2,552	0.90	1.41	3,881
110	County Court Clerks	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(gb)2C(LED)1	2	0.01	53	0.90	0.00	0
110A	Office	24T34RF4	4	156	0.62	2750		1,716	24T32RF(R)2	58	0.23	638	0.90	0.35	970
110B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
110C	Supervisor Office	24T34RF4	4	156	0.47	2750	4	1,287	24T32RF(R)2	58	0.23	638	0.90	0.21	584
110D	Training Room	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	0.53	1,455
110E	Office	24T34RF4	4	156	0.62	2750		1,716	24T32RF(R)2	58	0.23	638	0.90	0.35	970
110F	Mechanical Room	O100C11	1	100	0.10	250		25	S32CF(Lo)2	52	0.05	13	0.17	0.01	11
111	Stair	W34WF1	2	42	0.08	4000		336	W32WF(Lo)1	26	0.05	208	0.90	0.03	115
112	Janitor Closet	O60C11	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	0.01	13
113	Men Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
113	Men Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
114	Women Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
114	Women Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
115	Electrical Room	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00	7
200	District Attorney	24T34RF4	5	156	0.39	2750	10	1,073	24T32RF(R)2	58	0.29	798	0.90	0.09	248

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (23)Altura Plaza BLDG  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
200A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200C	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200E	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200F	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200G	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200H	Victim Witness	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
200J	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
200J	Flies Room	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
200J	Hall by 200J	22T34RF(U)2	3	78	0.23	4000		936	22T17RF(R)2	32	0.10	384	0.90	0.12	497
201	Reception Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
201	Reception Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b)2C(LED)1	2	0.00	35	0.90	0.00	0
201A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
201B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
S202	Stair	W34CF2	3	78	0.23	4000		936	24T32RF(R)2	58	0.12	319	0.90	0.18	485
H203	Hallway	24T34RF4	9	156	0.70	4000	18	2,808	W32CF(Lo)2	52	0.16	624	0.90	0.07	281
H203	Hallway	X(g)2C(LED)1	3	2	0.01	8759.52		53	24T32RF(R)2	58	0.52	2,088	0.90	0.16	648
204	Court Room	24T34RF4	23	156	2.50	1500	28	3,744	X(g)b)2C(LED)1	2	0.01	53	0.90	0.00	0
205	Open Office	24T34RF4	8	156	0.94	2750	8	2,574	24T32RF(R)2	58	1.33	2,001	0.90	1.05	1,569
205A	Jury Room	24T34RF4	5	156	0.78	500		390	24T32RF(R)2	58	0.46	1,276	0.90	0.42	1,168
205B	Judge's Chambers	24T34RF4	4	156	0.47	2750	4	1,287	24T32RF(R)2	58	0.29	145	0.33	0.15	221
205C	RR	W60WI2	1	120	0.12	2750		330	24T32RF(R)2	58	0.23	638	0.90	0.21	594
205D	RR	W60WI4	1	240	0.24	2750		660	2W17WVF(V)2	32	0.03	88	0.90	0.08	218
206	Mechanical Room	O100CI1	1	100	0.10	250		25	2W17WVF(V)2	32	0.03	88	0.90	0.19	515
H207	Hallway	24T34RF4	3	156	0.23	4000	6	936	S32CF(Lo)2	52	0.05	13	0.17	0.01	11
208	County Court	24T34RF4	19	156	2.57	1500	10	3,861	24T32RF(R)2	58	0.17	696	0.90	0.05	216
208	County Court	X(g)2C(LED)1	2	2	-0.02	8759.52	10	-140	24T32RF(R)2	58	1.10	1,653	0.90	1.32	1,987
208A	Office	24T34RF4	3	156	0.47	2750		1,287	X(g)b)2C(LED)1	2	0.00	35	0.90	-0.02	-158
209	District Attorney	24T34RF4	6	156	0.70	2750	6	1,931	24T32RF(R)2	58	0.17	479	0.90	0.26	728
209A	Office	24T34RF4	2	156	0.16	2750	4	429	24T32RF(R)2	58	0.35	957	0.90	0.32	876
209B	Office	24T34RF4	3	156	0.31	2750	4	858	24T32RF(R)2	58	0.12	319	0.90	0.04	99
									24T32RF(R)2	58	0.17	479	0.90	0.12	342

hrs. The demand savings are not fully claimed.

## Building: (23)Altura Plaza BLDG

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
209C	Office	24T34RF4	3	156	0.31	2750	4	858	24T32RF(R)2	58	0.17	479	0.90	342
209D	Office	24T34RF4	1	156	-0.08	2750	6	-215	24T32RF(R)2	58	0.06	160	0.90	-337
210	Copy Room	24T34RF4	2	156	0.16	2750	4	429	24T32RF(R)2	58	0.12	319	0.90	99
211	Office	24T34RF4	1	156	0.08	2750	2	215	24T32RF(R)2	58	0.06	160	0.90	50
211A	Office	24T34RF4	3	156	0.31	2750	4	858	24T32RF(R)2	58	0.17	479	0.90	342
S212	Stair	W34WF1	2	42	0.08	4000		336	W32WF(L)1	26	0.05	208	0.90	115
213	County Court	24T34RF4	22	156	3.43	1500		5,148	24T32RF(R)2	58	1.28	1,914	0.90	2,911
214	Open Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	485
214	Open Office	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	1,455
214A	Judge's Chambers	24T34RF4	5	156	0.78	2750		2,145	24T32RF(R)2	58	0.29	798	0.90	1,213
214A	Judge's Chambers	W60W11	1	60	0.06	2750		165	W60W11	60	0.06	165	0.90	0
214A	Judge's RR	W60W14	1	240	0.24	2750		660	2W17WF(V)2	32	0.03	88	0.90	515
214B	Jury Room	24T34RF4	6	156	0.94	500		468	24T32RF(R)2	58	0.35	174	0.33	265
215	Mechanical Room	O100C11	1	100	0.10	250		25	S32CF(L)2	52	0.05	13	0.17	11
H216	Hallway	24T34RF4	9	156	0.70	4000	18	2,808	24T32RF(R)2	58	0.52	2,088	0.90	648
217	Janitor Room	O60C11	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	13
218	Men Restroom	W34CF2	1	78	0.08	2750		215	W32CF(L)2	52	0.05	143	0.90	64
218	Men Restroom	S34CF2	1	78	0.08	2750		215	S32CF(L)2	52	0.05	143	0.90	64
219	Women Restroom	W34CF2	1	78	0.08	2750		215	W32CF(L)2	52	0.05	143	0.90	64
219	Women Restroom	S34CF2	1	78	0.08	2750		215	S32CF(L)2	52	0.05	143	0.90	64
220	Electrical Room	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	7
H221	Hallway	24T34RF4	3	156	0.23	4000	5	936	24T32RF(R)2	58	0.17	896	0.90	216
S300	Stair	W34WF1	2	42	0.08	4000		336	W32WF(L)1	26	0.05	208	0.90	115
301	Lunch Room	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	1,455
302	Nurse/Clerical	24T34RF4	5	156	0.70	2750	2	1,931	24T32RF(R)2	58	0.29	798	0.90	1,020
303	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	485
303	Office	24T34RF4	2	156	0.31	2750		958	24T32RF(R)2	58	0.12	319	0.90	485
304	Open Office	24T32RF(Low)3	7	78	0.55	2750		1,502	24T32RF(Low)2	58	0.41	1,117	0.90	347
304	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0
304A	Treatment	24T32RF(Low)3	2	78	0.16	2750		429	24T32RF(Low)2	58	0.12	319	0.90	99
304B	Break	24T32RF(Low)3	2	78	0.16	2750		429	24T32RF(Low)2	58	0.12	319	0.90	99
304C	Consult	24T32RF(Low)3	1	78	0.08	2750		215	24T32RF(Low)2	58	0.06	160	0.90	50

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
304D	Dental Clinic	C26R(CF)1	16	26	0.42	2750		1,144	C26R(CF)1	26	0.42	1,144	0.90	0.00	0
304E	Reception	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
304F	Lab	24T32RF3	2	87	0.17	2750		479	24T32RF(R)2	58	0.12	319	0.90	0.05	144
304G	Pump Room	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00	7
304H	X-Ray Room	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
304I	X-Ray Room	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
304J	X-Ray Room	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
304K	X-Ray Room	24T32RF(Lou)3	2	78	0.16	2750		429	24T32RF(Lou)2	58	0.12	319	0.90	0.04	99
304L	Dark Room	Q100R11	1	100	0.10	500		50	Q23R(CF)1	26	0.03	13	0.33	0.02	33
H304	Hallway	22T34RF(U)2	2	78	0.16	4000		824	22T17RF(R)2	32	0.06	256	0.90	0.08	331
H304	Hallway	22T32RF(U)2	2	58	0.12	4000		464	22T17RF(R)2	32	0.06	256	0.90	0.05	187
H305	Hallway	24T34RF4	9	156	0.70	4000	18	2,808	24T32RF(R)2	58	0.52	2,088	0.90	0.16	648
308	Environment Health	24T34RF4	8	156	1.25	2750		3,432	24T32RF(R)2	58	0.46	1,278	0.90	0.71	1,940
306A	Office	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	0.53	1,455
306B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
306C	Office	24T34RF4	6	156	0.78	2750	4	2,145	24T32RF(R)2	58	0.35	957	0.90	0.39	1,069
306D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
306E	Nursing	24T34RF4	4	156	0.62	2750		1,716	24T32RF(R)2	58	0.23	638	0.90	0.35	970
307	Field Nursing	24T34RF4	8	156	1.01	2750	6	2,789	24T32RF(R)2	58	0.46	1,276	0.90	0.50	1,361
307A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
307B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
308	Mechanical Room	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00	7
H309	Hallway	24T34RF4	3	156	0.23	4000	6	936	24T32RF(R)2	58	0.17	696	0.90	0.05	216
310	Janitor	O60C11	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	0.01	13
311	Men Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
311	Men Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
312	Women Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
312	Women Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
313	Electrical	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00	7
314	Conference Room	24T34RF4	6	156	0.94	250		234	24T32RF(R)2	58	0.35	87	0.17	0.09	132
315	IT Work Room	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
315	IT Work Room	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy Demand (kW)
315A	Work Room	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316	Reception Area	W34CF2	2	78	0.16	2750		429	W32CF(Lo)2	52	0.10	286	0.90	0.05
316A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316A	Office	22T34RF(U)2	1	78	0.08	2750		215	22T17RF(R)2	32	0.03	88	0.90	0.04
316B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316C	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316E	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316F	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316G	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316H	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316I	Office	24T34RF4	4	156	0.62	2750		1,716	24T32RF(R)2	58	0.23	638	0.90	0.35
316J	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
316K	Open Office	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	0.53
316K	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b)2C(LED)1	2	0.00	18	0.90	0.00
316L	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09
316M	RR	W34WF2	1	78	0.08	2750		215	W32WF(Lo)2	52	0.05	143	0.90	0.02
316N	Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26
H316	Hallway	22T34RF(U)2	5	78	0.39	4000		1,560	22T17RF(R)2	32	0.16	640	0.90	0.21
H316	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b)2C(LED)1	2	0.00	18	0.90	0.00
S317	Stair	W34CF2	3	78	0.23	4000		936	W32CF(Lo)2	52	0.16	624	0.90	0.07
H318	Hallway	24T34RF4	9	156	1.40	4000		5,616	24T32RF(R)2	58	0.52	2,088	0.90	0.79
318	Waiting Room	24T34RF4	9	156	1.09	2750	8	3,003	24T32RF(R)2	58	0.52	1,436	0.90	0.51
318A	Office	W34CF2	2	78	-0.08	2750	6	-215	W32CF(Lo)2	52	0.10	286	0.90	-0.16
318B	Office	24T34RF4	5	156	0.62	2750	4	1,716	24T32RF(R)2	58	0.29	798	0.90	0.30
318C	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
318D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
318E	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
318F	Exam 4	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
318G	Exam 3	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18
H318	Hallway	22T34RF(U)2	3	78	0.23	4000		936	22T17RF(R)2	32	0.10	384	0.90	0.12
H318	Hallway	22T34RF(U)2	3	78	0.23	4000		936	22T17RF(R)2	32	0.10	384	0.90	0.12



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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
318I	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b2C(LED)1	2	0.00	18	0.90	0.00	0
318H	Exam 2	24T34RF4	2	156	0.31	2750		858	24T32RF(R)T2	58	0.12	319	0.90	0.18	485
318I	Exam 1	24T34RF4	2	156	0.31	2750		858	24T32RF(R)T2	58	0.12	319	0.90	0.18	485
318J	Restroom	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
318J	Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
318k	Lab	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
318L	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
318M	Storage	24T34RF4	1	156	0.16	500		78	24T32RF(R)2	58	0.06	29	0.33	0.03	44
319	Mechanical	O60C11	1	60	0.06	250		15	Q13R(CF)2	31.2	0.03	8	0.17	0.00	7
H320	Hallway	24T34RF4	3	156	0.23	4000	6	936	24T32RF(R)2	58	0.17	696	0.90	0.05	216
S400	Stair	W34WF1	2	42	0.08	4000		336	W32WF(Lo)1	26	0.05	208	0.90	0.03	115
401	County Court	24T34RF4	21	156	3.28	1500		4,914	24T32RF(R)2	58	1.22	1,827	0.90	1.85	2,778
401A	Judge's Chambers	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	0.53	1,455
401A	Judge's RR	W60W12	1	120	0.12	2750		330	2W17WF(V)2	32	0.03	88	0.90	0.08	218
H401	Hallway	24T34RF4	2	156	0.31	4000		1,248	24T32RF(R)2	58	0.12	464	0.90	0.18	706
401B	Jury Room	24T34RF4	7	156	1.09	500		546	24T32RF(R)2	58	0.41	203	0.33	0.21	309
401C	RR	W60W12	1	120	0.12	2750		330	2W17WF(V)2	32	0.03	88	0.90	0.08	218
401D	RR	W60W12	1	120	0.12	2750		330	2W17WF(V)2	32	0.03	88	0.90	0.08	218
401E	Open Office	24T34RF4	5	156	0.78	2750		2,145	24T32RF(R)2	58	0.29	798	0.90	0.44	1,213
402	Mechanical	O75W11	1	75	0.08	250		19	S32CF(Lo)2	52	0.05	13	0.17	0.00	5
H403	Hallway	24T34RF2	9	78		4000	18		24T32RF(Lo)2	52	0.47	1,872	0.90	-0.42	-1,685
H403	Hallway	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)b2C(LED)1	2	0.01	53	0.90	0.00	0
404	Probation Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
404	Probation Office	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b2C(LED)1	2	0.00	35	0.90	0.00	0
404A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404C	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404E	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404F	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404G	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404H	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
404I	Office	24T34RF2	2	78	0.16	2750		429	24T32RF(Lo)2	52	0.10	286	0.90	0.05	129
404J	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404K	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404L	Waiting Room	24T34RF2	2	78	0.16	2750		429	24T32RF(Lo)2	52	0.10	286	0.90	0.05	129
404M	Waiting Room	24T34RF4	6	156	0.47	2750	12	1,287	24T32RF(R)2	58	0.35	957	0.90	0.11	297
404N	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404O	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
404P	Copy Room	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
404Q	Copy Room	22T34RF(U)2	1	78	0.08	2750		215	22T17RF(R)2	32	0.03	88	0.90	0.04	114
405	Telephone Room	O60C1	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	0.01	13
406	Women's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
406	Women's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
407	Men's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64
407	Men's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
408	Janitor	O60C1	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	0.01	13
409	Hallway	C75R(R40)1	1	75	0.08	4000		300	C15R(CF/R30)1	17	0.02	68	0.90	0.05	209
409	Hallway	24T34RF4	3	156	0.23	4000	6	936	24T32RF(R)2	58	0.17	696	0.90	0.05	216
410	Open Office	24T34RF4	6	156	0.94	2750		2,574	24T32RF(R)2	58	0.35	957	0.90	0.53	1,455
410	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b2C(LED)1	2	0.00	18	0.90	0.00	0
410A	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410B	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410C	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410D	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410E	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410F	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410G	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410H	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410I	Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.26	728
410J	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410K	Open Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410K	Open Office	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b2C(LED)1	2	0.00	18	0.90	0.00	0
410L	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (23)Altura Plaza BLDG

Job No. DWGES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
410M	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
410N	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
H410	Hallway	24T34RF4	5	156	0.78	4000		3,120	24T32RF(R)2	58	0.29	1,160	0.90	0.44	1,764
H410	Hallway	X(g)2C(LED)1	1	2	0.00	4000		8	X(g)2C(LED)1	2	0.00	8	0.90	0.00	0
411	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
411	Office	W34WF1	1	42	0.04	2750		116	W32WF(L)1	26	0.03	72	0.90	0.01	40
412	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
H413	Hallway	24T34RF4	9	156	0.70	4000	18	2,808	24T32RF(R)2	58	0.52	2,088	0.90	0.16	648
H413	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
S414	Stair	W34CF1	2	39	0.08	4000		312	W32CF(L)1	26	0.05	208	0.90	0.02	94
415	Court Room	24T34RF4	18	156	2.81	1500		4,212	24T32RF(R)2	58	1.04	1,566	0.90	1.59	2,381
H415	Hallway	22T34RF(U)2	2	78	0.16	4000		624	22T17RF(R)2	32	0.06	256	0.90	0.08	331
415A	Judge's Chambers	24T34RF4	5	156	0.78	2750		2,145	24T32RF(R)2	58	0.29	798	0.90	0.44	1,213
415A	Judge's RR	W60W12	1	120	0.12	2750		330	2W17WFF(V)2	32	0.03	88	0.90	0.08	218
415B	Jury Room	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	58	0.33	0.06	88
415C	Open Office	24T34RF4	7	156	1.09	2750		3,003	24T32RF(R)2	58	0.41	1,117	0.90	0.62	1,698
415D	RR	W60W12	1	120	0.12	2750		330	2W17WFF(V)2	32	0.03	88	0.90	0.08	218
416	Mechanical Room	O75W11	1	75	0.08	250		19	S32CF(L)2	52	0.05	13	0.17	0.00	5
H417	Hallway	24T34RF4	3	156	0.23	4000	6	936	24T32RF(R)2	58	0.17	696	0.90	0.05	216
S500	Stair	W34WF1	3	42	0.13	4000		504	W32WF(L)1	26	0.08	312	0.90	0.04	173
501	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
H501	Hallway	24T34RF4	7	156	1.09	4000		4,368	24T32RF(R)2	58	0.41	1,624	0.90	0.62	2,470
H501	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
502	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
503	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
504	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
504	Office	W34TF1	1	42	0.04	2750		116	W34TF1	42	0.04	116	0.90	0.00	0
505	Office	W34TF1	2	42	0.08	2750		231	W34TF1	42	0.08	231	0.90	0.00	0
505	Office	W30TF1	1	43	0.04	2750		118	W30TF1	43	0.04	118	0.90	0.00	0
506	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
506	Office	W34TF1	1	42	0.04	2750		116	W34TF1	42	0.04	116	0.90	0.00	0
507	Office	W34TF1	1	42	0.04	2750		116	W34TF1	42	0.04	116	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
507	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
508	Office	24T34RF4	2	156	0.31	2750		858	24T32RF(R)2	58	0.12	319	0.90	0.18	485
508	Office	W34TF1	2	42	0.08	2750		231	W34TF1	42	0.08	231	0.90	0.00	0
509	Lobby	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.25	728
509	Lobby	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
509	Lobby	24T34RF4	1	156	0.16	8759.52		1,366	24T32RF(R)2	58	0.06	508	0.90	0.09	773
510	Reception Area	24T34RF4	8	156	1.25	2750		3,432	24T32RF(R)2	58	0.46	1,276	0.90	0.71	1,940
510	Reception Area	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
511	Workroom	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.25	728
511A	Storage	O75W11	1	75	0.08	500		38	S32CF(Lo)2	52	0.05	26	0.33	0.01	10
512	Files Storage	24T34RF2	2	78	0.16	500		78	24T32RF(Lo)2	52	0.10	52	0.33	0.02	23
512	Files Storage	24T34RF4	1	156	0.16	500		78	24T32RF(R)2	58	0.06	29	0.33	0.03	44
513	Conference	24T34RF4	2	156	0.31	250		78	24T32RF(R)2	58	0.12	29	0.17	0.03	44
513	Conference	24T32RF4	1	116	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
513	Conference	C45TH1	7	45	0.32	250		79	C45TH1	45	0.32	79	0.17	0.00	0
514	Office	24T32RF4	2	116	0.23	2750		638	24T32RF(R)2	58	0.12	319	0.90	0.10	287
514	Office	24T34RF4	1	156	0.16	2750		429	24T32RF(R)2	58	0.06	160	0.90	0.09	243
515	Office	24T34RF4	3	156	0.47	2750		1,287	24T32RF(R)2	58	0.17	479	0.90	0.25	728
H516	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
H516	Hallway	24T34RF4	1	156	0.16	4000		624	24T32RF(R)2	58	0.06	232	0.90	0.09	353
517	Vacant Room	24T34RF4	21	156	3.28	500		1,638	24T32RF(R)2	58	1.22	609	0.33	0.62	926
517A	Vacant Room	24T34RF4	2	156	0.31	500		156	24T32RF(R)2	58	0.12	58	0.33	0.06	88
517B	Vacant Room	24T34RF4	8	156	1.25	500		624	24T32RF(R)2	58	0.46	232	0.33	0.24	353
517C	Vacant Room	24T34RF4	4	156	0.62	500		312	24T32RF(R)2	58	0.23	116	0.33	0.12	176
517C	Vacant Room	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
H518	Hallway	24T34RF2	1	78	0.08	4000		312	24T32RF(Lo)2	52	0.05	208	0.90	0.02	94
H518	Hallway	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
H518	Hallway	C75RI1	1	75	0.08	4000		300	C16R(CF)1	17	0.02	68	0.90	0.05	209
519	RR	W34CF4	1	156	0.16	2750		429	W32CF(Lo)4	104	0.10	286	0.90	0.05	129
520	Janitor	O60W11	1	60	0.06	500		30	S32CF(Lo)1	30	0.03	15	0.33	0.01	14
521	Men's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	0.02	64
521	Men's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	0.02	64

Project: **Arapahoe County** Job No. **DWCES30219**

Building: **(23)Altura Plaza BLDG**

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
522	Women's Restroom	W34CF2	1	78	0.08	2750		215	W32CF(Lo)2	52	0.05	143	0.90	64
522	Women's Restroom	S34CF2	1	78	0.08	2750		215	S32CF(Lo)2	52	0.05	143	0.90	64
523	Telephone Room	O60CI1	1	60	0.06	500		30	Q13R(CF)2	31.2	0.03	16	0.33	13
524	Elevator Lobby	24T34RF4	2	156	0.31	4000		1,248	24T32RF(R)2	58	0.12	464	0.90	706
524	Elevator Lobby	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b)2C(LED)1	2	0.00	18	0.90	0
Total kW: 140.17									Total kWh: 336,586.93				285.63	168,446
									60.64					64.73

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

DWCES30219

Job No.

Project: Arapahoe County

Building: (24) Centrepont Plaza

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
57	Room 057	22T31RF(w/Lou)2	6	59	0.35	3375		1,195	22T17RF(R/Lou)2	33	0.20	668	0.90	0.14	474
55	Learning Center	22T31RF(w/Lou)2	3	59	0.18	3375		597	22T17RF(R/Lou)2	33	0.10	334	0.90	0.07	237
44	Hall 044	22T31RF(w/Lou)2	5	59	0.30	4000		1,180	22T17RF(R/Lou)2	33	0.17	660	0.90	0.12	468
42A	Open Office	22T31RF(w/Lou)2	1	59	0.05	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
42B	Open Office	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
47.1	Coffee	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
H047	Hall 047	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
H051	Hall 051	22T31RF(w/Lou)2	4	59	0.24	4000		944	22T17RF(R/Lou)2	33	0.13	528	0.90	0.09	374
53	Break Rm.	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
51.1	Bulk Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
54	Instructors	24T32RF(Lou)3	5	87	0.44	3375		1,468	24T32RF(Lou)2	59	0.30	996	0.90	0.13	425
38.1	Phone Rm.	24T32RF(Lou)3	4	87	0.35	500		174	24T32RF(Lou)2	59	0.24	118	0.33	0.03	50
H058	Hall 058	22T31RF(w/Lou)2	4	59	0.24	4000		944	22T17RF(R/Lou)2	33	0.13	528	0.90	0.09	374
H059	Hall 059	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
H059	Hall 059	24T32RF(Lou)3	1	87	0.09	4000		348	24T32RF(Lou)2	59	0.06	236	0.90	0.03	101
72	IS Equip. Rm.	24T32RF3	12	87	1.04	500		522	24T32RF(R)2	59	0.71	354	0.33	0.10	151
73	Video Production	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	56	0.11	56	0.33	0.02	28
73	Video Production	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
2	Vending	24T32RF(Lou)3	3	87	0.26	3375		881	24T32RF(Lou)2	59	0.18	597	0.90	0.08	255
39	Copy	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
33	Interview Rm.	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou)2	59	0.12	30	0.17	0.01	13
H026	Hall 026	24T32RF3	3	87	0.26	4000		1,044	24T32RF(R)2	59	0.18	708	0.90	0.08	302
H022	Hall 022	24T32RF3	1	87	0.09	4000		348	24T32RF(R)2	59	0.06	236	0.90	0.03	101
23	Copy	24T32RF3	4	87	0.35	3375		1,175	24T32RF(R)2	59	0.24	797	0.90	0.10	340
24	Break Rm.	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou)2	59	0.24	797	0.90	0.10	340
H003	Hall 003	22T31RF(w/Lou)2	8	59	0.47	4000		1,888	22T17RF(R/Lou)2	33	0.26	1,056	0.90	0.19	749
H003.4	Hall 003.4	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
10	Bulk Cust. Storage	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou)2	59	0.12	59	0.33	0.02	25
11	Mail Processing	22T31RF(w/Lou)2	6	59	0.35	3375		1,195	22T17RF(R/Lou)2	33	0.20	668	0.90	0.14	474
12	Hall 012	22T31RF(w/Lou)2	5	59	0.30	4000		1,180	22T17RF(R/Lou)2	33	0.17	660	0.90	0.12	468
9	Elevator Lobby	22T31RF(w/Lou)2	2	59	0.12	3375		398	22T17RF(R/Lou)2	33	0.07	223	0.90	0.05	158

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
8	Hall 008	22T31RF(u/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
7	Records Lobby	22T31RF(u/Lou)2	5	59	0.30	3375		996	22T17RF(R/Lou)2	33	0.17	557	0.90	0.12	395
19	Copy	24T32RF(Lou)3	9	87	0.78	3375		2,643	24T32RF(Lou/R)2	59	0.53	1,792	0.90	0.23	766
0.7	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
20.2	Coffee	24T32RF3	1	87	0.09	3375		294	24T32RF(R)2	59	0.06	199	0.90	0.03	85
20	File Rm.	24T32RF3	10	87	0.87	500		435	24T32RF(R)2	59	0.59	295	0.33	0.08	126
192	Catering Kitchen	24T32RF3	8	87	0.70	3375		2,349	24T32RF(R)2	59	0.47	1,593	0.90	0.20	680
185.1	Table & Chair Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
H190	Hall 190	22T31RF(u)2	2	59	0.12	4000		472	22T17RF(R)2	33	0.07	264	0.90	0.05	187
171	Children	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
171	Children	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	56	0.22	756	0.90	0.11	377
H167	Hall 167	22T31RF(u/Lou)2	5	59	0.30	4000		1,180	22T17RF(R/Lou)2	33	0.17	660	0.90	0.12	468
172	Infants	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
173	B Office	24T32RF(Lou)3	1	87	0.09	3375		294	24T32RF(Lou/R)2	59	0.06	199	0.90	0.03	85
173	B Office	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
166	Check In	24T32RF(Lou)3	1	87	0.09	3375		294	24T32RF(Lou/R)2	59	0.06	199	0.90	0.03	85
169.3	Toilet	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
H169	Hall 169	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.90	0.02	94
169.1	Toilet	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
170	Toddlers	24T32RF(Lou)3	7	87	0.61	3375		2,055	24T32RF(Lou/R)2	59	0.41	1,394	0.90	0.18	595
168	Food Prep.	24T32RF3	2	87	0.17	3375		597	24T32RF(R)2	59	0.12	398	0.90	0.05	170
160.1	Coats	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
160.2	Coats	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
158	Coffee	22T31RF(u/Lou)2	2	59	0.12	3375		398	22T17RF(R/Lou)2	33	0.07	223	0.90	0.05	158
H155	Mail 155	22T31RF(u/Lou)2	3	59	0.18	3375		597	22T17RF(R/Lou)2	33	0.10	334	0.90	0.07	237
149	Conference	24T32RF(Lou)3	6	67	0.52	250		131	24T32RF(Lou/R)2	56	0.34	84	0.17	0.03	42
157	File Rm.	24T32RF(Lou)3	6	87	0.52	500		261	24T32RF(Lou/R)2	59	0.35	177	0.33	0.05	76
156	Copy/Project	24T32RF(Lou)3	3	87	0.26	3375		881	24T32RF(Lou/R)2	59	0.18	597	0.90	0.08	255
H160	Hall 160	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.50	0.02	94
162	Bulk Storage	24T32RF(Lou)3	4	87	0.35	500		174	24T32RF(Lou/R)2	59	0.24	118	0.33	0.03	50
H161	Hall 161	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.90	0.02	94
H163	Hall 163	22T31RF(u/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(24) Centrepoint Plaza**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
164	Hearing Rm.	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
165	Hearing Rm.	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
100.3	Entry	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
124	Waiting	24T32RF(Lou)3	9	87	0.78	3375		2,643	24T32RF(Lou/R)2	59	0.53	1,792	0.90	0.23	766
147	CSS Reception	24T32RF(Lou)3	6	87	0.52	3375		1,762	24T32RF(Lou/R)2	59	0.35	1,195	0.90	0.15	510
147.1	Copy	24T32RF(Lou)3	1	87	0.09	3375		294	24T32RF(Lou/R)2	59	0.06	199	0.90	0.03	85
H146	Hall 146	22T31RF(u/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
126	Touch & Go	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou/R)2	59	0.12	398	0.90	0.05	170
H124.2	Hall 124.2	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.90	0.02	94
127	Touch & Go	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou/R)2	59	0.12	398	0.90	0.05	170
128	Issuance	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	56	0.22	756	0.90	0.11	377
128.1	Vault	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
129	Copy	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou/R)2	59	0.12	398	0.90	0.05	170
H145.3	Hall 145.3	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.90	0.02	94
H145.2	Hall 145.2	22T31RF(u/Lou)2	1	59	0.06	4000		236	22T17RF(R/Lou)2	33	0.03	132	0.90	0.02	94
131.1	Coats	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
H131	Hall 131	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
132.1	Bulk Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
138	Switchboard	24T32RF3	3	87	0.26	3375		881	24T32RF(R)2	59	0.18	597	0.90	0.08	255
139	Coffee	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou/R)2	59	0.12	398	0.90	0.05	170
H140	Hall 140	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
144	Copy	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
144.1	File Rm.	24T32RF3	6	87	0.52	500		261	24T32RF(R)2	59	0.35	177	0.33	0.05	76
H106	Hall 106	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
H103	Hall 103	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
H121	Hall 121	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
120	Employee Break Rm.	24T32RF(Lou)3	5	87	0.44	3375		1,468	24T32RF(Lou/R)2	59	0.30	996	0.90	0.13	425
H107	Hall 107	22T31RF(u/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
115.1	Vest. 115.1	22T31RF(u/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
H108	Hall 108	22T31RF(u/Lou)2	4	59	0.24	4000		944	22T17RF(R/Lou)2	33	0.13	528	0.90	0.09	374
112	Coffee	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou/R)2	59	0.12	398	0.90	0.05	170
111	Copy	24T32RF(Lou)3	1	87	0.09	3375		294	24T32RF(Lou/R)2	59	0.06	199	0.90	0.03	85



Project: Arapahoe County

Job No.

DWCES30219

Building: (24) Centrepont Plaza

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
109	Office	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou)2	59	0.24	797	0.90	0.10	340
255	Open Office	24T32CF(Lou)3	2	87	0.17	3375		587	24T32CF(Lou)2	59	0.12	398	0.90	0.05	170
245	Interview	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou)2	59	0.12	30	0.17	0.01	13
244	Copy	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
243	Bulk Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	36
246	Break Rm.	24T32RF(Lou)3	6	87	0.52	3375		1,762	24T32RF(Lou)2	56	0.34	1,134	0.90	0.17	565
242	Coffee	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
H200	Corridor	22T31RF(w/Lou)2	8	59	0.47	4000		1,888	22T17RF(R/Lou)2	33	0.26	1,056	0.90	0.19	749
200.1	IS/Com	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
256.1	Coats	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
210.1	Kids Play	24T32RF(Lou)3	1	87	0.09	3375		294	24T32RF(Lou)2	59	0.06	199	0.90	0.03	85
210	Services Waiting Rm.	24T32RF(Lou)3	7	87	0.51	3375		2,055	24T32RF(Lou)2	59	0.41	1,394	0.90	0.18	595
H213	Hall 213	22T31RF(w/Lou)2	4	59	0.24	4000		944	22T17RF(R/Lou)2	33	0.13	528	0.90	0.09	374
H217	Hall 217	22T31RF(w/Lou)2	7	59	0.41	4000		1,652	22T17RF(R/Lou)2	33	0.23	924	0.90	0.16	655
217.1	Elev. Lobby	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
H222	Hall 222	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
H206	Hall 206	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
232.2	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
H232	Hall 232	22T31RF(w/Lou)2	6	59	0.35	4000		1,416	22T17RF(R/Lou)2	33	0.20	792	0.90	0.14	562
232.1	Coffee	22T31RF(w/Lou)2	1	59	0.06	3375		199	22T17RF(R/Lou)2	33	0.03	111	0.90	0.02	79
230	Interview	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou)2	59	0.12	30	0.17	0.01	13
231	Copy	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
H204	Hall 204	22T31RF(w/Lou)2	7	59	0.41	4000		1,652	22T17RF(R/Lou)2	33	0.23	924	0.90	0.16	655
H226	Hall 226	22T31RF(w/Lou)2	2	59	0.12	4000		472	22T17RF(R/Lou)2	33	0.07	264	0.90	0.05	187
225	Storage	24T32RF3	4	87	0.35	500		174	24T32RF(R)2	59	0.24	118	0.33	0.03	50
203	Corridor	24T32RF(Lou)3	1	87	0.09	4000		348	24T32RF(Lou)2	59	0.06	236	0.90	0.03	101
203	Corridor	22T31RF(w/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
365	File Rm.	24T32RF3	6	87	0.52	500		261	24T32RF(R)2	59	0.35	177	0.33	0.05	76
H364	Hall 364	22T31RF(w/Lou)2	3	59	0.18	4000		708	22T17RF(R/Lou)2	33	0.10	396	0.90	0.07	281
375	B-Fin	24T32RF(Lou)3	2	87	0.17	3375		587	24T32RF(Lou)2	59	0.12	398	0.90	0.05	170
366	Bulk Storage	24T32RF3	6	87	0.52	500		261	24T32RF(R)2	59	0.35	177	0.33	0.05	76
363	Copy/Project	24T32RF(Lou)3	6	87	0.52	3375		1,762	24T32RF(Lou)2	59	0.35	1,195	0.90	0.15	510

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES0249**  
Building: **(24) Centrepoint Plaza**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
300	Corridor	22T31RF(Lou)2	10	59	0.59	4000		2,360	22T17RF(R/Lou)2	33	0.33	1,320	0.90	0.23	936
2	Stair	24T32CF(Lou)3	3	87	0.26	4000		1,044	24T32CF(Lou/R)2	59	0.18	708	0.90	0.08	302
H311	Hall 311	22T31RF(Lou)2	9	59	0.53	4000		2,124	22T17RF(R/Lou)2	33	0.30	1,188	0.90	0.21	842
383	Copy	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	56	0.22	756	0.90	0.11	377
387	File/Safe	24T32RF(Lou)3	4	87	0.35	500		174	24T32RF(Lou/R)2	56	0.22	112	0.33	0.04	56
389	Interview	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou/R)2	59	0.12	30	0.17	0.01	13
360	Break Rm.	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
310.1	Receptionists	24T32RF(Lou)3	3	87	0.26	3375		881	24T32RF(Lou/R)2	59	0.18	597	0.90	0.08	255
310	Waiting	24T32RF(Lou)3	4	87	0.35	3375		1,175	24T32RF(Lou/R)2	59	0.24	797	0.90	0.10	340
313	Interview	24T32RF(Lou)3	3	87	0.26	250		65	24T32RF(Lou/R)2	59	0.18	44	0.17	0.01	19
Total kWh: 103,967.75									23.66				119.03	10.18	35,183

Project: Arapahoe County

Job No.

DWCE30219

Building: (29) Peoria Shop

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
001	Main Entrance	X20C12	1	40	0.04	8759.52		350	X(gb)2C(LED)1	6	0.01	53	0.90	0.03	268
001	Main Entrance	24T34RF4	1	144	0.14	2750		396	24T32RF(R)2	59	0.06	162	0.90	0.08	210
002	Hallway	24T34RF4	1	144	0.14	4250		612	24T32RF(R)2	59	0.06	251	0.90	0.08	325
002	Hallway	X20C12	1	40	0.04	8759.52		350	X(gb)2C(LED)1	6	0.01	53	0.90	0.03	268
002A	Women's Restroom	W34CF(NL)4	1	144	0.14	2750		396	W32CF(Lo)4	102	0.10	281	0.90	0.04	104
002B	Men's RR	W34CF4	1	144	0.14	2750		396	W32CF(Lo)4	102	0.10	281	0.90	0.04	104
003	Office	24T34RF4	4	144	0.58	2750		1,584	24T32RF(R)2	56	0.22	616	0.90	0.32	871
003A	Office	24T34RF4	4	144	0.58	2750		1,584	24T32RF(R)2	56	0.22	616	0.90	0.32	871
003A	Office	24T34RF4	1	144	0.14	2750		396	24T32RF(R)2	59	0.06	162	0.90	0.08	210
003B	Office	24T34RF4	1	144	0.14	2750		396	24T32RF(R)2	59	0.06	162	0.90	0.08	210
004	Office	8S75CF2	1	123	0.12	2750		338	18W32CF(Lo)4	102	0.10	281	0.90	0.02	52
004A	Breakroom	24T34RF4	2	144	0.29	2750		792	24T32RF(R)2	59	0.12	325	0.90	0.15	421
004B	Storage	O100W11	1	100	0.10	500		50	S32WF(Lo)2	52	0.05	26	0.33	0.01	22
005	Office	24T34RF4	3	144	0.43	2750		1,188	24T32RF(R)2	59	0.18	487	0.90	0.23	631
005A	Office	8S75CF2	5	123	0.62	2750		1,691	18W32CF(Lo)4	102	0.51	1,403	0.90	0.09	260
005B	Storage	8S75CF2	4	123	0.49	500		246	8S32CF(Lo)4	102	0.41	204	0.33	0.03	38
005B	Storage	W34CF(NL)4	1	144	0.14	500		72	W32CF(Lo)4	102	0.10	51	0.33	0.01	19
006	Office	24T34RF4	3	144	0.43	2750		1,188	24T32RF(R)2	59	0.18	487	0.90	0.23	631
006A	Shop	8S75CF2	5	123	0.62	2750		1,691	8S32CF(Lo)4	102	0.51	1,403	0.90	0.09	260
006A	Shop	I34PF2	1	72	0.07	2750		198	I32PF(Lo)2	52	0.05	143	0.90	0.02	50
006A	Shop	X20W12	1	40	0.04	8759.52		350	X(gb)2C(LED)1	6	0.01	53	0.90	0.03	268
007	Facilities & Fleet	8S75WF2	9	123	1.11	2750		3,044	8S32WF(Lo)4	102	0.92	2,525	0.90	0.17	468
007	Facilities & Fleet	X20W12	2	40	0.08	8759.52		701	X(gb)2C(LED)1	6	0.01	105	0.90	0.06	536
007	Facilities & Fleet	8S75CF2	19	123	2.34	2750		6,427	8S32CF(Lo)4	102	1.94	5,330	0.90	0.36	988
007	Facilities & Fleet	S34CF2	1	72	0.07	2750		198	S32CF(Lo)2	52	0.05	143	0.90	0.02	50
008	Office	24T34RF4	2	144	0.29	2750		792	24T32RF(R)2	59	0.12	325	0.90	0.15	421
009	Office	24T34RF4	2	144	0.29	2750		792	24T32RF(R)2	59	0.12	325	0.90	0.15	421
010	Storage	O100W11	1	100	0.10	500		50	S32WF(Lo)2	52	0.05	26	0.33	0.01	22
201	Stairs	Q150C(QT2)1	1	150	0.15	4250		638	W32CF(Lo)4	102	0.10	434	0.90	0.04	184
202	Locker room	8S75CF2	5	123	0.62	2750		1,691	8S32CF(Lo)4	102	0.51	1,403	0.90	0.09	260
202	Locker room	18W34WF4	1	144	0.14	2750		396	18W32WF(Lo)4	102	0.10	281	0.50	0.04	104

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**  
Building: **(29) Peoria Shop**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
203	Common Space	24T34RF4	12	144	1.73	2750		4,752	24T32RF(R)2	59	0.71	1,947	0.90	0.92	2,525
203	Common Space	X20W12	2	40	0.08	8759.52		701	X(g/b)2C(LED)1	6	0.01	105	0.90	0.06	536
204	Office	24T34RF4	3	144	0.43	2750		1,188	24T32RF(R)2	59	0.18	487	0.90	0.23	631
205	Office	24T34RF4	2	144	0.29	2750		792	24T32RF(R)T)2	56	0.11	308	0.90	0.16	436
206	Office	24T34RF4	2	144	0.29	2750		792	24T32RF(R)2	59	0.12	325	0.90	0.15	421
207	Office	24T34RF4	2	144	0.29	2750		792	24T32RF(R)2	59	0.12	325	0.90	0.15	421
Total kWh:									Total kWh:				34.50	5.35	16,327

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**

Building: **(35) ACJC Courthouse**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Penthouse	NE Stair	W34WF2	3	78	0.23	3875		907	W32WF(Lo)2	52	0.16	605	0.90	0.07	272
Penthouse	Penthouse Corridor H002	S34PF2	7	78	0.55	3875		2,116	S32PF(Lo)2	52	0.36	1,411	0.90	0.16	635
Penthouse	Penthouse Corridor H003	S34PF2	17	78	1.33	3875		5,138	S32PF(Lo)2	52	0.88	3,428	0.90	0.40	1,542
Penthouse	Penthouse Corridor H004	S34PF2	7	78	0.55	3875		2,116	S32PF(Lo)2	52	0.36	1,411	0.90	0.16	635
Penthouse	Elevator Control Room P003.1	S34PF2	6	78	0.47	3875		1,814	S32PF(Lo)2	52	0.31	1,209	0.90	0.14	544
Penthouse	Comm. Room P005	S34PF2	5	78	0.39	2625		1,024	S32PF(Lo)2	52	0.26	683	0.90	0.12	307
Penthouse	S.E Stair	W34WF2	3	78	0.23	3875		907	W32WF(Lo)2	52	0.16	605	0.90	0.07	272
408	Court Room #408	14T34RF2	4	78	0.31	2625		819	14T32RF(Lo)2	52	0.21	546	0.90	0.09	246
408	Court Room #408	14T34RF2	4	78	0.31	2625		819	14T32RF(Lo)2	52	0.21	546	0.90	0.09	246
408	Court Room #408	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
408	Court Room #408	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
408	Court Room #408	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
408	Court Room #408	22T34RF(Lo)2	3	78	0.23	2625		614	22T17RF(R)2	32	0.10	252	0.90	0.12	326
408	Court Room #408	X(g)20C12	2	40	0.08	8759.52		701	X(g)20C(LED)1	2	0.00	35	0.90	0.07	599
408	Court Room #408	S34CF2	6	78	0.47	2625		1,229	S32CF(Lo)2	52	0.31	819	0.90	0.14	369
408	Court Room #408	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
408	Court Room #408	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
408	Court Room #408	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
408	Court Room #408	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
408	Court Room #408	S34CF2	4	78	0.31	2625		819	S32CF(Lo)2	52	0.21	546	0.90	0.09	246
408	Court Room #408	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
408	Court Room #408	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
408	Court Room #408	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
408	Court Room #408	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
408	Court Room #408	S34CF2	4	78	0.31	2625		819	S32CF(Lo)2	52	0.21	546	0.90	0.09	246
408	Court Room #408	S34CF2	3	78	0.23	2625		614	S32CF(Lo)2	52	0.16	410	0.90	0.07	184
408	Court Room #408	C60R11	13	60	0.78	2625		2,048	C15R(CF)1	17	0.22	580	0.90	0.50	1,321
H401	Court Room Lobby	C13R(CF)1	7	15	0.11	2625		276	C13R(CF)1	15	0.11	276	0.90	0.00	0
H401	Court Room Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)20C(LED)1	2	0.00	18	0.90	0.03	300
408.1	Conference Room	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
407.1	Conference Room	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
407	Court Room #407	22T134RF(u/Lou)2	3	78	0.23	2625		614	22T17RF(R/Lou)2	32	0.10	252	0.90	0.12	326
407	Court Room #407	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
407	Court Room #407	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
407	Court Room #407	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(Lo)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
407	Court Room #407	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
407	Court Room #407	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
407	Court Room #407	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
407	Court Room #407	S34CF2	16	78	1.25	2625		3,276	S32CF(LoT)2	52	0.83	2,184	0.90	0.37	983
407	Court Room #407	S30CF2	2	70	0.14	2625		368	S25CF(Lo)2	46	0.09	242	0.90	0.04	113
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
407	Court Room #407	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
407	Court Room #407	C60R11	10	60	0.60	2625		1,575	C15R(CF)1	17	0.17	446	0.90	0.39	1,016
407	Court Room #407	X(g)20C12	3	40	0.12	8759.52		1,051	X(g)b20C(LED)1	2	0.01	53	0.90	0.10	899
407	Court Room #407	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
407	Court Room #407	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
407	Court Room #407	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
407 2	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
406	Court Room #406	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
406	Court Room #406	24T34RF3	4	117	0.47	2625		1,229	24T32RF(R)2	58	0.23	609	0.90	0.21	558
405 1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13

Project: Arapahoe County

Job No.

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hrs. The demand savings are not fully claimed.

Building: (35) ACJC Courthouse

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
405	Court Room #405	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246
405	Court Room #405	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
405	Court Room #405	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
405	Court Room #405	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
405	Court Room #405	22T34RF(u/Lou)2	3	78	0.23	2625		614	22T17RF(R/Lou)2	32	0.10	252	0.90	0.12	326
405	Court Room #405	C60R11	10	60	0.60	2625		1,575	C15R(CF)1	17	0.17	446	0.90	0.39	1,016
405	Court Room #405	X(g)20C12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599
405	Court Room #405	S34CF2	6	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
405	Court Room #405	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
405	Court Room #405	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
405	Court Room #405	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
405	Court Room #405	S34CF2	16	78	1.25	2625		3,276	S32CF(LoT)2	52	0.83	2,184	0.90	0.37	983
405	Court Room #405	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
405	Court Room #405	S30CF2	2	70	0.14	2625		368	S35CF(LoT)2	46	0.09	242	0.90	0.04	113
405	Court Room #405	S30CF2	3	70	0.21	2625		551	S25CF(Lo)2	46	0.14	362	0.90	0.06	170
405.2	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
417	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
417	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
H405-408	Court Room Lobby	C150R(MH)1	6	185	1.11	3875		4,301	22T17RF(R)2	32	0.19	744	0.90	0.83	3,202
H405-408	Court Room Lobby	X(g)20R12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599
405.4	Court Room Lobby	C150R(MH)1	4	185	0.74	3875		2,868	22T17RF(R)2	32	0.13	496	0.90	0.55	2,134
405.3	Elevator Lobby	C150R(MH)1	4	185	0.74	3875		2,868	C18R(CF)2	42	0.17	651	0.90	0.51	1,995
405.3	Elevator Lobby	S34CF2	8	78	0.62	3875		2,418	S32CF(LoT)2	52	0.42	1,612	0.90	0.19	725
405.3	Elevator Lobby	S34CF2	2	78	0.16	3875		605	S32CF(Lo)2	52	0.10	403	0.90	0.05	181
405.3	Elevator Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
405.5	Men's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
405.5	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
405.5	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
405.6	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
405.6	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
405.6	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
416	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
404.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
404	Court Room #404	22T17RF(R/Lou)2	3	78	0.23	2625		614	22T17RF(R/Lou)2	32	0.10	252	0.90	0.12	326
404	Court Room #404	X(g)20C12	1	40	0.04	8759.52		350	X(gb)2C(LED)1	2	0.00	18	0.90	0.03	300
404	Court Room #404	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
404	Court Room #404	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
404	Court Room #404	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
404	Court Room #404	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
404	Court Room #404	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
404	Court Room #404	S34CF2	16	78	1.25	2625		3,276	S32CF(LoT)2	52	0.83	2,184	0.90	0.37	983
404	Court Room #404	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
404	Court Room #404	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
404	Court Room #404	S30CF2	3	70	0.21	2625		551	S25CF(Lo)2	46	0.14	362	0.90	0.06	170
404.2	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
403	Court Room #403	24T34RF3	6	117	0.70	2625		1,843	24T32RF(R)2	58	0.35	914	0.90	0.32	836
402.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
402	Court Room #402	22T34RF(R/Lou)2	3	78	0.23	2625		614	22T17RF(R/Lou)2	32	0.10	252	0.90	0.12	326
402	Court Room #402	X(g)20C12	1	40	0.04	8759.52		350	X(gb)2C(LED)1	2	0.00	18	0.90	0.03	300
402	Court Room #402	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(gb)2C(LED)1	2	0.00	18	0.90	0.00	0
402	Court Room #402	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
402	Court Room #402	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
402	Court Room #402	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
402	Court Room #402	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
402	Court Room #402	S34CF2	16	78	1.25	2625		3,276	S32CF(LoT)2	52	0.83	2,184	0.90	0.37	983
402	Court Room #402	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
402	Court Room #402	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
402	Court Room #402	S30CF2	3	70	0.21	2625		551	S25CF(Lo)2	46	0.14	362	0.90	0.06	170
402	Court Room #402	C150R(MH)1	6	185	1.11	3875		4,301	22T17RF(R)2	32	0.19	744	0.90	0.83	3,202
402	Court Room #402	X(g)20C12	2	40	0.08	8759.52		701	X(gb)2C(LED)1	2	0.00	35	0.90	0.07	599
402	Court Room #402	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
402.2	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
401.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
401	Court Room #401	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246



hrs. The demand savings are not fully claimed.

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									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
401	Court Room #401	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
401	Court Room #401	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
401	Court Room #401	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
401	Court Room #401	C60R11	13	60	0.78	2625		2,048	C15R(CF)1	17	0.22	580	0.90	0.50	1,321
401	Court Room #401	X(g)20R12	2	40	0.08	8759.52		701	X(g)2C(LED)1	2	0.00	35	0.90	0.07	599
401	Court Room #401	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	369
401	Court Room #401	S34CF2	10	78	0.78	2625		2,048	S32CF(LoT)2	52	0.52	1,365	0.90	0.23	614
401	Court Room #401	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
401	Court Room #401	S34CF2	12	78	0.94	2625		2,457	S32CF(LoT)2	52	0.62	1,638	0.90	0.28	737
401	Court Room #401	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
401	Court Room #401	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
401	Court Room #401	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
401	Court Room #401	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
401	Court Room #401	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
401	Court Room #401	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
401	Court Room #401	S30CF2	4	70	0.28	2625		735	S25CF(LoT)2	46	0.18	483	0.90	0.09	227
401	Court Room #401	S30CF2	4	70	0.28	2625		735	S25CF(Lo)2	46	0.18	483	0.90	0.09	227
401	Court Room #401	S30CF2	4	70	0.28	2625		735	S25CF(LoT)2	46	0.18	483	0.90	0.09	227
401	Court Room #401	S30CF2	2	70	0.14	2625		368	S25CF(Lo)2	46	0.09	242	0.90	0.04	113
H401	Corridor	C13R(CF)1	7	15	0.11	3875		407	C13R(CF)1	15	0.11	407	0.90	0.00	0
H401	NE Stair	W34WF2	5	78	0.39	3875		1,511	W32WF(Lo)2	52	0.26	1,008	0.90	0.12	453
H401	SW Stair	W34WF2	2	78	0.16	3875		805	W32WF(Lo)2	52	0.10	403	0.90	0.05	181
401B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
401B	Jury Room	3W30CF2	1	70	0.07	500		35	3W25CF(Lo)2	48	0.05	24	0.33	0.01	10
401B.1	Jury Restroom	W60WI2	1	120	0.12	2625		315	2W17WF(V)2	32	0.03	84	0.90	0.08	208
401B.2	Jury Restroom	W60WI2	1	120	0.12	2625		315	2W17WF(V)2	32	0.03	84	0.90	0.08	208
401A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
401A1	Judge's RR	14T34RF2	3	78	0.23	2625		614	14T32RF(Lo)2	52	0.16	410	0.90	0.07	184
401B	Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
401C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
401D	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
402A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(35) ACJC Courthouse**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
402A1	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
402B	Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
402C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
402D	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
410	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
411	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
411.1	Entry - Elevator	14B34CF2	1	78	0.08	3875		302	14B32CF(Lo)2	52	0.05	202	0.90	0.02	91
411C	Elect. Room	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.17	0.00	6
402B	Jury Room	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
402B.1	Men's Restroom	W60WI1	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
402B.2	Women's Restroom	W60WI1	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
403A	Staff Offices	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
403B	Staff Offices	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
H403	Corridor	22T34RF(uLo)2	11	78	0.86	3875		3,325	22T17RF(RLo)2	32	0.35	1,364	0.90	0.46	1,765
H403	Corridor	X(g)20C12	2	40	0.08	8759.52		701	X(g)2C(1LED)1	2	0.00	35	0.90	0.07	599
H403	Corridor	C150R(MH)1	2	185	0.37	3875		1,434	C18R(CF)2	42	0.08	326	0.90	0.26	997
404B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
404B	Jury Room	3W30CF2	1	70	0.07	500		35	3W25CF(Lo)2	48	0.05	24	0.33	0.01	10
404B.1	Men's Restroom	W60WI1	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
404B.2	Women's Restroom	W60WI1	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
413	Janitor's Closet	S34CF2	1	78	0.08	500		39	S32CF(Lo)2	52	0.05	26	0.33	0.01	12
413A	Women's Staff	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
404A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
404A.1	Judge's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
404B	Office	24T34RF3	6	117	0.70	2625		1,843	24T32RF(R)2	58	0.35	914	0.90	0.32	836
404C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
404D	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
404E	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
404F	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
405A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
405A.1	Judge's Chambers Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
405B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80

hrs. The demand savings are not fully claimed.

Job No. DWGES30219

Project: Arapahoe County

Building: (35) ACJC Courthouse

Room Number	Surveyed Locations	Existing Fixtures ID Code	No of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
405B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(v)2	32	0.03	84	0.90	0.03	66
405B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(v)2	32	0.03	84	0.90	0.03	66
416	Elect. Room	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
416B	Men's Staff Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
H416	Corridor	22T34RF(u/Lou)2	8	78	0.62	2625		1,638	22T17RF(R/Lou)2	32	0.26	672	0.90	0.33	869
406A	Staff Offices	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
406A.1	Staff Offices	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
406B	Copy Room	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
407B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
407B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(v)2	32	0.03	84	0.90	0.03	66
407B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(v)2	32	0.03	84	0.90	0.03	66
407A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
407A.1	Judge's Chambers RR	14T34RF2	3	78	0.23	2625		614	14T32RF(Lo)2	52	0.16	410	0.90	0.07	184
407B	Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
407C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
407D	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
408A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
408A.1	Judge's Chambers RR	14T34RF2	3	78	0.23	2625		614	14T32RF(Lo)2	52	0.16	410	0.90	0.07	184
408B	Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
408C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
408D	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
408B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
408B.1	Men's Restroom	J60W11	1	60	0.06	2625		158	2W17WVF(v)2	32	0.03	84	0.90	0.03	66
408B.2	Women's Restroom	W26W(CF)1	1	31.2	0.03	2625		82	2W17WVF(v)2	32	0.03	84	0.90	0.00	-2
	NW Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.90	0.05	181
H408	Corridor	22T34RF(u/Lou)2	10	78	0.78	3875		3,023	22T17RF(R/Lou)2	32	0.32	1,240	0.90	0.41	1,604
H408	Corridor	X(ig)2C(LED)1	2	40	0.08	8759.52		701	X(ig)2C(LED)1	2	0.00	35	0.90	0.07	599
H408	Corridor	C150R(MH)1	2	185	0.37	3875		1,434	C18R(CF)2	42	0.08	326	0.90	0.26	997
419A	Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
419B	Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
419A-B	Elevator Entry	14B34CF2	1	78	0.08	3875		302	14B32CF(Lo)2	52	0.05	202	0.90	0.02	91
419C	Elect. Room	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.17	0.00	6

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
	Gun Armory	Locked							0		0.00		0.00	0.00	
	3rd Flr NW Stairtower	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.90	0.05	181
309	Courtroom #309	14T34RF2	4	78	0.31	2625		819	14T32RF(Lo)T)2	52	0.21	546	0.90	0.09	246
309	Courtroom #309	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)T)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
309	Courtroom #309	X(g)20C12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599
309	Courtroom #309	C50R11	13	60	0.78	2625		2,048	C15R(CF)1	17	0.22	580	0.90	0.50	1,321
309	Courtroom #309	22T34RF(u)2	3	78	0.23	2625		614	22T17RF(R)2	32	0.10	252	0.90	0.12	326
309	Courtroom #309	S34CF2	12	78	0.94	2625		2,457	S32CF(Lo)T)2	52	0.62	1,638	0.90	0.28	737
309	Courtroom #309	S34CF2	6	78	0.47	2625		1,229	S32CF(Lo)T)2	52	0.31	819	0.90	0.14	369
309	Courtroom #309	S34CF2	2	78	0.16	2625		410	S32CF(Lo)T)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
309	Courtroom #309	S34CF2	6	78	0.47	2625		1,229	S32CF(Lo)T)2	52	0.31	819	0.90	0.14	369
309	Courtroom #309	S34CF2	4	78	0.31	2625		819	S32CF(Lo)T)2	52	0.21	546	0.90	0.09	246
309	Courtroom #309	S34CF2	2	78	0.16	2625		410	S32CF(Lo)T)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	S30CF2	2	70	0.14	2625		368	S25CF(Lo)T)2	46	0.09	242	0.90	0.04	113
309	Courtroom #309	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
309	Courtroom #309	S34CF2	4	78	0.31	2625		819	S32CF(Lo)T)2	52	0.21	546	0.90	0.09	246
309	Courtroom #309	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)T)2	52	0.42	1,092	0.90	0.19	491
309	Courtroom #309	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	S34CF2	2	78	0.16	2625		410	S32CF(Lo)T)2	52	0.10	273	0.90	0.05	123
309	Courtroom #309	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
309	Courtroom #309	S34CF2	6	78	0.47	2625		1,229	S32CF(Lo)T)2	52	0.31	819	0.90	0.14	369
309	Courtroom #309	S30CF2	3	70	0.21	2625		551	S25CF(Lo)2	46	0.14	362	0.90	0.08	170
309.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
308	Courtroom #308	14T34RF2	4	78	0.31	2625		819	14T32RF(Lo)T)2	52	0.21	546	0.90	0.09	246
308	Courtroom #308	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
308	Courtroom #308	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)T)2	52	0.10	273	0.90	0.05	123
308	Courtroom #308	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
308	Courtroom #308	22T34RF(u)2	3	78	0.23	2625		614	22T17RF(R)2	32	0.10	252	0.90	0.12	326
308	Courtroom #308	X(g)20C12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599

hrs. The demand savings are not fully claimed.

Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
308	Courtroom #308	C60R11	10	60	0.60	2625		1,575	C15R(CF)1	17	0.17	446	0.90	0.39	1,016
308	Courtroom #308	S34CF2	12	78	0.94	2625		2,457	S32CF(LoT)2	52	0.62	1,638	0.90	0.28	737
308	Courtroom #308	S34CF2	10	78	0.78	2625		2,048	S32CF(LoT)2	52	0.52	1,365	0.90	0.23	614
308	Courtroom #308	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
308	Courtroom #308	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	369
308	Courtroom #308	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
308	Courtroom #308	S34CF2	2	78	0.16				S32CF(LoT)2	52	0.10	0	0.00	0.00	0
308	Courtroom #308	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
308	Courtroom #308	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
308	Courtroom #308	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
308	Courtroom #308	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
308	Courtroom #308	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
308	Courtroom #308	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
308	Courtroom #308	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
308	Courtroom #308	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
308	Courtroom #308	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
308	Courtroom #308	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
308	Courtroom #308	S34CF2	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
308.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
308.2	Conference Room	24T34RF3	6	117	0.70	2625		1,843	24T32RF(R)2	58	0.35	914	0.90	0.32	835
307	Court Room #307	22T17RF(R/Lo)2	3	78	0.23	2625		614	22T17RF(R/Lo)2	32	0.10	252	0.90	0.12	326
306	Court Room #306	C60R11	10	60	0.60	2625		1,575	C15R(CF)1	17	0.17	446	0.90	0.39	1,016
306	Court Room #306	X(g)20C12	2	40	0.08	8759.52		701	X(g)20C(1LED)1	2	0.00	35	0.90	0.07	539
306	Court Room #306	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246
306	Court Room #306	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
306	Court Room #306	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
306	Court Room #306	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
306	Court Room #306	S34CF2	12	78	0.94	2625		2,457	S32CF(LoT)2	52	0.62	1,638	0.90	0.28	737
306	Court Room #306	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	369
306	Court Room #306	S34CF2	10	78	0.78	2625		2,048	S32CF(LoT)2	52	0.52	1,365	0.90	0.23	614
306	Court Room #306	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
306	Court Room #306	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(35) ACJC Courthouse**  
Job No.: **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
306	Court Room #306	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
306	Court Room #306	S30CF2	2	70	0.14	2625		368	S25CF(Lo)2	46	0.09	242	0.90	0.04	113
306	Court Room #306	S34CF2	4	78	0.31	2625		819	S32CF(Lo)2	52	0.21	546	0.90	0.08	246
306	Court Room #306	S34CF2	8	78	0.62	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
306	Court Room #306	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
306	Court Room #306	S34CF2	4	78	0.31	2625		819	S32CF(Lo)2	52	0.21	546	0.90	0.09	246
306	Court Room #306	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
306	Court Room #306	S30CF2	4	70	0.28	2625		735	S25CF(Lo)2	46	0.18	483	0.90	0.09	227
306	Court Room #306	S30CF2	2	70	0.14	2625		368	S25CF(Lo)2	46	0.09	242	0.90	0.04	113
306.1	Conference Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
306.2	CASA Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
3rd	H300 Hallway	C26R(CF)1	7	26	0.18	3875		705	22T17RF(R)2	32	0.22	868	0.90	-0.04	-147
3rd	H300 Hallway	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
3rd	H301 Hallway	C150R(MH)1	6	185	1.11	3875		4,301	22T17RF(R)2	32	0.19	744	0.90	0.83	3,202
3rd	H301 Hallway	X(g)20R12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599
317	Human Services	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
316	Children Waiting Room	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
315	County Attorney	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
316A	Elect. Room	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
316B	Men's Staff Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
306.3	Elevator Lobby	C150R(MH)1	6	185	1.11	3875		4,301	C18R(CF)2	42	0.25	977	0.90	0.77	2,992
306.3	Elevator Lobby	S34CF2	8	78	0.62	3875		2,418	S32CF(Lo)2	52	0.42	1,612	0.90	0.19	725
306.3	Elevator Lobby	S34CF2	2	78	0.16	3875		605	S32CF(Lo)2	52	0.10	403	0.90	0.05	181
306.3	Elevator Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
306.5	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
306.5	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
306.5	Men's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
306.4	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
306.4	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
306.4	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
306.3	Lobby	C150R(MH)1	4	185	0.74	3875		2,868	22T17RF(R)2	32	0.13	496	0.90	0.55	2,134
306.3	Lobby	22T34RF(u/Lou)2	2	78	0.16	3875		605	22T17RF(R/Lou)2	32	0.06	248	0.90	0.08	321

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (35) ACJC Courthouse

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
313A	Women's Staff Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(LoT)2	52	0.05	137	0.90	0.02	61
313B	Janitor's Closet	S34CF2	1	78	0.08	500		39	S32CF(Lo)2	52	0.05	26	0.33	0.01	12
304	Court Room #304	14T34RF2	6	78	0.47	2625		1,229	14T32RF(LoT)2	52	0.31	819	0.90	0.14	369
304	Court Room #304	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
304	Court Room #304	X(gb)2C(LED)1	2	40	0.08	8759.52		701	X(gb)2C(LED)1	2	0.00	35	0.90	0.07	599
304	Court Room #304	C60R11	7	60	0.42	2625		1,103	C15R(CF)1	17	0.12	312	0.90	0.27	711
304	Court Room #304	S34CF2	8	78	0.32	2625		1,638	S32CF(Lo)2	52	0.42	1,092	0.90	0.19	491
304	Court Room #304	S34CF2	6	78	0.47	2625		1,229	S32CF(Lo)2	52	0.31	819	0.90	0.14	369
304	Court Room #304	S30CF2	2	70	0.14	2625		368	S25CF(LoT)2	46	0.09	242	0.90	0.04	113
304	Court Room #304	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
304A	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
304B	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
304C	Gun Storage Locked	Locked							0		0.00		0.00	0.00	
311C	Elect. Room	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.17	0.00	6
311A	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
311B	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.90	0.02	61
311	Elev. Entry	14B34CF2	1	78	0.08	3875		302	14B32CF(Lo)2	52	0.05	202	0.90	0.02	91
303	Court Room #303	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
303	Court Room #303	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
303	Court Room #303	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
303	Court Room #303	14T34RF2	3	78	0.23	2625		614	14T32RF(Lo)2	52	0.16	410	0.90	0.07	184
303	Court Room #303	C60R11	6	60	0.36	2625		945	C15R(CF)1	17	0.10	268	0.90	0.23	610
303	Court Room #303	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
303	Court Room #303	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
303	Court Room #303	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
303	Court Room #303	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
303	Court Room #303	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
303	Court Room #303	S30CF2	4	70	0.28	2625		735	S25CF(LoT)2	46	0.18	483	0.90	0.09	227
303	Court Room #303	X(gb)2C(LED)1	1	40	0.04	8755.52		350	X(gb)2C(LED)1	2	0.00	18	0.90	0.03	300
302.1	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
302.2	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
302	Court Room #302	22T17RF(R/Low)2	3	78	0.23	2625		614	22T17RF(R/Low)2	32	0.10	252	0.50	0.12	326

Project: Arapahoe County

Building: (35) ACJC Courthouse

Job No.

DWGES30219

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
302	Court Room #302	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246
302	Court Room #302	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
302	Court Room #302	X(g)20C12	2	40	0.08	8759.52		701	X(g)20C(LED)1	2	0.00	35	0.90	0.07	599
302	Court Room #302	C60R11	10	60	0.60	2625		1,575	C15R(CF)1	17	0.17	446	0.90	0.39	1,016
302	Court Room #302	S34CF2	20	78	1.56	2625		4,095	S32CF(LoT)2	52	1.04	2,730	0.90	0.47	1,229
302	Court Room #302	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	369
302	Court Room #302	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61
302	Court Room #302	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
302	Court Room #302	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	369
302	Court Room #302	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
302	Court Room #302	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
302	Court Room #302	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
302	Court Room #302	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
302	Court Room #302	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
301.1	Conference	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
301	Court Room #301	22T34RF(u/Lou)2	3	78	0.23	2625		614	22T17RF(R/Lou)2	32	0.10	252	0.90	0.12	326
301	Court Room #301	14T34RF2	4	78	0.31	2625		819	14T32RF(LoT)2	52	0.21	546	0.90	0.09	246
301	Court Room #301	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	14T34RF2	2	78	0.16	2625		410	14T32RF(LoT)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	14T34RF2	6	78	0.47	2625		1,229	14T32RF(Lo)2	52	0.31	819	0.90	0.14	369
301	Court Room #301	X(g)20C12	2	40	0.08	8759.52		701	X(g)20C(LED)1	2	0.00	35	0.90	0.07	599
301	Court Room #301	C60R11	13	60	0.78	2625		2,048	C15R(CF)1	17	0.22	580	0.90	0.50	1,321
301	Court Room #301	S34CF2	12	78	0.94	2625		2,457	S32CF(LoT)2	52	0.62	1,638	0.90	0.28	737
301	Court Room #301	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	1	78	0.08	2625		205	S32CF(Lo)2	52	0.05	137	0.90	0.02	61



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
301	Court Room #301	S34CF2	6	78	0.47	2625		1,229	S32CF(LoT)2	52	0.31	819	0.90	0.14	389
301	Court Room #301	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
301	Court Room #301	S34CF2	1	78	0.08	2625		205	S32CF(LoJ)2	52	0.05	137	0.90	0.02	61
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	1	78	0.08	2625		205	S32CF(LoJ)2	52	0.05	137	0.90	0.02	61
301	Court Room #301	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoJ)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
301	Court Room #301	S34CF2	4	78	0.31	2625		819	S32CF(LoT)2	52	0.21	546	0.90	0.09	246
301	Court Room #301	S34CF2	8	78	0.62	2625		1,638	S32CF(LoT)2	52	0.42	1,092	0.90	0.19	491
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoJ)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S34CF2	2	78	0.16	2625		410	S32CF(LoT)2	52	0.10	273	0.90	0.05	123
301	Court Room #301	S30CF2	1	70	0.07	2625		184	S25CF(LoJ)2	46	0.05	121	0.90	0.02	57
H302	Corridor	C150R(MH)1	6	185	1.11	3875		4,301	22T17RF(R)2	32	0.19	744	0.90	0.83	3,202
H302	Corridor	Xig20C12	1	40	0.04	8759.52		350	Xig(b)2C(LED)1	2	0.00	18	0.90	0.03	300
H303	Corridor	C13R(CF)1	7	15	0.11	3875		407	C13R(CF)1	15	0.11	407	0.90	0.00	0
H303	Corridor	Xig20C12	1	40	0.04	8759.52		350	Xig(b)2C(LED)1	2	0.00	18	0.90	0.03	300
	SW Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(LoJ)2	52	0.10	403	0.90	0.05	181
301B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
301B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
301B.1	Men's Restroom	3W30UcF2	1	70	0.07	2625		184	3W25UcF(LoJ)2	48	0.05	126	0.90	0.02	52
301B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
301	Receptionst	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
301A	Judge's Chamber	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
301A.1	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(LoJ)2	52	0.05	137	0.90	0.02	61
301B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
301C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
302	Receptionst	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
302A	Judge's Chamber	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
302A	Judge's RR	14T34RF2	3	78	0.23	2625		614	14T32RF(LoJ)2	52	0.16	410	0.90	0.07	184
302B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(35) ACJC Courthouse**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
302C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
305A	Tech. Support	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
305A.1	Tech. Support Men's	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
305A.2	Tech. Support Women's	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
305B	Office - Copy	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
305C	(Locked)	Locked							0		0.00		0.00	0.00	
305B.1	Storage Break Room	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
305B.1	Storage Break Room	3W30UcF2	3	70	0.21	2625		551	3W25UcF(Lo)2	48	0.14	378	0.90	0.06	156
305B.2	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
305B.3	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
H304	Corridor	22T17RF(R/Lou)2	11	78	0.86	3875		3,325	22T17RF(R/Lou)2	32	0.35	1,384	0.90	0.46	1,765
H304	Corridor	X(g)b2C(LED)1	2	40	0.08	8759.52		701	X(g)b2C(LED)1	2	0.00	35	0.90	0.07	599
H304	Corridor	C16R(CF)2	1	185	0.19	3875		717	C16R(CF)2	42	0.04	163	0.90	0.13	499
305	Receptionist Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
305A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
305A	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
305B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
305C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
306	Receptionist Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
306A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
306A.1	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
306B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
306C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
306B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
306B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
306B.1	Men's Restroom	3W30UcF2	1	70	0.07	2625		184	3W25UcF(Lo)2	48	0.05	126	0.90	0.02	52
306B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66
H305	Corridor	22T17RF(R/Lou)2	8	78	0.62	3875		2,418	22T17RF(R/Lou)2	32	0.26	992	0.90	0.33	1,283
307A	Court Facilitator	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
307B	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
308B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
308B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WF(V)2	32	0.03	84	0.90	0.03	66

Project: Arapahoe County DWGES30219

Job No.

Building: (35) ACJC Courthouse

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
308B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(V)2	32	0.03	84	0.30	0.03	86
308	Receptionist Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.30	0.16	418
308A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.30	0.16	418
308A.1	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.30	0.02	61
308B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.30	0.05	139
308C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.30	0.05	139
309	Receptionist Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.30	0.16	418
309A	Judge's Chambers	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.30	0.16	418
309A.1	Judge's RR	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.30	0.02	61
309B	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.30	0.05	139
309C	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.30	0.05	139
309B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
309B.1	Men's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(V)2	32	0.03	84	0.30	0.03	66
309B.2	Women's Restroom	W60W11	1	60	0.06	2625		158	2W17WVF(V)2	32	0.03	84	0.30	0.03	66
H306	Corridor	22T34RF(u/Lou)2	11	78	0.86	3875		3,325	22T17RF(R/Lou)2	32	0.35	1,364	0.30	0.46	1,765
H306	Corridor	X(g)20C12	2	40	0.08	8759.52		701	X(g)2C(LED)1	2	0.00	35	0.30	0.07	599
H306	Corridor	C150R(MH)1	2	185	0.37	3875		1,434	22T17RF(R)2	32	0.06	248	0.30	0.28	1,067
319A	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.30	0.02	61
319B	Holding Cell	14B34CF2	1	78	0.08	2625		205	14B32CF(Lo)2	52	0.05	137	0.30	0.02	61
319A&B	Elev. Entry	14B34CF2	1	78	0.08	3875		302	14B32CF(Lo)2	52	0.05	202	0.30	0.02	91
319C	Elect. Room	S34CF2	1	78	0.08	250		20	S32CF(Lo)2	52	0.05	13	0.17	0.00	6
3rd Flr	NE Stair tower	W34WF2	2	78	0.16	3875		805	W32WF(Lo)2	52	0.10	403	0.30	0.05	181
301	SE Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.30	0.05	181
	2nd Flr N.E Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.30	0.05	181
201	Court Room #201	22T32RF(u)2	2	58	0.12	2625		305	22T17RF(R)2	32	0.06	168	0.30	0.05	123
201	Court Room #201	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.30	0.00	0
201	Court Room #201	14T32RF2	6	58	0.35	2625		914	14T32RF2	58	0.35	914	0.30	0.00	0
201	Court Room #201	14T32RF2	8	58	0.46	2625		1,218	14T32RF2	58	0.46	1,218	0.30	0.00	0
201	Court Room #201	C23R(CF)1	14	27.6	0.39	2625		1,014	C23R(CF)1	27.6	0.39	1,014	0.30	0.00	0
201	Court Room #201	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.30	0.00	0
201	Court Room #201	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.30	0.00	0
201	Court Room #201	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.30	0.00	0

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(35) ACJC Courthouse**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
201	Court Room #201	3S25CF2	3	50	0.15	2625		394	3S25CF2	50	0.15	394	0.90	0.00	0
201	Court Room #201	3S25CF2	6	50	0.30	2625		788	3S25CF2	50	0.30	788	0.90	0.00	0
201	Court Room #201	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
201	Court Room #201	S32RF2	2	58	0.12	2625		305	S32RF2	58	0.12	305	0.90	0.00	0
201	Court Room #201	S32RF2	2	58	0.12	2625		305	S32RF2	58	0.12	305	0.90	0.00	0
201	Court Room #201	S32RF2	5	58	0.29	2625		761	S32RF2	58	0.29	761	0.90	0.00	0
201	Court Room #201	S32RF2	11	58	0.64	2625		1,675	S32RF2	58	0.64	1,675	0.90	0.00	0
201	Court Room #201	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.90	0.00	0
201	Court Room #201	S32RF2	5	58	0.29	2625		761	S32RF2	58	0.29	761	0.90	0.00	0
201	Court Room #201	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.90	0.00	0
201	Court Room #201	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.90	0.00	0
201	Court Room #201	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.90	0.00	0
201	Court Room #201	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
201	Court Room #201	3S25CF2	1	50	0.05	2625		131	3S25CF2	50	0.05	131	0.90	0.00	0
201	Court Room #201	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
H200	Corridor	22T17RF(R)2	4	58	0.23	3875		899	22T17RF(R)2	32	0.13	496	0.90	0.09	363
H200	Corridor	X(g)20C(LE)1	2	40	0.08	8759.52		701	X(g)20C(LE)1	2	0.00	35	0.90	0.07	599
202.1	Conference Room	22T17RF(R)2	2	58	0.12	250		29	22T17RF(R)2	32	0.05	16	0.17	0.01	12
202	Court Room #202	22T17RF(R)2	3	58	0.17	2625		457	22T17RF(R)2	32	0.10	252	0.90	0.07	184
202	Court Room #202	X(g)20C(LE)1	2	2	0.00	8759.52		35	X(g)20C(LE)1	2	0.00	35	0.90	0.00	0
202	Court Room #202	14T32RF2	12	58	0.70	2625		1,827	14T32RF2	58	0.70	1,827	0.90	0.00	0
202	Court Room #202	C23R(CF)1	7	27.6	0.19	2625		507	C23R(CF)1	27.6	0.19	507	0.90	0.00	0
202	Outer Cove	S32RF2	8	58	0.46	2625		1,218	S32RF2	58	0.46	1,218	0.90	0.00	0
202	Outer Cove	S32RF2	6	58	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
202	Outer Cove	S32RF2	6	58	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
202	Outer Cove	S32RF2	9	58	0.52	2625		1,370	S32RF2	58	0.52	1,370	0.90	0.00	0
202	Outer Cove	S32RF2	8	58	0.46	2625		1,218	S32RF2	58	0.46	1,218	0.90	0.00	0
202	Inner Cove	S32RF2	12	58	0.70	2625		1,827	S32RF2	58	0.70	1,827	0.90	0.00	0
202	Inner Cove	3S25CF2	3	50	0.15	2625		394	3S25CF2	50	0.15	394	0.90	0.00	0
202	Inner Cove	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
203	Conference Room	24T32RF3	4	87	0.35	250		87	24T32RF(R)2	58	0.23	59	0.17	0.02	26
204.1	Tech Support	22T17RF(R)2	2	58	0.12	2625		305	22T17RF(R)2	32	0.05	168	0.90	0.05	123

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Job No. DWCES30219

Building: (35) ACJC Courthouse

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
204	Court Room #204	22T32RF(u)2	2	58	0.12	2625		305	22T17RF(R)2	32	0.06	168	0.90	0.05	123
204	Court Room #204	22T32RF(u/em)2	1	58	0.06	2625		152	22T17RF(R/em)2	32	0.03	84	0.90	0.02	61
204	Court Room #204	14T32RF2	6	58	0.35	2625		914	14T32RF2	58	0.35	914	0.90	0.00	0
204	Court Room #204	14T32RF2	8	58	0.46	2625		1,218	14T32RF2	58	0.46	1,218	0.90	0.00	0
204	Court Room #204	C23R(CF)1	7	27.6	0.19	2625		507	C23R(CF)1	27.6	0.19	507	0.90	0.00	0
204	Court Room #204	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
204	Court Room #204	S32RF2	8	58	0.46	2625		1,218	S32RF2	58	0.46	1,218	0.90	0.00	0
204	Court Room #204	S32RF2	5	58	0.29	2625		761	S32RF2	58	0.29	761	0.90	0.00	0
204	Court Room #204	S32RF2	6	58	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
204	Court Room #204	S32RF2	8	58	0.46	2625		1,218	S32RF2	58	0.46	1,218	0.90	0.00	0
204	Court Room #204	3S25CF2	1	50	0.05	2625		131	3S25CF2	50	0.05	131	0.90	0.00	0
204	Court Room #204	3S25CF2	3	50	0.15	2625		394	3S25CF2	50	0.15	394	0.90	0.00	0
204	Court Room #204	S32RF2	9	58	0.52	2625		1,370	S32RF2	58	0.52	1,370	0.90	0.00	0
204	Court Room #204	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.90	0.00	0
204	Court Room #204	22T32RF(u/em)2	9	58	0.52	2625		1,370	22T17RF(R/em)2	32	0.29	756	0.90	0.21	553
204	Court Room #204	3S25CF2	1	50	0.05	2625		131	3S25CF2	50	0.05	131	0.90	0.00	0
204	Court Room #204	3S25CF2	9	50	0.45	2625		1,181	3S25CF2	50	0.45	1,181	0.90	0.00	0
216	Tech Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
H201	Corridor	22T32RF(u)2	6	58	0.35	3875		1,349	22T17RF(R)2	32	0.19	744	0.90	0.14	544
H201	Corridor	X(g)20C12	1	40	0.04	8759.52		350	X(g)2C(LED)1	2	0.00	18	0.90	0.03	300
204.2	Conf. Room	22T32RF(u)2	2	58	0.12	250		29	22T17RF(R)2	32	0.06	16	0.17	0.01	12
215	Conf. Room	24T32RF3	2	87	0.17	250		44	24T32RF(R)2	58	0.12	29	0.17	0.01	13
215	Conf. Room	24T34RF3	1	117	0.12	230		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
206.1	Conf. Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
215.1	Lobby	22T32RF(u/em)2	2	58	0.12	3875		450	22T17RF(R/em)2	32	0.06	248	0.90	0.05	181
215.1	Lobby	22T32RF(u)2	1	58	0.06	3875		225	22T17RF(R)2	32	0.03	124	0.90	0.02	91
215.1	Lobby	22T32RF(u/em)2	2	58	0.12	3875		450	22T17RF(R/em)2	32	0.06	248	0.90	0.05	181
215.1	Lobby	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
215.1	Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)2C(LED)1	2	0.00	18	0.90	0.03	300
215.2	Elevator Lobby	C150R(MH)1	6	185	1.11	3875		4,301	C18R(CF)2	42	0.25	977	0.90	0.77	2,992
215.2	Elevator Lobby	S34CF2	8	78	0.62	3875		2,418	S32CF(Lo)2	52	0.42	1,612	0.90	0.19	725
215.2	Elevator Lobby	S34CF2	2	78	0.16	3875		605	S32CF(Lo)2	52	0.10	403	0.90	0.05	181

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
215.2	Elevator Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)20C(LED)1	2	0.00	18	0.90	0.03	300
215.3	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)T2	52	0.10	273	0.90	0.05	123
215.3	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
215.3	Men's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
215.4	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)T2	52	0.10	273	0.90	0.05	123
215.4	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
215.4	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
206	Court Room #206	22T17RF(Wem)2	1	58	0.06	2625		152	22T17RF(R)em)2	32	0.03	84	0.90	0.02	61
206	Court Room #206	22T32RF(u)2	2	58	0.12	2625		305	22T17RF(R)2	32	0.06	168	0.90	0.05	123
206	Court Room #206	14T32RF2	6	58	0.35	2625		914	14T32RF2	58	0.35	914	0.90	0.00	0
206	Court Room #206	14T32RF2	8	58	0.46	2625		1,218	14T32RF2	58	0.46	1,218	0.90	0.00	0
206	Court Room #206	C23R(CF)1	7	27.6	0.19	2625		507	C23R(CF)1	27.6	0.19	507	0.90	0.00	0
206	Court Room #206	X(g)20C(LED)1	2	2	0.00	8759.52		35	X(g)20C(LED)1	2	0.00	35	0.90	0.00	0
206	Court Room #206	S32RF2	10	58	0.58	2625		1,523	S32RF2	58	0.58	1,523	0.90	0.00	0
206	Court Room #206	S32RF2	2	58	0.12	2625		305	S32RF2	58	0.12	305	0.90	0.00	0
206	Court Room #206	S32RF2	8	58	0.46	2625		1,218	S32RF2	58	0.46	1,218	0.90	0.00	0
206	Court Room #206	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.90	0.00	0
206	Court Room #206	S32RF2	6	58	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
206	Court Room #206	3S25CF2	9	50	0.45	2625		1,181	3S25CF2	50	0.45	1,181	0.90	0.00	0
206	Court Room #206	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
206	Court Room #206	S32RF2	5	58	0.29	2625		761	S32RF2	58	0.29	761	0.90	0.00	0
206	Court Room #206	S32RF2	2	58	0.12	2625		305	S32RF2	58	0.12	305	0.90	0.00	0
206	Court Room #206	S32RF2	12	58	0.70	2625		1,827	S32RF2	58	0.70	1,827	0.90	0.00	0
206	Court Room #206	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
206.2	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
206.2	Office	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
207.2	Conference Room	24T34RF3	1	117	0.12	2,500		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
207B.1	Jury Room	24T34RF3	6	117	0.70	500		351	24T32RF(R)2	58	0.35	174	0.33	0.11	159
207B.1	Jury Room	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	58	0.06	29	0.33	0.01	13
207B.1	Men's Restroom	W32CF2	1	58	0.06	2625		152	W32CF2	58	0.06	152	0.90	0.00	0
207B.2	Women's Restroom	W32CF2	1	58	0.06	2625		152	W32CF2	58	0.06	152	0.90	0.00	0
207	Court Room #207	22T32RF(u)2	2	58	0.12	2625		305	22T17RF(R)2	32	0.06	168	0.90	0.05	123

Project: Arapahoe County

Job No.

DWCES30219

Building: (35) ACJC Courthouse

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
207	Court Room #207	22T32RF(u/em)2	1	58	0.06	2625		152	22T17RF(R/em)2	32	0.03	84	0.90	0.02	61
207	Court Room #207	C23R(CF)1	7	27.6	0.19	2625		507	C23R(CF)1	27.6	0.19	507	0.90	0.00	0
207	Court Room #207	14T32RF2	6	58	0.35	2625		914	14T32RF2	58	0.35	914	0.90	0.00	0
207	Court Room #207	14T32RF2	8	58	0.46	2625		1,218	14T32RF2	58	0.46	1,218	0.90	0.00	0
207	Court Room #207	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
207	Court Room #207	S32RF2	6	56	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
207	Court Room #207	S32RF2	10	58	0.58	2625		1,523	S32RF2	58	0.58	1,523	0.90	0.00	0
207	Court Room #207	S32RF2	9	58	0.52	2625		1,370	S32RF2	58	0.52	1,370	0.90	0.00	0
207	Court Room #207	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.90	0.00	0
207	Court Room #207	S32RF2	6	58	0.35	2625		914	S32RF2	58	0.35	914	0.90	0.00	0
207	Court Room #207	S32RF2	3	58	0.17	2625		457	S32RF2	58	0.17	457	0.90	0.00	0
207	Court Room #207	S32RF2	5	58	0.29	2625		761	S32RF2	58	0.29	761	0.90	0.00	0
207	Court Room #207	S32RF2	4	58	0.23	2625		609	S32RF2	58	0.23	609	0.90	0.00	0
207	Court Room #207	3S25CF2	2	50	0.10	2625		263	3S25CF2	50	0.10	263	0.90	0.00	0
207	Court Room #207	3S25CF2	3	50	0.15	2625		394	3S25CF2	50	0.15	394	0.90	0.00	0
H202	Corridor	22T34RF(u/Lou)2	2	78	0.16	3875		605	22T17RF(R/Lou)2	32	0.06	248	0.90	0.08	321
H202	Corridor	22T32RF(u/em)2	2	58	0.12	3875		450	22T17RF(R/em)2	32	0.06	248	0.90	0.05	181
H202	Corridor	22T32RF(u)2	2	58	0.12	3875		450	22T17RF(R)2	32	0.06	248	0.90	0.05	181
H202	Corridor	X(g)2C(LED)1	1	2	0.00	8758.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
207.1	Conf. Room	24T34RF3	1	117	0.12	250		29	24T32RF(R)2	58	0.06	15	0.17	0.01	13
208	Victim Waiting Room	24T34RF3	8	117	0.94	2625		2,457	24T32RF(R)2	58	0.46	1,218	0.90	0.42	1,115
208	Victim Waiting Room	22T34RF(u/Lou)2	6	78	0.47	2625		1,229	22T17RF(R/Lou)2	32	0.19	504	0.90	0.25	852
208	Victim Waiting Room	22T32RF(u)2	1	58	0.06	2625		152	22T17RF(R)2	32	0.03	84	0.90	0.02	61
208A	Play Room	24T34RF3	4	117	0.47	2625		1,229	24T32RF(R)2	58	0.23	609	0.90	0.21	558
208B	TV Room	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
208C	Conference Room	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
208D	Conference Room	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
208E	Conference Room	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
208F	Conference Room	24T34RF3	2	117	0.23	250		59	24T32RF(R)2	58	0.12	29	0.17	0.02	27
208D.1	Storage	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	58	0.33	0.04	53
208D.1	Storage	X(g)2C(LED)1	1	40	0.04	8758.52		350	X(g)2C(LED)1	2	0.00	18	0.90	0.03	300
208E	Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	58	0.12	58	0.33	0.02	26

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(35) ACJC Courthouse**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
H208F	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
H203	Corridor	22T32RF(u)2	3	58	0.17	3875		674	22T17RF(R)2	32	0.10	372	0.90	0.07	272
H203	Corridor	22T32RF(u/em)2	1	58	0.06	3875		225	22T17RF(R/em)2	32	0.03	124	0.90	0.02	91
H203	Corridor	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)b)2C(LED)1	2	0.00	18	0.90	0.00	0
	2nd Flr E Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(L)2	52	0.10	403	0.90	0.05	181
	2nd Flr W Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(L)2	52	0.10	403	0.90	0.05	181
207	Receptionist Office	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
207A	Judge's Chambers	24T34RF3	4	117	0.47	2625		1,229	24T32RF(R)2	58	0.23	609	0.90	0.21	558
207A	Judge's Chambers	22T34RF(u/Lou)2	1	78	0.08	2625		205	22T17RF(R/Lou)2	32	0.03	84	0.90	0.04	109
207A	Judge's RR	W34CF2	1	78	0.08	2625		205	W32CF(L)2	52	0.05	137	0.90	0.02	61
207B	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
207C	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
206	Receptionist Office	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
206A	Judge's Chambers	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
206A	Judge's Chambers	24T34RF3	1	117	0.12	2625		307	24T32RF(R)2	58	0.06	152	0.90	0.05	139
206A.1	Judge's RR	W34CF2	1	78	0.08	2625		205	W32CF(L)2	52	0.05	137	0.90	0.02	61
206B	Office	24T34RF3	2	117	0.23	2625		614	24T32RF(R)2	58	0.12	305	0.90	0.11	279
206C	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
H204	Corridor	22T34RF(u/em)2	1	78	0.08	3875		302	22T17RF(R/em)2	32	0.03	124	0.90	0.04	160
H204	Corridor	22T34RF(u)2	3	78	0.23	3875		907	22T17RF(R)2	32	0.10	372	0.90	0.12	481
H204	Corridor	22T32RF(u)2	3	58	0.17	3875		674	22T17RF(R)2	32	0.10	372	0.90	0.07	272
H204	Corridor	22T32RF(u/em)2	2	58	0.12	3875		450	22T17RF(R/em)2	32	0.06	248	0.90	0.05	181
H204	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
H204	Corridor	C23R(CF)1	1	27.6	0.03	3875		107	C23R(CF)1	27.6	0.03	107	0.90	0.00	0
H204	Corridor	24T34RF3	2	117	0.23	3875		907	24T32RF(R)2	58	0.12	450	0.90	0.11	412
206B	Jury Room	24T34RF3	3	117	0.35	500		176	24T32RF(R)2	58	0.17	87	0.33	0.05	80
206B	Jury Room	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	58	0.17	87	0.33	0.03	39
206B	Jury's RR	W34CF2	1	78	0.08	2625		205	W32CF(L)2	52	0.05	137	0.90	0.02	61
206C	Mediation Room	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
H205	Corridor	22T34RF(u/em)2	2	78	0.16	3875		605	22T17RF(R/em)2	32	0.06	248	0.90	0.08	321
H205	Corridor	22T34RF(u/Lou)2	2	78	0.16	3875		605	22T17RF(R/Lou)2	32	0.06	248	0.90	0.08	321
H205	Corridor	22T32RF(u)2	1	58	0.06	3875		225	22T17RF(R)2	32	0.03	124	0.90	0.02	91



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
H205	Corridor	C23R(CF)1	1	27.6	0.03	3875		107	C23R(CF)1	27.6	0.03	107	0.90	0.00	0
H205	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
205A	Court Services Admin.	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
205A.1	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
205A.2	Office	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	58	0.12	305	0.90	0.05	137
248	Elect. Room	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
248.1	Women's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
205B	Conference Room	24T32RF3	3	87	0.26	250		65	24T32RF(R)2	58	0.17	44	0.17	0.01	20
205C	Conference Room	24T32RF3	3	87	0.26	250		65	24T32RF(R)2	58	0.17	44	0.17	0.01	20
205D	Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10	274
204	Receptionist Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10	274
204A	Judge's Chambers	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
204A	Judge's RR	W32CF2	1	58	0.06	2625		152	W32CF2	58	0.06	152	0.90	0.00	0
204B	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
204C	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
246.1	Men's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.30	0.02	61
246	Janitor's Closet	S34CF2	1	78	0.08	500		39	S32CF(Lo)2	52	0.05	26	0.33	0.01	12
204B	Jury Room	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	58	0.17	87	0.33	0.03	39
204B	Jury Room	W34CF2	1	78	0.08	500		39	W32CF(Lo)2	52	0.05	26	0.33	0.01	12
204B	Jury's RR	W60WI1	3	60	0.18	2625		473	2W17WF(V)2	32	0.10	252	0.90	0.08	199
H206	Corridor	22T32RF(u/em)2	1	58	0.06	3875		225	22T17RF(R/em)2	32	0.03	124	0.90	0.02	91
H206	Corridor	22T32RF(u)2	2	58	0.12	3875		450	22T17RF(R)2	32	0.05	248	0.90	0.05	181
H206	Corridor	22T34RF(u/em)2	1	78	0.08	3875		302	22T17RF(R/em)2	32	0.03	124	0.90	0.04	160
H206	Corridor	22T34RF(u/Low)2	4	78	0.31	3875		1,209	22T17RF(R/Lou)2	32	0.13	496	0.90	0.17	642
H206	Corridor	X(g)20C12	1	40	0.04	8759.52		350	X(g)2C(LED)1	2	0.00	18	0.90	0.03	300
H206	Corridor	X(g)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00	0
202B	Jury Room	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	58	0.17	87	0.33	0.03	39
202B.1	Women's Restroom	D60WI1	1	52	0.05	2625		137	2W17WF(V)2	32	0.03	84	0.90	0.02	47
202B.2	Men's Restroom	D60WI1	1	52	0.05	2625		137	2W17WF(V)2	32	0.03	84	0.90	0.02	47
202	Receptionist Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10	274
202A	Judge's Chambers	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
202A	Judge's RR	W34CF2	1	78	0.08	2625		205	W32CF(Lo)2	52	0.05	137	0.90	0.02	61

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
202B	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
202C	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
201	Receptionist Office	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	58	0.23	609	0.90	0.10	274
201A	Judge's Chambers	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	58	0.17	457	0.90	0.08	206
201A	Judge's RR	W34CF2	1	78	0.08	2625		205	W32CF(Lo)2	52	0.05	137	0.90	0.02	61
201B	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
202C	Office	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	58	0.06	152	0.90	0.03	69
201B	Jury Room	24T32RF3	4	87	0.35	500		174	24T32RF(R)2	58	0.23	116	0.33	0.03	52
201B.1	Women's Restroom	D60W11	1	52	0.05	2625		137	2W17WF(V)2	32	0.03	84	0.90	0.02	47
201B.2	Men's Restroom	D60W11	1	52	0.05	2625		137	2W17WF(V)2	32	0.03	84	0.90	0.02	47
201B.3	Gun Armory	J60W11	6	60	0.36	500		180	J15W(CF)1	17	0.10	51	0.33	0.08	116
211A	Holding Cell	14B32CF2	1	58	0.06	2625		152	14B32CF2	58	0.06	152	0.90	0.00	0
211B	Holding Cell	14B32CF2	1	58	0.06	2625		152	14B32CF2	58	0.06	152	0.90	0.00	0
211C	Elev. Lobby	14B32CF2	1	58	0.06	3875		225	14B32CF2	58	0.06	225	0.90	0.00	0
H207	Corridor	22T32RF(u)2	3	58	0.17	3875		674	22T17RF(R)2	32	0.10	372	0.90	0.07	272
H207	Corridor	22T32RF(wem)2	2	58	0.12	3875		450	22T17RF(R/em)2	32	0.06	248	0.90	0.05	181
278A	Tele. Rm.	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.17	0.00	6
H208	Corridor	22T32RF(wem)2	4	58	0.23	3875		899	22T17RF(R/em)2	32	0.13	496	0.90	0.09	363
H208	Corridor	22T32RF(u)2	8	58	0.46	3875		1,798	22T17RF(R)2	32	0.26	992	0.90	0.19	725
H208	Corridor	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
H208	Corridor	C23R(CF)1	5	27.6	0.14	3875		535	C23R(CF)1	27.6	0.14	535	0.90	0.00	0
H208	Corridor	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
	2nd Fir SE Stair Tower	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.90	0.05	181
	1st Fir SE Stair Tower	W34WF2	3	78	0.23	3875		907	W32WF(Lo)2	52	0.16	605	0.90	0.07	272
	1st Fir SE Stair Tower	X(g)2C(LED)1	1	40	0.04	3759.52		350	X(g)b2C(LED)1	2	0.00	18	0.90	0.03	300
100	File Room	24T34RF3	6	117	0.70	500		351	24T32RF(R/T)2	58	0.35	174	0.33	0.11	159
100	File Room	24T34RF3	106	117	12.40	500		6,201	24T32RF(R)2	58	6.15	3,074	0.33	1.88	2,814
100	File Room	22T34RF(u/Lou)2	4	78	0.31	500		156	22T17RF(R/Lou)2	32	0.13	64	0.33	0.06	83
100	File Room	X(g)20C12	3	40	0.12	8759.52		1,051	X(g)b2C(LED)1	2	0.01	53	0.90	0.10	899
100	File Room	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b2C(LED)1	2	0.00	35	0.90	0.00	0
100A	Copy Room	24T34RF3	6	117	0.70	2625		1,843	24T32RF(R)2	58	0.35	914	0.90	0.32	836
100B	Elevator Lobby	22T34RF(u/Lou)2	2	78	0.16	3875		605	22T17RF(R/Lou)2	32	0.06	248	0.90	0.08	321

hrs. The demand savings are not fully claimed.

Job No. DWGES30219

Project: Arapahoe County

Building: (35) ACJC Courthouse

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
100C	Storage	S34WF2	4	78	0.31	500		156	S32WF(Lo)2	52	0.21	104	0.33	0.03	47
100D	Office	24T34RF3	5	117	0.59	2625		1,536	24T32RF(R)2	58	0.29	761	0.90	0.27	697
100E	Office	24T34RF3	3	117	0.35	2625		921	24T32RF(R)2	58	0.17	457	0.90	0.16	418
100F	Electrical	S34CF2	1	78	0.08	250		20	S32CF(Lo)2	52	0.05	13	0.17	0.00	6
H100	Hallway	C150R(MH)1	8	165	1.48	3875		5,735	22T17RF(R)2	32	0.26	992	0.90	1.10	4,269
H100	Hallway	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
105	Mail Room	3W30CF2	10	70	0.70	2625		1,838	3W25CF(Lo)2	48	0.48	1,260	0.90	0.20	520
106	Storage	S34CF2	1	78	0.08	500		39	S32CF(Lo)2	52	0.05	26	0.33	0.01	12
106.1	Women's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
H101	Hall Way	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
H101	Hall Way	22T34RF(u/Lou)2	3	78	0.23	3875		907	22T17RF(R/Lou)2	32	0.10	372	0.90	0.12	481
107	File Room	3W30CF2	18	70	1.26	500		630	3W25CF(Lo)2	48	0.86	432	0.33	0.12	178
107A	Restroom	W60WI1	1	60	0.06	2625		158	2W17WFF(v)2	32	0.03	84	0.90	0.03	66
108.1	Men's Restroom	S30CF2	1	70	0.07	2625		184	S25CF(Lo)2	46	0.05	121	0.90	0.02	57
108.1	Men's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
108	Electrical	S34CF2	1	78	0.08	250		20	S32CF(Lo)2	52	0.05	13	0.17	0.00	6
109	File Room	22T34RF(u/Lou)2	12	78	0.94	500		468	22T17RF(R/Lou)2	32	0.38	192	0.33	0.17	248
109	File Room	3W30CF2	1	70	0.07	500		35	3W25CF(Lo)2	48	0.05	24	0.33	0.01	10
109A	Evidence	3W30CF2	1	70	0.07	2625		184	3W25CF(Lo)2	48	0.05	126	0.90	0.02	52
110	Work Out	3W30CF2	4	70	0.28	2625		735	3W25CF(Lo)2	48	0.19	504	0.90	0.08	208
110A	Shower Room	W34CF(v)2	1	78	0.08	2625		205	W32CF(Lo)2	52	0.05	137	0.90	0.02	61
110A	Shower Room	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
110B	Shower Room	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
110B	Shower Room	W34CF(v)2	1	78	0.08	2625		205	W32CF(Lo)2	52	0.05	137	0.90	0.02	61
H102-3	Hall Way	22T34RF(u/Lou)2	6	78	0.47	3875		1,814	22T17RF(R/Lou)2	32	0.19	744	0.90	0.25	963
H102-3	Hall Way	X(g)20C12	2	40	0.08	8759.52		701	X(g)b)2C(LED)1	2	0.00	35	0.90	0.07	599
109.1	Staff Room	3W30CF2	6	70	0.42	2625		1,103	3W25CF(Lo)2	48	0.29	756	0.90	0.12	312
103	Cafeteria	3W30CF2	12	70	0.84	2625		2,205	3W25CF(Lo)2	48	0.58	1,512	0.90	0.24	624
103	Cafeteria	22T34RF(u/Lou)2	6	78	0.47	2625		1,229	22T17RF(R/Lou)2	32	0.19	504	0.90	0.25	652
103	Cafeteria	24T34RF4	5	156	0.78	2625		2,048	24T32RF(R)2	58	0.29	761	0.90	0.44	1,158
103	Cafeteria	X(g)20C12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
103A	Kitchen Area	S34PF2	1	78	0.08	2625		205	S32PF(Lo)2	52	0.05	137	0.90	0.02	61

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
103B	Electrical	24T34RF4	4	156	0.62	250		156	24T32RF(R)2	58	0.23	58	0.17	0.06	88
104A	Jury Room	3W30CF2	6	70	0.42	500		210	3W25CF(LoT)2	48	0.29	144	0.33	0.04	59
104	Jury Room	3W30CF2	17	70	1.19	500		595	3W25CF(Lo)2	48	0.82	408	0.33	0.11	168
104	Jury Room	22T34RF(Lo)2	5	78	0.39	500		195	22T17RF(R/Lou)2	32	0.16	80	0.33	0.07	104
104	Jury Room	X(g)20C12	2	40	0.08	8759.52		701	X(g)b2C(LED)1	2	0.00	35	0.90	0.07	599
104B	Women's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
104B	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
104C	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
104C	Men's Restroom	14T34RF2	1	78	0.08	2625		205	14T32RF(Lo)2	52	0.05	137	0.90	0.02	61
104D	Law Library	3W30CF2	4	70	0.28	2625		735	3W25CF(Lo)2	48	0.19	504	0.90	0.08	208
104E	Office	3W30CF2	3	70	0.21	2625		551	3W25CF(Lo)2	48	0.14	378	0.90	0.06	156
104F	Office	3W30CF2	2	70	0.14	2625		368	3W25CF(Lo)2	48	0.10	252	0.90	0.04	104
104G	Storage	14T34RF2				500			14T32RF(Lo)2		0.00	0	0.33	0.00	
104G	W Stair	W34WF2	4	78	0.31	3875		1,209	W32WF(Lo)2	52	0.21	806	0.90	0.09	363
104G	E Stair	W34WF2	1	78	0.08	3875		302	W32WF(Lo)2	52	0.05	202	0.90	0.02	91
H104	Hallway	C150R(MH)1	6	185	1.11	3875		4,301	22T17RF(R)2	32	0.19	744	0.90	0.83	3,202
H104	Hallway	X(g)20C12	1	40	0.04	8759.52		350	X(g)b2C(LED)1	2	0.00	18	0.90	0.03	300
102	Main Lobby	C150R(MH)1	26	185	4.81	3875		18,639	22T17RF(R)2	32	0.83	3,224	0.90	3.58	13,873
102	Main Lobby	X(g)2C(LED)1	2	2	0.00	8759.52		35	X(g)b2C(LED)1	2	0.00	35	0.90	0.00	0
102	Main Lobby	C70R(MH)1	6	70	0.42	3875		1,828	C18R(CF)2	42	0.25	977	0.90	0.15	586
102A	Men's Restroom	S34CF2	3	78	0.23	2625		614	S32CF(LoT)2	52	0.16	410	0.90	0.07	184
102A	Men's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
102A	Men's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
102B	Women's Restroom	14T34RF2	2	78	0.16	2625		410	14T32RF(Lo)2	52	0.10	273	0.90	0.05	123
102B	Women's Restroom	S34CF2	3	78	0.23	2625		614	S32CF(LoT)2	52	0.16	410	0.90	0.07	184
102B	Women's Restroom	S34CF2	2	78	0.16	2625		410	S32CF(Lo)2	52	0.10	273	0.90	0.05	123
102C	Elevator Lobby	C150R(MH)1	10	185	1.85	3875		7,169	C18R(CF)2	42	0.42	1,628	0.90	1.29	4,987
102C	Elevator Lobby	X(g)20C12	1	40	0.04	8759.52		350	X(g)b2C(LED)1	2	0.00	18	0.90	0.03	300
102C	Elevator Lobby	S34CF2	4	78	0.31	3875		1,209	S32CF(LoT)2	52	0.21	806	0.90	0.09	363
102C	Elevator Lobby	S34CF2	8	78	0.62	3875		2,418	S32CF(LoT)2	52	0.42	1,612	0.90	0.19	725
102C	Elevator Lobby	S34CF2	2	78	0.16	3875		605	S32CF(Lo)2	52	0.10	403	0.90	0.05	181
102C	Elevator Lobby	S34CF2	1	78	0.08	3875		302	S32CF(Lo)2	52	0.05	202	0.90	0.02	91

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (35) ACJC Courthouse  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
102C	Elevator Lobby	3S30CF2	2	60	0.12	3875		465	3S25CF(Lo)2	48	0.10	372	0.90	0.02	84
102B	Office	3W30CF2	2	70	0.14	2625		368	3W25CF(Lo)2	48	0.10	252	0.90	0.04	104
102A	Office	3W30CF2	2	70	0.14	2625		368	3W25CF(Lo)2	48	0.10	252	0.90	0.04	104
102	Office	3W30CF2	3	70	0.21	2625		551	3W25CF(Lo)2	48	0.14	378	0.90	0.06	156
102	Office	W34WF2	2	78	0.16	2625		410	W32WF(Lo)2	52	0.10	273	0.90	0.05	123
B001	Parking Garage	R100C(HPS)1	23	128	2.94	5109.72		15,043	R100C(HPS)1	128	2.94	15,043	0.90	0.00	0
B001	Parking Garage	W34WF3	1	117	0.12	5109.72		598	W32WF(Lo)3	78	0.08	399	0.90	0.04	179
B001	Parking Garage	X(g)20R12	2	40	0.08	8759.52		701	X(g)2C(LED)1	2	0.00	35	0.90	0.07	599
B002	Tunnel	W34WF3	9	117	1.05	3875		4,080	W32WF(Lo)3	78	0.70	2,720	0.90	0.32	1,224
B002	Tunnel	X(g)20R12	2	40	0.08	8759.52		701	X(g)2C(LED)1	2	0.00	35	0.90	0.07	599
B003	Vault Files - Storage	S34PF2	7	78	0.55	500		273	S32PF(Lo)2	52	0.36	182	0.33	0.05	82
B004	Shop	R100C(HPS)1	1	128	0.13	2625		336	R100C(HPS)1	128	0.13	336	0.90	0.00	0
B004	Shop	S34PF2	2	78	0.16	2625		410	S32PF(Lo)2	52	0.10	273	0.90	0.05	123
B005	Storage Equipment	Locked				500			0		0.00	0	0.33	0.00	
B006	Vault Files - Storage	S34PF2	3	76	0.23	500		117	S32PF(Lo)2	52	0.16	78	0.33	0.02	35
H8007	Mechanical Room	S34PF2	7	78	0.55	250		137	S32PF(Lo)2	52	0.36	91	0.17	0.03	41
B007.1	Telephone Rm.	S34PF2	2	78	0.16	250		39	S32PF(Lo)2	52	0.10	26	0.17	0.01	12
B007.2	Electrical Room	S34PF2	2	78	0.16	250		39	S32PF(Lo)2	52	0.10	26	0.17	0.01	12
B007.2	Electrical Room	S34PF2	3	78	0.23	250		59	S32PF(Lo)2	52	0.16	39	0.17	0.01	18
B007.3	Boiler Room	S34PF2	13	78	1.01	250		254	S32PF(Lo)2	52	0.68	169	0.17	0.05	76
B008	Chiller Room	S34PF2	9	78	0.70	250		176	S32PF(Lo)2	52	0.47	117	0.17	0.04	53
B008.1	Elevator Equipment	S34PF2	1	78	0.08	500		39	S32PF(Lo)2	52	0.05	26	0.33	0.01	12
H8009	Hallway	S34PF2	1	78	0.08	3875		302	S32PF(Lo)2	52	0.05	202	0.90	0.02	91
B010	General Room	S34PF2	3	78	0.23	2625		614	S32PF(Lo)2	52	0.16	410	0.90	0.07	184
B011	Pump Room	S34PF2	2	78	0.16	250		39	S32PF(Lo)2	52	0.10	26	0.17	0.01	12
B012	Storage	S34PF2	1	78	0.08	500		39	S32PF(Lo)2	52	0.05	26	0.33	0.01	12
B012	Storage	X(g)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
B012.1	File Storage	S34PF2	2	78	0.16	500		78	S32PF(Lo)2	52	0.10	52	0.33	0.02	23
B012.2	File Storage	S34PF2	8	78	0.62	500		312	S32PF(Lo)2	52	0.42	208	0.33	0.06	94
B013	East Stair	W34WF2	2	78	0.16	3875		605	W32WF(Lo)2	52	0.10	403	0.90	0.05	181
B013	East Stair	X(g)20R12	1	40	0.04	8759.52		350	X(g)2C(LED)1	2	0.00	18	0.90	0.03	300
B014	Tunnel	W34WF3	6	117	0.70	3875		2,720	W32WF(Lo)3	78	0.47	1,814	0.90	0.21	816

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
B014	Tunnel	X(g)20R12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
B015	Fenced Storage	W34PF2	7	84	0.59	500		294	W32PF(Lo)2	52	0.36	182	0.33	0.07	101
B016	Storage "C"	Locked				500			0		0.00	0	0.33	0.00	
B017	Maint. Supervisor Office	8S75WF2	3	150	0.45	2625		1,181	8S32WF(Lo)4	104	0.31	819	0.90	0.12	328
B018	Break Area	W34PF2	10	84	0.84	2625		2,205	W32PF(Lo)2	52	0.52	1,365	0.90	0.29	756
B019	Hallway	W34PF2	8	84	0.67	3875		2,604	W32PF(Lo)2	52	0.42	1,612	0.90	0.23	893
B020	Maintenance Office	W34PF2	6	84	0.50	2625		1,323	W32PF(Lo)2	52	0.31	819	0.90	0.17	454
B020.1	Elevator Pit	W34PF2	2	84	0.17	3875		651	W32PF(Lo)2	52	0.10	403	0.90	0.06	223
B021	Elevator Lobby	24T34RF3	1	117	0.12	3875		453	24T32RF(R)2	58	0.05	225	0.90	0.05	206
B021	Elevator Lobby	X(g)20R12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
B021.1	Evidence Storage	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	58	0.33	0.04	53
B22	Tunnel	W34WF2	27	78	2.11	3875		8,161	W32WF(Lo)2	52	1.40	5,441	0.90	0.63	2,448
B22	Tunnel	X(g)20R12	1	40	0.04	8759.52		350	X(g)b)2C(LED)1	2	0.00	18	0.90	0.03	300
Outside	Employee Parking	Q400Po(HPS)2	25	920	23.00	5109.72		117,524	Q400Po(HPS)2	920	23.00	117,524	0.90	0.00	0
Outside	Employee Parking	Q400Po(HPS)1	5	460	2.30	5109.72		11,752	Q400Po(HPS)1	460	2.30	11,752	0.90	0.00	0
Outside	Public Parking	Q400Po(HPS)1	6	460	2.76	5109.72		14,103	Q400Po(HPS)1	460	2.76	14,103	0.90	0.00	0
Outside	Public Parking	Q400Po(HPS)2	23	920	21.16	5109.72		108,122	Q400Po(HPS)2	920	21.16	108,122	0.90	0.00	0
Total kW: 277.01									Total kWh: 852,209.44				671.90	73.47	232,351

Project: Arapahoe County

Job No.

DWCES30219

Building: (36) Detention Center

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
H2	Pod 2 Lower Level												0.00		
P2.1	Hallway	W32CF2	17	59	1.00	8736		8,762	W32CF2	59	1.00	8,762	0.90	0.00	0
P2.2	Storage	W32CF2	2	59	0.12	1092		129	W32CF2	59	0.12	129	0.73	0.00	0
P2.3	Exam room	W32CF2	2	59	0.12	2678		316	W32CF2	59	0.12	316	0.90	0.00	0
P2.3A	Class room	14T32RF2	6	59	0.35	2678		948	14T32RF2	59	0.35	948	0.90	0.00	0
P2.4	Classroom restroom	14T32RF3	1	88.5	0.09	8736		773	14T32RF3	88.5	0.09	773	0.90	0.00	0
P2.5	Office	14T32RF2	2	59	0.12	2678		316	14T32RF2	59	0.12	316	0.90	0.00	0
P2.5	Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
P2.6	Classroom	W32CF2	8	59	0.47	2678		1,264	W32CF2	59	0.47	1,264	0.90	0.00	0
P2.7	Conference room	24T32RF3	3	88.5	0.27	364		97	24T32RF3	88.5	0.27	97	0.24	0.00	0
P2.8	Stair	24T32RF2	2	59	0.12	8736		1,031	24T32RF2	59	0.12	1,031	0.90	0.00	0
P2.9	Operation coordinator	24T32RF2	2	59	0.12	5219,214		616	24T32RF2	59	0.12	616	0.90	0.00	0
P2.10	Women restroom	24T32RF2	1	59	0.06	8736		515	24T32RF2	59	0.06	515	0.90	0.00	0
P2.11	Men restroom	24T32RF2	1	59	0.06	8736		515	24T32RF2	59	0.06	515	0.90	0.00	0
P2.12	Office	24T32RF3	3	88.5	0.27	2678		711	24T32RF3	88.5	0.27	711	0.90	0.00	0
P2.13	Office	24T32RF(Lou)3	2	88.5	0.18	2678		474	24T32RF(Lou)3	88.5	0.18	474	0.90	0.00	0
P2.14	Open office	24T32RF(Lou)3	9	88.5	0.80	2678		2,133	24T32RF(Lou)3	88.5	0.80	2,133	0.90	0.00	0
P2.14	Open office	22T34RF(w)2	3	72	0.22	2805		606	22T17RF(R)2	33	0.10	278	0.90	0.11	295
P2.15	Restroom	14T32RF2	1	59	0.06	8736		515	14T32RF2	59	0.06	515	0.90	0.00	0
P2.16	Uniform storage	14T32RF2	2	59	0.12	1092		129	14T32RF2	59	0.12	129	0.73	0.00	0
P2.17	Work release hall	W32CF2	11	59	0.65	5219,214		3,387	W32CF2	59	0.65	3,387	0.90	0.00	0
P2.17	Work release hall	X(g)2C(LED)1	1	6	0.01	5219,214		31	X(g)2C(LED)1	6	0.01	31	0.90	0.00	0
P2.18	Work release entry	W32CF2	2	59	0.12	5219,214		616	W32CF2	59	0.12	616	0.90	0.00	0
P2.20	Jail industry	14T32RF3	17	88.5	1.50	5219,214		7,852	14T32RF3	88.5	1.50	7,852	0.90	0.00	0
P2.21	Jail industry office	24T32RF3	1	88.5	0.09	5219,214		462	24T32RF3	88.5	0.09	462	0.90	0.00	0
Pod 2	2A-Day room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 2	2A-Day room	W32CF2	28	59	1.65	5219,214		8,622	W32CF2	59	1.65	8,622	0.90	0.00	0
Pod 2	2A-Day room	WP150W(MH)1	5	190	0.95	5219,214		4,958	WP150W(MH)1	190	0.95	4,958	0.90	0.00	0
Pod 2	Lower cells 2A12-2A22	W32CF2	20	59	1.18	5219,214		6,159	W32CF2	59	1.18	6,159	0.90	0.00	0
Pod 2	Lower shower room	W32CF2	6	59	0.35	5219,214		1,848	W32CF2	59	0.35	1,848	0.90	0.00	0
Pod 2	Lower shower room	WP150W(MH)1	6	190	1.14	5219,214		5,950	WP150W(MH)1	190	1.14	5,950	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(36) Detention Center**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 2	Janitor room up/down	W32CF2	2	59	0.12	1092		129	W32CF2	59	0.12	129	0.73	0.00	0
Pod 2	Upper cell 2A1-2A11	W32CF2	22	59	1.30	5219.214		6,775	W32CF2	59	1.30	6,775	0.90	0.00	0
Pod 2	upper shower room	W32CF2	6	59	0.35	5219.214		1,848	W32CF2	59	0.35	1,848	0.90	0.00	0
Pod 2	upper shower room	WP150W(MH)1	6	190	1.14	5219.214		5,950	WP150W(MH)1	190	1.14	5,950	0.90	0.00	0
Pod 2	Lower 2B Day Room	W32CF2	7	59	0.41	5219.214		2,156	W32CF2	59	0.41	2,156	0.90	0.00	0
Pod 2	Lower 2B Day Room	W32CF2	6	59	0.35	5219.214		1,848	W32CF2	59	0.35	1,848	0.90	0.00	0
Pod 2	Lower cell 2B4-2B6	W32CF2	12	59	0.71	5219.214		3,695	W32CF2	59	0.71	3,695	0.90	0.00	0
Pod 2	Lower shower room	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00	0
Pod 2	Lower janitor 2B	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
Pod 2	Upper Cell 2B1-2B3	W32CF2	5	59	0.30	5219.214		1,540	W32CF2	59	0.30	1,540	0.90	0.00	0
Pod 2	Upper dayroom	W32CF2	5	59	0.30	5219.214		1,540	W32CF2	59	0.30	1,540	0.90	0.00	0
Pod 2	Upper shower	Q150C(MH)1	2	190	0.38	5219.214		1,983	Q150C(MH)1	190	0.38	1,983	0.90	0.00	0
Pod 2	Stair B/C day run	W32CF2	1	59	0.06	8736		515	W32CF2	59	0.06	515	0.90	0.00	0
Pod 2	2BC Storage	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
Pod 2	2C Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 2	2C Day room	W32CF2	18	59	1.06	5219.214		5,543	W32CF2	59	1.06	5,543	0.90	0.00	0
Pod 2	2C Day room	W32CF4	1	112	0.11	5219.214		585	W32CF4	112	0.11	585	0.90	0.00	0
Pod 2	Lower cells 2C8-2C14	W32CF2	14	59	0.83	5219.214		4,311	W32CF2	59	0.83	4,311	0.90	0.00	0
Pod 2	Lower shower	W32CF4	5	112	0.56	5219.214		2,923	W32CF4	112	0.56	2,923	0.90	0.00	0
Pod 2	Lower shower	Q150C(MH)1	4	190	0.76	5219.214		3,967	Q150C(MH)1	190	0.76	3,967	0.90	0.00	0
Pod 2	Upper/flower Janitor	W32CF2	2	59	0.12	5219.214		616	W32CF2	59	0.12	616	0.90	0.00	0
Pod 2	Upper Cells 2C1-2C7	W32CF2	14	59	0.83	5219.214		4,311	W32CF2	59	0.83	4,311	0.90	0.00	0
Pod 2	2D-day room	22B400C(MH)1	6	458	2.75	5219.214		14,342	22B400C(MH)1	458	2.75	14,342	0.90	0.00	0
Pod 2	2D-day room	W32CF2	19	59	1.12	5219.214		5,851	W32CF2	59	1.12	5,851	0.90	0.00	0
Pod 2	2D-day room	WP150W(MH)1	3	190	0.57	5219.214		2,975	WP150W(MH)1	190	0.57	2,975	0.90	0.00	0
Pod 2	Lower cells 2D1-2D6	W32CF2	12	59	0.71	5219.214		3,695	W32CF2	59	0.71	3,695	0.90	0.00	0
Pod 2	Lower shower	Q150C(MH)1	3	190	0.57	5219.214		2,975	Q150C(MH)1	190	0.57	2,975	0.90	0.00	0
Pod 2	Lower shower	W32CF2	3	59	0.18	5219.214		924	W32CF2	59	0.18	924	0.90	0.00	0
Pod 2	Lower janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
Pod 2	Upper Cells 2D7-2D12	W32CF2	12	59	0.71	5219.214		3,695	W32CF2	59	0.71	3,695	0.90	0.00	0
Pod 2	Upper shower	Q150C(MH)1	4	190	0.76	5219.214		3,967	Q150C(MH)1	190	0.76	3,967	0.90	0.00	0
Pod 2	Upper shower	W32CF2	6	59	0.35	5219.214		1,848	W32CF2	59	0.35	1,848	0.90	0.00	0



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 2	Upper Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
Pod 2	Courtyard	22B400C(MH)1	1	458	0.46	5109.72		2,340	22B400C(MH)1	458	0.46	2,340	0.30	0.00	0
Pod 2	Pod 2 upper Level								0	0	0.00	0	0.00	0.00	0
Pod 2	Pod 2 Hallway	W32CF2	10	59	0.59	8736		5,154	W32CF2	59	0.59	5,154	0.90	0.00	0
Pod 2	Pod 2 upper hall	14T32RF2	27	59	1.59	8736		13,916	14T32RF2	59	1.59	13,916	0.90	0.00	0
Pod 2	Upper control room	24T32RF3	2	88.5	0.18	8736		1,546	24T32RF3	88.5	0.18	1,546	0.90	0.00	0
Pod 2	stair #1	W32CF2	2	59	0.12	8736		1,031	W32CF2	59	0.12	1,031	0.90	0.00	0
Pod 2	stair #1	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0.00	0
Pod 2	Visitor Room V2B	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room V2B	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room V2C	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room PV2C	W32CF2	1	59	0.06	2805		165	W32CF2	59	0.06	165	0.90	0.00	0
Pod 2	Visitor Room PV2D	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room PV2A	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room V2D	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Visitor Room V2A	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0.00	0
Pod 2	Electrical P201	S32CF2	2	59	0.12	1092		129	S32CF2	59	0.12	129	0.73	0.00	0
Pod 2	Doctor Office P202	S32CF2	2	59	0.12	2678		316	S32CF2	59	0.12	316	0.90	0.00	0
Pod 2	Stair #2	W32WF2	2	59	0.12	8736		1,031	W32WF2	59	0.12	1,031	0.90	0.00	0
Pod 2	Jail Industry #1	8S32CF4	13	112	1.46	5219.214		7,599	8S32CF4	112	1.46	7,599	0.90	0.00	0
Pod 2	Jail Industry #2	8S32CF4	7	112	0.78	5219.214		4,092	8S32CF4	112	0.78	4,092	0.90	0.10	275
Visitation	Lower Visitation Center Lobby VC1	24T34RF3	4	115	0.35	2805	3	968	24T34RF3	59	0.24	662	0.90	0.00	0
Visitation	Lower Visitation Center Lobby VC1	X(g)2C(LED)1	1	6	0.01	2805		17	X(g)2C(LED)1	6	0.01	17	0.90	0.00	0
Visitation	Lower Visitation Center VC2	R26R(CF)1	14	26	0.36	2805		1,021	R26R(CF)1	26	0.36	1,021	0.90	0.00	0
Visitation	Lower Visitation Center VC2	24T34RF3	4	115	0.31	2805	4	860	24T34RF3	59	0.24	662	0.90	0.06	178
Visitation	Lower Control's RR VC4	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Visitation	Lower Control's Office VC3	24B34CF2	1	72	0.07	8736		629	24B32CF(Lo)2	52	0.05	454	0.90	0.02	157
Visitation	Lower Visitor's RR VC5	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 5	Pod 5 Lower Level												0.00		
Pod 5	Pod 5 Hallway	W32CF2	14	59	0.83	8736		7,216	W32CF2	59	0.83	7,216	0.90	0.00	0
Pod 5	Pod 5 Hallway	W32CF(em)2	9	59	0.53	8736		4,639	W32CF(em)2	59	0.53	4,639	0.90	0.00	0
Pod 5	Lower Cellhouse 5A1-5A3	14B32CF2	3	59	0.18	5219.214		924	14B32CF2	59	0.18	924	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 5	Upper Shower Room	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00	0
Pod 5	P5A Day room	14B32CF2	2	59	0.12	5219.214		616	14B32CF2	59	0.12	616	0.90	0.00	0
Pod 5	P5B Day room	22B400C(MH)1	4	458	1.83	5219.214		9,562	22B400C(MH)1	458	1.83	9,562	0.90	0.00	0
Pod 5	Lower P5B Cell 5B7-5B12	14B32CF2	6	59	0.35	5219.214		1,848	14B32CF2	59	0.35	1,848	0.90	0.00	0
Pod 5	Upper P5B Cell 5B1-5B6	14B32CF2	6	59	0.35	5219.214		1,848	14B32CF2	59	0.35	1,848	0.90	0.00	0
Pod 5	Upper P5B Shower	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00	0
Pod 5	Lower P5B Shower	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00	0
Pod 5	Lower P5B Shower	W32CF2	1	59	0.06	5219.214		308	W32CF2	59	0.06	308	0.90	0.00	0
Pod 5	P5B Hallway	W32CF2	5	59	0.30	8736		2,577	W32CF2	59	0.30	2,577	0.90	0.00	0
Pod 5	P5B Control Room	14T32RF3	2	88.5	0.18	8736		1,546	14T32RF3	88.5	0.18	1,546	0.90	0.00	0
Pod 5	P5A Court Yard	14B32CF2	5	59	0.30	5109.72		1,507	14B32CF2	59	0.30	1,507	0.90	0.00	0
Pod 5	P5C Day Room	W32CF2	24	59	1.42	5219.214		7,390	W32CF2	59	1.42	7,390	0.90	0.00	0
Pod 5	P5C Day Room	22B400C(MH)1	11	458	5.04	5219.214		26,294	22B400C(MH)1	458	5.04	26,294	0.90	0.00	0
Pod 5	P5C Day Room	WP150W(MH)1	5	190	0.95	5219.214		4,958	WP150W(MH)1	190	0.95	4,958	0.90	0.00	0
Pod 5	Lower P5C Cell 5C10-5C18	W32CF2	18	59	1.06	5219.214		5,543	W32CF2	59	1.06	5,543	0.90	0.00	0
Pod 5	Lower P5C Shower Room	W32CF2	4	59	0.24	5219.214		1,232	W32CF2	59	0.24	1,232	0.90	0.00	0
Pod 5	Lower P5C Shower Room	W32CF2	1	59	0.06	5219.214		308	W32CF2	59	0.06	308	0.90	0.00	0
Pod 5	Upper P5C Cell 5C1-5C9	W32CF2	18	59	1.06	5219.214		5,543	W32CF2	59	1.06	5,543	0.90	0.00	0
Pod 5	Upper P5C Shower	WP150W(MH)1	4	190	0.76	5219.214		3,967	WP150W(MH)1	190	0.76	3,967	0.90	0.00	0
Pod 5	Upper P5C Shower	W32CF2	8	59	0.47	5219.214		2,463	W32CF2	59	0.47	2,463	0.90	0.00	0
Pod 5	Upper P5C Janitor	W32CF2	2	59	0.12	1092		129	W32CF2	59	0.12	129	0.73	0.00	0
Pod 5	Upper P5C Visitor	W32CF2	1	59	0.06	2805		165	W32CF2	59	0.06	165	0.90	0.00	0
Pod 5	P5C Court Yard	22B400C(MH)1	3	458	1.37	5109.72		7,021	22B400C(MH)1	458	1.37	7,021	0.90	0.00	0
Pod 5	P5D Day Room	W32CF2	18	59	1.06	5219.214		5,543	W32CF2	59	1.06	5,543	0.90	0.00	0
Pod 5	P5D Day Room	22B400C(MH)1	6	458	2.75	5219.214		14,342	22B400C(MH)1	458	2.75	14,342	0.90	0.00	0
Pod 5	P5D Day Room	W32CF2	3	59	0.18	5219.214		924	W32CF2	59	0.18	924	0.90	0.00	0
Pod 5	Upper P5D Cell 5D1-5D6	W32CF3	12	87	1.04	5219.214		5,449	W32CF3	87	1.04	5,449	0.90	0.00	0
Pod 5	Upper P5D Shower	Q150C(MH)1	3	190	0.57	5219.214		2,975	Q150C(MH)1	190	0.57	2,975	0.90	0.00	0
Pod 5	Upper P5D Shower	W32CF2	4	59	0.24	5219.214		1,232	W32CF2	59	0.24	1,232	0.90	0.00	0
Pod 5	Upper P5D Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00	0
Pod 5	Lower P5D Cell 5D7-5D12	W32CF3	12	87	1.04	5219.214		5,449	W32CF3	87	1.04	5,449	0.90	0.00	0
Pod 5	Lower P5D Shower	W32CF3	3	87	0.26	5219.214		1,362	W32CF3	87	0.26	1,362	0.90	0.00	0

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (36) Detention Center  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
Pod 5	Lower PSD Shower	Q150C(MH)1	4	190	0.76	5219.214		3,967	Q150C(MH)1	190	0.76	3,967	0.90	0.00
Pod 5	Lower PSD Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00
Pod 5	5D Day Room	WP150W(MH)1	1	190	0.19	5219.214		992	WP150W(MH)1	190	0.19	992	0.90	0.00
Pod 5	P5E1 Hallway	W32CF2	2	59	0.12	8736		1,031	W32CF2	59	0.12	1,031	0.90	0.00
Pod 5	P5E Storage	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00
Pod 5	Upper P5E Cell 5E1-5E6	W32CF2	12	59	0.71	5219.214		3,695	W32CF2	59	0.71	3,695	0.90	0.00
Pod 5	Upper P5E Shower	W32CF3	3	87	0.26	5219.214		1,362	W32CF3	87	0.26	1,362	0.90	0.00
Pod 5	Upper P5E Visitor	W32CF(em)2	2	59	0.12	2805		331	W32CF(em)2	59	0.12	331	0.90	0.00
Pod 5	Upper P5E Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00
Pod 5	Lower P5E Cell 5E7-5E11	W32CF2	10	59	0.59	5219.214		3,079	W32CF2	59	0.59	3,079	0.90	0.00
Pod 5	Lower P5E Shower	W32CF3	3	87	0.26	5219.214		1,362	W32CF3	87	0.26	1,362	0.90	0.00
Pod 5	Lower P5E Janitor	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00
Pod 5	P5E Day Room	22B400C(MH)1	10	458	4.58	5219.214		23,904	22B400C(MH)1	458	4.58	23,904	0.90	0.00
Pod 5	P5E Day Room	W32CF2	10	59	0.59	5219.214		3,079	W32CF2	59	0.59	3,079	0.90	0.00
Pod 5	P5E Day Room	WP150W(MH)1	3	190	0.57	5219.214		2,975	WP150W(MH)1	190	0.57	2,975	0.90	0.00
Pod 5	P5E Court Yard	22B400C(MH)1	2	458	0.92	5109.72		4,681	22B400C(MH)1	458	0.92	4,681	0.90	0.00
Pod 5	P5F Day Room	14B32CF2	3	59	0.18	5219.214		924	14B32CF2	59	0.18	924	0.90	0.00
Pod 5	P5F Day Room	22B400C(MH)1	2	458	0.92	5219.214		4,781	22B400C(MH)1	458	0.92	4,781	0.90	0.00
Pod 5	Upper Cellhouse 5F1-5F4	14B32CF2	4	59	0.24	5219.214		1,232	14B32CF2	59	0.24	1,232	0.90	0.00
Pod 5	Upper 5F Shower Room	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00
Pod 5	Lower 5F Shower Room	Q150C(MH)1	1	190	0.19	5219.214		992	Q150C(MH)1	190	0.19	992	0.90	0.00
Pod 5	Lower Cellhouse 5F5-5F8	14B32CF2	4	59	0.24	5219.214		1,232	14B32CF2	59	0.24	1,232	0.90	0.00
Pod 5	P5G Day Room	14B32CF2	2	59	0.12	5219.214		616	14B32CF2	59	0.12	616	0.90	0.00
Pod 5	Lower Cellhouse 5G1-5G2	14B32CF2	2	59	0.12	5219.214		616	14B32CF2	59	0.12	616	0.90	0.00
Pod 5	5G MBR Library	24B32CF3	4	87	0.35	2878		932	24B32CF3	87	0.35	932	0.90	0.00
Pod 5	5G Men restroom	14T32RF2	1	59	0.06	8736		515	14T32RF2	59	0.06	515	0.90	0.00
Pod 5	5G Men restroom	14T32RF2	1	59	0.06	8736		515	14T32RF2	59	0.06	515	0.90	0.00
Pod 5	5B Stair	3W25WF2	1	46	0.05	8736		402	3W25WF2	46	0.05	402	0.90	0.00
Pod 5	5B Stair	W32WF2	1	59	0.06	8736		515	W32WF2	59	0.06	515	0.90	0.00
Pod 5	5G Janitor Closet	W32CF2	1	59	0.06	1092		64	W32CF2	59	0.06	64	0.73	0.00
Pod 5	Exam room	24B32CF3	2	87	0.17	2678		466	24B32CF3	87	0.17	466	0.90	0.00
	Pod 5 Upper Level												0.00	

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Job No. DWCES30219

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
Pod 5	Control Room Hallway	W32CF2	22	59	1.30	8736		11,339	W32CF2	59	1.30	11,339	0.90	0
Pod 5	Control Room	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0
Pod 5	Control Room	24B32CF3	1	87	0.09	8736		760	24B32CF3	87	0.09	760	0.90	0
Pod 5	Stair SE2	W32CF2	2	59	0.12	8736		1,031	W32CF2	59	0.12	1,031	0.90	0
Pod 5	Visitor V5D	W32CF2	1	59	0.06	2805		165	W32CF2	59	0.06	165	0.90	0
Pod 5	Visitor V5C	W32CF2	1	59	0.06	2805		165	W32CF2	59	0.06	165	0.90	0
Pod 5	Visitor PV5D	W32CF2	1	59	0.06	2805		165	W32CF2	59	0.06	165	0.90	0
Pod 5	Visitor PV5C	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0
Pod 5	Visitor V5B	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0
Pod 5	Visitor V5E	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0
Pod 5	Pod 5 Stair	W32CF2	2	59	0.12	8736		1,031	W32CF2	59	0.12	1,031	0.90	0
Pod 5	Electrical #1	S32CF2	2	59	0.12	1092		129	S32CF2	59	0.12	129	0.73	0
Pod 5	Visitor V5F	W32CF2	2	59	0.12	2805		331	W32CF2	59	0.12	331	0.90	0
Pod 5	Electrical #2	S32CF2	3	59	0.18	1092		193	S32CF2	59	0.18	193	0.73	0
Pod 5	Storage	S32CF2	2	59	0.12	1092		129	S32CF2	59	0.12	129	0.73	0
Pod 5	JAC1 Waiting Room	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC2 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC3 Conference	24T32RF3	3	88.5	0.27	364		97	24T32RF3	88.5	0.27	97	0.24	0
Pod 5	JAC4 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC5 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC6 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC7 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC8 Women's RR	14T32RF2	1	59	0.06	8736		515	14T32RF2	59	0.06	515	0.90	0
Pod 5	JAC9 men's RR	14T32RF2	1	59	0.06	8736		515	14T32RF2	59	0.06	515	0.90	0
Pod 5	JAC10 Office	24T32RF3	2	88.5	0.18	2678		474	24T32RF3	88.5	0.18	474	0.90	0
Pod 5	JAC11 Office	24T32RF3	8	88.5	0.71	2678		1,896	24T32RF3	88.5	0.71	1,896	0.90	0
Pod 5	JAC11A Storage	S32CF2	2	59	0.12	1092		129	S32CF2	59	0.12	129	0.73	0
Pod 5	JAC11B Stair	24T32RF3	2	88.5	0.18	8736		1,546	24T32RF3	88.5	0.18	1,546	0.90	0
Pod 5	JAC11B Stair	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0
Pod 5	JAC11B Stair	W32CF2	1	59	0.06	8736		515	W32CF2	59	0.06	515	0.90	0
Pod 5	JAC12 Photo Lab	W32CF2	5	59	0.30	1092		322	W32CF2	59	0.30	322	0.73	0
Pod 5	JAC13 Garage	14T32RF2	4	72	0.29	8736		2,516	14T32RF2(Lo)2	52	0.21	1,817	0.90	629

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 5	JAC14 Hall	W32CF2	3	59	0.18	8736		1,546	W32CF2	59	0.18	1,546	0.90	0.00	0
Pod 5	JAC15 Storage	S32CF2	7	59	0.41	1092		451	S32CF2	59	0.41	451	0.73	0.00	0
Pod 5	JAC16 Hallway	24T32RF3	7	88.5	0.62	8736		5,412	24T32RF3	88.5	0.62	5,412	0.90	0.00	0
Pod 5	JAC16 Hallway	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0.00	0
Pod 1	Pod 1 Lower Level												0.00		
Pod 1	Hallway H001	14T34RF2	5	72	0.36	8736		3,145	14T32RF(Lo)2	52	0.26	2,271	0.90	0.09	786
Pod 1	Exam room P1	W34CF2	1	72	0.07	2678		193	W32CF(Lo)2	52	0.05	139	0.90	0.02	48
Pod 1	Janitor P1	S34CF2	2	72	0.14	1092		157	S32CF(Lo)T2	51	0.10	111	0.73	0.03	41
Pod 1	Storage P1	S34PF2	5	72	0.36	1092		393	S32PF(Lo)2	52	0.26	284	0.73	0.07	98
Pod 1	Commissary P1.1	14T34RF2	2	72	0.14	1092		157	14T32RF(Lo)2	52	0.10	114	0.73	0.03	39
Pod 1	Sally Port	C60R11	4	60	0.24	2678		643	C15R(CF)1	15	0.06	161	0.90	0.16	434
Pod 1	A1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	A1 Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 1	Upper Cellhouse 1A1-1A8	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Upper 1 A Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1A9-1A16	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1A Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	B1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	B1 Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 1	Upper Cellhouse 1B1-1B8	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Upper 1B Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1B9-1B16	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1B Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	C1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	C1 Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 1	Upper Cellhouse 1C1-1C8	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Upper 1C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1C9-1C16	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	D1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	D1 Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 1	Upper Cellhouse 1D1-1D8	W34WF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (36) Detention Center  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 1	Upper 1D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1D9-1D16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	E1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	E1 Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 1	Upper Cellhouse 1E1-1E8	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Upper 1E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1E9-1E16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	F1 Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 1	F1 Day room	14B34CF2	11	72	0.79	5219.214		4,134	14B32CF(Lo)2	52	0.57	2,985	0.90	0.20	1,033
Pod 1	Upper Cellhouse 1F1-1F8	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Upper 1F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Lower Cellhouse 1F9-1F16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 1	Lower 1F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 1	Courtyard	WP150W(MH)1	7	190	1.33	5109.72		6,796	WP150W(MH)1	190	1.33	6,796	0.90	0.00	0
Pod 1	Library	14B34CF2	10	72	0.72	2678		1,928	14B32CF(Lo)2	52	0.52	1,393	0.90	0.18	482
Pod 1	Control Room's Stair	14B34CF2	4	72	0.29	8736		2,516	14B32CF(Lo)2	52	0.21	1,817	0.90	0.07	629
Pod 1	FE1 Tunnel	14T34RF2	1	72	0.07	5219.214		376	14T32RF(Lo)2	52	0.05	271	0.90	0.02	94
Pod 1	FE1 Tunnel	S34CF2	3	72	0.22	5219.214		1,127	S32CF(Lo)2	52	0.16	814	0.90	0.05	282
Pod 1	FE1 Tunnel	X(g)2C(LED)1	2	6	0.01	5219.214		63	X(g)2C(LED)1	6	0.01	63	0.90	0.00	0
Pod 1	FE1 Telephone rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 1	FE1 Electrical Rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 1	FE1 Stair	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
Pod 1	P1P3 Lower Hallway	14T34RF3	17	115	1.96	8736		17,079	14T32RF(Lo)3	78	1.33	11,584	0.90	0.57	4,945
Pod 1	P1P3 Lower Hallway	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
Pod 1	Pod1 Upper Level												0.00		
Pod 1	Inmate Visitation VS1	14B34CF2	6	72	0.43	2805		1,212	14B32CF(Lo)2	52	0.31	875	0.90	0.11	303
Pod 1	CV1 Lobby	14T34RF3	4	115	0.46	5219.214		2,401	14T32RF(Lo)3	78	0.31	1,628	0.90	0.13	695
Pod 1	CV1A Sergeant's Office	14T34RF2	1	72	0.07	3759.294		271	14T32RF(Lo)2	52	0.05	195	0.90	0.02	68
Pod 1	CV1A Sergeant's Office	W34TF1	1	43	0.04	3759.294		162	W32TF(Lo)1	29	0.03	109	0.90	0.01	47
Pod 1	CV1B Visitor Room	14T34RF2	1	72	0.07	2805		202	14T32RF(Lo)2	52	0.05	146	0.90	0.02	51

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 1	CV1C Visitor RR	14B34CF2	1	72	0.07	2805		202	14B32CF(Lo)2	52	0.05	146	0.90	0.02	51
Pod 1	Control Room	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 1	Control Room	C60R11	8	60	0.48	8736		4,193	C15R(CF)1	15	0.12	1,048	0.90	0.32	2,831
Pod 1	Control Room's RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 1	V1B Lobby	14T34RF2	3	72	0.22	8736		1,887	14T32RF(Lo)2	52	0.16	1,363	0.90	0.05	472
Pod 1	V1B Inmate	14T34RF2	7	72	0.50	2678		1,350	14T32RF(Lo)2	52	0.36	975	0.90	0.13	337
Pod 1	P1 Men' RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 1	P1 Women' RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Hall	P1-P3 Upper hallway	14T34RF3	17	115	1.96	8736		17,079	14T32RF(Lo)3	78	1.33	11,584	0.90	0.57	4,945
Hall	P1-P3 Upper hallway	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0.00	0
	Pod 3 Lower Level												0.00		
Pod 3	Hallway H003	14T34RF2	5	72	0.36	8736		3,145	14T32RF(Lo)2	52	0.26	2,271	0.90	0.09	786
Pod 3	Exam room P3	W34CF2	1	72	0.07	2678		193	W32CF(Lo)2	52	0.05	139	0.90	0.02	48
Pod 3	Janitor P3	S34CF2	2	72	0.14	1092		157	S32CF(Lo)T)2	51	0.10	111	0.73	0.03	41
Pod 3	Storage P3	S34PF2	5	72	0.36	1092		393	S32PF(Lo)2	52	0.26	284	0.73	0.07	98
Pod 3	Commissary P3.1	14T34RF2	2	72	0.14	1092		157	14T32RF(Lo)2	52	0.10	114	0.73	0.03	39
Pod 3	Sally Port	C60R11	4	60	0.24	2678		643	C15R(CF)1	15	0.06	161	0.90	0.16	434
Pod 3	3A Day room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 3	3A Day room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 3	Upper Cellhouse 3A1-3A8	W34WF(Up/Dw)IO)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 3	Upper 3A Shower Room	W23W(CF)1	1	23	0.02	5219,214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 3	Lower Cellhouse 3A9-3A16	W34WF(Up/Dw)IO)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 3	Lower 3A Shower Room	W23W(CF)1	1	23	0.02	5219,214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 3	3B Day room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 3	3B Day room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 3	Upper Cellhouse 3B1-3B8	W34WF(Up/Dw)IO)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 3	Upper 3B Shower Room	W23W(CF)1	1	23	0.02	5219,214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 3	Lower Cellhouse 3B9-3B16	W34WF(Up/Dw)IO)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 3	Lower 3B Shower Room	W23W(CF)1	1	23	0.02	5219,214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 3	3C Day room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 3	3C Day room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 3	Upper Cellhouse 3C1-3C8	W34WF(Up/Dw)IO)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (36) Detention Center  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
Pod 3	Upper 3C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	Lower Cellhouse 3C9-3C16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Lower 3C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	3D Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0
Pod 3	3D Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	1,127
Pod 3	Upper Cellhouse 3D1-3D8	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Upper 3D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	Lower Cellhouse 3D9-3D16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Lower 3D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	3E Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0
Pod 3	3E Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	1,127
Pod 3	Upper Cellhouse 3E1-3E8	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Upper 3E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	Lower Cellhouse 3E9-3E16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Lower 3E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	3F Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	3F Day room	14B34CF2	11	72	0.79	5219.214		4,134	22B400C(MH)1	458	3.21	16,733	0.90	0
Pod 3	Upper Cellhouse 3F1-3F8	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	14B32CF(Lo)2	52	0.57	2,985	0.90	1,033
Pod 3	Upper 3F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Lower Cellhouse 3F9-3F16	W34WF(Up/Dwl/O)3	8	115	0.92	5219.214		4,802	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	Lower 3F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	940
Pod 3	Lower 3F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0
Pod 3	Courtyard	WP150W(MH)1	7	190	1.33	5109.72		6,796	WP150W(MH)1	190	1.33	6,796	0.90	0
Pod 3	Library	14B34CF2	10	72	0.72	2678		1,928	14B32CF(Lo)2	52	0.52	1,393	0.90	482
Pod 3	Control Room's Stair	14B34CF2	4	72	0.29	8736		2,516	14B32CF(Lo)2	52	0.21	1,817	0.90	629
Pod 3	FE3 Tunnel	14T34RF2	1	72	0.07	5219.214		376	14T32RF(Lo)2	52	0.05	271	0.90	94
Pod 3	FE3 Tunnel	S34CF2	3	72	0.22	5219.214		1,127	S32CF(Lo)2	52	0.16	814	0.90	282
Pod 3	FE3 Tunnel	X(g)2C(LED)1	2	6	0.01	5219.214		63	X(g)2C(LED)1	6	0.01	63	0.90	0
Pod 3	FE3 Telephone rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	20
Pod 3	FE4 Electrical Rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	20
Pod 3	FE3 Stair	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0
Pod 3	Pod3 Upper Level												0.00	
Pod 3	Inmate Visitation VS3	14B34CF2	6	72	0.43	2805		1,212	14B32CF(Lo)2	52	0.31	875	0.90	303



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Project: Arapahoe County

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 3	CV3 Lobby	14T34RF3	4	115	0.46	8736		4,019	14T32RF(Lo)3	78	0.31	2,726	0.90	0.13	1,164
Pod 3	CV3A Sergeant's Office	14T34RF2	1	72	0.07	2676		193	14T32RF(Lo)2	52	0.05	139	0.90	0.02	48
Pod 3	CV3A Sergeant's Office	W34TF1	1	43	0.04	2678		115	W32TF(Lo)1	29	0.03	78	0.90	0.01	34
Pod 3	CV3B Visitor Room	14T34RF2	1	72	0.07	2805		202	14T32RF(Lo)2	52	0.05	146	0.90	0.02	51
Pod 3	CV3B Visitor RR	14B34CF2	1	72	0.07	8736		629	14B32CF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 3	Control Room	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 3	Control Room	C60RH	8	60	0.48	8736		4,193	C15R(CF)1	15	0.12	1,048	0.90	0.32	2,831
Pod 3	Control Room's RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 3	V3B Lobby	14T34RF2	3	72	0.22	8736		1,887	14T32RF(Lo)2	52	0.16	1,363	0.90	0.05	472
Pod 3	V3B Inmate	14T34RF2	7	72	0.50	2678		1,350	14T32RF(Lo)2	52	0.36	975	0.90	0.13	337
Pod 3	P3 Men' RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 3	P3 Women RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 4	Pod 4 Lower Level												0.00		
Pod 4	P4 Sally Port	W150W11	4	150	0.60	8736		5,242	W150W11	150	0.60	5,242	0.90	0.00	0
Pod 4	P4 Library	14B34CF2	10	72	0.72	2678		1,928	14B32CF(Lo)2	52	0.52	1,393	0.90	0.18	482
Pod 4	P4 Stair Of Sally Port	14B34CF2	1	72	0.07	8736		629	14B32CF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 4	P4 Stair Of Sally Port	14T34RF2	2	72	0.14	8736		1,258	14T32RF(Lo)2	52	0.10	909	0.90	0.04	315
Pod 4	P4 Stair Of Sally Port	W34WF3	1	115	0.12	8736		1,005	W32WF(Lo)3	78	0.08	681	0.90	0.03	291
Pod 4	P4-H1 Hallway	14T34RF2	15	72	1.08	8736		9,435	14T32RF(Lo)2	52	0.78	6,814	0.90	0.27	2,359
Pod 4	P4 Storage 1	S34CF2	5	72	0.36	1092		393	S32CF(Lo)2	52	0.26	284	0.73	0.07	98
Pod 4	P4 Storage 2	14T34RF2	2	72	0.14	1092		157	14T32RF(Lo)2	52	0.10	111	0.73	0.03	41
Pod 4	P4 Exam Room	W34WF2	2	72	0.14	1092		157	W32WF(Lo)2	51	0.10	111	0.73	0.03	41
Pod 4	P4 Janitor	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 4	P4A Day Room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 4	P4A Day Room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 4	Upper P4A Cell 4A1-4A8	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4A Shower	W23W(CF)1	2	23	0.05	5219.214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0
Pod 4	Lower P4A Cell 4A9-4A16	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 4	P4B Day Room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 4	P4B Day Room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 4	Upper P4B Cell 4B1-4B8	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4B Shower	W23W(CF)1	2	23	0.05	5219.214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0

Project: **Arapahoe County**  
Building: **(36) Detention Center**

Job No. **DWCES30219**

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 4	Lower P4B Cell 4B9-4B16	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	P4C Day Room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 4	P4C Day Room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 4	Upper P4C Cell 4C1-4C8	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4C Shower	W23W(CF)1	2	23	0.05	5219,214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0
Pod 4	Lower P4C Cell 4C9-4C16	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	P4D Day Room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 4	P4D Day Room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 4	Upper P4D Cell 4D1-4D8	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4D Shower	W23W(CF)1	2	23	0.05	5219,214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0
Pod 4	Lower P4D Cell 4D9-4D16	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	P4E Day Room	22B400C(MH)1	7	458	3.21	5219,214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 4	P4E Day Room	14B34CF2	12	72	0.86	5219,214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 4	Upper P4E Cell 4E1-4E8	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4E Shower	W23W(CF)1	2	23	0.05	5219,214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0
Pod 4	Lower P4E Cell 4E9-4E16	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	P4F Day Room	22B400C(MH)1	7	458	3.21	5219,214		16,733	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.00	0
Pod 4	P4F Day Room	14B34CF2	12	72	0.86	5219,214		4,509	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper P4F Cell 4F1-4F8	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Upper and Lower P4F Shower	W23W(CF)1	2	23	0.05	5219,214		240	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.00	0
Pod 4	Lower P4F Cell 4F9-4F16	W34WF(Up/Dwl/O)3	8	115	0.92	5219,214		4,802	W32WF(Up/Dwl/O)3	90	0.72	3,758	0.90	0.18	940
Pod 4	Pod 4 Court Yard	WP150W(MH)1	7	190	1.33	5219,214		6,942	WP150W(MH)1	190	1.33	6,942	0.90	0.00	0
Pod 4	FE4 Tunnel	14T34RF2	1	72	0.07	5219,214		376	14T32RF(Lo)2	52	0.05	271	0.90	0.02	94
Pod 4	FE4 Tunnel	S34CF2	3	72	0.22	5219,214		1,127	S32CF(Lo)2	52	0.16	814	0.90	0.05	282
Pod 4	FE4 Tunnel	X(g)2C(LED)1	2	6	0.01	5219,214		63	X(g)2C(LED)1	6	0.01	63	0.90	0.00	0
Pod 4	FE4 Telephone rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 4	FE4 Electrical Rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 4	FE4 Stair	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
Pod 4	Pod 4 Upper Level												0.00		
Pod 4	VF04 Stair	W34CF2	2	72	0.14	8736		1,258	W32CF(Lo)2	52	0.10	909	0.90	0.04	315
Pod 4	Visitation V1B	14T34RF2	4	72	0.29	2805		808	14T32RF(Lo)2	52	0.21	583	0.90	0.07	202
Pod 4	CV4A Sergeant's Office	14T34RF2	1	72	0.07	2878		193	14T32RF(Lo)2	52	0.05	139	0.90	0.02	48

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 4	CV4B Interview Room	14T34RF2	1	72	0.07	364		26	14T32RF(Lo)2	52	0.05	19	0.24	0.00	7
Pod 4	CV4C Restroom	14B34CF2	1	72	0.07	8736		629	14B32CF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 4	VS4 Visitation	14B34CF2	6	72	0.43	2805		1,212	14B32CF(Lo)2	52	0.31	875	0.90	0.11	303
Pod 4	PS4 Visitation	14T34RF2	6	72	0.43	2805		1,212	14T32RF(Lo)2	52	0.31	875	0.90	0.11	303
Pod 4	Control Room	C60R11	8	60	0.48	8736		4,193	C15R(CF)1	15	0.12	1,048	0.90	0.32	2,831
Pod 4	Control Room	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 4	Control Room RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 4	Visitor Men's RR	14T34RF2	1	72	0.07	2805		202	14T32RF(Lo)2	52	0.05	146	0.90	0.02	51
Pod 4	Visitor Women's RR	14T34RF2	1	72	0.07	2805		202	14T32RF(Lo)2	52	0.05	146	0.90	0.02	51
Pod 6	Pod 6 Lower Level												0.00		
Pod 6	Hallway H001	14T34RF2	5	72	0.36	8736		3,145	14T32RF(Lo)2	52	0.26	2,271	0.90	0.09	786
Pod 6	Exam room P6	W34CF2	1	72	0.07	2678		193	W32CF(Lo)2	52	0.05	139	0.90	0.02	48
Pod 6	Janitor P6	S34CF2	2	72	0.14	1092		157	S32CF(Lo)TJ2	51	0.10	111	0.73	0.03	41
Pod 6	Storage P6	S34PF2	5	72	0.36	1092		393	S32PF(Lo)2	52	0.26	284	0.73	0.07	98
Pod 6	Commissary P1.1	14T34RF2	2	72	0.14	2678		386	14T32RF(Lo)2	52	0.10	279	0.90	0.04	96
Pod 6	Sally Port	C60R11	4	60	0.24	2678		643	C15R(CF)1	15	0.06	161	0.90	0.16	434
Pod 6	6A Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6A Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 6	Upper Cellhouse 6A1-6A8	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6A Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Lower Cellhouse 6A9-6A16	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 6A Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	6B Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6B Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 6	Upper Cellhouse 6B1-6B8	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6B Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Lower Cellhouse 6B9-6B16	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 6B Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	6C Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6C Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 6	Upper Cellhouse 6C1-6C8	W34WF(Up/Dw)IO)3	8	115	0.92	5219.214		4,802	W32WF(Up/Dw)IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 6	Lower Cellhouse 6C9-6C16	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 6C Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	6D Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6D Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 6	Upper Cellhouse 6D1-6D8	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Lower Cellhouse 6D9-6D16	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 1D Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	6E Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6E Day room	14B34CF2	12	72	0.86	5219.214		4,509	14B32CF(Lo)2	52	0.62	3,257	0.90	0.22	1,127
Pod 6	Upper Cellhouse 6E1-6E8	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Lower Cellhouse 6E9-6E16	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 6E Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	6F Day room	22B400C(MH)1	7	458	3.21	5219.214		16,733	22B400C(MH)1	458	3.21	16,733	0.90	0.00	0
Pod 6	6F Day room	14B34CF2	11	72	0.79	5219.214		4,134	14B32CF(Lo)2	52	0.57	2,985	0.90	0.20	1,033
Pod 6	Upper Cellhouse 6F1-6F8	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Upper 6F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Lower Cellhouse 6F9-6F16	W34WFF(Up/Dw/IO)3	8	115	0.92	5219.214		4,802	W32WFF(Up/Dw/IO)3	90	0.72	3,758	0.90	0.18	940
Pod 6	Lower 6F Shower Room	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Pod 6	Courtyard P6	WP150W(MH)1	7	190	1.33	5109.72		6,796	WP150W(MH)1	190	1.33	6,796	0.90	0.00	0
Pod 6	Library	14B34CF2	10	72	0.72	2878		1,928	14B32CF(Lo)2	52	0.52	1,393	0.90	0.18	482
Pod 6	Control Room's Stair	14B34CF2	4	72	0.29	8736		2,516	14B32CF(Lo)2	52	0.21	1,817	0.90	0.07	629
Pod 6	FE6 Tunnel	14T34RF2	1	72	0.07	5219.214		376	14T32RF(Lo)2	52	0.05	271	0.90	0.02	94
Pod 6	FE6 Tunnel	S34CF2	3	72	0.22	5219.214		1,127	S32CF(Lo)2	52	0.16	814	0.90	0.05	282
Pod 6	FE6 Tunnel	X(g)2C(LED)1	2	6	0.01	5219.214		63	X(g)2C(LED)1	6	0.01	63	0.90	0.00	0
Pod 6	FE6 Telephone rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 6	FE6 Electrical Rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Pod 6	FE6 Stair	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
Hall	P4-P6 Lower Hallway	14T34RF3	17	115	1.96	8736		17,079	14T32RF(Lo)3	78	1.33	11,584	0.90	0.57	4,945
Hall	P4-P6 Lower Hallway	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
Pod 6	Pod 6 Upper Level												0.00		

hrs. The demand savings are not fully claimed.

Job No. DWGES30219

Project: Arapahoe County

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Pod 6	Inmate Visitation VS6	14B34CF2	6	72	0.43	2805		1,212	14B32CF(Lo)2	52	0.31	875	0.90	0.11	303
Pod 6	CV6 Lobby	14T34RF3	4	115	0.46	8736		4,019	14T32RF(Lo)3	78	0.31	2,726	0.90	0.13	1,164
Pod 6	CV6A Sergeant's Office	14T34RF2	1	72	0.07	2678		193	14T32RF(Lo)2	52	0.05	139	0.90	0.02	48
Pod 6	CV6A Sergeant's Office	W34TF1	1	43	0.04	2678		115	W32TF(Lo)1	29	0.03	78	0.90	0.01	34
Pod 6	CV6B Visitor Room	14T34RF2	1	72	0.07	2805		202	14T32RF(Lo)2	52	0.05	146	0.90	0.02	51
Pod 6	CV6C Visitor RR	14B34CF2	1	72	0.07	8736		629	14B32CF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 6	Control Room	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 6	Control Room	C60RH	8	60	0.48	8736		4,193	C15R(CF)1	15	0.12	1,048	0.90	0.32	2,831
Pod 6	Control Room's RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 6	V6B Lobby	14T34RF2	3	72	0.22	8736		1,887	14T32RF(Lo)2	52	0.16	1,363	0.90	0.05	472
Pod 6	V6B Inmate	14T34RF2	7	72	0.50	2678		1,350	14T32RF(Lo)2	52	0.36	975	0.90	0.13	337
Pod 6	P6 Men' RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Pod 6	P6 Women RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Hall	P4-P6 Upper hallway	14T34RF3	17	115	1.96	8736		17,079	14T32RF(Lo)3	78	1.33	11,584	0.90	0.57	4,945
Hall	P4-P6 Upper hallway	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0.00	0
Tunnel	T2 Tunnel	W34WF2	19	72	1.37	8736		11,951	W32WF(Lo)2	52	0.99	8,631	0.90	0.34	2,988
Tunnel	T2 Tunnel	X(g)2C(LED)1	3	6	0.02	8736		157	X(g)2C(LED)1	6	0.02	157	0.90	0.00	0
Tunnel	T2 Tunnel	C150R(MH)1	5	190	0.35	8736		8,299	C18R(CF)2	36	0.18	1,572	0.90	0.69	6,054
Upper	Upper Level												0.00		
Upper	Main (Hall)Street	14T34RF3	28	115	3.22	8736		28,130	14T32RF(Lo)3	78	2.18	19,079	0.90	0.93	8,145
Upper	Main (Hall)Street	W34CF2	1	72	0.07	8736		629	W32CF(Lo)2	52	0.05	454	0.90	0.02	157
	Main Lobby Double Door-Vestibule	C150R(MH)1	3	190	0.57	8736		4,980	C18R(CF)2	36	0.11	943	0.90	0.42	3,632
100	Main Entrance Lobby	C150R(MH)1	8	190	1.52	2678		4,071	22T1TRF(R)2	33	0.26	707	0.90	1.13	3,027
100	Main Entrance Lobby	24T34RF3	1	115	0.12	8736		1,005	24T32RF(R)2	59	0.06	515	0.90	0.05	440
100.1	Main Entrance Lobby RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)T)2	51	0.05	446	0.90	0.02	165
100.2	Women's RR	14T34RF2	2	72	0.14	8736		1,258	14T32RF(Lo)T)2	51	0.10	891	0.90	0.04	330
100.3	Men's RR	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)T)2	51	0.05	446	0.90	0.02	165
100A	Elevator Lobby	24T34RF4	3	144	0.43	8736		3,774	24T32RF(R)2	59	0.18	1,546	0.90	0.23	2,005
100B	Visitor Locker Rm	C13R(CF)1	2	13	0.03	2805		73	C13R(CF)1	13	0.03	73	0.90	0.00	0
100B	Visitor Locker Rm	24T34RF4	2	144	0.29	2805		808	24T32RF(R)2	59	0.12	331	0.90	0.15	429
101	Administration Office	24T34RF4	12	144	1.73	2678		4,628	24T32RF(R)2	59	0.71	1,896	0.90	0.92	2,458
101.1	Office	24T34RF3	4	115	0.46	2678		1,232	24T32RF(R)2	59	0.24	632	0.90	0.20	540

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(36) Detention Center**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
101.2 Office		24T34RF3	4	115	0.46	2678		1,232	24T32RF(R)2	59	0.24	632	0.90	0.20	540
101.3 Office		24T34RF3	3	115	0.35	2678		924	24T32RF(R)2	59	0.18	474	0.90	0.15	405
101.4 Office		24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
101.5 Conference room		24T34RF3	4	115	0.46	354		167	24T32RF(R)2	59	0.24	86	0.24	0.05	73
101.6 Open Office		24T34RF4	16	144	2.30	2678		6,170	24T32RF(R)2	59	0.84	2,528	0.90	1.22	3,278
101.6A Office		24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
101.6B Office		24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
101.6C Office		24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
101.6D Storage		S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
101.6E Women's RR		W34CF2	1	72	0.07	8736		629	W32CF(Lo)2	52	0.05	454	0.90	0.02	157
101.6F Men's RR		W34CF2	1	72	0.07	8736		629	W32CF(Lo)2	52	0.05	454	0.90	0.02	157
101.6G Work Room		24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
2049 Computer Room		W34CF4	4	144	0.58	2678		1,543	W32CF(Lo)4	102	0.41	1,093	0.90	0.15	405
2050 Computer Room		S34CF2	2	72	0.14	2678		386	S32CF(Lo)2	52	0.10	279	0.90	0.04	96
101.6H Office		W34CF4	6	144	0.86	2678		2,314	W32CF(Lo)4	102	0.61	1,539	0.90	0.23	607
CCH Central Control Hall		W34CF4	2	144	0.29	8736		2,516	W32CF(Lo)4	102	0.20	1,792	0.90	0.08	660
CCH Central Control Hall		14B34CF2	1	72	0.07	8736		629	14B32CF(Lo)2	52	0.05	454	0.90	0.02	157
CC-1 Central Control Office		24T34RF4	4	144	0.58	8736		5,032	24T32RF(R)2	59	0.24	2,062	0.90	0.31	2,673
CC-1 Central Control Office		C13R(CF)1	1	13	0.01	8736		114	C13R(CF)1	13	0.01	114	0.90	0.00	0
102 Briefing Room		R60W12	2	120	0.24	2678		643	D13W(CF)2	26	0.05	139	0.90	0.17	453
102 Briefing Room		24T34RF4	4	144	0.59	8736		5,032	24T32RF(R)2	56	0.22	1,957	0.90	0.32	2,768
103 Office		14T34RF2	2	72	0.14	2678		386	14T32RF(Lo)2	52	0.10	279	0.90	0.04	96
2010 Audio Visual		14T34RF2	2	72	0.14	2678		386	14T32RF(Lo)2	52	0.10	279	0.90	0.04	96
H103 Hallway H103		14T34RF2	5	72	0.36	8736		3,145	14T32RF(Lo)2	52	0.26	2,271	0.90	0.09	786
H103 Hallway H103		C13R(CF)1	1	13	0.01	8736		114	C13R(CF)1	13	0.01	114	0.90	0.00	0
2022 Activity Room		24T34RF4	6	144	0.86	2678		2,314	24T32RF(R)2	59	0.35	948	0.90	0.46	1,229
103.1 Storage		14T34RF2	1	72	0.07	1092		79	14T32RF(Lo)2	52	0.05	57	0.73	0.01	20
2028 Women's Locker Rm		22T34RF(u)2	10	72	0.72	2678		1,928	22T17RF(R)2	33	0.33	884	0.90	0.35	940
2028 Women's Shower Rm		W18C(CF)1	4	18	0.07	1092		79	W18C(CF)1	18	0.07	79	0.73	0.00	0
2023 Men's Locker Rm		24T34RF4	6	144	0.86	2678		2,314	24T32RF(R)2	59	0.35	948	0.90	0.46	1,229
2023 Men's Locker Rm		22T34RF(u)2	15	72	1.08	2678		2,892	22T17RF(R)2	33	0.50	1,326	0.90	0.53	1,410
2023 Men's Shower Rm		C60R11	4	60	0.24	2678		643	C15R(CF)1	15	0.06	161	0.90	0.16	434

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
2021	Classroom	24T34RF(Lou)4	12	144	1.73	2678		4,628	24T32RF(Lou)2	59	0.71	1,896	0.90	0.92	2,458
2021	Classroom	X(g)20C12	1	40	0.34	8759.52		350	X(g)20C(LED)1	6	0.01	53	0.90	0.03	268
2009	Electrical Rm	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
	Lower Level												0.00		
1071	Boiler Room	I34PF2	20	72	1.44	1092		1,572	I32PF(Lo)2	52	1.04	1,136	0.73	0.26	393
	Sally Port Garage	18W110CF(Vt)2	4	207	0.83	2678		2,217	18W32CF(Vt)4	112	0.45	1,200	0.90	0.34	916
	Sally Port Garage	W34CF2	1	72	0.07	2678		193	W32CF(Lo)2	52	0.05	139	0.90	0.02	48
1001	Storage	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	0.01	20
1002	Storage	S34CF2	2	72	0.14	1092		157	S32CF(Lo)2	51	0.10	111	0.73	0.03	41
1003	Storage	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	0.01	20
K3	Can Food Storage	W34CF2	7	72	0.50	1092		550	W32CF(Lo)2	52	0.36	397	0.73	0.09	138
K3A	Can Food Storage	S34CF(Tg)2	1	72	0.07	1092		79	W32CF(Lo)2	52	0.05	57	0.73	0.01	20
K4	Serving/ Kitchen Area	24T34RF4	51	144	7.34	2678		19,667	24T32RF(R)2	59	3.01	8,058	0.90	3.90	10,448
K4	Kitchen Hood	14T34RF2	10	72	0.72	2678		1,928	14T32RF(Lo)2	52	0.52	1,393	0.90	0.18	482
K5	Dock Area	WP100W(HPS)1	2	138	0.28	5219.214		1,441	WP100W(HPS)1	138	0.28	1,441	0.90	0.00	0
K6	Dishwasher	24T34RF4	5	144	0.72	2678		1,928	24T32RF(R)2	59	0.30	790	0.90	0.38	1,024
K7	Kitchen's Office	24T34RF4	2	144	0.29	3759.294		1,083	24T32RF(R)2	59	0.12	444	0.90	0.15	575
K7A	Office's Storage 1321	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	0.01	20
K7B	Restroom	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
K7C	Restroom	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
K7D	Office	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
K8	Laundry Room	24T34RF4	4	144	0.58	5219.214		3,006	24T32RF(R)2	56	0.22	1,169	0.90	0.32	1,653
K8	Laundry Room	24T34RF4	13	144	1.87	5219.214		9,770	24T32RF(R)2	59	0.77	4,003	0.90	0.99	5,191
K8A	Electrical Room	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
K8B	Storage	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
K8C	Restroom	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
K8D	Supervisor Office 1309	24T34RF3	2	115	0.23	2679		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
K9	Hallway K9	14T34RF2	4	72	0.29	8736		2,516	14T32RF(Lo)2	52	0.21	1,817	0.90	0.07	629
K9	Hallway K9	X(g)20C(LED)1	1	6	0.01	8736		52	X(g)20C(LED)1	6	0.01	52	0.90	0.00	0
K9A	Double Doors	14T34RF2	2	72	0.14	8736		1,258	14T32RF(Lo)2	52	0.10	909	0.90	0.04	315
H5	Inpatient Office #1	24T34RF2	2	72	0.14	2678		386	24T32RF(Lo)2	52	0.10	279	0.90	0.04	96
H5	Hallway HM2	14T34RF2	3	72	0.22	8736		1,887	14T32RF(Lo)2	52	0.16	1,363	0.90	0.05	472

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**  
Building: **(36) Detention Center**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Inpatient	Office #2	24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
Inpatient	Office #3	24T34RF3	1	115	0.12	2678		308	24T32RF(R)2	59	0.06	158	0.90	0.05	135
Inpatient	Office #4	24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
Inpatient	Office #5	24T34RF3	2	115	0.23	2678		616	24T32RF(R)2	59	0.12	316	0.90	0.10	270
Inpatient	Office #6	24T34RF2	3	72	0.22	2678		578	24T32RF(Lo)2	52	0.16	418	0.90	0.05	145
Inpatient	Hall H5.1	14T34RF2	4	72	0.29	2678		771	14T32RF(Lo)2	52	0.21	557	0.90	0.07	193
Inpatient	Nurse Station 1227	24T34RF3	5	115	0.58	2678		1,540	24T32RF(R)2	59	0.30	790	0.90	0.25	675
Inpatient	Clean Linen 1228	14T34RF2	2	72	0.14	5219.214		752	14T32RF(Lo)2	52	0.10	543	0.90	0.04	188
Inpatient	Storage 1228A	14T34RF2	1	72	0.07	1092		79	14T32RF(Lo)2	52	0.05	57	0.73	0.01	20
Inpatient	Nurse's RR 1228B	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Inpatient	Pharmacy 1228C	14T34RF2	2	72	0.14	2678		386	14T32RF(Lo)2	52	0.10	279	0.90	0.04	96
Inpatient	Janitor 1243	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	0.01	20
Inpatient	Electrical 1242	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	0.01	20
Inpatient	BC Inpatient	14T34RF3	6	115	0.69	2678		1,848	14T32RF(Lo)3	78	0.47	1,253	0.90	0.20	535
Inpatient	2 Shower Room	W23W(CF)1	2	23	0.05	5219.214		240	W23W(CF)1	23	0.05	240	0.90	0.00	0
Inpatient	BC.1 Restroom	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Inpatient	BC.2 Storage	14T34RF2	1	72	0.07	1092		79	14T32RF(Lo)2	52	0.05	57	0.73	0.01	20
Inpatient	Holding Cell BC1-BC8	W34WF(Up/Dw)(O)3	8	115	0.92	8736		8,037	W32WF(Up/Dw)(O)3	90	0.72	6,250	0.90	0.18	1,573
Inpatient	Hallway M7	14T34RF2	2	72	0.14	8736		1,258	14T32RF(Lo)2	52	0.10	909	0.90	0.04	315
Inpatient	Holding Cell MC1-MC12	W34WF(Up/Dw)(O)3	12	115	1.38	8736		12,056	W32WF(Up/Dw)(O)3	90	1.08	9,435	0.90	0.27	2,359
Inpatient	Three Shower Rm	W18C(CF)1	3	18	0.05	5219.214		282	W18C(CF)1	18	0.05	282	0.90	0.00	0
Inpatient	MC Hallway	14T34RF2	9	72	0.65	8736		5,661	14T32RF(Lo)2	52	0.47	4,088	0.90	0.16	1,415
Inpatient	Exam Room MC.2	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
Inpatient	Restroom MC.3	J60WI1	1	60	0.06	4368		262	J15W(CF)1	15	0.02	66	0.90	0.04	177
Inpatient	Oxygen Storage MC.4	14T34RF2	1	72	0.07	1092		79	14T32RF(Lo)2	52	0.05	57	0.73	0.01	20
Inpatient	Shower Room MC.1	24T34RF3	1	115	0.12	5219.214		600	24T32RF(R)2	59	0.06	308	0.90	0.05	263
Outpatient	Hallway	24T34RF3	6	115	0.69	8736		6,028	24T32RF(R)2	59	0.35	3,093	0.90	0.30	2,642
Outpatient	Hallway	14T34RF3	1	115	0.12	8736		1,005	14T32RF(Lo)3	78	0.08	681	0.90	0.03	291
Outpatient	Lab 1091	24T34RF4	4	144	0.58	2678		1,543	24T32RF(R)2	56	0.22	600	0.90	0.32	848
Outpatient	Restroom 1090	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
Outpatient	Nurse Station 1202	S34CF2	1	72	0.07	2678		193	S32CF(Lo)2	52	0.05	139	0.90	0.02	48
Outpatient	Nurse Station 1202	24T34RF4	4	144	0.58	2678		1,543	24T32RF(R)2	59	0.24	632	0.90	0.31	820



hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (36) Detention Center

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
Outpatient	Women RR 1202A	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.30	0.02	157
Outpatient	Office 1099	24T34RF3	3	115	0.35	2678		924	24T32RF(R)2	59	0.18	474	0.30	0.15	405
Outpatient	Restroom 1099A	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.30	0.02	157
Outpatient	Dental 1098	24T34RF4	2	144	0.29	2678		771	24T32RF(R)T)2	56	0.11	300	0.30	0.16	424
Outpatient	Office 1095	24T34RF4	2	144	0.29	2678		771	24T32RF(R)T)2	56	0.11	300	0.30	0.16	424
Outpatient	Treatment 1094	24T34RF4	4	144	0.58	2678		1,543	24T32RF(R)T)2	56	0.22	600	0.30	0.32	848
Outpatient	Treatment 1094	24T34RF4	3	144	0.43	2678		1,157	24T32RF(R)2	59	0.18	474	0.30	0.23	615
Outpatient	X-ray 1093	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.30	0.15	410
Outpatient	File Room 1092	24T34RF4	3	144	0.43	1092		472	24T32RF(R)2	59	0.18	193	0.73	0.17	251
Outpatient	File Room 1092	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
Outpatient	Waiting Room 1091	S34CF2	1	72	0.07	2678		193	S32CF(Lo)2	52	0.05	139	0.30	0.02	48
Outpatient	Waiting Room 1091A	W34CF2	1	72	0.07	2678		193	W32CF(Lo)2	52	0.05	139	0.90	0.02	48
CL Area	Crew Leader Area	14T34RF3	5	115	0.58	2678		1,540	14T32RF(Lo)3	78	0.39	1,044	0.90	0.17	446
CL Area	Office CL1	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
CL Area	Office CL2	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
CL Area	Office CL3	24T34RF4	2	144	0.29	2678		771	24T32RF(R)2	59	0.12	316	0.90	0.15	410
CL Area	Restroom CL3A	14T34RF2	1	72	0.07	8736		629	14T32RF(Lo)2	52	0.05	454	0.90	0.02	157
CL Area	1213 Storage CL4	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	0.01	20
CL Area	1213 Storage CL4	I34PF2	1	72	0.07	1092		79	I32PF(Lo)2	52	0.05	57	0.73	0.01	20
CL Area	Electrical CL4A	I34PF2	6	72	0.43	1092		472	I32PF(Lo)2	52	0.31	341	0.73	0.08	118
CL Area	Stair CL4B	X(g)2C(LED)1	1	6	0.01	8736		52	X(g)2C(LED)1	6	0.01	52	0.90	0.00	0
CL Area	Stair CL4B	W34WF2	1	72	0.07	8736		629	W32WF(Lo)2	52	0.05	454	0.90	0.02	157
CL Area	Shower Room CL5	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
CL Area	Shower Room CL6	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
CL Area	Shower Room CL7	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
CL Area	Shower Room CL8	W23W(CF)1	1	23	0.02	5219.214		120	W23W(CF)1	23	0.02	120	0.90	0.00	0
Property	Property Room 1043A	S34CF2	2	72	0.14	2678		386	S32CF(Lo)2	52	0.10	279	0.90	0.04	96
Property	Property Room 1043	S34CF2	2	72	0.14	2678		386	S32CF(Lo)T)2	51	0.10	273	0.90	0.04	101
Property	Property Room 1043	S34CF2	18	72	1.30	2678		3,471	S32CF(Lo)2	52	0.94	2,507	0.90	0.32	868
Intake	Holding Cell Hall HC1-5	14T34RF2	6	72	0.43	8736		3,774	14T32RF(Lo)2	52	0.31	2,726	0.90	0.11	944
Intake	Holding Cell HC1-HC5	W34WF(Up/Dw)IO)3	6	115	0.69	8736		6,028	W32WF(Up/Dw)IO)3	90	0.54	4,717	0.90	0.14	1,179
Intake	Holding Cell HC1-HC5	14B34CF2	3	72	0.22	8736		1,887	14B32CF(Lo)2	52	0.16	1,363	0.90	0.05	472

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
Court	Basement Lobby	C60R11	1	60	0.06	2678		161	C15R(CF)1	15	0.02	40	0.90	109
Court	Electrical 1037	S34CF2	2	72	0.14	1092		157	S32CF(LoT)2	51	0.10	111	0.73	41
Court	Control Room 1037A	S34CF2	2	72	0.14	8736		1,258	S32CF(LoT)2	51	0.10	891	0.90	330
Court	Holding Cell CH1	14B34CF2	3	72	0.22	8736		1,887	14B32CF(Lo)2	52	0.16	1,363	0.90	472
Court	Holding Cell CH2	W34CF2	3	72	0.22	8736		1,887	W32CF(Lo)2	52	0.16	1,363	0.90	472
Court	Holding Cell CH3	W34CF2	3	72	0.22	8736		1,887	W32CF(Lo)2	52	0.16	1,363	0.90	472
Court	Hallway CH4	14T34RF2	7	72	0.50	8736		4,403	14T32RF(Lo)2	52	0.36	3,180	0.90	1,101
Court	Hallway CH4	X(g)20C12	1	40	0.04	8759.52		350	X(g)2C(LED)1	6	0.01	53	0.90	268
Court	Elevator Room 1036	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	20
Court	Electrical Room 1037	S34PF2	1	72	0.07	1092		79	S32PF(Lo)2	52	0.05	57	0.73	20
Court Sev.	Court Services Area	24T34RF4	8	144	1.15	8736		10,064	24T32RF(R)2	59	0.47	4,123	0.90	5,346
Court Sev.	Office #1	24T34RF4	1	144	0.14	2678		366	24T32RF(R)2	59	0.06	158	0.90	205
Court Sev.	Office #2	24T34RF4	1	144	0.14	2678		366	24T32RF(R)2	59	0.06	158	0.90	205
Court Sev.	Office #2	W34TF1	1	43	0.04	2678		115	W32TF(Lo)1	29	0.03	78	0.90	34
Court Sev.	Office #3	24T34RF4	4	144	0.58	2678		1,543	24T32RF(R)2	59	0.24	632	0.90	820
Court Sev.	Restroom #4	W34WF2	2	72	0.14	8736		1,258	W32WF(Lo)2	52	0.10	909	0.90	315
Court Sev.	Lower Main Library 1061	24T34RF4	9	144	1.30	2678		3,471	24T32RF(R)2	59	0.53	1,422	0.90	1,844
Lower	Lower Main (Hall)Street	14T34RF3	28	115	3.22	8736		28,130	14T32RF(Lo)3	78	2.18	19,079	0.90	8,145
Lower	Lower Main (Hall)Street	W34CF2	1	72	0.07	8736		629	W32CF(Lo)2	52	0.05	454	0.90	157
	Upper Armory AR1	J60W11	3	60	0.18	2678		482	J15W(CF)1	15	0.05	121	0.90	325
	Janitor Of Main Hall	S34CF2	1	72	0.07	1092		79	S32CF(Lo)2	52	0.05	57	0.73	20
Exterior	Outside light	WP250W(HPS)1	20	295	5.90	5109.72		30,147	WP250W(HPS)1	295	5.90	30,147	0.90	0
Exterior	Outside light	SP250W(HPS)1	14	295	4.13	5109.72		21,103	SP250W(HPS)1	295	4.13	21,103	0.90	0
Exterior	Employee Parking Lot	Q400Po(HPS)2	24	930	22.32	5109.72		114,049	Q400Po(HPS)2	930	22.32	114,049	0.90	0
Exterior	Employee Parking Lot	Q400Po(HPS)1	4	465	1.86	5109.72		9,504	Q400Po(HPS)1	465	1.86	9,504	0.90	0
Exterior	Visitors' Parking Lot	Q400Po(HPS)2	28	930	26.04	5109.72		133,057	Q400Po(HPS)2	930	26.04	133,057	0.90	0
Exterior	Visitors' Parking Lot	Q400Po(HPS)1	4	465	1.86	5109.72		9,504	Q400Po(HPS)1	465	1.86	9,504	0.90	0
Total kWh: 2,134,311.13									Total kW: 410.02				571.44	277,890
Total kWh: 2,134,311.13									Total kW: 347.89				55.13	277,890

**NOTE:** If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: **Arapahoe County** Job No. **DWCES30219**

Building: **(37) Administrative II**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
300	3rd Floor Mech. Rm	S34WF2	4	78	0.31	250		78	S32WF(L0)2	52	0.21	52	0.17	0.02	23
301	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(L0)2	52	0.05	13	0.17	0.00	6
302	N. Stairway	14B34CF2	2	78	0.16	4250		663	14B32CF(L0)2	52	0.10	442	0.90	0.05	199
303	(Locked) Closet	Locked							0		0.00		0.00	0.00	
304	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L0)2	52	0.10	237	0.90	0.12	472
304	Office	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
305	File Rm.	22T34RF(U)2	1	78	0.08	500		39	22T17RF(R)2	32	0.03	16	0.33	0.01	21
305	File Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(L0)2	52	0.10	36	0.33	0.04	73
H306	Corridor	22T34RF(U)2	6	78	0.47	4250		1,989	22T17RF(R)2	32	0.19	816	0.90	0.25	1,056
H306	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
307	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
308	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
309	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L0)2	52	0.10	237	0.90	0.12	472
310	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L0)2	52	0.10	237	0.90	0.12	472
311	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
312	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
313	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
314	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
315	Office	24T34RF3	3	117	0.27	3250	2	887	24T32RF(L0)2	52	0.16	355	0.90	0.11	479
316	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L0)2	52	0.16	355	0.90	0.18	707
337	Copy Rm.	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.08	208	0.90	0.08	269
337	Copy Rm.	24T34RF3	1	117	0.12	3250		380	24T32RF(L0)2	52	0.05	118	0.90	0.06	236
H317	Corridor	22T34RF(U)2	13	78	0.94	4250	2	3,978	22T17RF(R)2	32	0.42	1,768	0.90	0.47	1,989
H317	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
318	Open Office	24T34RF3	5	117	0.59	3250		1,901	24T32RF(L0)2	52	0.26	592	0.90	0.29	1,179
H320	Corridor	24T34RF3	2	117	0.23	4250		995	24T32RF(L0)2	52	0.10	309	0.90	0.12	617
319	File Rm.	14T34RF2	17	78	1.33	500		663	14T32RF(L0)2	52	0.88	442	0.33	0.13	199
319	File Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(R/T)2	58	0.12	41	0.33	0.04	69
321	Storage	24T34RF3	1	117	0.12	500		59	24T32RF(L0)2	52	0.05	18	0.33	0.02	36
322	Conference Rm.	24T34RF3	6	117	0.59	250	3	146	24T32RF(L0)2	52	0.31	55	0.17	0.04	83
306A	Office	24T34RF3	2	117	0.20	3250	1	634	24T32RF(L0)2	52	0.10	237	0.90	0.08	357

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (37) Administrative II  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (KW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (KWh)	RETOFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (KW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
323	Open Office	24T34RF3	7	117	0.82	3250		2,662	24T32RF(Lo)2	52	0.36	828	0.90	0.41	1,650
323	Open Office	14T34RF2	9	78	0.70	3250		2,282	14T32RF(Lo)2	52	0.47	1,521	0.90	0.21	685
H324	Corridor	22T34RF(U)2	15	78	1.17	4250		4,973	22T17RF(R)2	32	0.48	2,040	0.90	0.62	2,639
H324	Corridor	X(rgb)6C14	2	24	0.05	8759.52		420	X(rgb)2C(LED)1	2	0.00	35	0.90	0.04	347
325	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
325	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
326	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
326	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
327	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
327	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
328	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
328	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
329	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
329	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
330	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
330	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
331	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
331	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
332	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
333	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
334	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
335	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
H336	Corridor	22T34RF(U)2	7	78	0.55	4250		2,321	22T17RF(R)2	32	0.22	952	0.90	0.29	1,232
H336	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(rgb)2C(LED)1	2	0.00	18	0.90	0.00	0
H336	Corridor	X(rgb)6C14	1	24	0.02	8759.52		210	X(rgb)2C(LED)1	2	0.00	18	0.90	0.02	173
H338	Corridor	22T34RF(U)2	4	78	0.31	4250		1,326	22T17RF(R)2	32	0.13	544	0.90	0.17	704
H338	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(rgb)2C(LED)1	2	0.00	18	0.90	0.00	0
H338	Corridor	X(rgb)6C14	1	24	0.02	8759.52		210	X(rgb)2C(LED)1	2	0.00	18	0.90	0.02	173
339	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(Lo)2	52	0.16	365	0.90	0.18	707
340	Conference Rm.	24T34RF3	2	117	0.23	250		59	24T32RF(R/T)2	58	0.12	20	0.17	0.02	34
341	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
342	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
343	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
344	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
345	Open Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(Lo)2	52	0.21	473	0.90	0.23	943
345	Open Office	22T34RF(U)2	5	78	0.39	3250		1,268	22T17RF(R)2	32	0.16	520	0.90	0.21	673
345	Open Office	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
346	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
346	Men's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76
346	Men's Restroom	14T34RF2	3	78	0.23	3250		761	14T32RF(Lo)2	52	0.16	507	0.90	0.07	228
346	Men's Restroom	S34CF2	4	78	0.31	3250		1,014	S32CF(Lo)2	52	0.21	676	0.90	0.09	304
346	Men's Restroom	C60R11	4	60	0.18	3250	1	585	C16R(CF)1	15	0.06	195	0.90	0.11	351
347	Exercise Rm.	24T34RF3	5	117	0.51	3250	2	1,648	24T32RF(Lo)2	52	0.26	592	0.90	0.22	951
348	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
348	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
349	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
350	Office	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.06	208	0.90	0.08	269
350	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
351	Reception Area	C13R(CF)2	14	30	0.42	3250		1,365	C13R(CF)2	30	0.42	1,365	0.90	0.00	0
351	Reception Area	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
351	Reception Area	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.06	208	0.90	0.08	269
352	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
353	Elevator Lobby	C150R(MH)1	3	150	0.45	4250		1,913	C18R(CF)2	42	0.13	536	0.90	0.29	1,239
353	Elevator Lobby	C13R(CF)2	7	30	0.21	4250		893	C13R(CF)2	30	0.21	893	0.90	0.00	0
353	Elevator Lobby	X(r)b)20C12				8759.52			X(g)2C(LED)1		0.00	0	0.90	0.00	
354	Men's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
354	Men's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
354	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
354	Men's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76
355	Jan. Closet	S34WF2	1	78	0.08	500		39	S32WF(Lo)2	52	0.05	26	0.33	0.01	12
357	Women's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
357	Women's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
357	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
357	Women's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
356	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
358	Cntr. Stair Tower	14B34WF(em)2	2	78	0.16	4250		663	14B32WF(em)2	58	0.12	493	0.90	0.04	153
H359	Corridor	22T34RF(U)2	6	78	0.47	4250		1,989	22T17RF(R)2	32	0.19	816	0.90	0.25	1,056
H359	Corridor	C13R(CF)2	9	30	0.27	4250		1,148	C13R(CF)2	30	0.27	1,148	0.90	0.00	0
H359	Corridor	X(r)b6C4	1	24	0.02	8759.52		210	X(g)b2C(LED)1	2	0.00	18	0.90	0.02	173
360	Storage (locked)	24T34RF3	3	117	0.35	500		176	24T32RF(Lo)2	52	0.16	55	0.33	0.06	109
361	Office	24T34RF3	5	117	0.59	3250		1,901	24T32RF(Lo)2	52	0.26	592	0.90	0.29	1,179
361	Office	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
362	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
362	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
363	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
363	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
364	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
365	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
366	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
367	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
368	Enry-Lobby	24T34RF3	2	117	0.16	4250	2	663	24T32RF(R)2	58	0.12	345	0.90	0.04	286
368	Enry-Lobby	24T34RF3	6	117	0.70	4250		2,984	24T32RF(Lo)2	52	0.31	928	0.90	0.35	1,850
368	Enry-Lobby	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
H369	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
H369	Corridor	24T34RF3	6	117	0.70	4250		2,984	24T32RF(Lo)2	52	0.31	928	0.90	0.35	1,850
H370	Corridor	22T34RF(U)2	8	78	0.62	4250		2,652	22T17RF(R)2	32	0.26	1,088	0.90	0.33	1,408
360	Office Storage	24T34RF3	1	117	0.12	500		59	24T32RF(Lo)2	52	0.05	18	0.33	0.02	36
361	Office Storage	24T34RF3	3	117	0.20	500	4	98	24T32RF(Lo)2	52	0.16	55	0.33	0.01	39
362	Office Storage	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	41	0.33	0.04	69
362	Office Storage	24T34RF3	1	117	0.12	500		59	24T32RF(Lo)2	52	0.05	18	0.33	0.02	36
363	Office Storage	24T34RF3	3	117	0.35	500		176	24T32RF(Lo)2	52	0.16	55	0.33	0.06	109
364	Office Storage	24T34RF3	3	117	0.27	500	2	137	24T32RF(Lo)2	52	0.16	55	0.33	0.04	74
365	Office Storage	24T34RF3	3	117	0.35	500		176	24T32RF(Lo)2	52	0.16	55	0.33	0.06	109
366	Office Storage	24T34RF3	4	117	0.47	500		234	24T32RF(Lo)2	52	0.21	73	0.33	0.08	145
366A	Restroom	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
367	Storage	24T34RF3	4	117	0.31	500	4	156	24T32RF(Lo)2	52	0.21	73	0.33	0.03	75

Project: Arapahoe County  
Building: (37) Administrative II

Job No. DWCES30219

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
368	West Stairway	14B34WF(em)2	2	78	0.16	4250		663	14B32WF(em)R)2	58	0.12	493	0.90	0.04	153
369	Corridor	24T34RF3	3	117	0.35	4250		1,492	24T32RF(Lo)2	52	0.16	464	0.90	0.18	925
369	Corridor	22T34RF(U)2	3	78	0.23	4250		995	22T17RF(R)2	32	0.10	408	0.90	0.12	528
369	Corridor	X(r)6C14	2	24	0.05	8759.52		420	X(g)b)2C(LED)1	2	0.00	35	0.90	0.04	347
369	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
370	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.02	6
371	Mach. Rm.	S34WF2	4	78	0.31	250		78	S32WF(Lo)2	52	0.21	52	0.17	0.05	23
372	Conference Rm.	24T34RF3	5	117	0.59	250		146	24T32RF(Lo)2	52	0.26	46	0.17	0.05	91
373	File Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	41	0.33	0.04	69
373	File Rm.	24T34RF3	1	117	0.12	500		59	24T32RF(Lo)2	52	0.05	18	0.33	0.02	36
373	File Rm.	22T34RF(U)2	1	78	0.08	500		39	22T17RF(R)2	32	0.03	16	0.33	0.01	21
374	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
375	Office	24T34RF3	2	117	0.20	3250	1	634	24T32RF(Lo)2	52	0.10	237	0.90	0.08	357
376	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
377	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
378	Server Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(Lo)2	52	0.10	36	0.33	0.04	73
378	Server Rm.	22T34RF(U)2	1	78	0.08	500		39	22T17RF(R)2	32	0.03	16	0.33	0.01	21
379	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
H380	Corridor	22T34RF(U)2	5	78	0.39	4250		1,658	22T17RF(R)2	32	0.16	680	0.90	0.21	880
H380	Corridor	X(r)6C14	1	24	0.02	8759.52		210	X(g)b)2C(LED)1	2	0.00	18	0.90	0.02	173
381	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
382	Office	24B34CF3	2	117	0.23	3250		761	24B32CF(R)2	58	0.12	377	0.90	0.11	345
383	Office	24B34CF3	2	117	0.23	3250		761	24B32CF(R)2	58	0.12	377	0.90	0.11	345
384	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
384	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
385	Office	24T34RF3	2	117	0.20	3250	1	634	24T32RF(R)2	58	0.12	264	0.90	0.07	333
386	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
387	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
388	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
389	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
390	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447
391	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	264	0.90	0.11	447

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Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
392	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
393	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
393	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
394	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
395	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
396	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
396	Office	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	135
397	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
397	Office	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	135
398	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
H399	Corridor	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
H399	Corridor	24T34RF3	6	117	0.70	4250		2,984	24T32RF(Lo)2	52	0.31	928	0.90	1,950
H399	Corridor	22T34RF(U)2	16	78	1.25	4250		5,304	22T17RF(R)2	32	0.51	2,176	0.90	2,815
H399	Corridor	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0
H399	Corridor	X(r)b6C14	1	24	0.02	8759.52		210	X(g)b)2C(LED)1	2	0.00	18	0.90	173
399A	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
399.1	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(R/T)2	58	0.12	264	0.90	219
399.1	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
399.2	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
399.3	Open Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
399.3	Open Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
399.3	Open Office	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0
399.4	Break Rm.	22T34RF(U)2	9	78	0.70	3250		2,282	22T17RF(R)2	32	0.29	936	0.90	1,211
399.5	Closet	22T34RF(U)2	1	78	0.08	250		20	22T17RF(R)2	32	0.03	8	0.17	10
H399.6	Corridor	22T34RF(U)2	7	78	0.55	4250		2,321	22T17RF(R)2	32	0.22	952	0.90	1,232
H399.6	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0
345.1	Conference Rm.	24T34RF3	7	117	0.82	250		205	24T32RF(Lo)2	52	0.36	64	0.17	127
345.1	Conference Rm.	24T34RF(em)3	1	117	0.12	250		29	24T32RF(R/em)2	58	0.06	15	0.17	13
399.7	Women's Restroom	14T34RF2	3	78	0.23	3250		761	14T32RF(Lo)2	52	0.16	507	0.90	228
399.7	Women's Restroom	C60C11	4	60	0.24	3250		780	C15C(CF)1	15	0.06	195	0.90	527
399.7	Women's Restroom	S34CF2	4	78	0.31	3250		1,014	S32CF(Lo)T)2	52	0.21	676	0.90	304
399.7	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	152



hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
M200	Mech. Rm. #1	S34WF2	4	78	0.31	250		78	S32WF(Lo)2	52	0.21	52	0.17	0.02	23
M200.1	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
M200.2	Corridor	24T34RF3	2	117	0.20	4250	1	829	24T32RF(Lo)2	52	0.10	309	0.90	0.08	467
M200.3	2nd Floor N. Stair Tower	14B34PF(em)2	2	78	0.16	4250		663	14B32PF(em)2	52	0.10	442	0.90	0.05	199
225	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
226	Office Storage	24T34RF3	2	117	0.23	500		117	24T32RF(Lo)2	52	0.10	36	0.33	0.04	73
227	Office Storage	24T34RF3	2	117	0.23	500		117	24T32RF(Lo)2	52	0.10	36	0.33	0.04	73
228	Office Storage	24T34RF3	2	117	0.23	500		117	24T32RF(Lo)2	52	0.10	36	0.33	0.04	73
228.1	Closet (locked)	Locked				500			0		0.00	0	0.33	0.00	
228.2	Closet (locked)	Locked				500			0		0.00	0	0.33	0.00	
H228.3	Corridor	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H228.3	Corridor	Xi(r)b8C14	2	24	0.05	8759.52		420	Xi(g)b2C(LED)1	2	0.00	35	0.90	0.04	347
H264.1	Corridor	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H264.1	Corridor	Xi(r)b8C14	1	24	0.02	8759.52		210	Xi(g)b2C(LED)1	2	0.00	18	0.90	0.02	173
264	File Rm.	24T34RF3	4	117	0.47	500		234	24T32RF(Lo)2	52	0.21	73	0.33	0.08	145
266	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
267	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
268	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
269	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
269	Office	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.06	208	0.90	0.08	269
H269.1	Corridor	24T34RF3	1	117	0.12	4250		497	24T32RF(Lo)2	52	0.05	155	0.90	0.06	308
272	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(RT)2	58	0.12	264	0.90	-0.03	-9
273	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
274	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
275	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
H275.1	Corridor	24T34RF3	1	117	0.04	4250	2	166	24T32RF(Lo)2	52	0.05	155	0.90	-0.01	10
277	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
278	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
279	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
280	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
H280.1	Corridor	24T34RF3	1	117	0.12	4250		497	24T32RF(Lo)2	52	0.05	155	0.90	0.06	308
286	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243

hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(37) Administrative II**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
257	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
258	Print Rm.	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.05	236
259	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
260	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
H260.1	Corridor	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H260.1	Corridor	X(rfb)6C14	2	24	0.05	8759.52		420	X(gb)2C(LED)1	2	0.00	35	0.90	0.04	347
260	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
251	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
252	Office	24T34RF3	2	117	0.20	3250	1	634	24T32RF(Lo)2	52	0.10	237	0.90	0.08	357
253	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
245	Office	24T34RF3	2	117	0.20	3250	1	634	24T32RF(Lo)2	52	0.10	237	0.90	0.08	357
247	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
248	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
249	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
H249.1	Corridor	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H249.1	Corridor	X(rfb)6C14	2	24	0.05	8759.52		420	X(gb)2C(LED)1	2	0.00	35	0.90	0.04	347
224	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(Lo)2	52	0.16	355	0.90	0.18	707
223	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
222	Office	24T34RF3	2	117	0.16	3250	2	507	24T32RF(Lo)2	52	0.10	237	0.90	0.05	243
221	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
220	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
219	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
218	Office	24T34RF3	2	117	0.12	3250	3	380	24T32RF(Lo)2	52	0.10	237	0.90	0.01	129
217	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
216	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
H216.1	Corridor	24T34RF3	13	117	1.52	4250		6,464	24T32RF(Lo)2	52	0.68	2,011	0.90	0.76	4,008
H216.1	Corridor	X(rfb)6C14	2	24	0.05	8759.52		420	X(gb)2C(LED)1	2	0.00	35	0.90	0.04	347
232	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
230	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
213	Recep. Office	24T34RF3	5	117	0.59	3250		1,901	24T32RF(Lo)2	52	0.26	592	0.90	0.29	1,179
213	Recep. Office	C26R(CF)2	4	52	0.13	3250	3	423	C26R(CF)2	52	0.21	676	0.90	-0.07	-228
231A	Conference Rm.	24T34RF3	2	117	0.23	250		59	24T32RF(R7)2	58	0.12	20	0.17	0.02	34

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (37) Administrative II

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
231A	Conference Rm.	24T34RF3	5	117	0.59	250		146	24T32RF(Lo)2	52	0.26	45	0.17	0.05	91
237	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
239	U.A. Lab	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
238	Restroom	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
240	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
241	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
235	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
H235.1	Corridor	24T34RF3	12	117	1.40	4250		5,967	24T32RF(Lo)2	52	0.62	1,856	0.90	0.70	3,700
H235.1	Corridor	X(r/b)6C14	2	24	0.05	8759.52		420	X(g/b)2C(LED)1	2	0.00	35	0.90	0.04	347
281	Office	24T34RF3	2	117	0.12	3250	3	380	24T32RF(Lo)2	52	0.10	237	0.90	0.01	129
205	Break Rm.	24T34RF3	4	117	0.47	3250		1,521	24T32RF(Lo)2	52	0.21	473	0.90	0.23	943
H205.1	Corridor	24T34RF3	3	117	0.35	4250		1,492	24T32RF(Lo)2	52	0.16	464	0.90	0.18	925
287	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
288	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
282	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
290	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
293	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
295	Storage	24T34RF3	1	117	0.12	500		59	24T32RF(Lo)2	52	0.05	18	0.33	0.02	36
294	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
289	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
H289.1	Corridor	24T34RF3	5	117	0.59	4250		2,486	24T32RF(Lo)2	52	0.25	774	0.90	0.29	1,542
H289.1	Corridor	X(r/b)6C14	2	24	0.05	8759.52		420	X(g/b)2C(LED)1	2	0.00	35	0.90	0.04	347
H289.1	Men's Restroom	14T32RF2	3	58	0.17	3250		566	14T32RF2	58	0.17	566	0.90	0.00	0
H289.1	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
H296.1	Hallway	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H296.1	Hallway	X(r/b)6C14	1	24	0.02	8759.52		210	X(g/b)2C(LED)1	2	0.00	18	0.90	0.02	173
H296.1	Hallway	C26R(CF)2	1	52	0.05	4250		221	C26R(CF)2	52	0.05	221	0.90	0.00	0
H296.2	Women's Restroom	14T34RF2	3	78	0.23	3250		761	14T32RF(Lo)2	52	0.16	507	0.90	0.07	228
H296.2	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
H296.3	Elevator	C150R(MH)1	3	150	0.45	4250		1,913	C18R(CF)2	42	0.13	536	0.90	0.29	1,239
H296.3	Elevator	X(r/b)6C14	1	24	0.02	8759.52		210	X(g/b)2C(LED)1	2	0.00	18	0.90	0.02	173
296.4	Janitor	S34WF2	1	78	0.08	500		39	S32WF(Lo)2	52	0.05	26	0.33	0.01	12

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
296.5	Men's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
296.5	Men's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
296.5	Men's Restroom	S34WF3	3	117	0.35	3250		1,141	S32WF(Lo)3	78	0.23	761	0.90	0.11	342
296.6	Women's Restroom	S34WF2	2	78	0.16	3250		507	S32WF(LoT)2	52	0.10	338	0.90	0.05	152
296.6	Women's Restroom	S34WF2	1	78	0.08	3250		254	S32WF(Lo)2	52	0.05	169	0.90	0.02	76
296.6	Women's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
296.6	Women's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
296.6	Janitor RR	S34PF2	1	78	0.08	3250		254	S32PF(Lo)2	52	0.05	169	0.90	0.02	76
296.7	Hallway	C28R(CF)2	4	52	0.21	4250		884	C28R(CF)2	52	0.21	884	0.90	0.00	0
296.8	Storage	24T34RF3	1	117	0.12	500		59	24T32RF(Lo)2	52	0.05	18	0.33	0.02	36
296.9	Hallway	C28R(CF)2	5	52	0.26	4250		1,105	C28R(CF)2	52	0.26	1,105	0.90	0.00	0
296.9	Hallway	X(r)b6C14	1	24	0.02	8759.52		210	X(g)b2C(LED)1	2	0.00	18	0.90	0.02	173
296.9	Center Stair	14T34WF(em)2	2	78	0.16	4250		663	14T32WF(Lo/em)2	52	0.10	442	0.90	0.05	199
201	Probation Lobby	24T34RF3				4250			24T32RF(R)2		0.00	0	0.90	0.00	
201.1	B2 - Conference	24T34RF3	4	117	0.31	250	4	78	24T32RF(R)2	58	0.23	58	0.17	0.01	18
201.1	B2 - Conference	X(r)b6C14	2	24	0.05	8759.52		420	X(g)b2C(LED)1	2	0.00	35	0.90	0.04	347
200	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(R)2	58	0.17	566	0.90	0.16	518
201	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
202	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
203	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(R)2	58	0.17	566	0.90	0.16	518
204	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
205	Open Office	24T34RF3	5	117	0.59	3250		1,901	24T32RF(R)2	58	0.29	943	0.90	0.27	863
205.1	Open Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	377	0.90	0.11	345
206	Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(R/T)2	58	0.23	754	0.90	0.21	690
207	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(R)2	58	0.17	566	0.90	0.16	518
208	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	377	0.90	0.11	345
208	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(R)2	58	0.06	189	0.90	0.05	173
209	File Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(R/T)2	58	0.12	58	0.33	0.04	53
209	File Rm.	24T34RF3	5	117	0.59	500		293	24T32RF(R)2	58	0.29	145	0.33	0.09	133
209.1	Hallway	24T34RF3	11	117	1.29	4250		5,470	24T32RF(R)2	58	0.64	2,712	0.90	0.58	2,482
210	Conference	24T34RF3	3	117	0.35	250		88	24T32RF(R)2	58	0.17	44	0.17	0.03	40
211	Server	24T34RF3	2	117	0.23	500		117	24T32RF(R)2	58	0.12	58	0.33	0.04	53

Project: Arapahoe County

Job No.

DWCES30219

Building: (37) Administrative II

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
212	Conference	24T34RF3	6	117	0.70	250		176	24T32RF(R)2	58	0.35	87	0.17	0.05	80
212.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
212.2	Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(R)2	58	0.23	754	0.90	0.21	690
212.3	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
212.4	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
212.5	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
212.6	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R)2	58	0.12	377	0.90	0.11	345
212.6	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(R)2	58	0.06	189	0.90	0.05	173
212.7	S.W. Stair Tower	14834PF(em)2	2	78	0.16	4250		663	14832PF(em)2	52	0.10	442	0.90	0.05	199
H212.8	Corridor	24T34RF3	2	117	0.23	4250		995	24T32RF(L)2	52	0.10	309	0.90	0.12	617
212.8	Corridor	Xi(r)b8C4	1	24	0.02	8759.52		210	Xi(g)b2C(LED)1	2	0.00	18	0.90	0.02	173
212.9	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(L)2	52	0.05	13	0.17	0.00	6
213.1	Mech. Rm.	S34WF2	4	78	0.31	250		78	S32WF(L)2	52	0.21	52	0.17	0.02	23
213.2	Office	24B34CF3	3	117	0.35	3250		1,141	24B32CF(R)2	58	0.17	566	0.90	0.16	518
H213.3	Corridor	24T34RF3	1	117	0.12	4250		497	24T32RF(L)2	52	0.05	155	0.90	0.06	308
213.4	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
213.5	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
213.6	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
213.7	Office (locked)												0.00		
213.8	Office -Conference Rm.	24T34RF3	3	117	0.35	3250		1,141	24T32RF(L)2	52	0.16	355	0.90	0.18	707
H213.9	Corridor	24T34RF3	5	117	0.59	4250		2,486	24T32RF(L)2	52	0.26	774	0.90	0.29	1,542
H213.9	Corridor	Xi(r)b8C4	2	24	0.05	8759.52		420	Xi(g)b2C(LED)1	2	0.00	35	0.90	0.04	347
H214.1	Corridor	24T34RF3	2	117	0.23	4250		995	24T32RF(L)2	52	0.10	309	0.90	0.12	617
214.2	Conference Rm.	24T34RF3	2	117	0.23	250		59	24T32RF(L)2	52	0.10	18	0.17	0.02	36
214.3	Radio Equip.	24T34RF3	2	117	0.23	500		117	24T32RF(L)2	52	0.10	36	0.33	0.04	73
214.4	Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(L)2	52	0.21	473	0.90	0.23	943
214.5	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
214.6	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
214.7	Office	24T34RF3	2	117	0.12	3250	3	380	24T32RF(L)2	52	0.10	237	0.90	0.01	129
214.8	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
214.9	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472
215.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(L)2	52	0.10	237	0.90	0.12	472

hrs. The demand savings are not fully claimed.

Project: Arapahoe County  
Building: (37) Administrative II  
Job No. DWCES30219

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)	Demand Diversity Factor	Energy (kWh)
215.2	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
215.3	Office	24T34RF3	2	117	0.12	3250	3	380	24T32RF(Lo)2	52	0.10	237	0.90	129
215.4	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
215.5	Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(Lo)2	52	0.21	473	0.90	943
215.6	File Rm.	24T34RF3	4	117	0.47	500		234	24T32RF(Lo)2	52	0.21	73	0.33	145
215.7	Open Office	24T34RF3	5	117	0.59	3250		1,901	24T32RF(Lo)2	52	0.26	592	0.90	1,179
215.7	Open Office	C26R(CF)2	3	52	0.13	3250	1	423	C26R(CF)2	52	0.16	507	0.90	-76
215.8	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
215.9	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
216.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	472
H216.2	Corridor	24T34RF3	8	117	0.94	4250		3,978	24T32RF(Lo)2	52	0.42	1,238	0.90	2,466
H216.2	Corridor	X(r)b)6Ci4	4	24	0.10	8759.52		841	X(g)b)2C(LED)1	2	0.01	70	0.90	694
216.3	Conference Rm.	24T34RF3	6	117	0.70	250		176	24T32RF(Lo)2	52	0.31	55	0.17	109
H216.9	Corridor	24T34RF3	2	117	0.23	4250		995	24T32RF(Lo)2	52	0.10	309	0.90	617
H216.9	Corridor	X(r)b)6Ci4	1	24	0.02	8759.52		210	X(g)b)2C(LED)1	2	0.00	18	0.90	173
100	Mech. Rm.	S34WF2	4	78	0.31	250		78	S32WF(Lo)2	52	0.21	52	0.17	23
101	Elect. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	6
102	File Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(R/T)2	58	0.12	41	0.33	69
102	File Rm.	24T34RF3	10	117	1.17	500		585	24T32RF(Lo)2	52	0.52	260	0.33	293
102	File Rm.	22T34RF(U)2	2	78	0.16	500		78	22T17RF(R)2	32	0.06	32	0.33	41
103	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
104	Open Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(R/T)2	58	0.23	528	0.90	894
104	Open Office	24T34RF3	36	117	4.21	3250		13,689	24T32RF(Lo)2	52	1.87	4,259	0.90	8,487
104	Open Office	22T34RF(U)2	12	78	0.94	3250		3,042	22T17RF(R)2	32	0.36	1,248	0.90	1,615
104	Open Office	X(P)2C(LED)1	6	2	0.01	8759.52		105	X(g)2C(LED)1	2	0.01	105	0.90	0
105	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
106	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
107	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	236
108	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
109	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447
109	Office	24T34RF3	1	117	0.04	3250	2	127	24T32RF(Lo)2	52	0.05	118	0.90	8
110	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	447

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
110	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.05	236
111	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
111	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
112	Office	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.06	208	0.90	0.08	269
113	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
113	Women's Restroom	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
114	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
114	Women's Restroom	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
115	Open Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
115	Open Office	24T34RF3	36	117	4.21	3250		13,689	24T32RF(Lo)2	52	1.87	4,259	0.90	2.11	8,487
115	Open Office	24T34RF(em)3				3250			24T32RF(R/em)2		0.00	0	0.90	0.00	
115	Open Office	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R)2	32	0.06	208	0.90	0.08	269
116	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
117	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
118	Conference Rm.	24T34RF3	4	117	0.47	250		117	24T32RF(Lo)2	52	0.21	36	0.17	0.04	73
119	Open Office	24T34RF3	8	117	0.94	3250		3,042	24T32RF(Lo)2	52	0.42	946	0.90	0.47	1,886
119	Open Office	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.30	0.00	0
120	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
121	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
122	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
123	W. Stair Tower	14B34PF2	1	78	0.08	4250		332	14B32PF(Lo)2	52	0.05	221	0.90	0.02	100
124	Kitchen	22T34RF(U)2	3	78	0.23	3250		761	22T17RF(R)2	32	0.10	312	0.90	0.12	404
124	Kitchen	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.30	0.00	0
125	Comp. Rm.	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
126	Comp. Rm.	24T34RF3	4	117	0.47	3250		1,521	24T32RF(Lo)2	52	0.21	473	0.90	0.23	943
127	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
127	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
128	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
128	Office	24T34RF3	1	117	0.12	3250		380	24T32RF(Lo)2	52	0.05	118	0.90	0.06	236
129	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
130	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
131	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
132	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
133	Open Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
133	Open Office	22T34RF(U)2	2	78	0.16	3250		507	22T17RF(R/T)2	32	0.06	208	0.90	0.08	269
133	Open Office	22T34RF(U)2	9	78	0.70	3250		2,282	22T17RF(R)2	32	0.29	936	0.90	0.37	1,211
133	Open Office	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
133	Open Office	X(r)6C14	1	24	0.02	8759.52		210	X(g)6)2C(LED)1	2	0.00	18	0.90	0.02	173
134	Men's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76
134	Men's Restroom	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
135	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
135	Women's Restroom	22T34RF(U)2	1	78	0.08	3250		254	22T17RF(R)2	32	0.03	104	0.90	0.04	135
136	Storage	22T34RF(U)2	2	78	0.16	500		78	22T17RF(R)2	32	0.06	32	0.90	0.03	41
137	W. Entry Vest.	24T34RF3	1	117	0.12	4250		497	24T32RF(Lo)2	52	0.05	155	0.90	0.06	308
137	W. Entry Vest.	X(g)6)6C14	1	24	0.02	8759.52		210	X(g)6)2C(LED)1	2	0.00	18	0.90	0.02	173
138	Entry - Elev. Lobby	C150R(MH)1	13	150	1.95	4250		8,288	C18R(CF)2	42	0.55	2,321	0.90	1.26	5,370
138	Entry - Elev. Lobby	X(r)6C14	2	24	0.05	8759.52		420	X(g)6)2C(LED)1	2	0.00	35	0.90	0.04	347
139	Men's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
139	Men's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
139	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
139	Men's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76
139.1	Jan. Closet	S34WF2	1	78	0.08	500		39	S32WF(Lo)2	52	0.05	26	0.90	0.01	12
140	Women's Restroom	C150R(MH)1	1	150	0.15	3250		488	C18R(CF)2	42	0.04	137	0.90	0.10	316
140	Women's Restroom	14T34RF2	1	78	0.08	3250		254	14T32RF(Lo)2	52	0.05	169	0.90	0.02	76
140	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
140	Women's Restroom	S34CF2	1	78	0.08	3250		254	S32CF(Lo)2	52	0.05	169	0.90	0.02	76
140.1	Elect. Tele.	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.90	0.00	6
141	Cntr. Stair Tower (1st Flr.)	14B34WF(em)2	2	78	0.16	4250		663	14B32WF(em)2	58	0.12	493	0.90	0.04	153
142	Lobby	24T34RF3	3	117	0.35	4250		1,492	24T32RF(Lo)2	52	0.16	464	0.90	0.18	925
142	Lobby	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
101.1	Lobby Waiting	24T34RF3	4	117	0.47	4250		1,989	24T32RF(Lo)2	52	0.21	619	0.90	0.23	1,233
101.2	Recep. Office	24T34RF3	2	117	0.23	3250		761	24T32RF(R/T)2	58	0.12	264	0.90	0.11	447
101.2	Recep. Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(Lo)2	52	0.16	355	0.90	0.18	707
102.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170



hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (37) Administrative II

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
103.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
104.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
107.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
108.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
109.1	Office	24T32RF3	3	87	0.26	3250		848	24T32RF(R)2	58	0.17	566	0.90	0.08	255
110.1	Office	24T34RF3	4	117	0.47	3250		1,521	24T32RF(Lo)2	52	0.21	473	0.90	0.23	943
111.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
112.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
113.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
116.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
117.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
118.1	Break Rm.	24T34RF3	6	117	0.70	3250		2,282	24T32RF(Lo)2	52	0.31	710	0.90	0.35	1,415
120.1	Video Intake	24T34RF3	5	117	0.59	3250		1,901	24T32RF(Lo)2	52	0.26	592	0.90	0.29	1,179
121.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
123.1	Clerical Spec.	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
122.1	Office	24T34RF3	2	117	0.23	3250		761	24T32RF(Lo)2	52	0.10	237	0.90	0.12	472
106.1	Lab Area Wk. Rm.	24T34RF3	5	117	0.59	3250		1,901	24T32RF(Lo)2	52	0.26	592	0.90	0.29	1,179
105.1	Lab Area Wk. Rm.	22T32RF(u)2	3	58	0.17	3250		566	22T17RF(R)2	32	0.10	312	0.90	0.07	228
H116.2	Corridor	24T34RF3	5	117	0.59	4250		2,486	24T32RF(Lo)2	52	0.26	774	0.90	0.29	1,542
H116.2	Corridor	22T32RF(u)2	4	58	0.23	4250		986	22T17RF(R)2	32	0.13	544	0.90	0.09	398
151	Training Rm.	24T34RF3	2	117	0.23	500		117	24T32RF(R/T)2	58	0.12	41	0.33	0.04	69
151	Training Rm.	24T34RF3	12	117	1.40	500		702	24T32RF(Lo)2	52	0.62	218	0.33	0.23	435
151	Training Rm.	X(R)2C(LED)1	2	2	0.00	8759.52		35	X(g)2C(LED)1	2	0.00	35	0.90	0.00	0
151.1	Mech. Rm.	S34WF2	4	78	0.31	250		78	S32WF(Lo)2	52	0.21	52	0.17	0.02	23
151.2	Elect. Rm.	S34WF2	1	78	0.08	250		20	S32WF(Lo)2	52	0.05	13	0.17	0.00	6
151.3	N. Stair Tower	14B34CF2	1	78	0.08	4250		332	14B32CF(Lo)2	52	0.05	221	0.90	0.02	100
152	File Storage	24T32RF3	5	87	0.38	500	2	189	24T32RF(R)2	58	0.29	145	0.33	0.03	39
152	File Storage	24T34RF3	2	117	0.23	500		117	24T32RF(Lo)2	52	0.10	36	0.33	0.04	73
153	File Storage	24T34RF3	6	117	0.70	500		351	24T32RF(Lo)2	52	0.31	109	0.33	0.12	218
154.1	Office	24T32RF3	1	87	0.09	3250		283	24T32RF(R)2	58	0.06	189	0.90	0.03	85
154.2	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
154.3	Open Office	24T32RF3	6	87	0.52	3250		1,697	24T32RF(R)2	58	0.35	1,131	0.90	0.16	509

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
154.3	Open Office	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00	0
154.4	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
154.5	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.1	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.2	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.3	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.4	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.5	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.6	Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
155.7	Open Office	24T32RF3	2	87	0.17	3250		566	24T32RF(R)2	58	0.12	377	0.90	0.05	170
H155.8	Corridor	24T32RF3	2	87	0.17	4250		740	24T32RF(R)2	58	0.12	493	0.90	0.05	222
156	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
156.1	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
156.2	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
156.3	Recep.	24T34RF3	3	117	0.35	3250		1,141	24T32RF(Lo)2	52	0.16	355	0.90	0.18	707
156.3	Recep.	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
156.4	Office	24T34RF3	3	117	0.35	3250		1,141	24T32RF(Lo)2	52	0.16	355	0.90	0.18	707
156.5	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
156.6	Office	24T34RF3	2	117	0.12	3250	3	380	24T32RF(Lo)2	52	0.10	237	0.90	0.01	129
156.7	Office	24T34RF3	2	117	0.08	3250	4	254	24T32RF(Lo)2	52	0.10	237	0.90	-0.02	15
H156.8	Corridor	22T32RF(u)2	3	58	0.17	4250		740	22T17RF(R)2	32	0.10	408	0.90	0.07	298
H156.8	Corridor	24T34RF3	1	117	0.12	4250		497	24T32RF(Lo)2	52	0.05	155	0.90	0.06	308
H156.8	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
156.9	Waiting Rm.	24T34RF3	2	117	0.20	3250	1	634	24T32RF(Lo)2	52	0.10	237	0.90	0.08	357
157	Jan. Closet	24T34RF3	4	117	0.47	500		234	24T32RF(Lo)2	52	0.21	73	0.33	0.08	145
158	Women's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
159	Men's Restroom	S34CF2	2	78	0.16	3250		507	S32CF(Lo)2	52	0.10	338	0.90	0.05	152
H160	Corridor	24T34RF3	11	117	1.29	4250		5,470	24T32RF(Lo)2	52	0.57	1,702	0.90	0.64	3,391
H160	Corridor	X(R)2C(LED)1	3	2	0.01	8759.52		53	X(g)2C(LED)1	2	0.01	53	0.90	0.00	0
H160	Corridor	24T34RF(em)3	1	117	0.12	4250		497	24T32RF(R/em)2	58	0.06	247	0.90	0.05	226
H160.1	Corridor	24T34RF3	3	117	0.35	4250		1,492	24T32RF(Lo)2	52	0.16	464	0.90	0.18	925

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
H160.1	Corridor	X(R)2C(LED)1				8759.52			X(g)2C(LED)1		0.00	0	0.90	0.00	
H160.2	Corridor	24T34RF3	4	117	0.47	4250		1,989	24T34RF(Lo)2	52	0.21	619	0.90	0.23	1,233
H160.2	Corridor	24T34RF(em)3	2	117	0.23	4250		995	24T32RF(R/em)2	58	0.12	493	0.90	0.11	451
H160.2	Corridor	X(R)2C(LED)1	1	2	0.00	8759.52		18	X(g)2C(LED)1	2	0.00	18	0.90	0.00	0
B001	Elev. Lobby	S34PF2	2	78	0.16	4250		663	S32PF(Lo)2	52	0.10	442	0.90	0.05	199
B001	Elev. Lobby	X(r)6C14	1	24	0.02	8759.52		210	X(g)b2C(LED)1	2	0.00	18	0.90	0.02	173
B002	Storage	S34PF2	1	78	0.08	500		39	S32PF(Lo)2	52	0.05	26	0.33	0.01	12
B003	Crawl Space	O18C(CF)1	1	18	0.02	500		9	O18C(CF)1	18	0.02	9	0.33	0.00	0
B004	Elev. Equip. Rm.	S34PF2	1	78	0.08	250		20	S32PF(Lo)2	52	0.05	13	0.17	0.00	6
B005	Sprinkler Rm.	S34PF2	4	78	0.31	250		78	S32PF(Lo)2	52	0.21	52	0.17	0.02	23
B005	Sprinkler Rm.	8S34PF4	2	156	0.31	250		78	18S32CF(Lo)4	104	0.21	52	0.17	0.02	23
B006	Elect. Rm.	S34PF2	2	78	0.16	250		39	S32PF(Lo)2	52	0.10	26	0.17	0.01	12
B007	Storage	S34PF2	2	78	0.16	500		78	S32PF(Lo)2	52	0.10	52	0.33	0.02	23
B008	Evidence Rm.	S34PF2	2	78	0.16	500		78	S32PF(Lo)2	52	0.10	52	0.33	0.02	23
B009	Parking Garage	8S60PF2	13	121	1.57	5109.72		8,038	8S32PF(Lo)4	104	1.35	6,908	0.90	0.20	1,016
B009	Parking Garage	8S60PF(em)2	2	121	0.24	5109.72		1,237	8S32PF(em)Lo)4	104	0.21	1,063	0.90	0.03	156
B010	Tele - Equip.	8S60PF4	1	242	0.24	250		51	8W32PF(R)4	116	0.12	29	0.17	0.02	28
								Total kWh:	827,640.51				420.87	107.03	442,587
								Total kW:	272.75						

NOTE: If the annual hours are less than 1,500 hrs. The demand savings are not fully claimed.

Project: **Arapahoe County**  
Building: **(38) Sheriff/Coroner Facility**  
Job No. **DWCES30219**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
1139	Armory	24T32RF3	3	87	0.26	2625		685	24T32RF(R)2	59	0.18	465	0.90	0.08	199
11425	Hall	22T17RF(u/Lou)2	16	59	0.94	3750		3,540	22T17RF(R/Lou)2	33	0.53	1,980	0.90	0.37	1,404
1134	Juvenile Interview	24T32RF(Lou)3	1	87	0.09	500		44	24T32RF(LowR)2	59	0.06	30	0.33	0.01	13
1128	Coffee	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1123	Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(LowR)2	59	0.12	30	0.17	0.01	13
1119	Work Rm	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
1118	File Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
11115	Hall	22T32RF(u/Lou)2	4	59	0.24	3750		885	22T17RF(R/Lou)2	33	0.13	495	0.90	0.08	351
1107	Reception	22T32RF(u/Lou)2	4	59	0.24	2625		620	22T17RF(R/Lou)2	33	0.13	347	0.90	0.09	246
1112	Small Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(LowR)2	59	0.12	30	0.17	0.01	13
1110	Library	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LowR)2	59	0.12	310	0.90	0.05	132
1300	Women's Locker	22T32RF(u/Lou)2	4	59	0.24	2625		620	22T17RF(R/Lou)2	33	0.13	347	0.90	0.09	246
1106	Exercise	24T32RF3	12	87	1.04	2625		2,741	24T32RF(R)2	59	0.71	1,859	0.90	0.30	794
1144A	Evidence Exam	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(LowR)2	59	0.18	465	0.90	0.08	199
1142	Prop. Evidence. Intake	24T32RF(Lou)3	6	87	0.52	2625		1,370	24T32RF(LowR)2	59	0.35	929	0.90	0.15	397
1204	Small Conference	24T32RF(Lou)3	3	87	0.26	250		65	24T32RF(LowR)2	59	0.18	44	0.17	0.01	19
1205	Depth Storage	24T32RF3	7	87	0.61	500		305	24T32RF(R)2	59	0.41	207	0.33	0.06	88
1206	Interview Test	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(LowR)2	59	0.12	59	0.33	0.02	25
1203	Equipment Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
1209	Electronics	24T32RF(Lou)3	10	87	0.87	2625		2,284	24T32RF(LowR)2	59	0.59	1,549	0.90	0.25	682
1208A	Coffee	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1211	Testing/Staging	24T32RF(Lou)3	9	87	0.78	2625		2,055	24T32RF(LowR)2	59	0.53	1,394	0.90	0.23	595
1464	O.D.	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(LowR)2	59	0.12	310	0.90	0.05	132
1472	Hair + Fiber	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
1471	Shake Down	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
1465	In-Proc. Evid.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
1457.1	West of AFIS	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1457	AFIS	24T32RF(Lou)3	6	87	0.52	2625		1,370	24T32RF(LowR)2	59	0.35	929	0.90	0.15	397
1457.2	East of AFIS	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1481	Coffee	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1455	Studio	22T17RF(Lou)3	2	47	0.09	2625		247	22T17RF(R/Lou)2	33	0.07	173	0.90	0.03	66

hrs. The demand savings are not fully claimed.

Job No. **DWCES30219**

Project: **Arapahoe County**

Building: **(38) Sheriff/Coroner Facility**

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
1144	Property Release	24T32RF(Lou)3	1	87	0.09	2625		228	24T32RF(Lou)2	59	0.06	155	0.90	0.03	66
H1301.1	Hall	22T32RF(u/Lou)2	1	59	0.06	3750		221	22T17RF(R/Lou)2	33	0.03	124	0.90	0.02	88
1301	Women's TLT.	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
1303	Men's Locker	22T32RF(u/Lou)2	8	59	0.47	2625		1,239	22T17RF(R/Lou)2	33	0.26	693	0.90	0.19	491
1303	Men's Locker	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
H1106A	Hall	22T32RF(u/Lou)2	3	59	0.18	3750		664	22T17RF(R/Lou)2	33	0.10	371	0.90	0.07	263
H1401	Hall	22T32RF(u/Lou)2	6	59	0.35	3750		1,328	22T17RF(R/Lou)2	33	0.20	743	0.90	0.14	527
1406	Coroners Gen Stor.	24T32RF3	8	87	0.70	2625		1,827	24T32RF(R)2	59	0.47	1,239	0.90	0.20	529
1143	Conference	22T32RF(u/Lou)2	8	59	0.47	250		118	22T17RF(R/Lou)2	33	0.26	66	0.17	0.03	47
1049A	Coffee	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
1408	Storage	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou)2	59	0.12	59	0.33	0.02	25
1409	Break	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
H1419.1	Reception Entry	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
1419	Reception	22T32RF(u/Lou)2	4	59	0.24	2625		620	22T17RF(R/Lou)2	33	0.13	347	0.90	0.09	246
1421	Waiting/View	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(Lou)2	59	0.18	465	0.90	0.08	199
1423	View	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
1424	Vest	24T32RF3	5	87	0.44	3750		1,631	24T32RF(R)2	59	0.30	1,106	0.90	0.13	473
1427	Tox.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
1428	Hist.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
1429.1	Drying Rm.	24T32RF4	1	112	0.11	2625		294	24T32RF(R)2	59	0.06	155	0.90	0.05	125
1429	Autopsy	24T32RF4	5	112	0.56	2625		1,470	24T32RF(R)2	59	0.30	774	0.90	0.24	626
1429	Autopsy	24T32RF4	4	112	0.45	2625		1,176	24T32RF(R)2	56	0.22	588	0.90	0.20	529
1429	Autopsy	24T32RF4	12	112	1.34	2625		3,528	24T32RF(R)2	56	0.67	1,764	0.90	0.60	1,588
1429	Autopsy	24T32RF4	2	112	0.22	2625		588	24T32RF(R)2	59	0.12	310	0.90	0.10	250
1433	Laundry	24T32RF4	3	112	0.34	500		168	24T32RF(R)2	59	0.18	89	0.33	0.05	72
1434	Tissue Prep.	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
1432	Spec. Autopsy	24T32RF4	4	112	0.45	2625		1,176	24T32RF(R)2	56	0.22	588	0.90	0.20	529
1432	Spec. Autopsy	24T32RF4	2	112	0.22	2625		588	24T32RF(R)2	59	0.12	310	0.90	0.10	250
1431	X-Ray	24T32RF4	4	112	0.45	2625		1,176	24T32RF(R)2	59	0.24	620	0.90	0.19	501
1478	ENT	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
1474	ALS. Rm.	24T32RF(Lou)3	6	87	0.52	2625		1,370	24T32RF(Lou)2	59	0.35	929	0.90	0.15	397
1467	Lab	24T32RF(Lou)3	6	87	0.52	2625		1,370	24T32RF(Lou)2	59	0.35	929	0.90	0.15	397

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
1458	Copy Rm.	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
1459	Shoe & Tire	24T32RF3	1	87	0.09	2625		228	24T32RF(R)2	59	0.06	155	0.90	0.03	66
H1466	Vest	22T32RF(uLou)2	3	59	0.18	3750		664	22T17RF(R/Lou)2	33	0.10	371	0.90	0.07	263
H1462	Passage	22T32RF(uLou)2	3	59	0.18	3750		664	22T17RF(R/Lou)2	33	0.10	371	0.90	0.07	263
1470	Storage	24T32RF3	1	87	0.09	500		44	24T32RF(R)2	59	0.06	30	0.33	0.01	13
1463	Multi-Media Comp. Lab	24T32RF(Lou)3	4	87	0.35	2625		914	24T32RF(Lou/R)2	59	0.24	620	0.90	0.10	265
1458	Office	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
1460	Wet Lab	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(Lou/R)2	59	0.18	465	0.90	0.08	199
1459	Instr. Rm.	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(Lou/R)2	59	0.18	465	0.90	0.08	199
1452	Film + Print Processing	24T32RF3	11	87	0.96	2625		2,512	24T32RF(R)2	59	0.65	1,704	0.90	0.28	728
2110	Vest.	22T32RF(u)2	6	59	0.35	3750		1,328	22T17RF(R)2	33	0.20	743	0.90	0.14	527
2111	Bldg. Maint. Supply	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
2109	Maint. Staff	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
2108	Central Supply	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
2107	Mail	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
H2105	Hall	22T32RF(u)2	5	59	0.30	3750		1,106	22T17RF(R)2	33	0.17	619	0.90	0.12	439
2106	Lab	24T32RF(Lou)3	4	87	0.35	2625		914	24T32RF(Lou/R)2	59	0.24	620	0.90	0.10	265
2102	Small Conference	24T32RF(Lou)3	3	87	0.26	250		65	24T32RF(Lou/R)2	59	0.18	44	0.17	0.01	19
2103	Reception	22T32RF(uLou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
H2311	Hall	22T32RF(uLou)2	6	59	0.35	3750		1,328	22T17RF(R/Lou)2	33	0.20	743	0.90	0.14	527
2305	Records Storage	24T32RF3	18	87	1.57	500		783	24T32RF(R)2	59	1.06	531	0.33	0.15	227
2307	Copy	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
H2307	Entry to Copy	24T32RF3	1	87	0.09	3750		326	24T32RF(R)2	59	0.06	221	0.90	0.03	95
2318	Interview	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
2327	Work Rm./Storage	24T32RF3	2	87	0.17	2625		457	24T32RF(R)2	59	0.12	310	0.90	0.05	132
H2120.1	Hall	22T32RF(uLou)2	16	59	0.94	3750		3,540	22T17RF(R/Lou)2	33	0.53	1,980	0.90	0.37	1,404
2123	Med. Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou/R)2	59	0.12	30	0.17	0.01	13
2123	Med. Conference	24T32RF(Lou)3	4	87	0.35	250		87	24T32RF(Lou/R)2	59	0.24	59	0.17	0.02	25
2116	Computer	24T32RF(Lou)3	20	87	1.74	2625		4,568	24T32RF(Lou/R)2	59	1.18	3,098	0.90	0.50	1,323
2116	Computer	22T17RF(Lou)3	6	47	0.28	2625		740	22T17RF(R/Lou)2	33	0.20	520	0.90	0.08	199
2116A	Tape	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
2201	Locked Coats	22T32RF(uLou)2	5	59	0.30	500		148	22T17RF(R/Lou)2	33	0.17	83	0.33	0.04	59

hrs. The demand savings are not fully claimed.

Job No. DWCES30219

Project: Arapahoe County

Building: (38) Sheriff/Coroner Facility

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
2204	Copier	24T32RF(Lou)3	4	87	0.35	2625		914	24T32RF(Lou)2	59	0.24	620	0.90	0.10	285
2200	Dispatch	24T32RF(Lou)3	26	87	2.26	6256.8		14,153	24T32RF(Lou)2	59	1.53	9,598	0.90	0.66	4,100
2203	Equipment	24T32RF3	4	87	0.35	2625		914	24T32RF(R)2	59	0.24	620	0.90	0.10	265
2207	Small Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou)2	59	0.12	30	0.17	0.01	13
2200.1	Entry to Dispatch	22T32RF(u/Lou)2	1	59	0.06	6256.8		369	22T17RF(R/Lou)2	33	0.03	206	0.90	0.02	146
2214	Vend	24T32RF(Lou)3	4	87	0.35	6256.8		2,177	24T32RF(Lou)2	59	0.24	1,477	0.90	0.10	631
H2421.1	West of Large Conference	22T32RF(u/Lou)2	2	59	0.12	3750		443	22T17RF(R/Lou)2	33	0.07	248	0.90	0.05	176
2421	Large Conference	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
2421	Large Conference	24T32RF(Lou)3	6	87	0.52	2625		1,370	24T32RF(Lou)2	59	0.35	929	0.90	0.15	397
2416	File/Storage	24T32RF3	4	87	0.35	500		174	24T32RF(R)2	59	0.24	118	0.33	0.03	50
2418	AV Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
2418	AV Storage	22T32RF(u)2	3	59	0.18	500		89	22T17RF(R)2	33	0.10	50	0.33	0.02	35
2420	Employee Storage	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou)2	59	0.12	59	0.33	0.02	25
2419	Secretary	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
H2421.2	East of Large Conference	22T32RF(u/Lou)2	2	59	0.12	3750		443	22T17RF(R/Lou)2	33	0.07	248	0.90	0.05	176
2327	Work Rm. / Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
H2400	Corridor	22T32RF(u/Lou)2	24	59	1.42	3750		5,310	22T17RF(R/Lou)2	33	0.79	2,970	0.90	0.56	2,106
H2417	Hall by Library	22T32RF(u/Lou)2	4	59	0.24	3750		885	22T17RF(R/Lou)2	33	0.13	495	0.90	0.09	351
2410	Training Storage	24T32RF3	6	87	0.52	500		261	24T32RF(R)2	59	0.35	177	0.33	0.05	76
2402	Coffee	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132
2304	Fingerprint I.D.	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
2303	Meagans Law DB	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
2304.1	East of Fingerprint I.D.	24T32RF(Lou)3	1	87	0.09	3750		326	24T32RF(Lou)2	59	0.06	221	0.90	0.03	95
2306	Archive Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
2312	File Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
2314	Closed Work Rm.	24T32RF(Lou)3	3	87	0.26	2625		685	24T32RF(Lou)2	59	0.18	465	0.90	0.08	199
H3105	Hall	22T32RF(u/Lou)2	8	59	0.47	3750		1,770	22T17RF(R/Lou)2	33	0.26	990	0.90	0.19	702
3102	Entry	22T32RF(u/Lou)2	3	59	0.18	3750		664	22T17RF(R/Lou)2	33	0.10	371	0.90	0.07	263
3316	Temp/Recept.	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
3119	General Storage	22T32RF(u/Lou)2	12	59	0.71	500		354	22T17RF(R/Lou)2	33	0.40	198	0.33	0.09	140
H3401	Hall	22T32RF(u/Lou)2	13	59	0.77	3750		2,876	22T17RF(R/Lou)2	33	0.43	1,609	0.90	0.30	1,141
3407	F.R.E.D.	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou)2	59	0.12	310	0.90	0.05	132

Project: Arapahoe County

Building: (38) Sheriff/Coroner Facility

Job No.

DWGES30219

hrs. The demand savings are not fully claimed.

Room Number	Surveyed Locations	Existing Fixtures ID Code	No. of Fixtures per Area	Watts per Fixture	Area's Working (kW)	Annual Hours of Usage	Number of Lamps Dead & Gone	Existing Annual (kWh)	RETROFIT				Demand Diversity Factor	SAVINGS	
									Retrofit Fixture ID Code	Retrofit Fixture Wattage	Retrofit Install (kW)	Retrofit Annual (kWh)		Demand (kW)	Energy (kWh)
3408	Large Conference	24T32RF(Lou)3	6	87	0.52	250		131	24T32RF(Lou/R)2	59	0.35	89	0.17	0.03	38
3409	Small Conference	24T32RF(Lou)3	2	87	0.17	250		44	24T32RF(Lou/R)2	59	0.12	30	0.17	0.01	13
34330	Hall	22T32RF(u/Lou)2	14	59	0.83	3750		3,098	22T17RF(R/Lou)2	33	0.46	1,733	0.90	0.33	1,229
3331	Victims Assist	24T32RF(Lou)3	2	87	0.17	2625		457	24T32RF(Lou/R)2	59	0.12	310	0.90	0.05	132
3332	Soft Interview	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
3333	Soft Interview	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
3335	Polygraph	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
3336	File Storage	24T32RF3	2	87	0.17	500		97	24T32RF(R)2	59	0.12	59	0.33	0.02	25
3337	Victims Interview	24T32RF(Lou)3	2	87	0.17	500		87	24T32RF(Lou/R)2	59	0.12	59	0.33	0.02	25
3328	Coffee	22T32RF(u/Lou)2	2	59	0.12	2625		310	22T17RF(R/Lou)2	33	0.07	173	0.90	0.05	123
3316	Coffee	22T32RF(u/Lou)2	1	59	0.06	2625		155	22T17RF(R/Lou)2	33	0.03	87	0.90	0.02	61
3315	Reception	22T32RF(u/Lou)2	6	59	0.35	2625		929	22T17RF(R/Lou)2	33	0.20	520	0.90	0.14	369
3323	Work Rm. / Storage	24T32RF3	6	87	0.52	2625		1,370	24T32RF(R)2	59	0.35	929	0.90	0.15	397
3324	Secure Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
3304	File Storage	24T32RF3	3	87	0.26	500		131	24T32RF(R)2	59	0.18	89	0.33	0.03	38
3112	Archive Storage	24T32RF3	6	87	0.52	500		261	24T32RF(R)2	59	0.35	177	0.33	0.05	76
3111	Sheriff	22T32RF(u/Lou)2	1	59	0.06	5256.8		369	22T17RF(R/Lou)2	33	0.03	206	0.90	0.02	146
3122	Interview	24T32CF(Lou)3	1	97	0.09	500		44	24T32CF(Lou/R)2	59	0.06	30	0.33	0.01	13
3410	Interview	24T32CF(Lou)3	2	87	0.17	500		87	24T32CF(Lou/R)2	59	0.12	59	0.33	0.02	25
3413	File Storage	24T32RF3	2	87	0.17	500		87	24T32RF(R)2	59	0.12	59	0.33	0.02	25
Total kW: 46.53									Total kWh: 115,968.43				106.83	12.88	39,353



# **Appendix B**

## **Standards of Control**

# Equipment Operating Schedules - Arapahoe County Buildings

Building	Schedule	Equipment	EXISTING					PROPOSED					Notes					
			Start	Stop	Days	Heating		Cooling		Start	Stop	Days		Heating		Cooling		
						Occupied	Unoccupied	Occupied	Unoccupied					Occupied	Unoccupied	Occupied	Unoccupied	
01 - Administration Building	A	DHW-1 & HX Pump	0:00	23:59	MTWRF	N/A	N/A	N/A	N/A	N/A	N/A	18:30	MTWRF	N/A	N/A	N/A	N/A	
			0:00	23:59	SS													
01 - Administration Building	B	AH-1	5:00	23:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	6:00	MTWRF	72	55	74	OFF	1
			8:00	16:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
01 - Administration Building	C	AH-2	5:00	23:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	6:00	MTWRF	72	55	74	OFF	1
			8:00	16:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
01 - Administration Building	D	AH-3	5:00	23:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	6:00	MTWRF	72	55	74	OFF	1
			8:00	16:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
01 - Administration Building	E	AH-4	5:00	23:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	6:00	MTWRF	72	55	74	OFF	1
			8:00	16:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
12 - Arapahoe Plaza East Building	A	AHU-E1	6:00	22:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	7:00	MTWRF	72	55	74	OFF	2
			8:00	16:30	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
12 - Arapahoe Plaza East Building	B	AHU-E2	6:00	22:00	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	7:00	MTWRF	72	55	74	OFF	2
			8:00	16:30	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
13 - Arapahoe Human Services	A	AHU-SW1	Existing Schedule Was Not Available to Chevron Energy Solutions									7:00	MTWRF	72	55	74	OFF	2
												OFF	SS	OFF	55	OFF	OFF	
13 - Arapahoe Human Services	B	AHU-SW2	Existing Schedule Was Not Available to Chevron Energy Solutions									7:00	MTWRF	72	55	74	OFF	2
												OFF	SS	OFF	55	OFF	OFF	
14 - Arapahoe Plaza West Building	A	AHU-W1	0:00	23:59	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	7:00	MTWRF	72	55	74	OFF	
			4:00	18:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
14 - Arapahoe Plaza West Building	B	AHU-W2	0:00	23:59	MTWRF	70-72	OFF	72-74	OFF	72-74	OFF	7:00	MTWRF	72	55	74	OFF	
			4:00	18:00	SS	70-72	OFF	72-74	OFF	72-74	OFF	OFF	SS	OFF	55	OFF	OFF	
15 - Federal Warehouse	A	RTU-1 & RTU-4	N/A	N/A	MTWRF	68	55-63	72-78	72-80	72-90	72-90	6:00	MTWRF	68	55	74	OFF	3
			N/A	N/A	SS	68	55-63	72-78	72-80	72-90	72-90	OFF	SS	OFF	55	OFF	OFF	
15 - Federal Warehouse	B	RTU-2 & RTU-3	6:00	18:00	MTWRF	66	55-59	68-73	90	90	90	6:00	MTWRF	66	55	74	OFF	
			6:00	18:00	SS	66	55-59	68-73	90	90	90	OFF	SS	OFF	55	OFF	OFF	
15 - Federal Warehouse	C	RTU-5, RTU-6, RTU-8, RTU-9	6:00	18:00	MTWRF	63-66	55-60	71-76	73-90	73-90	73-90	6:00	MTWRF	65	55	74	OFF	
			6:00	18:00	SS	63-66	55-60	71-76	73-90	73-90	73-90	OFF	SS	OFF	55	OFF	OFF	
15 - Federal Warehouse	D	RTU-7	5:00	17:00	MTWRF	70	60	74	90	90	90	6:00	MTWRF	70	55	74	OFF	
			5:00	17:00	SS	70	60	74	90	90	90	OFF	SS	OFF	55	OFF	OFF	
15 - Federal Warehouse	D	RTU-10	0:00	23:59	MTWRF	70-72	70-72	72-74	72-74	72-74	72-74	6:00	MTWRF	70	55	74	OFF	
			0:00	23:59	SS	70-72	70-72	72-74	72-74	72-74	72-74	OFF	SS	OFF	55	OFF	OFF	
20 - Tri County Health	A	AC-1	0:00	23:59	MTWRF	70-72	70-72	72-74	72-74	72-74	72-74	7:00	MTWRF	72	55	74	OFF	
			0:00	23:59	SS	70-72	70-72	72-74	72-74	72-74	72-74	OFF	SS	OFF	55	OFF	OFF	
20 - Tri County Health	B	F-3 to F-6	0:00	23:59	MTWRF	70-72	70-72	72-74	72-74	72-74	72-74	7:00	MTWRF	72	55	74	OFF	
			0:00	23:59	SS	70-72	70-72	72-74	72-74	72-74	72-74	OFF	SS	OFF	55	OFF	OFF	
20 - Tri County Health	C	RTU-1 to RTU-4	0:00	23:59	MTWRF	70-72	70-72	72-74	72-74	72-74	72-74	7:00	MTWRF	72	55	74	OFF	
			0:00	23:59	SS	70-72	70-72	72-74	72-74	72-74	72-74	OFF	SS	OFF	55	OFF	OFF	

[illegible]

The existing schedule reflects the schedule that was used during the baseline utility period, which may differ from the current schedule. Since the existing schedule for this unit is unknown, the unit was assumed to be operating according to the existing schedule shown for the units at Arapahoe Plaza East Building. The schedule readout on the programmable thermostat was dysfunctional during the time of the survey. Some of the areas served by the WSHP's are occupied during times outside of the proposed operating schedule. Since each WSHP will be controlled independently, each WSHP will have its own operating schedule that can be modified to accommodate a specific occupancy schedule.

# **Appendix C**

## **Points Lists**

LOCATION: Arapahoe County, CO 5/5/2004	Description	Location	HARDWARE										SOFTWARE					COMMENTS AND SPECIAL FUNCTIONS			
			EMS OUTPUTS					EMS INPUTS													
			DIGITAL		ANALOG			DIGITAL		ANALOG											
			Relay	Solenoid	Contactors	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature	Relative Humidity	PSI, or PSIG, or PSD	Carbon Monoxide Level /		Air Flow (CFM)	Trend	Schedule
01 - Administration Building New EMCS Installation	NEW POINTS																				
	Outside Air Temperature										1						1/2 hr				F.U.S
	Chillers (CH-1 & CH-2)	1st Floor Mech. Rm.	1														COS			X	U
	CH-1 Alarm									1							COS			X	U
	CH-1 Status									1							COS			X	U
	CH-1 Supply Water Temp										1						1 hr				U
	CH-2 Start/Stop		1														COS				U
	CH-2 Alarm									1							COS			X	U
	CH-2 Status									1							COS			X	U
	CH-2 Supply Water Temp										1						1 hr				U
	Common CHW Supply Temp										1						1 hr				U
	Common CHW Return Temp										1						1 hr				U
	CHW Pump P-1 Start/Stop		1														COS			X	U
	CHW Pump P-1 Status										1						COS			X	U
	CHW Pump P-2 Start/Stop		1														COS				U
	CHW Pump P-2 Status									1							COS			X	U
	Cooling Tower																				
	Cooling Tower Fan Start/Stop	Outside	1														COS				U
	Cooling Tower Fan Status										1						COS			X	U
	CW Pump P-3 Start/Stop		1														COS				U
	CW Pump P-3 Status										1						COS			X	U
	CW Pump P-4 Start/Stop		1														COS				U
	CW Pump P-4 Status										1						COS			X	U
	CW Supply Temp											1					1 hr				U
	CW Return Temp											1					1 hr				U
	Boilers (B-1, B-2, & B-3)																				
Boiler B-1 Start/Stop	1st Floor Mech. Rm.	1														COS				U	
Boiler B-1 Alarm										1						COS			X	U	
Boiler B-2 Start/Stop		1														COS				U	
Boiler B-2 Alarm										1						COS			X	U	
Boiler B-3 Start/Stop		1														COS				U	
Boiler B-3 Alarm										1						COS			X	U	
Common HW Supply Temp											1					1 hr				U	
Common HW Return Temp																1 hr				U	
HW Pump P-3 Start/Stop		1														COS			X	U	
HW Pump P-3 Status										1						COS				U	
HW Pump P-4 Start/Stop		1														COS				U	
HW Pump P-4 Status										1						COS			X	U	
Hydronic Loop Valves																					
V-1 HW Surge Tank 3-Way Valve	1st Floor Mech. Rm.			1																U	
V-2 CHW Surge Tank 3-Way Valve				1																U	
V-3 Cooling Tower Bypass Valve				1																U	
V-4 CHW System 3-Way Valve for P-1				1																U	
V-5 CHW System 3-Way Valve for P-2				1																U	
V-6 HW System 2-Way Valve				1																U	
TOTALS			12	0	0	0	6	0	0	0	0	0	14	9	0	0					



LOCATION Arapahoe County, CO 5/5/2004	Description	Location	HARDWARE										SOFTWARE				COMMENTS AND SPECIAL FUNCTIONS					
			EMS OUTPUTS					EMS INPUTS														
			DIGITAL		ANALOG			DIGITAL	ANALOG				Trend		Alarm			Graphic				
			Relay	Solenoid	Contactlor	PE Transducer	EP Transducer	0-10Vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature	Relative Humidity	PSI, or PSIG, or PSD		Carbon Monoxide Level /	Air Flow (CFM)			
01 - Administration Building New EMCS Installation	AH-4	North Penithouse Mech. Rm.	1															E	COS			U
	Supply Fan Start/Stop																		COS	X		U
	Supply Fan Status										1											U
	Supply Fan VFD Drive Speed																		1 hr			U
	Supply Fan VFD Feed Back																		1 hr			U
	Duct Static Pressure																		COS			F.U
	Return/Exhaust Fan Start/Stop																		COS			U
	Return/Exhaust Fan Status										1								COS	X		U
	Mixed Air Damper																					U
	Mixed Air Temperature																		1 hr			U
	Return Air Temperature																		1 hr			U
	CHW Coil Valve																					U
	Discharge Air Temperature																		1 hr			U
	Space Temperature	1st Flr. North																	1 hr			F.U
	Space Temperature	2nd Flr. North																	1 hr			F.U
	Space Temperature	3rd Flr. North																	1 hr			F.U
	Space Temperature	4th Flr. North																	1 hr			F.U
TOTALS			2	0	0	0	2	1	0	0	0	0	2	7	0	1	0	1				

Total New Points For This Sheet

16

Total New Points For This Building

93

LOCATION Arapahoe County, CO 5/5/2004	Description	Location	HARDWARE										SOFTWARE				COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Total New Points For This Sheet

169

Total New Points For This Building

169



LOCATION Arapahoe County, CO 5/5/2004	Description	Location	HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Total New Points For This Sheet











LOCATION Arapahoe County, CO 5/5/2004	Description	Location	HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Total New Points For This Sheet

331

Total New Points For This Building

367

LOCATION Arapahoe County, CO 6/30/2005	24 - Centrepont Building	Description	Location	HARDWARE										SOFTWARE		Trend COS = Change of state F = Floor Graphics U = Unit Graphic S = Summary Graphic	Note (1) Schedule	Note (2) Trend	Note (3) Alarm	Graphic	COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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LOCATION Arapahoe County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS					
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			Relay	Solenoid	Contact	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature		Relative Humidity	PSI, or PSIG, or PSD	Carbon Monoxide Level /	Air Flow (CFM)	Trend
	EXISTING POINTS																			
	Outside Air Temperature											1					1/2 hr			F.U.S
	Boilers (B-1 - B-2)	Basement Mech. Rm	1																	
	Boiler B-1 Enable/Disable																			U
	Boiler B-1 Flame Failure Alarm																			X
	Boiler B-1 LO/HI Fire control		1																	1 hr
	Boiler B-2 Enable/Disable																			U
	Boiler B-2 Flame Failure Alarm																			X
	Boiler B-2 LO/HI Fire control		1																	1 hr
	Pump P-1 Start/Stop																			U
	Pump P-1 Status																			X
	Pump P-2 Start/Stop		1																	U
	Pump P-2 Status																			X
	Pump P-3 Status																			U
	Pump P-6 Status																			X
	Pump P-7 Status																			X
	Pump P-10 Status																			U
	Heat Exchanger Valve																			X
	Heat Exchanger HW Supply Temp																			1 hr
	AHU-1 HW Coil Valve																			U
	Chilled Water System	Basement Mech. Rm	1																	
	CH-1 Start/Stop																			COS
	CH-1 Status																			COS
	Pump P-3 Start/Stop		1																	COS
	Pump P-3 Status																			COS
	Pump P-4 Start/Stop		1																	COS
	Pump P-4 Status																			COS
	Pump P-8 Start/Stop		1																	COS
	Pump P-8 Status																			COS
	Pump P-9 Start/Stop		1																	COS
	Pump P-9 Status																			COS
	CH-1 Return Water Temp																			COS
	Condenser Water Valve																			1 hr
	Cooling Tower enable/Disable		1																	COS
	Cooling Tower Drain Valve		1																	COS
	Lighting Control																			
	Basement Lighting		1																	COS
	1st Floor Lighting		1																	COS
	2nd Floor Lighting		1																	COS
	3rd Floor Lighting		1																	COS
	4th Floor Lighting		1																	COS
	Exhaust Fan Control																			
	Exhaust fans 1-4, Transfer Fans 1-2 Start/Stop		1																	COS
	TOTALS		19	0	0	0	0	3	0	0	0	0	13	3	0	0				

Total Existing Points For This Sheet

LOCATION Arapahoe County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE	COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Total Existing Points For This Sheet 800

Total Existing Points 838

LOCATION		HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS								
6/30/2005	Description	EIMS OUTPUTS					EIMS INPUTS					Trend COS = Change of state F = Floor Graphic U = Unit Graphic S = Summary Graphic										
		Relay	Solenoid	Contactor	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override				Current Sensor	Temperature	Relative Humidity	PSI, or PSIG, or PSD	Carbon Monoxide Level /	Air Flow (CFM)		
Location																		Schedule	Note (1)	Note (2)	Note (3)	
EXISTING POINTS																						
	Outside Air Temperature																			1/2 hr		F,U,S
	Boilers (B-1 - B-3)																					
	Boiler B-1 Enable/Disable	Parking Garage Mech. Rm.	1																			
	Boiler B-1 Flame Failure Alarm																					
	Boiler B-1 Low Level Alarm																					
	Boiler B-1 LO/HI Fire control																					
	Boiler B-1 HW Supply Temp																					
	Boiler B-1 Pump Start/Stop																					
	Boiler B-1 Pump Status																					
	Boiler B-2 Enable/Disable	Mech. Rm.	1																			
	Boiler B-2 Flame Failure Alarm																					
	Boiler B-2 Low Level Alarm																					
	Boiler B-2 LO/HI Fire control																					
	Boiler B-2 HW Supply Temp																					
	Boiler B-2 Pump Start/Stop																					
	Boiler B-2 Pump Status																					
	Boiler B-3 Enable/Disable	Mech. Rm.	1																			
	Boiler B-3 Flame Failure Alarm																					
	Boiler B-3 Low Level Alarm																					
	Boiler B-3 LO/HI Fire control																					
	Boiler B-3 HW Supply Temp																					
	Boiler B-3 Pump Start/Stop																					
	Boiler B-3 Pump Status																					
	Common HW Return Temp																					
	DHW Meter																					
	Glycol Feed Alarm																					
	Alarm																					
	AHU-1																					
	Supply Fan Start/Stop		1																			
	Supply Fan Status																					
	Supply Fan Inlet Vanes Control																					
	Duct Static Pressure																					
	Return Fan Start/Stop		1																			
	Return Fan Status																					
	Return Fan Inlet Vanes Control																					
	Building Static Pressure																					
	Mixed Air Damper																					
	Return Air Temperature																					
	Discharge Air Temperature																					
	HW Coil Valve																					
	Evaporator Fan Start/Stop		1																			
	Evaporator Fan Status																					
	Evaporator Pump Start/Stop																					
	Evaporator Pump Status																					
	Evaporator Fill Valve		1																			
	Evaporator Drain Valve		1																			
	Filter Status																					
TOTALS			12	0	3	0	0	4	1	0	2	0	13	8	0	3	0					

LOCATION Arapahoe County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE										COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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LOCATION Apache County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE										COMMENTS AND SPECIAL FUNCTIONS	
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			Relay	Solenoid	Contact	PE Transducer	EP Transducer	0-10Vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature	Relative Humidity	PSI, or PSIG, or PSD	Carbon Monoxide Level /	Air Flow (CFM)	Trend:			Graphics:		
																		Note (1) Schedule	Note (2) Trend	Note (2) Alarm	Note (2) Graphic			
37 - ACJC Administration II Replace Siemens EMCS	AHU-1		1															A	COS			COS	U	
	Supply Fan Start/Stop																					X	U	
	Supply Fan Status																						U	
	Supply Fan Inlet Vanes Control																						U	
	Duct Static Pressure																						F.U	
	Mixed Air Damper																						U	
	Mixed Air Temperature																						U	
	Return Air Temperature																						U	
	Discharge Air Temperature																						U	
	CHW Coil Valve																							U
	AHU-2		1																B	COS			COS	U
Supply Fan Start/Stop																						X	U	
Supply Fan Status																							U	
Supply Fan Inlet Vanes Control																							U	
Duct Static Pressure																								F.U
Mixed Air Damper																								U
Mixed Air Temperature																								U
Return Air Temperature																								U
Discharge Air Temperature																								U
CHW Coil Valve																								U
AHU-3		1																	B	COS			COS	U
Supply Fan Start/Stop																							X	U
Supply Fan Status																								U
Supply Fan Inlet Vanes Control																								U
Duct Static Pressure																								F.U
Mixed Air Damper																								U
Mixed Air Temperature																								U
Return Air Temperature																								U
Discharge Air Temperature																								U
CHW Coil Valve																								U
AHU-4		1																	A	COS			COS	U
Supply Fan Start/Stop																							X	U
Supply Fan Status																								U
Supply Fan Inlet Vanes Control																								F.U
Duct Static Pressure																								U
Mixed Air Damper																								U
Mixed Air Temperature																								U
Return Air Temperature																								U
Discharge Air Temperature																								U
CHW Coil Valve																								U
TOTALS			4	0	0	0	12	4	0	0	0	0	12	0	4	0	0							

LOCATION		HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
37 - ACJC Administration II Replace Siemens EMCS		EMS OUTPUTS			EMS INPUTS							Trend: COS = Change of State F = Floor Graphics U = Unit Graphic S = Summary Graphic																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		DIGITAL	ANALOG	Relay	Solenoid	Contactor	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch				Switch Closure	Override	Current Sensor	Temperature	Relative Humidity	PSD	Level / PSI, or PSIG, or Carbon Monoxide	Air Flow (CFM)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Total Existing Points For This Sheet

461

Total Existing Points

546

LOCATION Arapahoe County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE			COMMENTS AND SPECIAL FUNCTIONS					
			EMS OUTPUTS					EMS INPUTS													
			DIGITAL		ANALOG			DIGITAL		ANALOG											
			Relay	Solenoid	Contactor	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature	Relative Humidity		PSI, or PSIG, or PSD	Carbon Monoxide Level /	Air Flow (CFM)	Trend	Alarm
EXISTING POINTS																					
	Outside Air Temperature											1					1/2 hr			F.U.S	
	RTU-1	Roof																			
	Supply Fan Start/Stop		1														A	COS	X	U	
	Supply Fan Status																	COS		U	
	Supply Air Damper Control		1																	U	
	Supply Fan VFD Control																			U	
	Exhaust Fan VFD Control																			U	
	Duct Static Pressure																			U	
	Building Static Pressure																			U	
	Exhaust Air Damper																			U	
	Outside Air Damper																			U	
	Mixed Air Temperature																			U	
	Return Air Temperature																			U	
	Discharge Air Temperature																			U	
	Natural gas burner - 1																			U	
	Natural gas burner - 2		1																	U	
	Natural gas burner - 3		1																	U	
	Natural gas burner - 4		1																	U	
	DX Cooling Compressor - A		1																	U	
	DX Cooling Compressor - B		1																	U	
	DX Cooling Compressor - C		1																	U	
	DX Cooling Compressor - D		1																	U	
	RTU-2	Roof																			
	Supply Fan Start/Stop		1																	U	
	Supply Fan Status																			U	
	Supply Air Damper Control		1																	U	
	Supply Fan VFD Control																			U	
	Exhaust Fan VFD Control																			U	
	Duct Static Pressure																			U	
	Building Static Pressure																			U	
	Exhaust Air Damper																			U	
	Outside Air Damper																			U	
	Mixed Air Temperature																			U	
	Return Air Temperature																			U	
	Discharge Air Temperature																			U	
	Natural gas burner - 1		1																	U	
	Natural gas burner - 2		1																	U	
	Natural gas burner - 3		1																	U	
	Natural gas burner - 4		1																	U	
	DX Cooling Compressor - A		1																	U	
	DX Cooling Compressor - B		1																	U	
	DX Cooling Compressor - C		1																	U	
	DX Cooling Compressor - D		1																	U	
TOTALS			18	0	0	0	0	8	2	0	0	0	0	7	0	4	0				

LOCATION Apache County, CO 6/30/2005		HARDWARE										SOFTWARE				COMMENTS AND SPECIAL FUNCTIONS	
Description		EMS OUTPUTS					EMS INPUTS					Trend: COS = Change of State F = Floor Graphics U = Unit Graphic S = Summary Graphic					
		DIGITAL		ANALOG			DIGITAL		ANALOG								
		Relay	Solenoid	Contact	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override						Current Sensor
Location																	
RTU-3		Roof															
Supply Fan Start/Stop		1															
Supply Fan Status																	
Supply Air Damper Control		1															
Supply Fan VFD Control		1															
Exhaust Fan VFD Control		1															
Duct Static Pressure		1															
Building Static Pressure		1															
Exhaust Air Damper		1															
Outside Air Damper		1															
Mixed Air Temperature		1															
Return Air Temperature		1															
Discharge Air Temperature		1															
Natural gas burner - 1		1															
Natural gas burner - 2		1															
Natural gas burner - 3		1															
DX Cooling Compressor - A		1															
DX Cooling Compressor - B		1															
DX Cooling Compressor - C		1															
DX Cooling Compressor - D		1															
RTU-4		Roof															
Supply Fan Start/Stop		1															
Supply Fan Status																	
Supply Air Damper Control		1															
Supply Fan VFD Control		1															
Exhaust Fan VFD Control		1															
Duct Static Pressure		1															
Building Static Pressure		1															
Exhaust Air Damper		1															
Outside Air Damper		1															
Mixed Air Temperature		1															
Return Air Temperature		1															
Discharge Air Temperature		1															
Natural gas burner - 1		1															
Natural gas burner - 2		1															
Natural gas burner - 3		1															
DX Cooling Compressor - A		1															
DX Cooling Compressor - B		1															
DX Cooling Compressor - C		1															
DX Cooling Compressor - D		1															
TOTALS		18	0	0	0	0	8	2	0	0	0	0	0	0	4	0	0

LOCATION Arapahoe County, CO 6/30/2005	Description	Location	HARDWARE										SOFTWARE		COMMENTS AND SPECIAL FUNCTIONS						
			EMS OUTPUTS					EMS INPUTS													
			DIGITAL		ANALOG			DIGITAL		ANALOG											
			Relay	Solenoid	Contactors	PE Transducer	EP Transducer	0-10vdc or 4-20 mA	Pressure Switch	Flow Switch	Switch Closure	Override	Current Sensor	Temperature		Relative Humidity	PSI, or PSIG, or PSD	Carbon Monoxide Level /	Air Flow (CFM)	Note (1) Schedule	Note (2) Trend
38 - Sheriff/Coroner Facility	RTU-5	Roof															A	COS			
	Supply Fan Start/Stop		1															COS	X		U
	Supply Fan Status																	COS			U
	Supply Air Damper Control		1																		U
	Discharge Air Temperature																	1hr			U
	Natural gas burner - 1																	COS			U
	Natural gas burner - 2																	COS			U
	Natural gas burner - 3																	COS			U
	DX Cooling Compressor - A																	COS			U
	DX Cooling Compressor - B																	COS			U
	Space Temperature Sensor																	1hr			U
	RTU-6	Roof															A	COS			U
	Supply Fan Start/Stop		1															COS	X		U
	Supply Fan Status																				U
	Supply Air Damper Control		1																		U
	Discharge Air Temperature																	1hr			U
Fan Powered VAV Boxes (32 Boxes)	Natural gas burner - 1																	COS			U
	Natural gas burner - 2																	COS			U
	Natural gas burner - 3																	COS			U
	DX Cooling Compressor - A																	COS			U
	DX Cooling Compressor - B																	COS			U
	Space Temperature Sensor																	1hr			U
	Fan Powered VAV Boxes (32 Boxes)																A	COS			U
	Fan Start/Stop		32																		U
	VAV Damper																				U
	1st Stage Electric Heat		32																		U
	2nd Stage Electric Heat		32																		U
	Air Flow (CFM)																	1hr			U
	Space Temperature																	1 hr			F.S
	VAV Boxes (62 Boxes)																	A			U
	VAV Damper																				F.S
	Air Flow (CFM)																	1 hr			F.S
Space Temperature																					
TOTALS			110	0	0	0	0	0	94	2	0	0	0	0	0	192	0	0	0	0	0



## **Appendix D**

# **Weighted Average Service Life of the Project**

# APPENDIX D - WEIGHTED AVERAGE SERVICE LIFE OF THE PROJECT

	L&M Budget	Project Amount	% of Total	Estimated Service Life (Years)	Source
ECM					
Lighting Energy Efficiency Improvements		987,028	17.5%	11	2
Water Conservation Measures		158,604	2.8%	25	2
Water Conservation Measures w/ Waterless Urinal Retrofit		284,745	5.0%	25	2
Install New/Upgrade the Existing EMCS		1,818,146	32.2%	15	1
Install Programmable Thermostats		5,531	0.1%	15	1
Replace the Existing Chillers and Cooling Tower		174,732	3.1%	22	1
Replace the Existing Natural Gas Fired Boilers		254,842	4.5%	25	1
Install a New VFD on Existing Exhaust Fan		31,157	0.6%	15	2
Install a New VFD on Existing Vane Axial Fan		117,963	2.1%	15	2
Install A/C Units to Serve Computer Equipment Rooms		84,388	1.5%	20	1
Water Softener		400,401	7.1%	15	2
Waterside Economizer		82,031	1.5%	24	1
Irrigation Control System Upgrade		29,651	0.5%	15	1
Programmable Flush Valve Controls		743,272	13.2%	15	1
Water Reclaim		52,434	0.9%	10	1
Laundry Conservation		52,747	0.9%	15	2
Replace DHW HX with new DHW Heater		25,935	0.5%	24	1
Energy Resource Conservation Management Program		78,169	1.4%	19	3
New Cooling Tower		217,137	3.8%	20	1
Retro Commissioning		50,885	0.9%	15	1
Replace Existing Moduline Boxes w/ VAV Terminal Units		0	0.0%	23	1

5,649,798 100%

WEIGHTED AVERAGE SERVICE LIFE OF THE PROJECT:

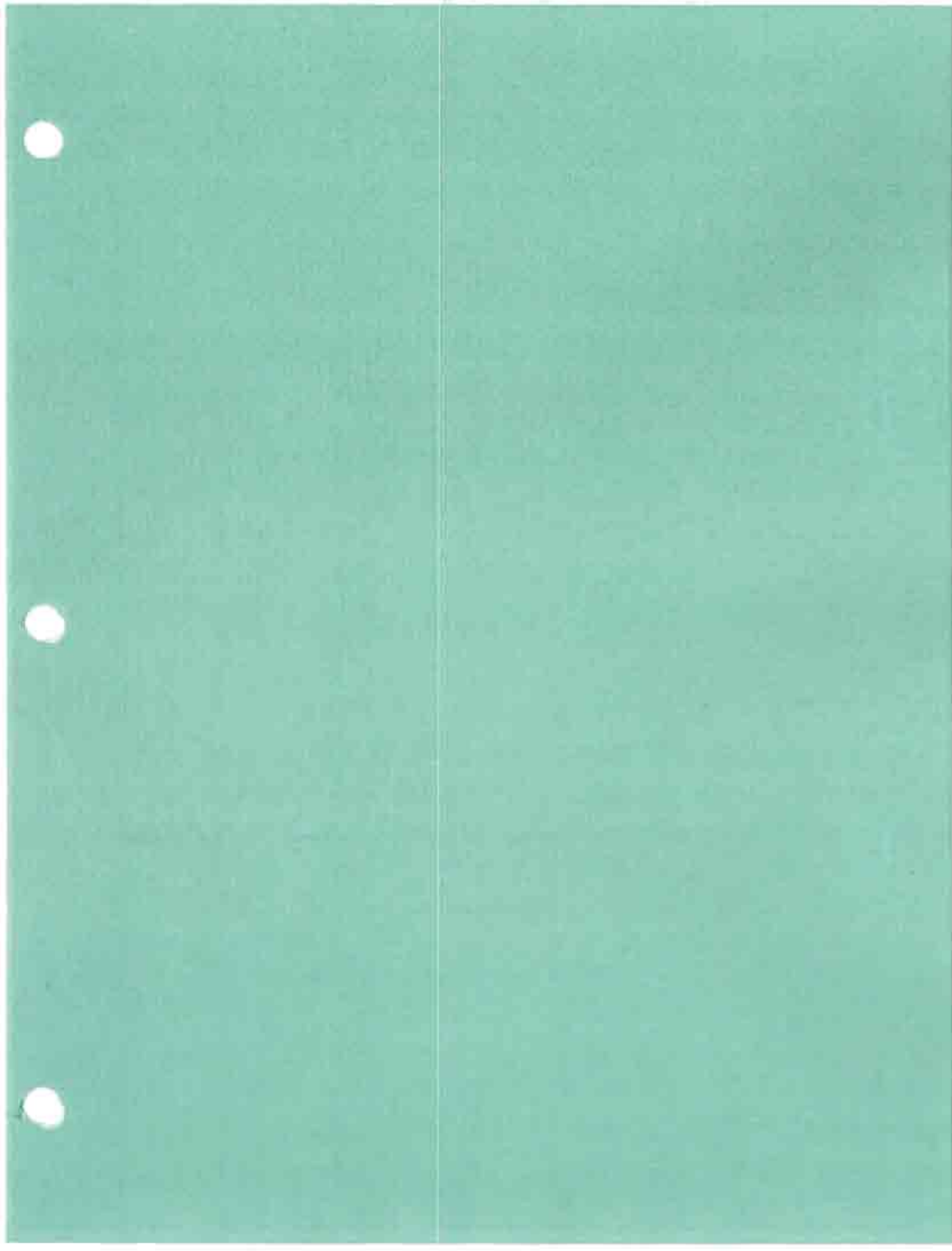
20.4

16.2

Sources of Estimated Service Life

- 1 2003 ASHRAE Applications Handbook, page 36.3
- 2 Manufacturers Literature
- 3 Life of Program





**Comprehensive  
Energy  
Analysis  
of  
Arapahoe County  
Littleton, Colorado**

**by:**

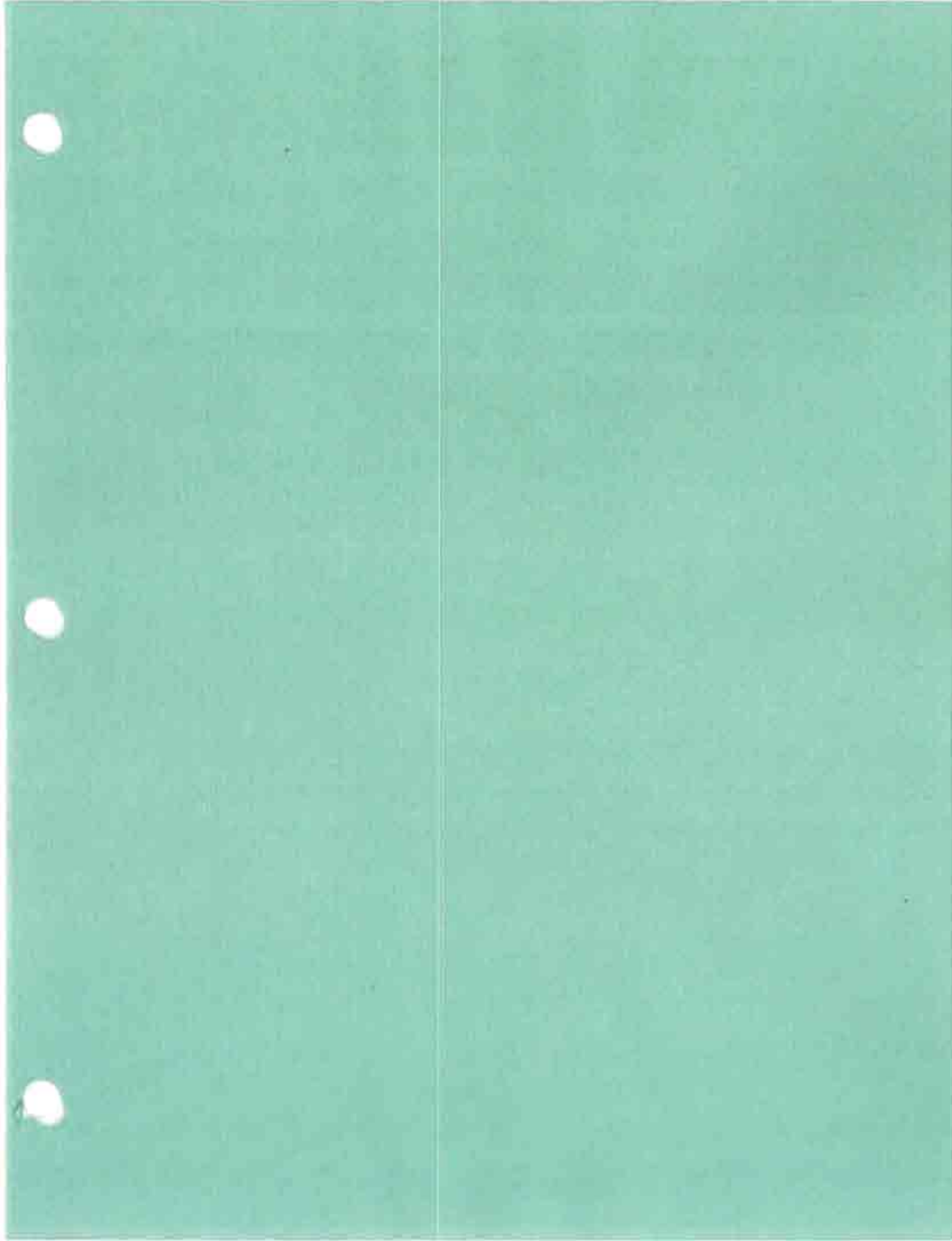
**Chevron Energy  
Solutions Company**

**October 2005**



**Volume 2 of 2**

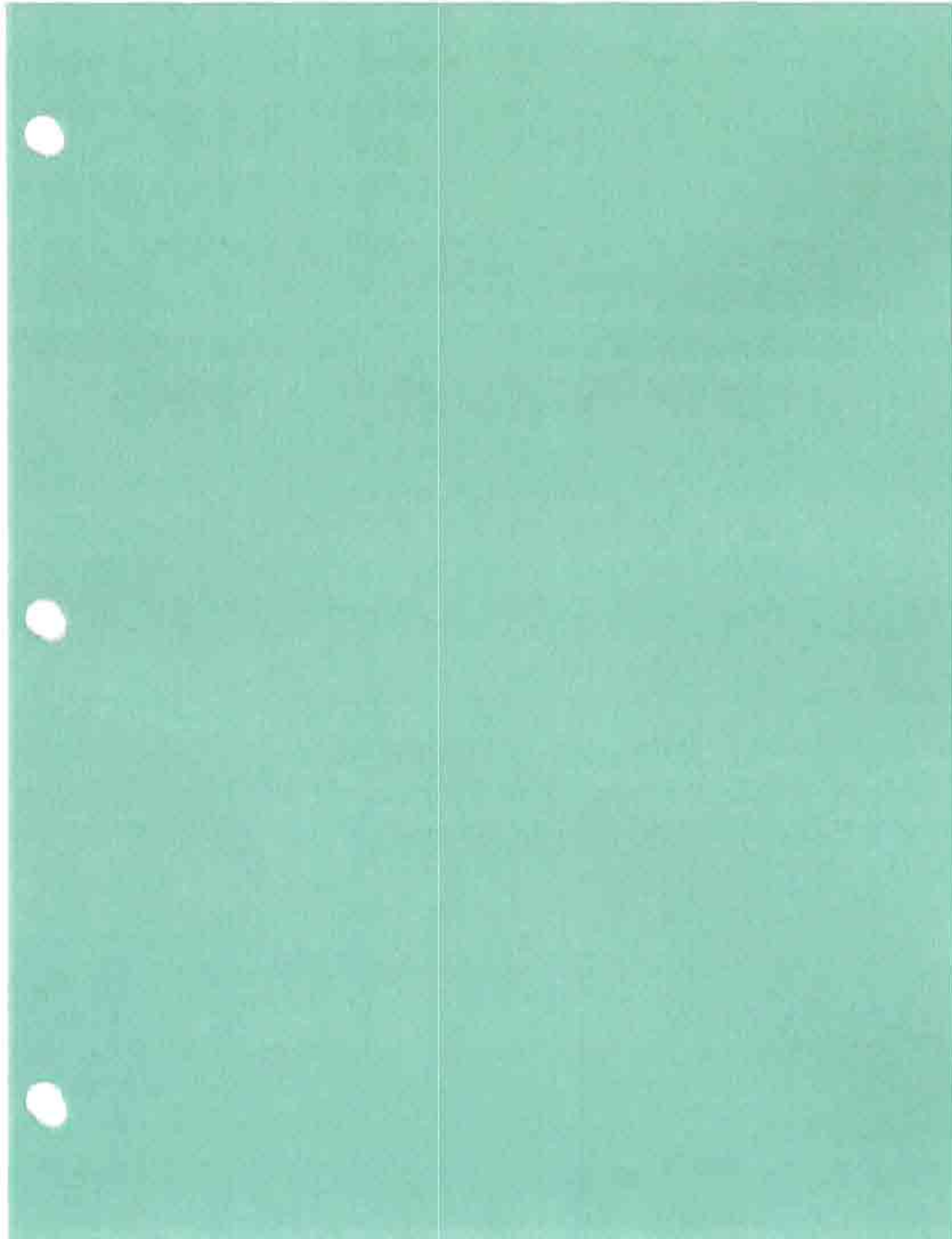
1	ECM 1: Lighting Energy Efficiency Upgrades
2	ECM 2: Water Conservation Measures
3	ECM 2a: Water Conservation Measures w/Waterless Urinals
4	ECM 3: Install New/Upgrade Energy Management System
5	ECM 4: Install Programmable Thermostats
6	ECM 5: Replace the Existing Chillers and Cooling Tower
7	ECM 6: Replace the Existing Natural Gas Fired Boilers
8	ECM 7: Install a New VFD on the Existing Exhaust Fan
9	ECM 8: Install a New VFD on Existing Vane Axial Fan
10	ECM 10: Install an A/C Unit to Serve Computer Equipment Room
11	ECM 12: Install Water Softener
12	ECM 13: Install Waterside Economizer
13	ECM 16: Irrigation Control System Upgrade
14	ECM 17: Programmable Flush Controls
15	ECM 18: Water Reclaim
16	ECM 19: Laundry Conservation
17	ECM 20: Replace DHW HX with a New DHW Heater
18	ECM 21: Change Natural Gas Utility Provider
19	ECM 23: Energy Resource Conservation Manager
20	ECM 24: Replace Cooling Tower
21	ECM 25: Retro-Commissioning
22	ECM 26: Replace Modulines, Install VAV Boxes, Diffusers, Controls
23	
24	
25	
26	
27	
28	
29	
30	
31	



### ***ECM 1 – Lighting Energy Efficiency Upgrades (General for all buildings.)***

Details of Lighting Survey and Savings can be found in Appendix A, located in Volume 1 of 3 of this Comprehensive Energy Analysis.

- IES recommended luminance levels are met in all areas as foot candle readings were taken in most areas during the survey. Areas that are under lit will have light levels raised to IES standards.
- Fixture watt data taken from manufacturers' literature.
- Diversity factors applied to saving.
- IES Standards will be met in all rooms. Light level readings will be taken after construction.
- A standard safety factor is applied to all savings calculations. For lighting this factor ranges from .9 to .95.
- For all buildings with natural gas heat, the kWh saved per year shall be multiplied by 0.01004 to arrive at the heating penalty in therms of natural gas.
- No air conditioning credit is currently calculated.



## ECM 2 – Water Conservation Measures

### Modeling the Water Usage.

General:

Domestic Water usage for each building was modeled using population figures, both staff and visitors, occupancy schedules, fixture usage rates as determined in the survey and average estimates of fixture usage. The model is then compared to the metered usage and reasonable adjustments to the model are made to reflect the metered usage. In general, the fixture rates were adjusted to bring the model rates safely below the metered rates. After matching the water model to the building use, various water conservation scenarios were applied to the model to analyze potential savings.

The water usage is determined by:

$$(\text{Number of People}) \times (\text{Fixture Rate}) \times (\text{Uses per Day}) \times (\text{Days Occupied per Year})$$

Visitor populations were also included. Visitation period was assumed to be for .5 hours for the Admin 1 A/D Works buildings and 2 hours for the Court Houses, the detention center and Altura Plaza, and then the population was normalized to an 8 hr day and added to the given population figure using the following formula:

$$(\text{Number of Hours Visitation}) \div (8 \text{ hours}) \times (\text{Visitors/Day}) = \text{Normalized Visitor Population}$$

Fixture use rates:

There were some adjustments made to the fixture rates to bring the modeled usage in line with the metered data. Some of the adjustments were downward (lower GPF). Some were adjusted upward; this is justified as long as all water is accounted for. Maladjusted flush valves and leaking tank valves can account for significant losses. Also, where there was a mix of fixtures, a weighted average was applied to the model, which also lowered the modeled fixture rate.

The following table illustrates the uses per day per person used in the models.

Uses per day	Inmates		Staff		Visitors		Units
	Male	Female	Male	Female	Male	Female	
Toilet	5	5	1	4	1	4	Flushes
Urinal	0	0	3	0	3	0	Flushes
Lav Faucet	1	1	0.7	0.7	0.7	0.7	Minutes
Shower (M F)		10	0	0	0	0	Minutes

\*Based on: "A Water Conservation Guide for Commercial Institutional and Industrial Users", Water Use and Conservation Bureau, New Mexico Office of the State Engineer.

Schedules are considered only to the extent that the days that the buildings are open and the building are populated.

Schedules:

	Office (staff and visitors)	Detention Center
Work days	250	365
Holidays	-10	0
Vacation	-14	0
Total	226	365

Population assumptions are listed below:

	Population (1)	Visitors / day (2)	Quantity of toilets
Administration #1	358	1000*	44
Arapahoe Plaza (A/D works)	60	100	11
Arapahoe Plaza (Human Services)	90	500	19
Arapahoe Plaza (County Court)	30	500	19
CSU Extension Office	16	0 (3)	4
CSU Ware House	0		1
Federal Blvd Warehouse	15	15	10
Tri County Health	NA	NA	8
Administration #2	250	100	32
ACJC District Court	109	1500	79
P.J. Sullivan Detention Center	195	163	71
P.J. Sullivan Detention Center (Comby)	1215	0	413
County Shops:	35	0	6
Altura Plaza	145	1600	55
Total			772

- (1) Population figures are as given by the Maintenance Staff.
- (2) Visitor figures as per Arapahoe County Staff.
- (3) There are no public bathroom facilities.

In considering water conservation measures, the following principles apply.

**Permanence:** The measures must be durable. Tank toilets should be pressure-assisted models. Tanks with flapper controls are prone to phantom leaks that go undetected and unreported, wasting many gallons before they are repaired.

**Reliability:** The completed toilet replacement measures should work as intended, with adequate flows and volumes to remove waste and stay clean. It is possible to install ultra low flush equipment on existing china, but the resulting system will not function properly resulting in double flushing to remove waste, negating any savings. The china must be replaced in order to achieve the full performance of the system.

**Durability:** The fixtures should be of a quality to hold up to the level of usage required.

Standardization: The equipment installed should be of one make to simplify procurement of parts and maintenance requirements.

In addition to replacing the toilets, faucet aerators should be inspected and replaced where they are missing or exhibiting excessive flow. Most of the faucets were in good shape with low flows or metering handles with only a few faucets running greater than 2 GPM.



Arapahoe County Domestic Water  
ACJC Detention Center

<b>Assumptions</b>	<b>Billing units</b>	<b>\$/unit</b>
Staff Population	DHW heating source	\$0.5300
Pop Ratio Female	Fuel conversion source	\$0.6560
Visitor Population	Nat. Gas System Efficiency	82.00%
Pop Ratio Male		
Inmate Population		
Pop Ratio Female		
Population Inmate		
Staff Absentee rate		0.00%
Visitors/day		163
Visitor ratio Female		0.8
Length of stay(hours)		1.2
Days/year		365
Site Type (Res Comm)		res
Common Laundry?		no
Quantity of Machines		6
Quantity of Apt Units		88
Laundry Population		0
non resident factor		0.01
<b>Water Temperature</b>		
Street		54
DHW supply		130
DHW Efficiency		0.7
<b>Laundry</b>		
Cycle/person/day		0
Gallons/load Pre		37.5
Gallons/load Post		25
<b>Ice Machine Calc.</b>		
Lbs / Day		300 lbs
Lbs/Year		109500 lbs/year
Gallons / year		13145.3 gallons/year
Gallons of water/100 lbs of ice process waste		4 gallons/day
Process waste		4380 gallons/year
Storage waste / day		24 gallons/day
Est. Storage Waste		8760 gallons/year
Number of Ice Machines		2 gal
Total Storage Waste		17520 gallons/year
Total Ice Machine Usage (Gallons)		35045 gallons/year

**Arapahoe County Domestic Water  
ACJC Detention Center**

556.162

Feature Diversity	GPF	Weighted	
		Quantity	Average
Total		18	0.350
Total		35	71
Comby		16	30.83
Comby		4	385
Unind		1	0.200
Unind		2	22

Immature pods 2A5		
Population:	400	Pop 1200
Immature: War	90	0.2
Immature: Mor	320	0.8
Immature: Tot	400	
Aberr		0.00%

Population	1985	Pop Ratio
Indonesian Women	163	0.2
Indonesian Men	582	0.8
Indonesian Total	915	
Absent		0.00%

Shift	Prod/Unit	Staff	Pop Ratio
Production	117	0.6	
Staff: Women	78	0.4	
Staff: Men	195		
Staff: Total		0.04%	
Absent			
Visitors			
Length of stay: 8 hour day		15%	1.20

Visitors: Total per day	183
Visitors: Women conv to prison days	20
Visitors: Men conv to prison days	5
	0.8
	0.2

Table 1. The effect of the treatment on the growth of <i>S. aureus</i> in the milk.									
Time (h)	pH	Total viable count (log CFU/ml)	Enterococci (log CFU/ml)	Staphylococci (log CFU/ml)	Lactobacilli (log CFU/ml)	Enterococci		Staphylococci	
						CFU/ml	%	CFU/ml	%
0	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
2	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
4	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
6	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
8	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
10	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
12	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
14	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
16	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
18	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
20	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
22	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
24	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
26	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
28	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
30	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
32	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
34	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
36	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
38	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
40	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
42	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
44	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
46	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
48	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
50	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
52	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
54	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
56	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
58	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
60	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
62	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
64	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
66	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
68	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
70	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
72	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
74	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
76	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
78	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
80	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
82	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
84	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
86	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
88	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
90	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
92	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
94	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
96	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
98	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100
100	6.5	10 <sup>8.5</sup>	10 <sup>7.5</sup>	10 <sup>8.5</sup>	10 <sup>7.5</sup>	100	100	100	100

[illegible][illegible]

Typical Range	Benchmarks Admin 1
25-36	170
	Usage/SF less Impaction

Sanitary Water Use Summary	Gallons	Cost / person / year	Cost / SF / Year	Cost / person / day
Personal Usage Pk1	21,071	136.430	93	360
Personal Usage Pk2	18,250	84.0	63	256
Shower Usage Pk1	1,330	550	19	19
Shower Usage Pk2	1,670	510	2	9
Wrestler Usage Pk1	190,087	975	3	3
Wrestler Usage Pk2	93,853	481	1	1
Total Usage Pk1	22,505	508	96	365
Total Usage Pk2	19,072	332	65	256
Personal Usage Pk1	19,072	332	65	256
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	(Mmbtu)	Therms	kWh
Energy Pro (Mmbtu)	5,156	51,359	1,522,368
Energy Prod (Mmbtu)	5,077	50,774	1,487,661
Energy Savings	119	1,185	34,727
% Savings (Hot Water)	2.3%		

Arapohoe County Domestic Water  
ACJC Detention Center

APSE Data Book Chapter 4 `1989

Kitchen	
Water Use single seat	0.7 /meal
Water Use Full Service	1.5

Number of Inmates	1,215
Number of Meals /inmate / day	2.2
Number of Meals / day	2,625
Gallons/meal	1.5

Gallons/day	3,938
Gallons/year	1,437,188

Hobart LX	
Gals/rack	1.2
Cycles/day	30
Cycles/year	10,950
Gals/year	13,140

Stero Tray Washer	



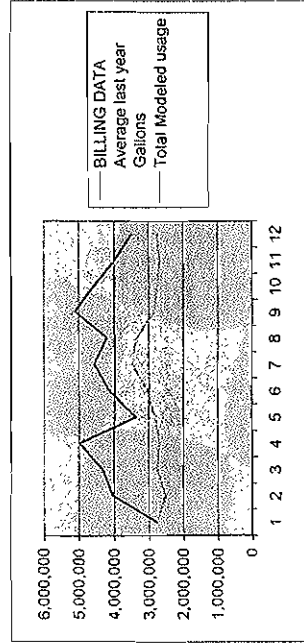
Arapahoe County Domestic Water  
ACJC Detention Center

Water Sewer  
Differential Differential

BILLING DATA	Average last year Gallons	Staff days per month	Visitors days per month	Population days	Sanitary Water Use Model	Balance	Gallons Saved	Water Dollars Saved	Sewer Dollars Saved	Total Dollars Saved	Sewer Differential	Water Differential
Jan	2,756,486	31	31	6,820	2,428,919	327,567	814,173	\$3,542	\$2,833	\$6,375	13%	
Feb	4,021,000	28	28	6,160	2,193,862	1,827,138	735,382	\$3,199	\$2,559	\$5,758	83%	
Mar	4,314,714	31	31	6,820	2,428,919	1,885,795	814,173	\$3,542	\$2,833	\$6,375	78%	
Apr	4,884,286	30	30	6,600	2,350,567	2,633,719	787,909	\$3,427	\$2,742	\$6,169	112%	
May	3,868,529	31	31	6,820	2,428,919	939,610	814,173	\$3,542	\$2,833	\$6,375	39%	
June	4,151,471	30	30	6,600	2,350,567	1,800,904	787,909	\$3,427	\$2,742	\$6,169	77%	
Jul	4,564,677	31	31	6,820	2,428,919	2,135,758	814,173	\$3,542	\$2,833	\$6,375	88%	
Aug	4,210,161	31	31	6,820	2,428,919	1,751,242	814,173	\$3,542	\$2,833	\$6,375	73%	
Sep	5,095,161	30	30	6,600	2,350,567	2,744,584	787,909	\$3,427	\$2,742	\$6,169	117%	
Oct	4,572,727	31	31	6,820	2,428,919	2,143,808	814,173	\$3,542	\$2,833	\$6,375	88%	
Nov	3,977,273	30	30	6,600	2,350,567	1,626,706	787,909	\$3,427	\$2,742	\$6,169	69%	
Dec	3,475,000	31	31	6,820	2,428,919	1,046,081	814,173	\$3,542	\$2,833	\$6,375	43%	
	49,491,485	365		80,300	28,598,560	20,892,925	9,586,227	41,700	\$39,360	\$75,060		19%

28,598,560

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total	Modelled usage	Modelled to billing ratio
327,567	1,827,138	1,885,795	2,633,719	939,610	1,800,904	2,135,758	1,751,242	2,744,584	2,143,808	1,626,706	1,046,081	20,892,925	2,750,431	0%
328	1,827	1,886	2,634	940	1,801	2,136	1,781	2,745	2,143	1,627	1,046	20,893	2,750,431	37%
2,920	2,920	2,920	2,920	2,920	2,920	2,920	2,920	2,920	2,920	2,920	2,920	35,045	2,750,431	36%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	46%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	16%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	27%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	24%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	21%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	44%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	40%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	33%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	21%
0	0	0	0	0	0	0	0	0	0	0	0	0	2,750,431	31%



Arapahoe County Domestic Water  
ACJC Detention Center

Code	Units
1	Gal
2	Kgal
3	CF
4	CCF
5	MCF
2	<<< enter unit code

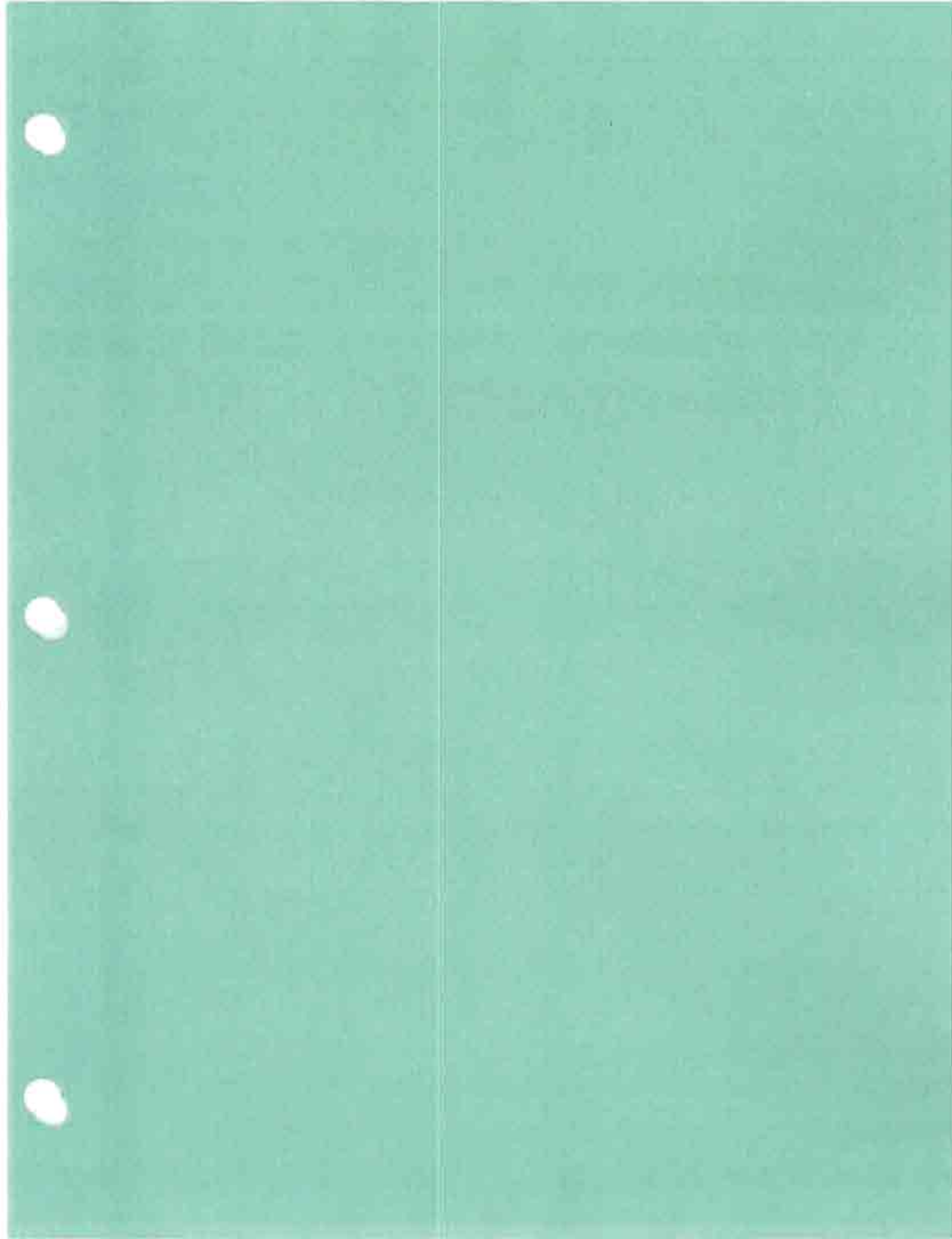
Water Rate	Sewer Rate
< 25,000 gal	\$0.00232
25,000 - 200,000	\$0.00290
> 200,000	\$0.00348
Minimum Usage	144,000 gals
Storm water fee	\$15.30
FireLineCharge	\$1,142.04
Capital Fund	\$317.50

Water	Sewer
Differential	Differential
\$0.00073	\$0.00058
\$0.00145	\$0.00116
	\$0.00522
	\$0.00653
	\$0.00783

Read Date	Month	Kgal/day	Usage	Gallons	Billing Days	Water Charges	Sewer Charges	Total Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total	\$/gallon Total
1/31/2004	Jan	110	2,756	Kgal	2,756.486	\$11.847	\$9.477	\$21.324	\$7.804	\$0.00430	0.0034379	0.0077357	0.0154714
2/25/2004	Feb	134	4,021	Kgal	4,021.000	\$17.347	\$13.877	\$31.224	\$6.771	\$0.00431	0.0034512	0.0077653	0.0155307
3/25/2004	Mar	123	4,315	Kgal	4,314.714	\$18.625	\$14.899	\$33.524	\$8.368	\$0.00432	0.0034531	0.0077787	0.0155395
4/30/2004	Apr	185	4,984	Kgal	4,984.286	\$21.538	\$17.229	\$38.767		\$0.00432	0.0034567	0.0077778	0.0155557
5/27/2004	May	99	3,369	Kgal	3,368.529	\$14.509	\$11.606	\$26.115		\$0.00431	0.0034456	0.0077528	0.0155056
6/30/2004	Jun	138	4,151	Kgal	4,151.471	\$17.915	\$14.331	\$32.246		\$0.00432	0.0034521	0.0077674	0.0155347
7/30/2004	Jul	147	4,565	Kgal	4,564.677	\$19.712	\$15.769	\$35.481		\$0.00432	0.0034546	0.0077730	0.0155461
8/30/2004	Aug	136	4,210	Kgal	4,210.161	\$18.170	\$14.535	\$32.705	\$8.178	\$0.00432	0.0034524	0.0077682	0.0155365
9/30/2004	Sep	182	5,095	Kgal	5,095.161	\$22.020	\$17.615	\$39.635		\$0.00432	0.0034572	0.0077790	0.0155579
10/28/2004	Oct	139	4,573	Kgal	4,572.727	\$19.747	\$15.797	\$35.544		\$0.00432	0.0034546	0.0077731	0.0155463
11/30/2004	Nov	128	3,977	Kgal	3,977.273	\$17.157	\$13.725	\$30.882	\$7.096	\$0.00431	0.0034508	0.0077646	0.0155293
12/31/2004	Dec	116	3,475	Kgal	3,475.000	\$14.972	\$11.977	\$26.949	\$1.752	\$0.00431	0.0034466	0.0077562	0.0155104
1/30/2005	Jan												

2756486	2756.486
4021000	4021
4314714	4314.714
4984286	4984.286
3368529	3368.529
4151471	4151.471
4564677	4564.677
4210161	4210.161
5095161	5095.161
4572727	4572.727
3977273	3977.273
3475000	3475

Arapahoe County Domestic Water										Water		Sewer	
ACJC Detention Center										per		per	
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***ECM 2a – Water Conservation Measures with Waterless Urinals***

Arapahoe County Domestic Water  
Administration Building

Assumptions	
Staff Population	358.00
Pop Ratio Female	50.00%
Visitor Population	1000
Pop Ratio Female	0.5
Length of Stay (hrs)	0.50
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	10.00%
Days/year	236
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

Energy Inputs	
DHW heating source	NG
Fuel conversion source	GC
Nat. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	208
Est. Storage Waste	8000
Number of Ice Machines	8000
Total Ice Machine Usage (Gallons)	8832



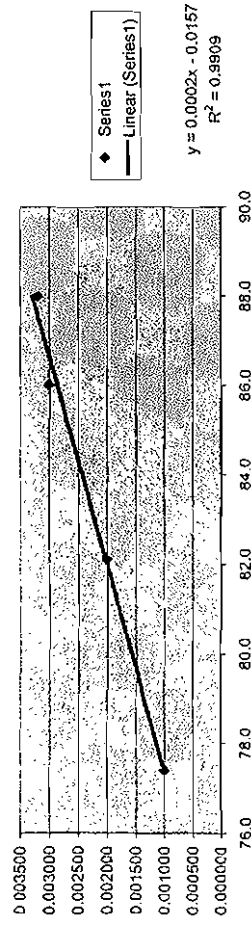
# Arapahoe County Domestic Water Administration Building

2.4 gallons/minute/100 tons of cooling	3 Rule of thumb CFM/SF
748 Chiller size	0.075 lb/cf density of air
Number of Chillers	122,833 SF of conditioned space
Design Load	368,499 CFM total
50% turn down	
24 minimum load	

<http://qweather.com/ccd/nrmccd.htm>

Month	CCD	% of CCD in this Month	Gallons / month
Jan	0	0%	0
Feb	0	0%	0
Mar	0	0%	0
Apr	2	0%	3,795
May	23	3%	43,638
Jun	135	19%	256,137
Jul	281	38%	495,199
Aug	217	31%	411,717
Sep	57	8%	108,147
Oct	0	0%	0
Nov	0	0%	0
Dec	0	0%	0
	695	1	1,318,634

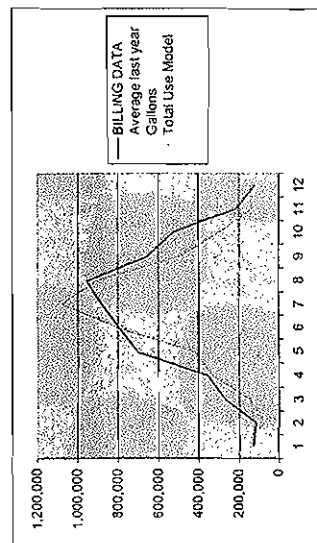
Month	DENVER Wet Bulb	DENVER RH	DENVER Mean Dry Bulb	DENVER High Temp Dry Bulb	Average High and mean	Psychrometric Chart Humidity Ratio (#moisture / # of dry air)	Gallons / month
Jan	24	49	36.4	43.2	39.8		
Feb	27	44	36.5	47.2	41.9		
Mar	31	40	43.1	53.7	48.4		
Apr	38	35	50.9	60.9	55.9		
May	46	38	61.0	70.5	65.8		
Jun	54	35	69.2	82.1	75.7	0.002000	286,659
Jul	58	34	78.2	88.0	83.1	0.002000	495,655
Aug	57	35	74.8	86.0	80.4	0.003000	429,989
Sep	50	34	65.9	77.4	71.7	0.001000	143,330
Oct	41	36	53.2	66.0	59.6		
Nov	31	49	41.0	51.5	46.3		
Dec	25	52	35.2	44.1	39.7		
	40	50	53.8	64.2	59.0		1,318,634



SELLING DATA		Sales days per month	Volume days per month	Position days	Satisfy water line model	Balance	Water Docks		Seed	Seed Price	Seed Rate	Seed Price
Year	Average seed per year						Water Docks	Seed				
201	175,341	22	22	1,777	33,351	-10,003	54,353	6	30	10	5	5
202	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
203	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
204	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
205	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
206	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
207	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
208	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
209	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
210	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
211	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
212	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
213	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
214	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
215	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
216	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
217	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
218	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
219	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
220	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
221	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
222	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
223	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
224	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
225	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
226	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
227	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
228	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
229	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
230	175,341	20	20	1,444	33,351	-10,003	54,353	6	30	10	5	5
231	175,341											

	Non Security Use	Non Security Use	Exposure Exposure	Incident	Loaned	Total Incident per Member	Base	First Use Base	Total Incident per Member
Jan	-10.35	-10	0	0	0	0	78	146.05	0
Feb	-13.85	-11	0	0	0	0	78	171.90	0
Mar	155.56	172	0	0	0	0	-113.55	142.15	0
Apr	155.56	172	0	0	0	0	-113.55	142.15	0
May	513.51	529	0	0	0	0	24.73	414.78	0
Jun	513.51	529	0	0	0	0	24.73	414.78	0
Jul	513.51	529	0	0	0	0	24.73	414.78	0
Aug	513.51	529	0	0	0	0	24.73	414.78	0
Sep	513.51	529	0	0	0	0	24.73	414.78	0
Oct	513.51	529	0	0	0	0	24.73	414.78	0
Nov	513.51	529	0	0	0	0	24.73	414.78	0
Dec	513.51	529	0	0	0	0	24.73	414.78	0
Jan	513.51	529	0	0	0	0	24.73	414.78	0
Feb	513.51	529	0	0	0	0	24.73	414.78	0
Mar	513.51	529	0	0	0	0	24.73	414.78	0
Apr	513.51	529	0	0	0	0	24.73	414.78	0
May	513.51	529	0	0	0	0	24.73	414.78	0
Jun	513.51	529	0	0	0	0	24.73	414.78	0
Jul	513.51	529	0	0	0	0	24.73	414.78	0
Aug	513.51	529	0	0	0	0	24.73	414.78	0
Sep	513.51	529	0	0	0	0	24.73	414.78	0
Oct	513.51	529	0	0	0	0	24.73	414.78	0
Nov	513.51	529	0	0	0	0	24.73	414.78	0
Dec	513.51	529	0	0	0	0	24.73	414.78	0

Coal Analysis	No. Scales Used	No. Scales Used	No. Scales Used	Exposure coefficient	Location	Altitude feet	Total Weight tonnage
Jan	41	30	30	0	0	0	
Feb	40	30	30	0	0	0	
Mar	42	30	30	0	0	0	
Apr	42	30	30	0	0	0	
May	42	30	30	0	0	0	
June	42	30	30	0	0	0	
July	42	30	30	0	0	0	
Aug	42	30	30	0	0	0	
Sept	42	30	30	0	0	0	
Oct	42	30	30	0	0	0	
Nov	42	30	30	0	0	0	
Dec	42	30	30	0	0	0	
Total	42	30	30	0	0	0	



Arapahoe County Domestic Water  
Administration Building

Code	Units
1	Gal
2	Kgal
3	Cf
4	Ccf
5	Mcf
2	<<< enter unit code

Summer rate \$3.000000 per  
Winter rate \$0.000000 per  
Water Rate \$2.570000 per  
Sewer Rate \$0.000000 per  
Service Charge \$85.20 bi monthly  
Storm water fee \$2.460.00 annual  
Fireline Charge \$15.03 bi monthly

Read Date	Month	Kgal/day	Usage	Gallons	Billing days	Water Charges	Sewer Charges	Total Watered Charges	Total Water Charges	Total Charges
5/27/2004	May	21	699	699,324	31	\$1,737	\$1,668	\$3,405	\$1,737	\$3,405
6/30/2004	Jun	26	790	789,762	30	\$2,036	\$1,968	\$3,968	\$2,036	\$3,968
7/30/2004	Jul	28	878	878,157	31	\$2,257	\$2,188	\$4,445	\$2,257	\$4,445
8/30/2004	Aug	31	955	954,706	31	\$2,454	\$2,385	\$4,839	\$2,454	\$4,839
9/30/2004	Sep	23	655	655,211	28	\$1,684	\$1,668	\$3,352	\$1,684	\$3,352
10/28/2004	Oct	16	505	504,794	33	\$1,349	\$1,332	\$2,681	\$1,349	\$2,681
11/30/2004	Nov	14	428	427,553	30	\$1,098	\$1,068	\$2,166	\$1,098	\$2,166
1/30/2005	Jan	14	428	427,553	30	\$1,098	\$1,068	\$2,166	\$1,098	\$2,166
										17199,222.03
										21619,876.03

129,964  
115,828  
266,561  
352,443  
699,329  
789,762  
878,157  
954,706  
655,211  
524,794  
214,553  
120,761

\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total
\$0.0021	\$0.0028	\$0.0050
\$0.0021	\$0.0032	\$0.0053
\$0.0021	\$0.0044	\$0.0065
\$0.0021	\$0.0010	\$0.0032
\$0.0026	\$0.0065	\$0.0091
\$0.0026	\$0.0003	\$0.0030
\$0.0026	\$0.0004	\$0.0030
\$0.0026	\$0.0004	\$0.0030
\$0.0026	\$0.0005	\$0.0031
\$0.0026	\$0.0007	\$0.0033
\$0.0021	\$0.0017	\$0.0039
\$0.0021	\$0.0031	\$0.0052

Arapahoe County Domestic Water  
Arapahoe Plaza East

<b>Assumptions</b>	
Staff Population	60.00
Pop Ratio Female	50.00%
Visitor Population	200
Pop Ratio Female	0.5
Length of Stay (hrs)	1.00
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site Type (Res Comm)	comm
Laundry Population	0

<b>Water Temperature</b>	
Street	54
DHW supply	130
Boiler Efficiency	100%
<b>Laundry</b>	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

<b>Ice Machine Calc.</b>	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

<b>Energy Inputs</b>	
DHW heating source	NG
Fuel conversion source	GG
Not. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	8000
Total Ice Machine Usage (Gallons)	8832

Use of Language

WYJG/PZCN

	SOUTH OF STONE FILL & HOUR AND	60-78	VE	1.00	HOUR
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[illegible][illegible]

Year	Day	Month	Year
1997	10	10	1997

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Y Hma 2.0

235	235	235
236	236	236

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Population (millions)	5.3	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.3	8.5	8.7	8.9	9.1	9.3	9.5	9.7	9.9	10.1	10.3	10.5	10.7	10.9	11.1	11.3	11.5	11.7	11.9	12.1	12.3	12.5	12.7	12.9	13.1	13.3	13.5	13.7	13.9	14.1	14.3	14.5	14.7	14.9	15.1	15.3	15.5	15.7	15.9	16.1	16.3	16.5	16.7	16.9	17.1	17.3	17.5	17.7	17.9	18.1	18.3	18.5	18.7	18.9	19.1	19.3	19.5	19.7	19.9	20.1	20.3	20.5	20.7	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.5	22.7	22.9	23.1	23.3	23.5	23.7	23.9	24.1	24.3	24.5	24.7	24.9	25.1	25.3	25.5	25.7	25.9	26.1	26.3	26.5	26.7	26.9	27.1	27.3	27.5	27.7	27.9	28.1	28.3	28.5	28.7	28.9	29.1	29.3	29.5	29.7	29.9	30.1	30.3	30.5	30.7	30.9	31.1	31.3	31.5	31.7	31.9	32.1	32.3	32.5	32.7	32.9	33.1	33.3	33.5	33.7	33.9	34.1	34.3	34.5	34.7	34.9	35.1	35.3	35.5	35.7	35.9	36.1	36.3	36.5	36.7	36.9	37.1	37.3	37.5	37.7	37.9	38.1	38.3	38.5	38.7	38.9	39.1	39.3	39.5	39.7	39.9	40.1	40.3	40.5	40.7	40.9	41.1	41.3	41.5	41.7	41.9	42.1	42.3	42.5	42.7	42.9	43.1	43.3	43.5	43.7	43.9	44.1	44.3	44.5	44.7	44.9	45.1	45.3	45.5	45.7	45.9	46.1	46.3	46.5	46.7	46.9	47.1	47.3	47.5	47.7	47.9	48.1	48.3	48.5	48.7	48.9	49.1	49.3	49.5	49.7	49.9	50.1	50.3	50.5	50.7	50.9	51.1	51.3	51.5	51.7	51.9	52.1	52.3	52.5	52.7	52.9	53.1	53.3	53.5	53.7	53.9	54.1	54.3	54.5	54.7	54.9	55.1	55.3	55.5	55.7	55.9	56.1	56.3	56.5	56.7	56.9	57.1	57.3	57.5	57.7	57.9	58.1	58.3	58.5	58.7	58.9	59.1	59.3	59.5	59.7	59.9	60.1	60.3	60.5	60.7	60.9	61.1	61.3	61.5	61.7	61.9	62.1	62.3	62.5	62.7	62.9	63.1	63.3	63.5	63.7	63.9	64.1	64.3	64.5	64.7	64.9	65.1	65.3	65.5	65.7	65.9	66.1	66.3	66.5	66.7	66.9	67.1	67.3	67.5	67.7	67.9	68.1	68.3	68.5	68.7	68.9	69.1	69.3	69.5	69.7	69.9	70.1	70.3	70.5	70.7	70.9	71.1	71.3	71.5	71.7	71.9	72.1	72.3	72.5	72.7	72.9	73.1	73.3	73.5	73.7	73.9	74.1	74.3	74.5	74.7	74.9	75.1	75.3	75.5	75.7	75.9	76.1	76.3	76.5	76.7	76.9	77.1	77.3	77.5	77.7	77.9	78.1	78.3	78.5	78.7	78.9	79.1	79.3	79.5	79.7	79.9	80.1	80.3	80.5	80.7	80.9	81.1	81.3	81.5	81.7	81.9	82.1	82.3	82.5	82.7	82.9	83.1	83.3	83.5	83.7	83.9	84.1	84.3	84.5	84.7	84.9	85.1	85.3	85.5	85.7	85.9	86.1	86.3	86.5	86.7	86.9	87.1	87.3	87.5	87.7	87.9	88.1	88.3	88.5	88.7	88.9	89.1	89.3	89.5	89.7	89.9	90.1	90.3	90.5	90.7	90.9	91.1	91.3	91.5	91.7	91.9	92.1	92.3	92.5	92.7	92.9	93.1	93.3	93.5	93.7	93.9	94.1	94.3	94.5	94.7	94.9	95.1	95.3	95.5	95.7	95.9	96.1	96.3	96.5	96.7	96.9	97.1	97.3	97.5	97.7	97.9	98.1	98.3	98.5	98.7	98.9	99.1	99.3	99.5	99.7	99.9	100.1	100.3	100.5	100.7	100.9	101.1	101.3	101.5	101.7	101.9	102.1	102.3	102.5	102.7	102.9	103.1	103.3	103.5	103.7	103.9	104.1	104.3	104.5	104.7	104.9	105.1	105.3	105.5	105.7	105.9	106.1	106.3	106.5	106.7	106.9	107.1	107.3	107.5	107.7	107.9	108.1	108.3	108.5	108.7	108.9	109.1	109.3	109.5	109.7	109.9	110.1	110.3	110.5	110.7	110.9	111.1	111.3	111.5	111.7	111.9	112.1	112.3	112.5	112.7	112.9	113.1	113.3	113.5	113.7	113.9	114.1	114.3	114.5	114.7	114.9	115.1	115.3	115.5	115.7	115.9	116.1	116.3	116.5	116.7	116.9	117.1	117.3	117.5	117.7	117.9	118.1	118.3	118.5	118.7	118.9	119.1	119.3	119.5	119.7	119.9	120.1	120.3	120.5	120.7	120.9	121.1	121.3	121.5	121.7	121.9	122.1	122.3	122.5	122.7	122.9	123.1	123.3	123.5	123.7	123.9	124.1	124.3	124.5	124.7	124.9	125.1	125.3	125.5	125.7	125.9	126.1	126.3	126.5	126.7	126.9	127.1	127.3	127.5	127.7	127.9	128.1	128.3	128.5	128.7	128.9	129.1	129.3	129.5	129.7	129.9	130.1	130.3	130.5	130.7	130.9	131.1	131.3	131.5	131.7	131.9	132.1	132.3	132.5	132.7	132.9	133.1	133.3	133.5	133.7	133.9	134.1	134.3	134.5	134.7	134.9	135.1	135.3	135.5	135.7	135.9	136.1	136.3	136.5	136.7	136.9	137.1	137.3	137.5	137.7	137.9	138.1	138.3	138.5	138.7	138.9	139.1	139.3	139.5	139.7	139.9	140.1	140.3	140.5	140.7	140.9	141.1	141.3	141.5	141.7	141.9	142.1	142.3	142.5	142.7	142.9	143.1	143.3	143.5	143.7	143.9	144.1	144.3	144.5	144.7	144.9	145.1	145.3	145.5	145.7	145.9	146.1	146.3	146.5	146.7	146.9	147.1	147.3	147.5	147.7	147.9	148.1	148.3	148.5	148.7	148.9	149.1	149.3	149.5	149.7	149.9	150.1	150.3	150.5	150.7	150.9	151.1	151.3	151.5	151.7	151.9	152.1	152.3	152.5	152.7	152.9	153.1	153.3	153.5	153.7	153.9	154.1	154.3	154.5	154.7	154.9	155.1	155.3	155.5	155.7	155.9	156.1	156.3	156.5	156.7	156.9	157.1	157.3	157.5	157.7	157.9	158.1	158.3	158.5	158.7	158.9	159.1	159.3	159.5	159.7	159.9	160.1	160.3	160.5	160.7	160.9	161.1	161.3	161.5	161.7	161.9	162.1	162.3	162.5	162.7	162.9	163.1	163.3	163.5	163.7	163.9	164.1	164.3	164.5	164.7	164.9	165.1	165.3	165.5	165.7	165.9	166.1	166.3	166.5	166.7	166.9	167.1	167.3	167.5	167.7	167.9	168.1	168.3	168.5	168.7	168.9	169.1	169.3	169.5	169.7	169.9	170.1	170.3	170.5	170.7	170.9	171.1	171.3	171.5	171.7	171.9	172.1	172.3	172.5	172.7	172.9	173.1	173.3	173.5	173.7	173.9	174.1	174.3	174.5	174.7	174.9	175.1	175.3	175.5	175.7	175.9	176.1	176.3	176.5	176.7	176.9	177.1	177.3	177.5	177.7	177.9	178.1	178.3	178.5	178.7	178.9	179.1	179.3	179.5	179.7	179.9	180.1	180.3	180.5	180.7	180.9	181.1	181.3	181.5	181.7	181.9	182.1	182.3	182.5	182.7	182.9	183.1	183.3	183.5	183.7	183.9	184.1	184.3	184.5	184.7	184.9	185.1	185.3	185.5	185.7	185.9	186.1	186.3	186.5	186.7	186.9	187.1	187.3	187.5	187.7	187.9	188.1	188.3	188.5	188.7	188.9	189.1	189.3	189.5	189.7	189.9	190.1	190.3	190.5	190.7	190.9	191.1	191.3	191.5	191.7	191.9	192.1	192.3	192.5	192.7	192.9	193.1	193.3	193.5	193.7	193.9	194.1	194.3	194.5	194.7	194.9	195.1	195.3	195.5	195.7	195.9	196.1	196.3	196.5	196.7	196.9	197.1	197.3	197.5	197.7	197.9	198.1	198.3	198.5	198.7	198.9	199.1	199.3	199.5	199.7	199.9	200.1	200.3	200.5	200.7	200.9	201.1	201.3	201.5	201.7	201.9	202.1	202.3	202.5	202.7	202.9	203.1	203.3	203.5	203.7	203.9	204.1	204.3	204.5	204.7	204.9	205.1	205.3	205.5	205.7	205.9	206.1	206.3	206.5	206.7	206.9	207.1	207.3	207.5	207.7	207.9	208.1	208.3	208.5	208.7	208.9	209.1	209.3	209.5	209.7	209.9	210.1	210.3	210.5	210.7	210.9	211.1	211.3	211.5	211.7	211.9	212.1	212.3	212.5	212.7	212.9	213.1	213.3	213.5	213.7	213.9	214.1	214.3	214.5	214.7	214.9	215.1	215.3	215.5	215.7	215.9	216.1	216.3	216.5	216.7	216.9	217.1	217.3	217.5	217.7	217.9	218.1	218.3	218.5	218.7	218.9	219.1	219.3	219.5	219.7	219.9	220.1	220.3	220.5	220.7	220.9	221.1	221.3	221.5	221.7	221.9	222.1	222.3	222.5	222.7	222.9	223.1	223.3	223.5	223.7	223.9	224.1	224.3	224.5	224.7	224.9	225.1	225.3	225.5	225.7	225.9	226.1	226.3	226.5	226.7	226.9	227.1	227.3	227.5	227.7	227.9	228.1	228.3	228.5	228.7	228.9	229.1	229.3	229.5	229.7	229.9	230.1	230.3	230.5	230.7	230.9	231.1	231.3	231.5	231.7	231.9	232.1	232.3	232.5	232.7	232.9	233.1	233.3	233.5	233.7	233.9	234.1	234.3	234.5	234.7	234.9	235.1	235.3	235.5	235.7	235.9	236.1	236.3	236.5	236.7	236.9	237.1	237.3	237.5	237.7	237.9	238.1	238.3	238.5	238.7	238.9	239.1	239.3	239.5	239.7	239.9	240.1	240.3	240.5	240.7	240.9	241.1	241.3	241.5	241.7	241.9	242.1	242.3

Steel Usage Port (Giss)	0	0	0
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[illegible]

	Calls /	Calls / 50'	G
Time - Meter How Common?			

LAW OFFICE POST		8009	178	
Slice 1200G Pig		10007	289	
		10006	150	

Sewage Discharge		40%	
Hot Water Supply	8,271		14%
Hot Water Supply for Laundry			

	(Number)	Poems	with
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[illegible]

Rank/Temp	Admin 1	Percent Blouse
70-100	70	70-100
100-150		
150-200		
200-250		
250-300		
300-350		
350-400		
400-450		
450-500		
500-550		
550-600		
600-650		
650-700		
700-750		
750-800		
800-850		
850-900		
900-950		
950-1000		
1000-1050		
1050-1100		
1100-1150		
1150-1200		
1200-1250		
1250-1300		
1300-1350		
1350-1400		
1400-1450		
1450-1500		
1500-1550		
1550-1600		
1600-1650		
1650-1700		
1700-1750		
1750-1800		
1800-1850		
1850-1900		
1900-1950		
1950-2000		
2000-2050		
2050-2100		
2100-2150		
2150-2200		
2200-2250		
2250-2300		
2300-2350		
2350-2400		
2400-2450		
2450-2500		
2500-2550		
2550-2600		
2600-2650		
2650-2700		
2700-2750		
2750-2800		
2800-2850		
2850-2900		
2900-2950		
2950-3000		
3000-3050		
3050-3100		
3100-3150		
3150-3200		
3200-3250		
3250-3300		
3300-3350		
3350-3400		
3400-		

Category	Subcategory	Colts / person/ha	Colts / SF / ha	Colts / person
Habitat	Forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
Habitat	Forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0
	Open forest	0	0	0
	Forest edge	0	0	0

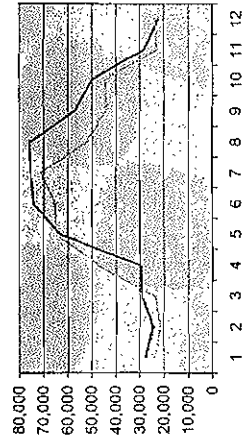


Arapahoe County Domestic Water  
Arapahoe Plaza East

				Water Rate		Sewer Rate			
				Summer rate	\$2.57000	\$3.00000	0	0	0
				Winter rate	\$2.14000	\$2.00000	\$0.00000	\$0.00000	\$0.00000
					\$0.00000	\$0.00000	\$0.00000	\$0.00000	\$0.00000
BILLING DATA				Water Dollars		Sewer Dollars		Total Dollars	
Average last year	Gallons	Staff days per month	Visitors-days per month	Population	Sanitary Water Use Model	Balance	Collons Saved	Saved	Saved
Jan	21,466	22	2,657	2,657	23,535	3,931	9,474	\$0	\$0
Feb	24,417	20	2,400	2,400	21,258	3,159	8,512	\$0	\$0
Mar	28,964	22	2,657	2,657	23,535	5,429	9,474	\$0	\$0
Apr	29,263	21	2,571	2,571	22,176	6,517	9,120	\$0	\$0
May	62,933	22	2,657	2,657	23,535	49,398	9,474	\$0	\$0
June	74,048	21	2,571	2,571	22,176	51,272	9,120	\$0	\$0
Jul	75,163	22	2,657	2,657	23,535	51,648	9,474	\$0	\$0
Aug	75,615	22	2,657	2,657	23,535	52,080	9,474	\$0	\$0
Sep	57,104	21	2,571	2,571	22,176	34,328	9,120	\$0	\$0
Oct	50,020	22	2,657	2,657	23,535	26,465	9,474	\$0	\$0
Nov	28,021	21	2,571	2,571	22,176	5,245	9,120	\$0	\$0
Dec	22,209	22	2,657	2,657	23,535	-1,326	9,474	\$0	\$0
	555,273	251	31,288	277,107		278,166	110,963	0	\$0

20%

Non Sanitary Use		Non Sanitary Use-Kcal	Fee-machine	Evaporative coolers	Irrigation	Laundry	Kitchen	Total	Balance	Total Use-Model	Total-Model / Billing
Jan	3,931	4	0	0	0	0	0	0	3,931	23,535	86%
Feb	3,159	3	0	0	0	0	0	0	3,159	21,258	87%
Mar	5,429	5	0	0	0	0	0	0	5,429	23,535	81%
Apr	6,517	7	0	0	24,166	0	0	24,166	-17,649	46,942	160%
May	39,398	39	0	0	41,154	0	0	41,154	-1,756	64,669	103%
June	51,272	51	0	0	42,290	0	0	42,290	8,982	65,066	88%
Jul	51,648	52	0	0	47,508	0	0	47,508	4,140	71,043	94%
Aug	52,080	52	0	0	28,512	0	0	28,512	23,588	52,047	69%
Sep	34,328	34	0	0	21,513	0	0	21,513	12,813	44,231	78%
Oct	26,465	26	0	0	20,709	0	0	20,709	5,776	44,244	86%
Nov	5,245	5	0	0	0	0	0	0	5,245	22,716	81%
Dec	-1,326	-1	0	0	0	0	0	0	-1,326	23,535	105%
	278,166	278	0	0	225,859	0	0	225,859	52,312	302,961	412%





Arapahoe County Domestic Water  
Arapahoe Plaza Human Services

Assumptions	
Staff Population	90.00
Pop Ratio Female	60.00%
Visitor Population	500
Pop Ratio Female	0.5
Length of Stay (hrs)	0.50
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

Energy Inputs	
DHW heating source	NG
Fuel conversion source	GG
Nat. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	674
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	8000
Total Ice Machine Usage (Gallons)	8832

**RECEIVED**

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Total (within days)		1-159		160-259		260-359		360-459		460-559		560-659		660-759		760-859		860-959		960-1059		1060-1159		1160-1259		1260-1359		1360-1459		1460-1559		1560-1659		1660-1759		1760-1859		1860-1959		1960-2059		2060-2159		2160-2259		2260-2359		2360-2459		2460-2559		2560-2659		2660-2759		2760-2859		2860-2959		2960-3059		3060-3159		3160-3259		3260-3359		3360-3459		3460-3559		3560-3659		3660-3759		3760-3859		3860-3959		3960-4059		4060-4159		4160-4259		4260-4359		4360-4459		4460-4559		4560-4659		4660-4759		4760-4859		4860-4959		4960-5059		5060-5159		5160-5259		5260-5359		5360-5459		5460-5559		5560-5659		5660-5759		5760-5859		5860-5959		5960-6059		6060-6159		6160-6259		6260-6359		6360-6459		6460-6559		6560-6659		6660-6759		6760-6859		6860-6959		6960-7059		7060-7159		7160-7259		7260-7359		7360-7459		7460-7559		7560-7659		7660-7759		7760-7859		7860-7959		7960-8059		8060-8159		8160-8259		8260-8359		8360-8459		8460-8559		8560-8659		8660-8759		8760-8859		8860-8959		8960-9059		9060-9159		9160-9259		9260-9359		9360-9459		9460-9559		9560-9659		9660-9759		9760-9859		9860-9959		9960-10059		10060-10159		10160-10259		10260-10359		10360-10459		10460-10559		10560-10659		10660-10759		10760-10859		10860-10959		10960-11059		11060-11159		11160-11259		11260-11359		11360-11459		11460-11559		11560-11659		11660-11759		11760-11859		11860-11959		11960-12059		12060-12159		12160-12259		12260-12359		12360-12459		12460-12559		12560-12659		12660-12759		12760-12859		12860-12959		12960-13059		13060-13159		13160-13259		13260-13359		13360-13459		13460-13559		13560-13659		13660-13759		13760-13859		13860-13959		13960-14059		14060-14159		14160-14259		14260-14359		14360-14459		14460-14559		14560-14659		14660-14759		14760-14859		14860-14959		14960-15059		15060-15159		15160-15259		15260-15359		15360-15459		15460-15559		15560-15659		15660-15759		15760-15859		15860-15959		15960-16059		16060-16159		16160-16259		16260-16359		16360-16459		16460-16559		16560-16659		16660-16759		16760-16859		16860-16959		16960-17059		17060-17159		17160-17259		17260-17359		17360-17459		17460-17559		17560-17659		17660-17759		17760-17859		17860-17959		17960-18059		18060-18159		18160-18259		18260-18359		18360-18459		18460-18559		18560-18659		18660-18759		18760-18859		18860-18959		18960-19059		19060-19159		19160-19259		19260-19359		19360-19459		19460-19559		19560-19659		19660-19759		19760-19859		19860-19959		19960-20059		20060-20159		20160-20259		20260-20359		20360-20459		20460-20559		20560-20659		20660-20759		20760-20859		20860-20959		20960-21059		21060-21159		21160-21259		21260-21359		21360-21459		21460-	
Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage																																																																																														

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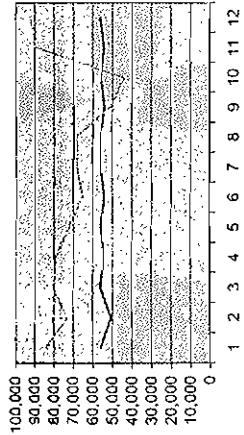
		Costs / acre-inch	Costs / SF / Year	Costs / acre-inch	Costs / SF / Year
Surface Water Use Summary					
Private Reservoir Use		0	0	0	0
San Joaquin River		247.77	2.42	0	0
San Joaquin Canal		171.44	1.69	5	5
San Joaquin River		141.83	1.38	3	3
San Joaquin Canal		196.66	1.92	17	17
Water User Fee		226.00	2.21	7	7
Total Water Use		558.66	5.55	17	17
Private Reservoir Use		0	0	0	0
San Joaquin River		247.77	2.42	0	0
San Joaquin Canal		171.44	1.69	5	5
San Joaquin River		141.83	1.38	3	3
San Joaquin Canal		196.66	1.92	17	17
Water User Fee		226.00	2.21	7	7
Total Water Use		558.66	5.55	17	17

	Number	Percent	Mean
Energy Pay (Amount)	8	81	2.885
Energy Pay (Ratio)	0	0	0
Field	8	81	2.885
Energy Pay (Amount)	8	81	2.885
Energy Savings	0	0	0
% Savings (N/A) Worker	0.02		

Arapahoe County Domestic Water  
Arapahoe Plaza Human Services

Billing Data					Water Rate		Sewer Rate		0	
Average last year					Summer rate	\$25.0000	\$3.000000	\$0.000000	\$0.000000	\$0.000000
Gallons					Winter rate	\$2.140000	\$0.000000	\$0.000000	\$0.000000	\$0.000000
Staff days per month					0		0		0	
Visitors days per month					0		0		0	
Population					0		0		0	
Sanitary Water Use Model					0		0		0	
Balance					0		0		0	
Gallons Saved					0		0		0	
Water Dollars Saved					0		0		0	
Sewer Dollars Saved					0		0		0	
Total Dollars Saved					0		0		0	
Jan					28,178		24,299		50%	
Feb					22,754		21,948		45%	
Mar					24,446		24,299		44%	
Apr					24,911		23,515		45%	
May					16,567		24,299		30%	
June					11,149		23,515		21%	
Jul					12,039		24,299		22%	
Aug					12,413		24,299		22%	
Sep					-3,581		23,515		-7%	
Oct					11,756		24,299		21%	
Nov					35,593		23,515		66%	
Dec					36,183		24,299		65%	
Total					208,893		286,103		33%	

Non Sanitary Use					Evaporative coolers					Irrigation					Laundry					Kitchen					Total					Balance					Total Use Model					Total Model / billing				
Jan					28,178					0					0					0					28,178					28,150					55,920					33%				
Feb					22,754					0					0					0					22,754					22,731					50,506					31%				
Mar					24,446					0					0					0					24,421					24,421					55,917					30%				
Apr					24,911					0					0					0					24,886					24,886					54,114					32%				
May					16,567					0					0					0					17,138					16,550					53,909					23%				
June					11,149					0					0					0					11,138					11,138					54,100					17%				
Jul					12,039					0					0					0					12,027					12,027					55,904					18%				
Aug					12,413					0					0					0					12,400					12,400					55,905					18%				
Sep					-3,581					0					0					0					-4					-3,578					54,086					-7%				
Oct					11,756					0					0					0					11,744					11,744					55,880					-7%				
Nov					35,593					0					0					0					36					35,557					54,125					40%				
Dec					36,183					0					0					0					36					36,147					55,928					39%				
Total					208,893					0					0					0					209					208,884					658,295					-32%				



33%

**Arapahoe County Domestic Water  
Arapahoe Plaza Human Services**

Code	Units
1	Gal
2	Kgal
3	CF
4	CCF
5	MCF
6	enter unit code

Summer rate  
Water rate  
\$2,570.00  
\$2,180.00

Service Charge  
Storm water fee  
Fireline Charge  
\$32.19 bimonthly  
\$207.79  
\$15.03 bimonthly

Water Rate  
Sewer Rate  
per Kgal  
per Kgal  
per Kgal

Read Date	Month	Kgal/day	Usage	Gallons	Billing days	Water Charges	Sewer Charges	Total Metered Charges	Total Water Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total
1/31/2004	Jan	84	84	84,070	31	\$1,888.00	\$188.00	\$2,076.00	\$188.00	\$2,264.00	\$0.0026	\$0.0028	\$0.0054
2/28/2004	Feb	73	73	73,237	28	\$1,352.00	\$135.20	\$1,487.20	\$135.20	\$1,622.40	\$0.0026	\$0.0031	\$0.0057
3/31/2004	Mar	80	80	80,338	31	\$1,776.00	\$177.60	\$1,953.60	\$177.60	\$2,131.20	\$0.0026	\$0.0030	\$0.0056
4/30/2004	Apr	79	79	79,000	30	\$1,440.00	\$144.00	\$1,584.00	\$144.00	\$1,728.00	\$0.0026	\$0.0030	\$0.0056
5/27/2004	May	72	72	72,459	31	\$1,566.00	\$156.60	\$1,722.60	\$156.60	\$1,879.20	\$0.0026	\$0.0030	\$0.0056
6/30/2004	Jun	65	65	65,238	30	\$1,168.00	\$116.80	\$1,284.80	\$116.80	\$1,401.60	\$0.0026	\$0.0030	\$0.0056
7/30/2004	Jul	68	68	67,931	31	\$1,175.00	\$117.50	\$1,292.50	\$117.50	\$1,410.00	\$0.0026	\$0.0030	\$0.0056
8/30/2004	Aug	68	68	68,305	31	\$1,176.00	\$117.60	\$1,293.60	\$117.60	\$1,411.20	\$0.0026	\$0.0030	\$0.0056
9/30/2004	Sep	51	51	50,508	28	\$830.00	\$83.00	\$913.00	\$83.00	\$996.00	\$0.0026	\$0.0030	\$0.0056
10/28/2004	Oct	44	44	44,136	31	\$813.00	\$81.30	\$894.30	\$81.30	\$975.60	\$0.0026	\$0.0030	\$0.0056
11/30/2004	Nov	40	40	39,682	30	\$792.00	\$79.20	\$871.20	\$79.20	\$950.40	\$0.0026	\$0.0030	\$0.0056
12/31/2004	Dec	92	92	92,075	31	\$1,692.00	\$169.20	\$1,861.20	\$169.20	\$2,030.40	\$0.0026	\$0.0030	\$0.0056
1/30/2005	Jan				30	\$1,104.00	\$110.40	\$1,214.40	\$110.40	\$1,324.80	\$0.0026	\$0.0030	\$0.0056
										\$4,791			
										\$2,014			

84,070  
73,237  
80,338  
79,000  
72,459  
65,238  
67,931  
68,305  
50,508  
44,136  
89,682  
92,075

84  
73  
80  
79  
72  
65  
68  
68  
51  
44  
90  
92

Arapahoe County Domestic Water  
Arapahoe Plaza West Building (County Court)

Assumptions	
Staff Population	30.00
Pop Ratio Female	60.00%
Visitor Population	500
Pop Ratio Female	0.5
Length of Stay (hrs)	2.50
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

Energy Inputs	
DHW heating source	NG
Fuel conversion source	GG
Nat. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
8000	8000
Total Ice Machine Usage (Gallons)	8832

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[illegible]

6.37%

Category	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2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[illegible]

	Male	Female	Male	Female	Male	Female	Units
Cash	0	0	0	0	0	0	4
Debt	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

[illegible][illegible][illegible]

	(lbm/lb)	Thermes	kwh
Energy Pwr. (lbm/lb)	3	77	795
Kilom	0	0	0
Solid	3	27	795
Water Pwr. (lbm/lb)	3	27	795
Energy Savings	0 pps	0	0
% Savings Incl Water			

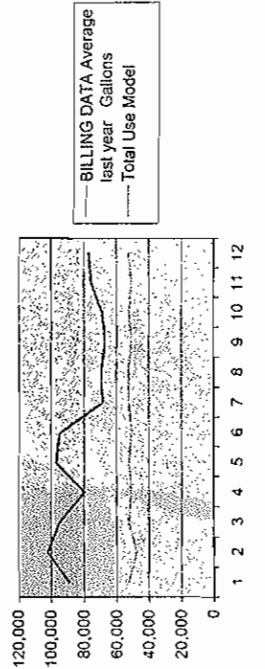
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Arapahoe County Domestic Water  
Arapahoe Plaza West Building (County Court)

				Water Rate		Sewer Rate		0		
				Summer rate	\$7.5000	\$3.000000	\$0.000000	\$0.000000	\$0.000000	
				Winter rate	\$2.14000	\$0.000000	\$0.000000	\$0.000000	\$0.000000	
				average	\$2.35500	\$0.000000	\$0.000000	\$0.000000	\$0.000000	
BILLING DATA	Average last year	Staff days per month	Visitors days per month	Population days	Sanitary Water Use Model	Balance	Gallons Saved	Water Dollars Saved	Sewer Dollars Saved	Total Dollars Saved
Jan	88,900	22	22	3,986	52,325	36,575	28,765	\$67,742	\$0	\$67,742
Feb	101,914	20	20	3,600	47,261	54,653	25,982	\$61,187	\$0	\$61,187
Mar	94,652	22	22	3,986	52,325	42,327	28,765	\$67,742	\$0	\$67,742
Apr	79,483	21	21	3,857	50,637	28,846	27,837	\$65,557	\$0	\$65,557
May	96,604	22	22	3,986	52,325	44,479	28,765	\$67,742	\$0	\$67,742
June	94,524	21	21	3,857	50,637	43,887	27,837	\$65,557	\$0	\$65,557
Jul	67,931	22	22	3,986	52,325	15,606	28,765	\$67,742	\$0	\$67,742
Aug	69,619	22	22	3,986	52,325	17,294	28,765	\$67,742	\$0	\$67,742
Sep	66,839	21	21	3,857	50,637	16,202	27,837	\$65,557	\$0	\$65,557
Oct	68,736	22	22	3,986	52,325	16,411	28,765	\$67,742	\$0	\$67,742
Nov	75,455	21	21	3,857	50,637	24,818	27,837	\$65,557	\$0	\$65,557
Dec	77,038	22	22	3,986	52,325	24,713	28,765	\$67,742	\$0	\$67,742
	981,893	261		46,923	616,083	365,812	338,689	\$797,612	\$0	\$797,612

Non Sanitary Use	Non Sanitary Use Kgal	Non Sanitary Use Machine	Evaporative coolers	Irrigation	Laundry	Kitchen	Total	Balance	Total Model / billing
Jan	36,575	37	0	0	0	0	0	36,575	52,325
Feb	54,653	55	0	0	0	0	0	54,653	47,261
Mar	42,327	42	0	0	0	0	0	42,327	52,325
Apr	28,846	29	0	0	0	0	0	28,846	50,637
May	44,479	44	0	0	0	0	0	44,479	52,325
June	43,887	44	0	0	0	0	0	43,887	50,637
July	15,606	16	0	0	0	0	0	15,606	52,325
Aug	17,294	17	0	0	0	0	0	17,294	52,325
Sep	16,202	16	0	0	0	0	0	16,202	50,637
Oct	16,411	16	0	0	0	0	0	16,411	52,325
Nov	24,818	25	0	0	0	0	0	24,818	50,637
Dec	24,713	25	0	0	0	0	0	24,713	52,325
	365,812	365	0	0	0	0	0	365,812	616,083



**Arapahoe County Domestic Water**  
**Arapahoe Plaza West Building (Co**

Code	Units
1	Gal
2	Kgal
3	CF
4	CCF
5	MCF
6	2 <<< enter unit code

Summer rate	\$2,570.00	Sewer Rate	\$3,000.00
Winter rate	\$2,140.00		
Service Charge	\$2,350.00		
Storm water fee	\$14.60 bimonthly		
FireLine Charge	\$207.79 annual		
	\$0.00 bimonthly		

Kgal  
Kgal  
Kgal

per  
per  
per

Read Date	Month	Kgal/Gal	Usorn	Gallons	Billing Days	Water Charges	Sewer Charges	Total Metered Charges	Total Water Charges	Total Charges
7/23/2004	Jul	4	69	88,900	25	\$206	\$190	\$396	\$713	\$213
8/23/2004	Aug	3	102	107,914	30	\$206	\$173	\$379	\$713	\$213
9/23/2004	Sep	3	95	94,552	30	\$206	\$173	\$379	\$713	\$213
10/23/2004	Oct	3	97	96,804	34	\$206	\$190	\$396	\$713	\$213
11/23/2004	Nov	3	95	94,552	30	\$206	\$173	\$379	\$713	\$213
12/23/2004	Dec	2	68	67,931	31	\$206	\$173	\$379	\$713	\$213
1/23/2005	Jan	2	70	69,619	31	\$206	\$173	\$379	\$713	\$213
2/23/2005	Feb	2	67	66,839	28	\$206	\$173	\$379	\$713	\$213
3/23/2005	Mar	2	69	68,116	33	\$206	\$173	\$379	\$713	\$213
4/23/2005	Apr	2	72	75,455	31	\$206	\$173	\$379	\$713	\$213
5/23/2005	May	3	77	77,038	31	\$206	\$173	\$379	\$713	\$213
6/23/2005	Jun				30	\$206	\$173	\$379	\$713	\$213
7/23/2005	Jul				30	\$206	\$173	\$379	\$713	\$213

88,900	89
101,914	102
94,552	95
79,483	79
96,804	97
94,524	95
67,931	68
69,619	70
66,839	67
68,736	69
75,455	75
77,038	77

88,900	89
101,914	102
94,552	95
79,483	79
96,804	97
94,524	95
67,931	68
69,619	70
66,839	67
68,736	69
75,455	75
77,038	77

Arapahoe County Domestic Water  
Federal Warehouse

Assumptions	
Staff Population	13.00
Pop Ratio Female	0.00%
Visitor Population	15
Pop Ratio Female	0.5
Length of Stay (hrs)	2.40
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Energy Inputs		Billing units	\$/unit
DHW heating source	NG	therm	\$0.8900
Fuel conversion source	CG	kWh	\$0.1000
Not. Gas System Efficiency		100.00%	

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
	8000
Total Ice Machine Usage (Gallons)	8832

Arapahoe County Domestic Water  
Federal Warehouse

7/1/70

PLANNED MAINTENANCE	OFF	Quantity	Weighted Average
Local	1.5	15	7.5%
State	1.5	15	7.5%
Federal	1.5	15	7.5%
Other	1.5	15	7.5%
Total	1.5	15	7.5%

made/line  
3.625

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

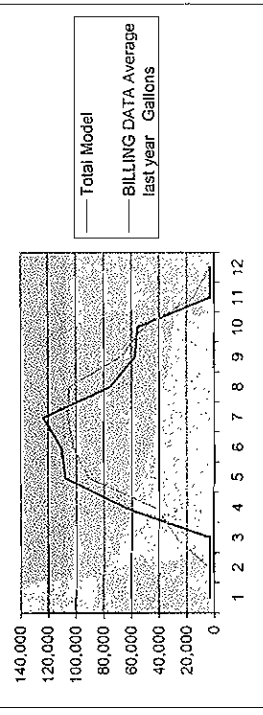
Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Category	Value	Unit
Construction	0	1.00/1000
Improvements	0	1.00/1000
Repairs	0	1.00/1000
Other	0	1.00/1000
Total	0	1.00/1000

Arapahoe County Domestic Water  
Federal Warehouse

					Water Rate		Sewer Rate			
					Summer rate	\$2.57000	\$3.00000		0	0
					Winter rate	\$2.14000	\$0.00000	\$0.00000	\$0.00000	\$0.00000
						\$0.00000	\$0.00000	\$0.00000	\$0.00000	\$0.00000
BILLING DATA					Water Dollars		Sewer Dollars		Total Dollars	
Average last	Staff days	Visitors days	Population	Sanitary Water	Balance	Gallons Saved	Balance	Gallons Saved	Balance	Gallons Saved
year - Gallons	per month	per month	days	Use Model						
Jan 3,993	22	22	399	2,823	1,170	762	876	762	876	762
Feb 3,375	20	20	360	2,549	876	762	762	762	762	762
Mar 27,075	22	22	399	2,823	24,252	762	24,252	762	24,252	762
Apr 42,293	21	21	386	2,731	39,522	762	39,522	762	39,522	762
May 90,865	22	22	399	2,823	88,042	762	88,042	762	88,042	762
June 101,429	21	21	386	2,731	98,698	762	98,698	762	98,698	762
Jul 105,545	22	22	399	2,823	102,722	762	102,722	762	102,722	762
Aug 104,617	22	22	399	2,823	101,794	762	101,794	762	101,794	762
Sep 67,602	21	21	386	2,731	64,871	762	64,871	762	64,871	762
Oct 50,570	22	22	399	2,823	47,747	762	47,747	762	47,747	762
Nov 14,536	21	21	386	2,731	11,805	762	11,805	762	11,805	762
Dec 3,702	22	22	399	2,823	879	762	879	762	879	762
615,552	261	261	4,693	33,233	582,329	9,149	582,329	9,149	582,329	9,149

Non Sanitary Use		Non Sanitary Use Kgal	Ice machine	Evaporative coolers	Irrigation	Laundry	Kitchen	Total	Balance	Total Model
Jan	1,170	1	0	0	0	0	0	1	1,169	2,824
Feb	826	1	0	0	0	0	0	1	825	2,550
Mar	24,252	24	0	0	0	0	0	24	24,228	2,847
Apr	39,522	40	0	0	61,391	0	0	61,430	-21,909	64,162
May	88,042	88	0	0	104,549	0	0	104,594	-16,594	107,459
June	98,698	98	0	0	107,434	0	0	107,533	-8,835	110,264
July	102,722	103	0	0	120,691	0	0	120,794	-18,071	123,616
Aug	101,794	102	0	0	72,431	0	0	72,533	29,261	75,356
Sep	64,871	65	0	0	54,658	0	0	54,723	10,148	57,454
Oct	47,747	48	0	0	52,609	0	0	52,657	-4,909	55,479
Nov	11,805	12	0	0	0	0	0	12	11,793	2,743
Dec	879	1	0	0	0	0	0	1	879	2,823
582,329	582	582	0	0	573,762	0	0	574,343	7,964	607,576



**Arapahoe County Domestic Water  
Federal Warehouse**

Code	Units
1	Gal
2	Kgal
3	Cf
4	Ccf
5	Mcf
2	<<< enter unit code

Summer rate  
Water rate  
\$2.57000  
\$2.14000  
\$32.19 bimonthly  
\$812.62 annual  
\$26.30 bimonthly

Sewer Rate  
per  
per  
\$1.00000  
\$0.00000

Service Charge  
Storm water fee  
Fireline Charge

Read Date	Mont h	Kgal/day	Usage	Colbns	Billing days	Water Charges	Sewer Charges	Total Metered Charges	Total Water Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total
10/31/2004	Oct	3	91	90.365	34	\$2.44	\$1.15	\$3.59	\$3.59	\$3.59	\$0.0026	\$0.0035	\$0.0061
11/30/2004	Nov	3	101	101.428	30	\$2.61	\$1.15	\$3.76	\$3.76	\$3.76	\$0.0026	\$0.0031	\$0.0057
12/31/2004	Dec	3	108	105.545	31	\$2.71	\$1.15	\$3.86	\$3.86	\$3.86	\$0.0026	\$0.0030	\$0.0056
1/31/2005	Jan	3	105	104.617	31	\$2.69	\$1.15	\$3.84	\$3.84	\$3.84	\$0.0026	\$0.0030	\$0.0056
2/28/2005	Feb	2	68	67.602	28	\$1.74	\$1.15	\$2.89	\$2.71	\$2.71	\$0.0026	\$0.0047	\$0.0072
3/31/2005	Mar	2	51	50.570	33	\$1.40	\$1.15	\$2.55	\$2.71	\$2.71	\$0.0026	\$0.0062	\$0.0088
4/30/2005	Apr	0	15	14.536	31	\$0.51	\$1.15	\$1.66	\$1.66	\$1.66	\$0.0026	\$0.0062	\$0.0088
5/31/2005	May	0	24	23.69	30	\$0.49	\$1.15	\$1.64	\$1.64	\$1.64	\$0.0026	\$0.0062	\$0.0088
6/30/2005	Jun	0	4	3.993	30	\$0.16	\$1.15	\$1.31	\$1.31	\$1.31	\$0.0026	\$0.0062	\$0.0088
											\$2.705		
											\$1.541		

3,993	4
3,375	3
27,075	27
42,253	42
90,865	91
101,429	101
105,545	106
104,617	105
67,602	68
50,570	51
14,536	15
3,702	4

Arapahoe County Domestic Water  
Altura Plaza

Assumptions	
Staff Population	145.00
Pop Ratio Female	60.00%
Visitor Population	1600
Pop Ratio Female	0.5
Length of Stay (hrs)	2.50
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 qal
Gallons of water/100 lbs of ice	16 qal
Process waste	0 qal
Est. Storage Waste	0 qal
Number of Ice Machines	1 qal
Total Storage Waste	24 qal
Total Ice Machine Usage (Gallons)	0 qal

Energy Inputs	
DHW heating source	NG
Fuel conversion source	GG
Nat. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
	8000
Total Ice Machine Usage (Gallons)	8832

Arabahoe County Domestic Water

74615

Altura Plaza  
Building Area

PLUMBING REVENUE	
Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue	Water	Sewer	Storm	Other	Total
Water	1.5	1.5	0	0	0	1.5
Sewer	1.5	0	1.5	0	0	1.5
Storm	1.5	0	0	1.5	0	1.5
Other	1.5	0	0	0	1.5	1.5
Total	6.0	1.5	1.5	1.5	1.5	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0

Category	Revenue
Water	1.5
Sewer	1.5
Storm	1.5
Other	1.5
Total	6.0



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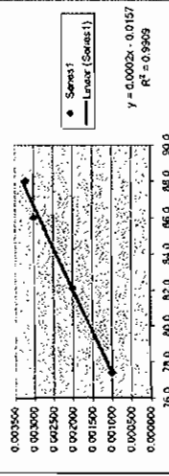
Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

ntb://cawweather.com/ccd/armcdd.htm

h <sub>1</sub>	h <sub>2</sub>	overcast	Total TransGulfings AFB New York Denver	Total Hours	Hours of celestia	Water varies with food	lens load	Variable Water Use Rate gallons	Humidity Ratio (no moisture per lbs dry air)	gallons of water used
95	98	97	3	4	4	378	378	625	0.004100	625
96	99	98	37	42	42	340	340	20.84	0.003100	4960
97	80	81	120	163	163	303	303	73.66	0.002100	13,439
98	80	82	265	280	280	265	265	106.79	0.001100	11,732
99	75	76	418	438	438	183	183	135.60	0.000100	1,572
00	65	66	731	759	759	151	151	138.95		
01	64	62	711	718	718	113	124	142.91		
02	59	57	709	759	759	76	124	142.69		
03	54	52	666	769	769	38	124	137.43		
04	45	43	613	710	710	0		1,028.44		32,287
05	44	42	613	710	710	0				
06	35	33	713	672	672	0				
07	30	34	812	673	673	0				
08	25	27	554	582	582	0				
09	20	24	400	436	436	0				
10	15	19	266	317	317	0				
11	14	17	266	317	317	0				
12	9	12	113	130	130	0				
13	0	4	38	46	46	0				
14	0	2	38	46	46	0				
15	-1	1	6	11	11	0				
16	-5	5	25	20	20	0				
17	-10	-3	1	0	0	0				
18	-15	-1	1	0	0	0				
19	-20	-13	0	0	3500	0				

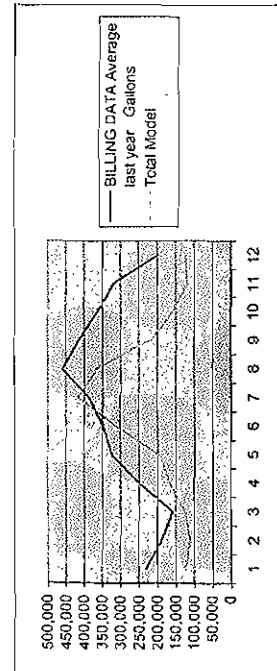
Weight of air lb/cf 0.075

Length	DEMER Wet BBS	DEMER RH	DEMER Mean Dry Wet	DEMER High Temp Dry BBS	Wetqsn, High Temp and mean	Psychronic Start Hardly Ride (fracture 1/2 of an or	gears / month
800	74	49	16.4	43.3	41.8		
850	71	45	15.4	41.3	41.8		
900	31	40	4.1	53.7	53.7		
950	31	40	4.1	53.7	48.9		
1000	46	35	51.0	60.3	55.3		
1050	46	35	51.0	70.5	65.9		
1100	54	34	59.2	72.1	74.7	0.007000	54.852
1150	54	34	78.2	56.0	83.1	0.005000	37.785
1200	54	34	74.8	55.0	80.4	0.005000	37.785
1250	76	14	74.3	77.4	81.3	0.005000	57.278
1300	76	14	74.3	77.4	81.3	0.005000	57.278
1350	11	48	21.0	51.5	46.1	0.001000	21.926
1400	25	52	35.7	44.1	39.7		
1450	25	52	35.7	64.2	59.0		
1500	40	40	33.6				



BILLING DATA		Staff: days per month	Visitors: days per month	Population days	Sanitary Water Use: Mgal.	Balance	Water		Sewer		Water Differential	Sewer Differential
Average last: year	Gallons						Gallons Saved	Dollars Saved	Dollars Saved	Dollars		
Jan	231,312	22	22	13,839	122,977	108,335	41,026	\$0	\$0	\$0	88%	
Feb	188,690	20	20	12,500	111,076	77,614	37,055	\$0	\$0	\$0	70%	
Mar	157,555	22	22	13,839	122,977	54,768	41,026	\$0	\$0	\$0	28%	
Apr	247,231	21	21	13,393	119,010	128,221	39,702	\$0	\$0	\$0	108%	
May	372,300	22	22	13,839	122,977	199,323	41,026	\$0	\$0	\$0	162%	
June	347,233	21	21	13,393	119,010	228,223	39,702	\$0	\$0	\$0	192%	
Jul	387,367	22	22	13,839	122,977	264,390	41,026	\$0	\$0	\$0	215%	
Aug	459,150	22	22	13,839	122,977	316,173	39,702	\$0	\$0	\$0	213%	
Sept	414,267	21	21	13,393	119,010	295,252	39,702	\$0	\$0	\$0	248%	
Oct	381,663	22	22	13,839	122,977	239,066	41,026	\$0	\$0	\$0	194%	
Nov	318,155	21	21	13,393	119,010	199,145	39,702	\$0	\$0	\$0	167%	
Dec	196,791	22	22	13,839	122,977	73,814	41,026	\$0	\$0	\$0	60%	
	3,631,734	261		162,946	1,447,952	2,183,782	483,992	0	0	0	100%	

	Non Sanitary Use	Non Sanitary Kptl	Sanitary Use	Sanitary Kptl	Evaporative coolers	Irrigation	Laundry	Kitchen	Total	Balance	Total Model
Jan	108.355	108			0	0	0		0	108.355	122.977
Feb	37.514	36			0		0		0	71.514	111.076
Mar	34.578	35					0			34.578	122.977
Apr	178.221	128									
May	199.323	199			776	22.342			23.068	105.145	165.145
June	228.273	228			8.350	27.197			35.547	163.776	194.070
July	228.273	228			49.012	46.219			95.230	132.953	309.470
Aug	264.350	264			94.756	52.192			146.948	117.442	415.673
Sept	336.173	335			78.782	41.974			120.756	215.417	354.488
Oct	295.257	295			20.694	23.240			43.934	245.333	218.878
Nov	238.706	239			0	18.236			18.236	220.470	159.449
Dec	199.145	199			0				199.145	119.010	1002
Jan	74	74			0				74	33.814	122.977
Feb	233.814	233			252.393	231.400			483.793	694.053	2.427.390
Mar	2.183.782	2.184			0				491.903	1.691.879	2.97



**Arapahoe County Domestic Water**  
**Altura Plaza**

Code	Units
1	Gal
2	Kgal
3	CF
4	CCF
5	MCF
6	<<< enter unit code

Flat rate	1000000	Water Rate	\$3.34000	Sewer Rate	\$1.64000
Water Service Charge	\$0.00000		\$0.00000		\$0.00000
Sewer Service Charge	\$0.00000		\$0.00000		\$0.00000
Storm water fee	\$12.13	gals			
SD COM component	\$3.83				
	\$90.90				

Water	Differential	Sewer	Differential
\$3.34000		\$1.64000	
\$3.34000		\$1.64000	

Read Date	Month	Usage	Kgal/day	Gallons	Billing days	Water Charges	Sewer Charges	Total Metered Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total	\$/gallon Total
1/31/2004	Jan	231	9	231,312	25	\$773	\$337	\$2,220	\$2,341	\$0.0033	\$0.0015	\$0.0048	\$0.0096
2/25/2004	Feb	189	6	188,690	30	\$630	\$337	\$1,935	\$2,056	\$0.0033	\$0.0018	\$0.0051	\$0.0103
3/26/2004	Mar	158	5	157,555	35	\$526	\$337	\$1,727	\$1,848	\$0.0033	\$0.0021	\$0.0055	\$0.0110
4/30/2004	Apr	247	9	247,231	27	\$826	\$337	\$2,326	\$2,447	\$0.0033	\$0.0014	\$0.0047	\$0.0094
5/27/2004	May	322	9	322,300	34	\$1,076	\$337	\$2,827	\$2,949	\$0.0033	\$0.0010	\$0.0044	\$0.0088
6/30/2004	Jun	347	12	347,233	30	\$1,160	\$337	\$2,994	\$3,115	\$0.0033	\$0.0010	\$0.0043	\$0.0086
7/30/2004	Jul	387	12	387,367	31	\$1,294	\$337	\$3,262	\$3,383	\$0.0033	\$0.0009	\$0.0042	\$0.0084
8/30/2004	Aug	459	15	459,150	31	\$1,534	\$337	\$3,741	\$3,863	\$0.0033	\$0.0007	\$0.0041	\$0.0081
9/30/2004	Sep	414	15	414,267	28	\$1,384	\$337	\$3,442	\$3,563	\$0.0033	\$0.0008	\$0.0042	\$0.0083
10/28/2004	Oct	362	11	361,683	33	\$1,208	\$337	\$3,090	\$3,212	\$0.0033	\$0.0009	\$0.0043	\$0.0086
11/30/2004	Nov	318	10	318,155	31	\$1,063	\$337	\$2,800	\$2,921	\$0.0033	\$0.0011	\$0.0044	\$0.0088
12/31/2004	Dec	197	7	196,791	30	\$657	\$337	\$1,989	\$2,110	\$0.0033	\$0.0017	\$0.0051	\$0.0101
1/30/2005	Jan												

231	231,312
189	188,690
158	157,555
247	247,231
322	322,300
347	347,233
387	387,367
459	459,150
414	414,267
362	361,683
318	318,155
197	196,791

Arapahoe County Domestic Water  
Peoria Shops

Assumptions	
Staff Population	56.00
Pop Ratio Female	30.00%
Visitor Population	0
Pop Ratio Female	0.5
Length of Stay (hrs)	2.40
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	50.00%
Days/year	341
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Energy Inputs		Billing units	\$/unit
DHW heating source	NC	Therm	\$0.8900
Fuel conversion source	CG	kWh	\$0.1000
Not. Gas System Efficiency			100.00%

Ice Machine Calc.	
Lbs/Day	0 lbs
Lbs/Year	0 lbs
Gallons / year	0 gal
Gallons of water/100 lbs of ice	16 gal
Process waste	0 gal
Est. Storage Waste	0 gal
Number of Ice Machines	1 gal
Total Storage Waste	24 gal
Total Ice Machine Usage (Gallons)	0 gal

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
8000	8000
Total Ice Machine Usage (Gallons)	8832

## 25,008

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**Arapahoe County Domestic Water**  
**Peoria Shops**  
 Road Maintenance

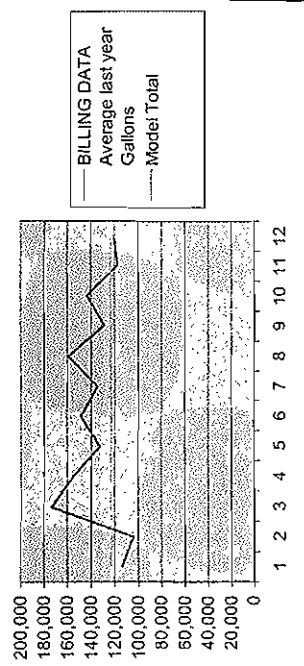
Street sweepers are deployed when Temps are above 20 °F

Street Sweepers	250	gallons
Capacity		
Quantity	4	
Frequency	237	
Total Usage	59,365	
Patch Trucks		
Capacity	50	
Quantity	3	
Frequency	150	
Total Usage	22,500	
Painters		
Capacity	0	
Quantity	2	
Frequency	150	
Total Usage	0	
Grand Total	81,865	

Recycle factor 0.5  
 Total recycle savings 640000  
 Estimated cost savings 9600

Total Hours		20
average	Denver	
97	4	0
92	42	0
87	168	0
82	280	0
77	397	0
72	498	0
67	634	0
62	798	0
57	799	0
52	769	0
47	737	0
42	710	0
37	672	0
32	678	0
27	582	0
22	438	0
17	242	242
12	137	137
7	80	80
2	46	46
-3	20	20
-8	11	11
-13	3	3
-18	2	2
		541
		23

Billing Data	Average last year	Staff days per month	Visitors days per month	Population days	Sanitary Water Use Model	Balloons		Water Rate		Sewer Rate		Water Differential	Sewer Differential
						Callons	Saved	Water Dollars	Saved	Sewer Dollars	Saved		
Jan	113,372	22	22	620	9,609	103,763	4,630	\$7.17	\$0.00290	\$0.00232	\$0.00073	\$0.00048	
Feb	103,890	20	20	560	8,680	95,210	4,182	\$6.35	\$0.00263	\$0.00205	\$0.00045	\$0.00030	
Mar	173,374	22	22	620	9,609	163,765	4,830	\$7.17	\$0.00290	\$0.00232	\$0.00073	\$0.00048	
Apr	135,558	21	21	600	9,299	146,259	4,481	\$6.16	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
May	132,547	22	22	620	9,609	122,318	4,630	\$6.35	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
June	148,231	21	21	600	9,299	138,932	4,481	\$6.35	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
July	134,590	22	22	620	9,609	124,981	4,630	\$6.35	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
Aug	138,899	22	22	620	9,609	149,280	4,830	\$7.17	\$0.00290	\$0.00232	\$0.00073	\$0.00048	
Sept	128,592	21	21	600	9,299	119,203	4,481	\$6.16	\$0.00263	\$0.00205	\$0.00045	\$0.00030	
Oct	143,174	22	22	620	9,609	133,515	4,630	\$6.35	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
Nov	117,060	21	21	600	9,299	107,161	4,481	\$6.16	\$0.00263	\$0.00205	\$0.00045	\$0.00030	
Dec	120,167	22	22	620	9,609	110,558	4,630	\$6.35	\$0.00277	\$0.00219	\$0.00069	\$0.00044	
Total	1,629,304	261	261	3,000	113,144	1,516,160	54,919	\$176.11	\$176.11	\$176.11	\$53.04	\$53.04	

[illegible]

Recycle factor	0.5
total recycle savings	\$540,000
	9600

**Arapahoe County Domestic Water  
Peoria Shops**

Code	Units
1	Gal
2	Kgal
3	CC
4	CC
5	NCF
2	<<< enter unit code

Water Rate      Sewer Rate  
 < 25,000 gpd      25,000      \$0.00232  
 25,001-200,000      200,000      \$0.00250  
 > 200,000      200,000      \$0.00340  
 Minimum Usage:      12,000 gals  
 Storm water fee      \$117.45  
 Fireline Charge      \$0.00  
 Capital Fund Factor      \$2.00

Water Differential      Sewer Differential  
 \$0.00073      \$0.00058  
 \$0.00145      \$0.00116

Kgal  
Kgal  
Kgal

Read Date	Month	Kgal/Mtr	Usage	Gallons	Billing days	Water Charges	Sewer Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total	\$/gallon Total
7/31/2004	Jul	5	113,372	113,372	31	\$3.17	\$0.00	\$3.17	\$0.0035	\$0.0028	\$0.0063	\$0.0063
8/31/2004	Aug	5	103,890	103,890	31	\$3.17	\$0.00	\$3.17	\$0.0041	\$0.0035	\$0.0076	\$0.0076
9/30/2004	Sep	5	173,374	173,374	31	\$3.17	\$0.00	\$3.17	\$0.0013	\$0.0010	\$0.0023	\$0.0023
10/31/2004	Oct	6	155,558	155,558	31	\$3.17	\$0.00	\$3.17	\$0.0018	\$0.0014	\$0.0032	\$0.0032
11/30/2004	Nov	4	132,547	132,547	31	\$3.17	\$0.00	\$3.17	\$0.0026	\$0.0021	\$0.0046	\$0.0046
12/31/2004	Dec	5	148,231	148,231	31	\$3.17	\$0.00	\$3.17	\$0.0020	\$0.0016	\$0.0036	\$0.0036
1/31/2005	Jan	5	158,889	158,889	31	\$3.17	\$0.00	\$3.17	\$0.0025	\$0.0020	\$0.0045	\$0.0045
2/28/2005	Feb	4	128,502	128,502	29	\$3.17	\$0.00	\$3.17	\$0.0017	\$0.0013	\$0.0030	\$0.0030
3/31/2005	Mar	4	143,124	143,124	31	\$3.17	\$0.00	\$3.17	\$0.0027	\$0.0022	\$0.0049	\$0.0049
4/30/2005	Apr	4	117,060	117,060	31	\$3.17	\$0.00	\$3.17	\$0.0035	\$0.0028	\$0.0063	\$0.0063
5/31/2005	May	4	120,167	120,167	31	\$3.17	\$0.00	\$3.17	\$0.0031	\$0.0025	\$0.0056	\$0.0056
6/30/2005	Jun	4	113,372	113,372	30	\$3.17	\$0.00	\$3.17	\$0.0031	\$0.0025	\$0.0056	\$0.0056

113,372  
103,890  
173,374  
155,558  
132,547  
148,231  
158,889  
128,502  
143,124  
117,060  
120,167

\$3.17  
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\$0.0035  
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\$0.0035  
\$0.0031

\$0.0028  
\$0.0035  
\$0.0010  
\$0.0014  
\$0.0021  
\$0.0016  
\$0.0020  
\$0.0013  
\$0.0022  
\$0.0035  
\$0.0028

\$0.0063  
\$0.0076  
\$0.0023  
\$0.0032  
\$0.0046  
\$0.0036  
\$0.0045  
\$0.0030  
\$0.0049  
\$0.0063  
\$0.0056

\$0.0063  
\$0.0076  
\$0.0023  
\$0.0032  
\$0.0046  
\$0.0036  
\$0.0045  
\$0.0030  
\$0.0049  
\$0.0063  
\$0.0056



Arapahoe County Domestic Water  
ACJC Courthouse

Assumptions	
Staff Population	109.00
Pop Ratio Female	60.00%
Visitor Population	1500
Pop Ratio Female	0.6
Length of Stay (hrs)	1.00
Inmate Population	50
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	355
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/ Day	50 lbs
Lbs/Year	18250 lbs
Gallons / year	2191 qal
Gallons of water/100 lbs of ice	16 qal
Process waste	2920 qal
Est. Storage Waste	8000 qal
Number of Ice Machines	1 qal
Total Storage Waste	24 qal
Total Ice Machine Usage (Gallons)	10920 qal

Energy Inputs		Billing units	\$/unit
DHW heating source	NG	Therm	\$0.8900
Fuel conversion source	GG	kWh	\$0.1000
Nat. Gas System Efficiency			100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
	8000
Total Ice Machine Usage (Gallons)	8832

## 148.522

FUTURE TENDENCY			Weighted Average
	GDP	Quantity	
Total	1.6	5	
Food	1.6	24	
Non-food	1.6	10	
Commodities	1.6	1.60	
Services	3.5	0	
Capital	1.6	3	
Transfer	1	1.00	
Unpaid	1	0	

[illegible]

Staff:	100	100	100
Spill:	0.4	0.4	0.4
Spill: Men	0.6	0.6	0.6
Spill: Total	1.0	1.0	1.0
Spill:	0.000	0.000	0.000

[illegible][illegible]

	Male	Female
Toilet	15.09	10.62
Shower	10.62	10.62
Low Forest	10.62	10.62
Shower (M.F.)	10.62	10.62

**Turkey**

	Toilet usage women	Toilet usage men
Days/yr	355	355
Population:	18	7.5

Minutes	Use per day	Uses per minutes	Diversity (account for absence*)	Q11 attend	Q14 explain	Q15 proposed
5	5	11.053	1	150	0	0
13.311						

Net Proceeds	49,760	21,500
Total Usable Pkgs (Net)	0	0
Total Usable Post (Gross)	49,760	21,500
Savings		
Hot Water Galleons Pkgs		
Hot Water Galleons Post		

	Cost /
Hot Water Engine Pile (ambulance)	
Hot Water Engine Post (ambulance)	
Hot Water Engine Services (ambulance)	

Sanitary Water Use Summary	Gallons	Percent
Domestic Use	84,313	17.8
Industrial Use	172,313	36.5
Commercial Use	13,313	2.8
Public Use	471,889	100.0
Sanitary Use	865,213	18.1
Sanitary Use	172,313	36.5
Sanitary Use	84,313	17.8
Sanitary Use	13,313	2.8
Sanitary Use	471,889	100.0

[illegible]

Thema	(Numble)
Energy Pre (Numble)	34
Kishen	69
103	103
103	103

Material	0.02%
Energy Prod. (MWh/y)	34
Energy Savings	0
% Savings (vs. Water)	0.0%

109500

[illegible]

Participants	Adolescents	Control Group
Total Visits / \$	23	25-26
Visits / \$ Mass Transmision		

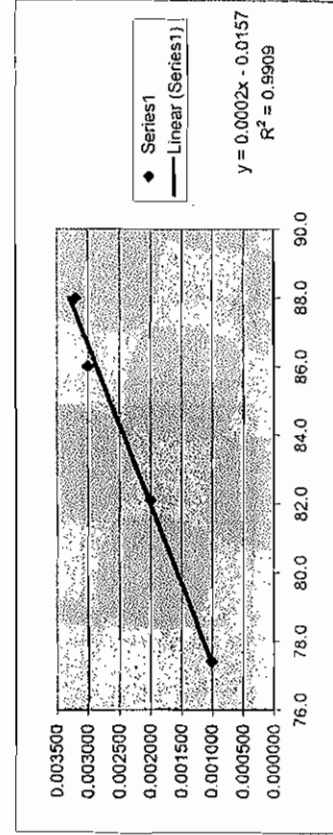
Apache County Domestic Water  
ACJC Courthouse

3 Rule of thumb CFM/SF
0.075 lb/cf density of air
148,000 SF of conditioned space
444,000 CFM total

<http://qweather.com/ccd/nrmcdd.htm>

Month	CCD	% of CCD in this Month	Gallons/ month
Jan	0	0%	0
Feb	0	0%	0
Mar	0	0%	0
Apr	2	0%	4,572
May	23	3%	52,579
Jun	135	19%	308,617
Jul	261	38%	596,659
Aug	217	31%	496,073
Sep	57	8%	130,303
Oct	0	0%	0
Nov	0	0%	0
Dec	0	0%	0
	695		1,588,806

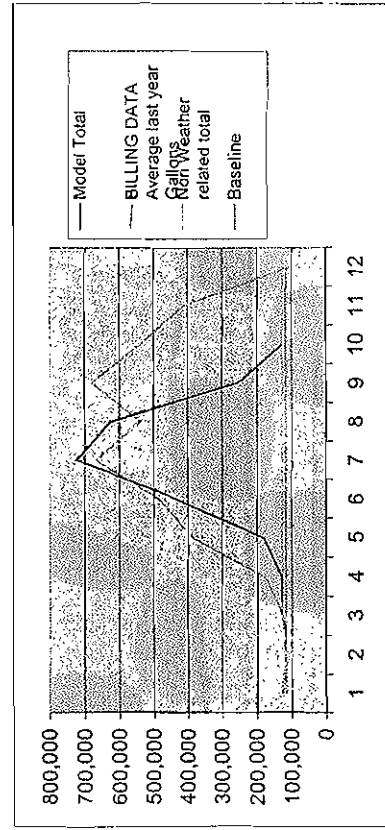
Month	DENVER Wet Bulb	DENVER RH	DENVER Mean Dry Bulb	DENVER High Temps Dry Bulb	Average, high and mean	Psychrometric Chart Humidity Ratio (#moisture / # of dry air	gallons / month
Jan	24	49	36.4	43.2	39.8		
Feb	27	44	36.5	47.2	41.9		
Mar	31	40	43.1	53.7	48.4		
Apr	38	35	50.9	60.9	55.9		
May	46	38	61.0	70.5	65.8		
Jun	54	35	69.2	82.1	75.7	0.002000	345,393
Jul	58	34	78.2	88.0	83.1	0.003200	552,628
Aug	57	35	74.8	86.0	80.4	0.003000	518,089
Sep	50	34	65.9	77.4	71.7	0.001000	172,596
Oct	41	36	53.2	66.0	59.6		
Nov	31	49	41.0	51.5	46.3		
Dec	25	52	35.2	44.1	39.7		
	40	40	53.8	64.2	59.0		1,588,806



BILLING DATA		Sanitary Water Use		Non Weather related total		Baseline		Balance		Gallons Saved		New Baseline	
Month	Year	Gallons per month	Week days per month	Kitchen	Laundry	Total	Baseline	Model Total	Balance (gal)	Gallons Saved	Baseline	New Baseline	Balance
Jan	2011	176,154	22	9,125	178,163	178,163	178,163	178,163	-2,009	474	178,163	176,154	2,009
Feb	2011	107,937	20	9,125	116,643	116,643	116,643	116,643	-3,651	474	116,643	107,937	8,706
Mar	2011	174,801	22	9,125	178,163	178,163	178,163	178,163	-3,757	474	178,163	174,801	3,362
Apr	2011	175,622	21	9,125	178,163	178,163	178,163	178,163	-4,727	474	178,163	175,622	2,541
May	2011	383,974	27	9,125	393,100	393,100	393,100	393,100	-20,062	474	393,100	383,974	9,126
June	2011	446,176	21	9,125	455,301	455,301	455,301	455,301	-53,268	474	455,301	446,176	9,125
July	2011	661,181	22	9,125	670,306	670,306	670,306	670,306	-57,681	474	670,306	661,181	9,125
Aug	2011	517,484	21	9,125	526,609	526,609	526,609	526,609	-86,757	474	526,609	517,484	9,125
Sep	2011	619,355	21	9,125	628,480	628,480	628,480	628,480	-10,748	474	628,480	619,355	9,125
Oct	2011	519,919	21	9,125	529,044	529,044	529,044	529,044	-28,784	474	529,044	519,919	9,125
Nov	2011	409,107	21	9,125	418,232	418,232	418,232	418,232	-27,148	474	418,232	409,107	9,125
Dec	2011	106,077	22	9,125	115,202	115,202	115,202	115,202	-27,148	474	115,202	106,077	9,125
Year	2011	4,957,707	261	73,000	5,030,707	5,030,707	5,030,707	5,030,707	-284,131	533,517	5,030,707	4,957,707	73,000

Non Sanitary Use		Sanitary Use		Evaporative coolers		Total		Model Total		Balance (gal)		Model total to billing	
Month	Year	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)	Use (Kgal)
Jan	2011	7,116	0	0	0	7,116	7,116	7,116	7,116	-2,009	107%	7,116	7,116
Feb	2011	4,74	0	0	0	4,74	4,74	4,74	4,74	-3,651	100%	4,74	4,74
Mar	2011	5,653	6	0	0	5,659	5,659	5,659	5,659	-3,757	102%	5,659	5,659
Apr	2011	6,424	60	4,372	0	10,796	10,796	10,796	10,796	-4,727	17%	10,796	10,796
May	2011	264,786	265	52,579	0	317,365	317,365	317,365	317,365	-20,062	57%	317,365	317,365
June	2011	370,938	371	308,617	0	679,555	679,555	679,555	679,555	-53,268	89%	679,555	679,555
July	2011	548,123	549	596,659	0	1,144,782	1,144,782	1,144,782	1,144,782	-57,681	103%	1,144,782	1,144,782
Aug	2011	418,446	418	496,075	0	914,521	914,521	914,521	914,521	-86,757	116%	914,521	914,521
Sep	2011	564,157	564	130,305	0	694,462	694,462	694,462	694,462	-10,748	74%	694,462	694,462
Oct	2011	419,871	420	0	0	419,871	419,871	419,871	419,871	-28,784	30%	419,871	419,871
Nov	2011	293,909	294	0	0	293,909	293,909	293,909	293,909	-27,148	121%	293,909	293,909
Dec	2011	113,071	113	0	0	113,071	113,071	113,071	113,071	-27,148	121%	113,071	113,071
Year	2011	2,941,131	2,941	1,588,805	0	4,529,936	4,529,936	4,529,936	4,529,936	-284,131	71%	4,529,936	4,529,936

1538.605162



Apache County Domestic Water  
ACJC Courthouse

Code	Units
1	Gal
2	Kgal
3	CCF
4	CCF
5	MCF
2	<<< enter unit code

< 25,000g gal	25000	\$0.00290	\$0.00232
25,001-200,000	200000	\$0.00363	\$0.00290
>200,000	200000	\$0.00435	\$0.00348
Minimum Usage		144,000 gals	
Storm water fee		\$15.30	
FireLineCharge		\$1,142.04	
Capitol Fund		\$317.50	

Water	Differential	Sewer	Differential
	\$0.00073	\$0.00058	
	\$0.00145	\$0.00116	

Read Date	Mont h	Kgal/day	Usage	Gallons	Billing days	Water Charges	Sewer Charges	Total Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total	\$/gallon Total
1/31/2004	Jan	5	126	Kgal	25	\$360	\$287	\$1,295		\$0.00285	0.0022776	0.0051324	0.0102849
2/25/2004	Feb	4	108	Kgal	30	\$413	\$329	\$1,485		\$0.00382	0.0030508	0.0068735	0.0137470
3/26/2004	Mar	4	125	Kgal	35	\$364	\$290	\$1,308		\$0.00291	0.0023237	0.0052363	0.0104726
4/30/2004	Apr	7	176	Kgal	27	\$217	\$173	\$779		\$0.00123	0.0009825	0.0022164	0.0044329
5/27/2004	May	11	384	Kgal	34	\$1,526	\$1,220	\$5,491		\$0.00397	0.0031778	0.0071526	0.0143052
6/30/2004	Jun	16	486	Kgal	30	\$1,971	\$1,576	\$7,094		\$0.00405	0.0032414	0.0072952	0.0145904
7/30/2004	Jul	22	667	Kgal	31	\$2,758	\$2,206	\$9,928		\$0.00413	0.0033061	0.0074403	0.0148806
8/30/2004	Aug	17	537	Kgal	31	\$2,194	\$1,754	\$7,897		\$0.00408	0.0032642	0.0073463	0.0148925
9/30/2004	Sep	24	679	Kgal	28	\$2,811	\$2,248	\$10,119		\$0.00414	0.0033092	0.0074473	0.0148946
10/28/2004	Oct	16	539	Kgal	33	\$2,200	\$1,759	\$7,919		\$0.00408	0.0032648	0.0073475	0.0148951
11/30/2004	Nov	13	409	Kgal	31	\$1,636	\$1,308	\$5,887		\$0.00400	0.0031965	0.0071945	0.0143889
12/31/2004	Dec	4	106	Kgal	30	\$419	\$334	\$1,505		\$0.00395	0.0031508	0.0070988	0.0141976
1/30/2005	Jan												

126,154  
107,992  
124,901  
175,622  
383,824  
486,176  
667,161  
537,484  
679,355  
538,909  
409,107  
106,017

126,154  
107,992  
124,901  
175,622  
383,824  
486,176  
667,161  
537,484  
679,355  
538,909  
409,107  
106,017

# Arapahoe County Domestic Water Administrative II

Assumptions	
Staff Population	250.00
Pop Ratio Female	60.00%
Visitor Population	150
Pop Ratio Female	0.5
Length of Stay (hrs)	0.50
Inmate Population	0
Pop Ratio Female	0.7
Length of Stay (hrs)	4.00
Staff Absentee rate	0.00%
Days/year	236
Site Type (Res Comm)	comm
Laundry Population	0

Water Temperature	
Street	54
DHW supply	130
Boiler Efficiency	100%
Laundry	
Cycle/person/day	0
Gallons/load Pre	37.5
Gallons/load Post	25

Ice Machine Calc.	
Lbs/Day	50
Lbs/Year	18250
Gallons / year	2191
Gallons of water/100 lbs of ice	16
Process waste	2928
Est. Storage Waste	8000
Number of Ice Machines	1
Total Storage Waste	24
Total Ice Machine Usage (Gallons)	10920

Energy Inputs	
DHW heating source	NG
Fuel conversion source	CG
Nat. Gas System Efficiency	100.00%

Lbs/Year	5200
Gallons / year	624
Gallons of water/100 lbs of ice	16
Process waste	832
Est. Storage Waste	8000
Number of Ice Machines	1
Total Ice Machine Usage (Gallons)	8832

## 000'15

[illegible]

model/bbox  
92.37%

Task#44	Task Name	Start	Stop	Days
1	Prep Work	10/1/00	10/1/00	1
2	Design	10/2/00	10/2/00	1
3	Code	10/3/00	10/3/00	1
4	Test	10/4/00	10/4/00	1
5	Deploy	10/5/00	10/5/00	1
6	Post-mortem	10/6/00	10/6/00	1
7	Report	10/7/00	10/7/00	1
8	Review	10/8/00	10/8/00	1
9	Final	10/9/00	10/9/00	1
10	Close	10/10/00	10/10/00	1
11	Archive	10/11/00	10/11/00	1
12	Release	10/12/00	10/12/00	1
13	Support	10/13/00	10/13/00	1
14	Feedback	10/14/00	10/14/00	1
15	Summary	10/15/00	10/15/00	1
16	Final	10/16/00	10/16/00	1
17	Close	10/17/00	10/17/00	1
18	Archive	10/18/00	10/18/00	1
19	Release	10/19/00	10/19/00	1
20	Support	10/20/00	10/20/00	1
21	Feedback	10/21/00	10/21/00	1
22	Summary	10/22/00	10/22/00	1
23	Final	10/23/00	10/23/00	1
24	Close	10/24/00	10/24/00	1
25	Archive	10/25/00	10/25/00	1
26	Release	10/26/00	10/26/00	1
27	Support	10/27/00	10/27/00	1
28	Feedback	10/28/00	10/28/00	1
29	Summary	10/29/00	10/29/00	1
30	Final	10/30/00	10/30/00	1
31	Close	10/31/00	10/31/00	1
32	Archive	11/1/00	11/1/00	1
33	Release	11/2/00	11/2/00	1
34	Support	11/3/00	11/3/00	1
35	Feedback	11/4/00	11/4/00	1
36	Summary	11/5/00	11/5/00	1
37	Final	11/6/00	11/6/00	1
38	Close	11/7/00	11/7/00	1
39	Archive	11/8/00	11/8/00	1
40	Release	11/9/00	11/9/00	1
41	Support	11/10/00	11/10/00	1
42	Feedback	11/11/00	11/11/00	1
43	Summary	11/12/00	11/12/00	1
44	Final	11/13/00	11/13/00	1
45	Close	11/14/00	11/14/00	1
46	Archive	11/15/00	11/15/00	1
47	Release	11/16/00	11/16/00	1
48	Support	11/17/00	11/17/00	1
49	Feedback	11/18/00	11/18/00	1
50	Summary	11/19/00	11/19/00	1
51	Final	11/20/00	11/20/00	1
52	Close	11/21/00	11/21/00	1
53	Archive	11/22/00	11/22/00	1
54	Release	11/23/00	11/23/00	1
55	Support	11/24/00	11/24/00	1
56	Feedback	11/25/00	11/25/00	1
57	Summary	11/26/00	11/26/00	1
58	Final	11/27/00	11/27/00	1
59	Close	11/28/00	11/28/00	1
60	Archive	11/29/00	11/29/00	1
61	Release	11/30/00	11/30/00	1
62	Support	12/1/00	12/1/00	1
63	Feedback	12/2/00	12/2/00	1
64	Summary	12/3/00	12/3/00	1
65	Final	12/4/00	12/4/00	1
66	Close	12/5/00	12/5/00	1
67	Archive	12/6/00	12/6/00	1
68	Release	12/7/00	12/7/00	1
69	Support	12/8/00	12/8/00	1
70	Feedback	12/9/00	12/9/00	1
71	Summary	12/10/00	12/10/00	1
72	Final	12/11/00	12/11/00	1

Total (all five days)		Total (all five days)		Total (all five days)		Total (all five days)		Total (all five days)	
Sample	Size	Sample	Size	Sample	Size	Sample	Size	Sample	Size
1	10	1	10	1	10	1	10	1	10
2	10	2	10	2	10	2	10	2	10
3	10	3	10	3	10	3	10	3	10
4	10	4	10	4	10	4	10	4	10
5	10	5	10	5	10	5	10	5	10
6	10	6	10	6	10	6	10	6	10
7	10	7	10	7	10	7	10	7	10
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9	10	9	10	9	10	9	10	9	10
10	10	10	10	10	10	10	10	10	10
11	10	11	10	11	10	11	10	11	10
12	10	12	10	12	10	12	10	12	10
13	10	13	10	13	10	13	10	13	10
14	10	14	10	14	10	14	10	14	10
15	10	15	10	15	10	15	10	15	10
16	10	16	10	16	10	16	10	16	10
17	10	17	10	17	10	17	10	17	10
18	10	18	10	18	10	18	10	18	10
19	10	19	10	19	10	19	10	19	10
20	10	20	10	20	10	20	10	20	10
21	10	21	10	21	10	21	10	21	10
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24	10	24	10	24	10	24	10	24	10
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90	10	90	10	90	10	90	10	90	10
91	10	91	10	91	10	91	10	91	10
92	10	92	10	92	10	92	10	92	10
93	10	93	10	93	10	93	10	93	10
94	10	94	10	94	10	94	10	94	10
95	10	95	10	95	10	95	10	95	10
96	10	96	10	96	10	96	10	96	10
97	10	97	10	97	10	97	10	97	10
98	10	98	10	98	10	98	10	98	10
99	10	99	10	99	10	99	10	99	10
100	10	100	10	100	10	100	10	100	10

[illegible][illegible]

	Cashes	Cash / person / hour	Cash / person / day	Remarks	Month	Travel Dates
Sanitation Waste Pipe Summary						
Sanitation Waste Pipe	0	0	0			
Sanitation Waste Pipe	0	0	0			
Sanitation Waste Pipe	572.300	184	9			
Sanitation Waste Pipe	384.180	124	4			
Sanitation Waste Pipe	384.180	124	4			
Sanitation Waste Pipe	513.000	167	8			
Sanitation Waste Pipe	670.575	219	11			

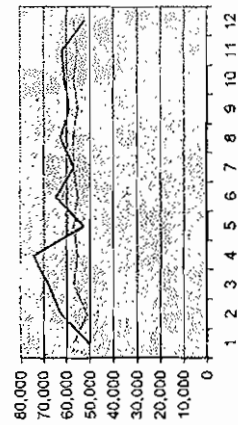
	Number	Items	Year
Excess Per (A-10)	34	139	9,915
Excess	0	0	0
Excess	34	139	9,915
Excess Per (A-10)	212	705	6,654
Excess	11	113	3,372
Excess Per (A-10)	33,372		

# Arapahoe County Domestic Water Administrative II

Billing Data	Average last year	Staff days per month	Visitors days per month	Population	Sanitary Water Use Model	Balance	Gallons Saved	Water Dollars Saved	Sewer Dollars Saved	Total Dollars Saved	Water Differential	Sewer Differential
Jan	50,667	22	22	6,532	58,950	-6,283	17,614	\$77	\$61	\$138	-11%	-11%
Feb	62,424	20	20	5,900	51,438	10,986	15,909	\$69	\$55	\$125	21%	21%
Mar	67,807	22	22	6,532	58,950	10,857	17,614	\$77	\$61	\$138	19%	19%
Apr	74,499	22	22	6,532	58,950	19,387	17,614	\$77	\$61	\$138	35%	35%
May	52,803	22	22	6,532	58,950	-4,147	17,614	\$77	\$61	\$138	-7%	-7%
June	64,498	21	21	6,532	58,950	9,386	17,614	\$77	\$61	\$138	17%	17%
July	56,908	22	22	6,532	58,950	-42	17,614	\$77	\$61	\$138	10%	10%
Aug	62,375	22	22	6,532	58,950	5,425	17,614	\$77	\$61	\$138	10%	10%
Sept	58,965	22	22	6,532	58,950	3,853	17,614	\$77	\$61	\$138	7%	7%
Oct	60,856	22	22	6,532	58,950	3,908	17,614	\$77	\$61	\$138	17%	17%
Nov	61,749	21	21	6,532	58,950	6,677	17,614	\$77	\$61	\$138	17%	17%
Dec	52,392	22	22	6,532	58,950	-4,558	17,614	\$77	\$61	\$138	-8%	-8%
	725,943	261	261	75,911	670,535	55,408	207,385	\$902	\$722	\$1,624		

29%

Non-Sanitary Use	Non-Sanitary Use Kgal	Ice machine	Evaporative coolers	Laundry	Kitchen	Total Modeled non-sanitary use	Balance	Total Use Model	Total Use Model
Jan	-6,283	910	0	0	0	910	-7,193	57,860	113%
Feb	10,386	910	0	0	0	910	10,076	52,348	80%
Mar	10,857	910	0	0	0	910	9,947	57,860	83%
Apr	19,397	910	0	0	0	910	18,477	56,022	86%
May	-4,147	910	0	0	0	910	-5,057	57,860	109%
June	9,386	910	0	0	0	910	8,476	56,022	85%
July	-42	910	0	0	0	910	-952	57,860	102%
Aug	5,425	910	0	0	0	910	4,515	57,860	92%
Sept	3,853	910	0	0	0	910	2,943	56,022	85%
Oct	3,908	910	0	0	0	910	2,996	57,860	95%
Nov	6,677	910	0	0	0	910	5,777	56,022	90%
Dec	-4,558	910	0	0	0	910	-5,468	57,860	110%
	55,408	10,920	0	0	0	10,975	44,433	681,455	94%



— BILLING DATA Average last year Gallons  
--- Sanitary Water Use Model



# **Arapahoe County Domestic Water Administrative II**

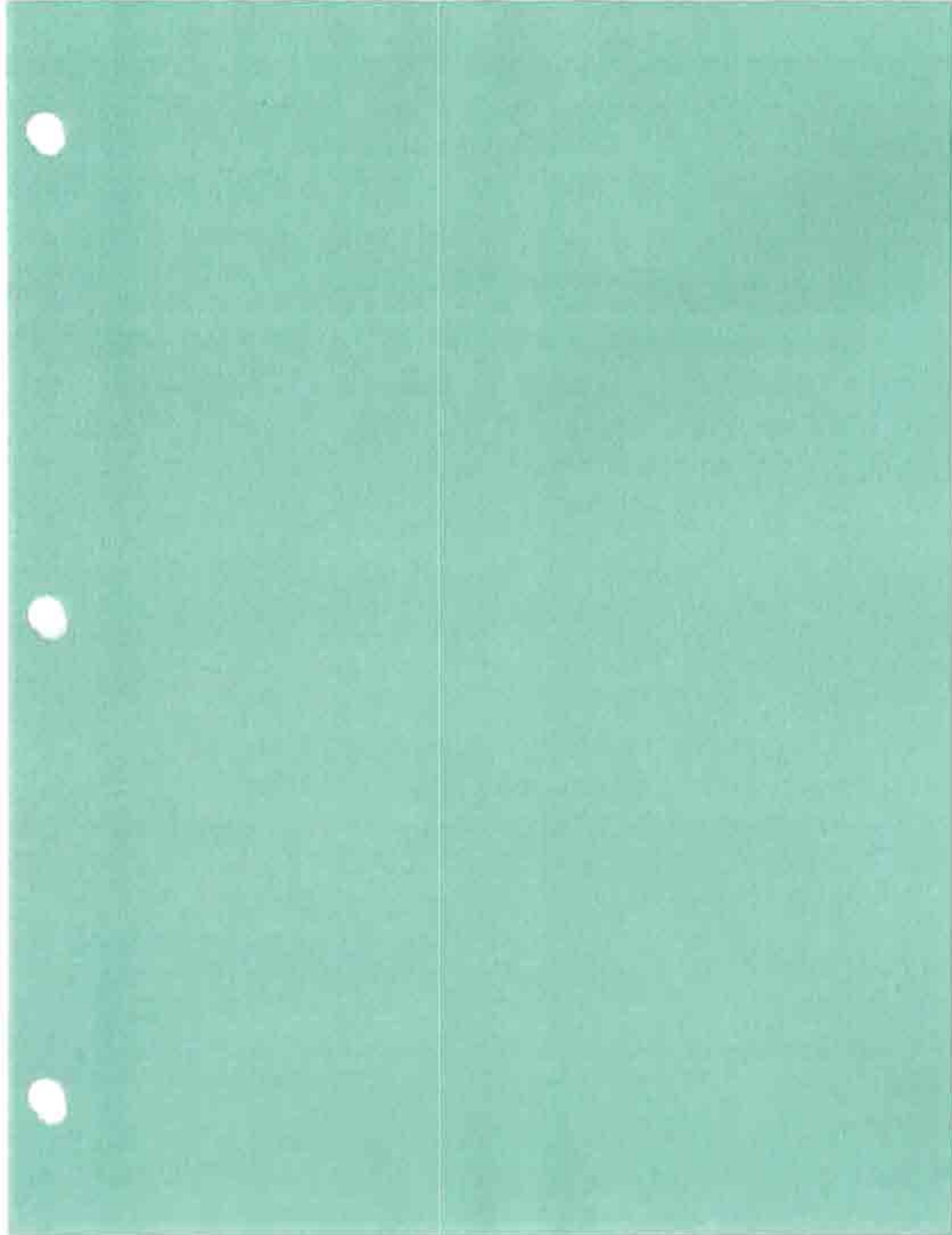
Code	Units
1	Gal
2	Kgal
3	CF
4	CCF
5	MCF
2	<<< enter unit code

Water Rate	Sewer Rate
< 25,000 gal	\$0.00232
25,000-200,000	\$0.00290
>200,000	\$0.00348
Minimum Usage	144,000 gals
Storm water fee	\$15.30
Fireline Charge	\$1,142.04
Capitol Fund	\$317.50

Water	Sewer
Differential	Differential
\$0.00073	\$0.00058
\$0.00145	\$0.00116

Read Date	Month	Kash/day	Usage	Gallons	Billing days	Water Charges	Sewer Charges	Total Charges	\$/gal Water charge	\$/gal Sewer charge	\$/gallon Total	\$/gallon Total
1/31/2004	Jan	2	51	50,667	25	\$579	\$462	\$1,041	\$0.0114	\$0.0091	\$0.0205	\$0.0411
2/25/2004	Feb	2	62	62,424	30	\$545	\$435	\$980	\$0.0087	\$0.0070	\$0.0157	\$0.0314
3/26/2004	Mar	2	68	67,807	35	\$529	\$423	\$952	\$0.0078	\$0.0062	\$0.0140	\$0.0281
4/30/2004	Apr	3	74	74,499	27	\$510	\$407	\$917	\$0.0068	\$0.0055	\$0.0123	\$0.0245
5/21/2004	May	2	53	52,803	34	\$573	\$457	\$1,030	\$0.0108	\$0.0087	\$0.0195	\$0.0390
6/30/2004	Jun	2	64	64,498	30	\$539	\$430	\$969	\$0.0084	\$0.0067	\$0.0150	\$0.0301
7/30/2004	Jul	2	57	56,908	31	\$561	\$448	\$1,009	\$0.0091	\$0.0079	\$0.0177	\$0.0355
8/30/2004	Aug	2	62	62,375	31	\$545	\$435	\$980	\$0.0087	\$0.0070	\$0.0157	\$0.0314
9/30/2004	Sep	2	59	58,965	28	\$555	\$443	\$998	\$0.0094	\$0.0075	\$0.0169	\$0.0339
10/28/2004	Oct	2	61	60,856	33	\$550	\$439	\$989	\$0.0090	\$0.0072	\$0.0162	\$0.0325
11/30/2004	Nov	2	62	61,749	31	\$547	\$437	\$984	\$0.0089	\$0.0071	\$0.0159	\$0.0319
12/31/2004	Dec	2	52	52,392	30	\$574	\$458	\$1,032	\$0.0110	\$0.0088	\$0.0197	\$0.0394
1/30/2005	Jan											

50,667	50,667
62,424	62,424
67,807	67,807
74,499	74,499
52,803	52,803
64,498	64,498
56,908	56,908
62,375	62,375
58,965	58,965
60,856	60,856
61,749	61,749
52,392	52,392



### ***ECM 3 – Install New/Upgrade Energy Management System***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

#### Existing Condition to Warrant an ECM Opportunity:

Some of the facilities within Arapahoe County currently have an energy management control system (EMCS). In most cases, the equipment in these facilities operates during periods of the little or no occupancy. So, some of the existing operating schedules programmed into the EMCS can be modified to better match the actual occupancy schedules.

Many facilities within Arapahoe County are currently without an EMCS. These facilities utilize time clocks, programmable thermostats, and non-programmable thermostats for control of their equipment. In most cases, the equipment operates during periods of little or no occupancy. The installation of a new EMCS will allow the maintenance staff to easily modify the equipment operating schedules to better match the actual occupancy schedules.

#### Savings Calculation Methodology:

The implementation of this ECM shall result in both natural gas and electrical savings. The savings for this ECM were calculated utilizing two Trane Trace building energy simulation models. The first model included the existing operating schedules for each piece of equipment. The second model was modified to include the new operating schedules for each piece of equipment. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings.

Spreadsheet calculations were performed on the buildings that were not modeled. The spreadsheet calculations used the same methodology described above.

Figure 1

Arapahoe County - Admin I Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)			
Month	BASELINE	MODEL	
Jan	217,183	160,605	26%
Feb	189,788	145,184	24%
Mar	229,311	168,223	27%
Apr	218,456	194,211	11%
May	243,374	236,417	3%
Jun	248,088	246,541	1%
Jul	270,700	246,323	9%
Aug	264,710	258,730	2%
Sep	243,348	223,995	8%
Oct	232,915	230,945	1%
Nov	220,561	174,307	21%
Dec	216,466	156,768	28%
	2,794,900	2,442,249	13%

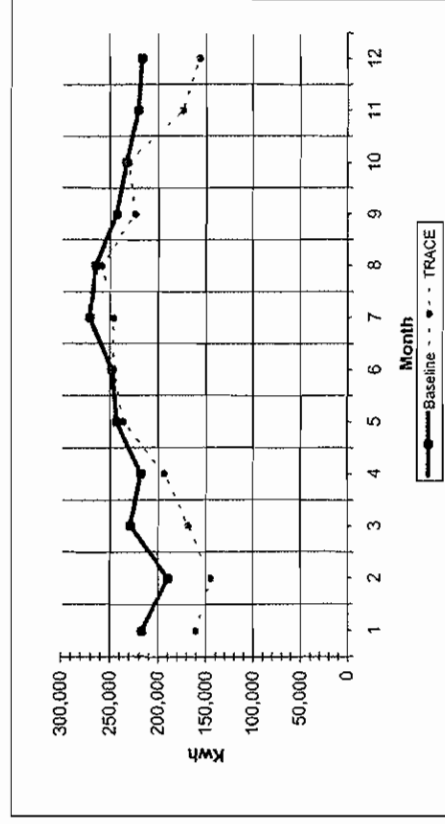
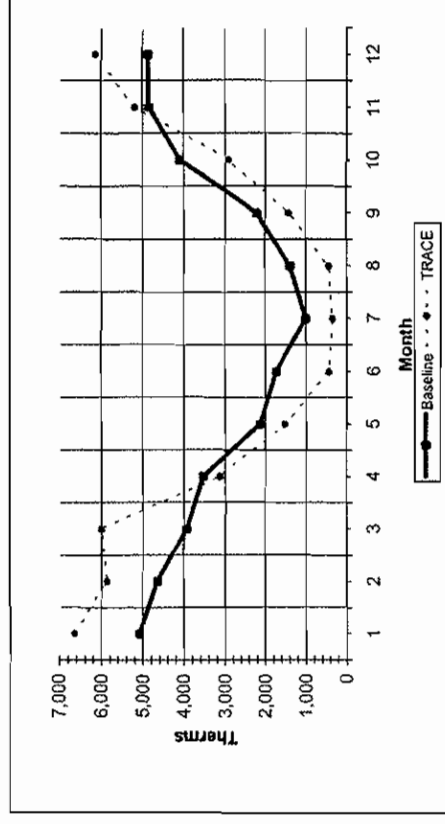


Figure 2

Arapahoe County - Admin I Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)			
Month	BASELINE	MODEL	
Jan	5,080	6,648	-31%
Feb	4,650	5,870	-26%
Mar	3,950	6,011	-52%
Apr	3,550	3,128	12%
May	2,140	1,521	29%
Jun	1,740	449	74%
Jul	1,010	353	65%
Aug	1,390	443	68%
Sep	2,220	1,421	36%
Oct	4,110	2,921	29%
Nov	4,850	5,181	-7%
Dec	4,870	6,142	-26%
	39,560	40,089	-1%



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - Match

Utility	Monthly Energy Consumption												Total	
Electric	On-Pk Cons. (kWh)	160,605	145,184	168,223	194,211	236,417	246,541	246,323	258,730	223,995	230,945	174,307	156,768	2,442,249
	On-Pk Demand (kW)	410	410	410	648	665	673	684	676	665	664	575	410	684
Gas	On-Pk Cons. (therms)	6,648	5,870	6,011	3,128	1,521	449	353	443	1,421	2,921	5,181	6,142	40,089
	On-Pk Demand (therms/hr)	38	39	38	36	35	6	2	3	35	36	37	38	39
Water	Cons. (1000gal)	0	0	0	104	215	258	298	281	197	155	24	0	1,533
Building Energy Consumption = 110,260 Btu/(ft2-year)														
Source Energy Consumption = 261,072 Btu/(ft2-year)														
Floor Area = 111,956 ft2														

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - Lighting Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	140,796	127,277	147,458	172,897	212,943	223,527	222,829	233,874	199,514	211,337	138,488	137,436	2,168,375
On-Pk Demand (kW)	358	358	358	586	593	609	619	612	607	600	358	358	619
<b>Gas</b>													
On-Pk Cons. (therms)	6,751	5,968	6,114	3,168	1,499	476	353	465	1,708	2,917	5,907	6,238	41,562
On-Pk Demand (therms/hr)	37	37	37	35	34	6	2	3	35	35	36	37	37
<b>Water</b>													
Cons. ('1000gal)	0	0	0	91	197	235	277	260	179	145	0	0	1,385
<b>Building Energy Consumption =</b>													
Source Energy Consumption =	103,227 Btu/(ft2-year)												
Floor Area =	237,407 Btu/(ft2-year)												
	111,956 ft2												

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe County - Admin I - EMCS Run

## Monthly Energy Consumption

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	130,120	117,639	137,067	149,284	177,616	184,908	184,820	196,456	161,483	176,125	128,253	1,870,390
	On-Pk Demand (kW)	358	358	358	586	616	638	646	636	614	600	358	646
Gas	On-Pk Cons. (therms)	4,845	4,278	3,815	1,265	415	388	353	405	353	1,373	3,805	25,743
	On-Pk Demand (therms/hr)	37	37	36	34	12	2	2	2	2	31	36	37
Water	Cons. (1000gal)	0	0	0	70	145	186	200	210	124	103	0	1,037
Building Energy Consumption = 80,013 Btu/(ft2-year)													
Source Energy Consumption = 195,278 Btu/(ft2-year)													
Floor Area = 111,956 ft2													

## MODELING NOTES

### ARAPAHOE COUNTY - ADMIN I BUILDING

ECM Run: Install New EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-2	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-3	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-4	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off

**Previous Run (New Lighting Run):**

Annual kWh Usage: 2,168,375  
Annual kW Usage: 6,016  
Annual Therms Usage: 41,562

**Current Run (Install New EMCS Run):**

Annual kWh Usage: 1,870,390  
Annual kW Usage: 6,125  
Annual Therms Usage: 25,743

**Savings (Install New EMCS Savings):**

Annual kWh Savings: 297,985  
Annual kW Savings: -109  
Annual Therms Savings: 15,819

**Notes:**

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73



### Admin I - DHW Pump EMCS Savings

Pump ID:	HP:	LF:	Efficiency:	kW:	Existing Run Hrs:	New Run Hrs:	kWh Savings:
DHWP-1	0.17	0.75	0.7	0.13	8,760	3,259	733
HX Pump	0.25	0.75	0.7	0.20	8,760	3,259	1,099

**Total kWh Savings: 1,832**

Note: The existing run hours are 24 h/d, 7 d/w. The new run hours are 12.5 h/d, 5 d/w. These savings shall be added to the EMCS savings that were calculated in the Trane Trace building simulation model.

Figure 1

Arapahoe County - Arapahoe Plaza East Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	33,024	29,670
Feb	28,866	26,813
Mar	33,384	30,602
Apr	28,336	28,562
May	28,416	30,213
Jun	28,020	29,748
Jul	29,354	30,148
Aug	31,700	31,074
Sep	29,611	28,642
Oct	30,668	30,136
Nov	27,862	29,028
Dec	31,304	29,204
	360,545	353,840
		2%

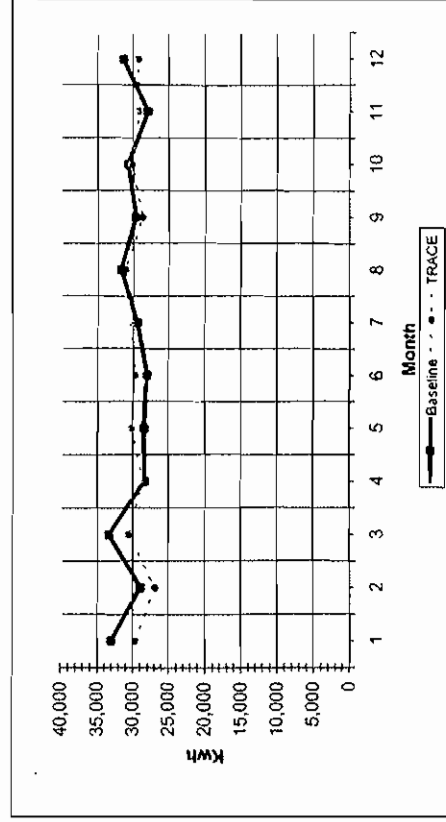


Figure 2

Arapahoe County - Arapahoe Plaza East Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASELINE	MODEL
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
	0	0
		#DIV/0!

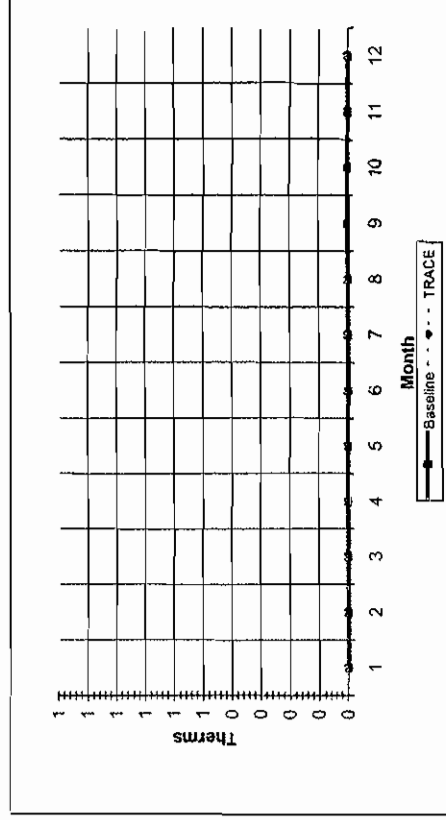


Figure 1

Arapahoe County - Arapahoe Human Services  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASILINE	MODEL
Jan	56,825	59,538
Feb	53,311	53,809
Mar	57,360	61,379
Apr	55,422	65,372
May	57,204	88,176
Jun	69,488	96,267
Jul	102,970	112,971
Aug	83,302	107,725
Sep	80,601	85,398
Oct	83,325	78,622
Nov	73,482	58,109
Dec	56,864	58,611
	830,154	925,977
		-12%

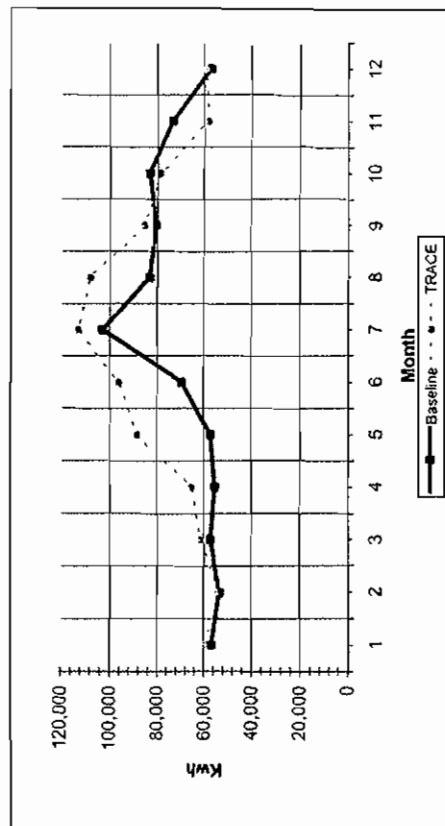


Figure 2

Arapahoe County - Arapahoe Human Services  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASILINE	MODEL
Jan	6,316	4,401
Feb	5,567	4,013
Mar	5,364	3,706
Apr	3,074	2,406
May	2,324	1,602
Jun	1,054	1,203
Jul	605	691
Aug	873	1,129
Sep	1,523	1,596
Oct	4,029	2,418
Nov	6,131	3,477
Dec	6,336	4,222
	43,196	30,865
		29%

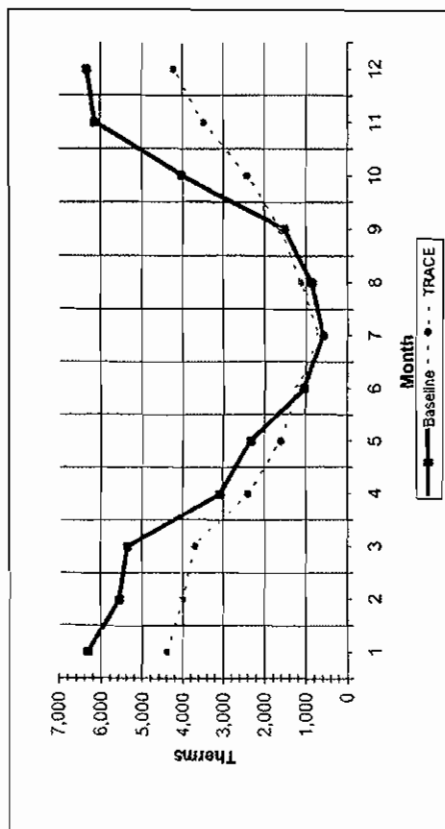


Figure 1

Arapahoe County - Arapahoe Plaza West Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	34,674	30,921 11%
Feb	32,763	27,950 15%
Mar	36,092	32,238 11%
Apr	32,596	29,711 9%
May	32,167	31,652 2%
Jun	32,748	31,235 5%
Jul	34,057	30,975 9%
Aug	34,661	32,667 6%
Sep	32,809	29,781 9%
Oct	33,233	31,579 5%
Nov	32,757	30,370 7%
Dec	34,647	30,263 13%
	403,204	369,343 8%

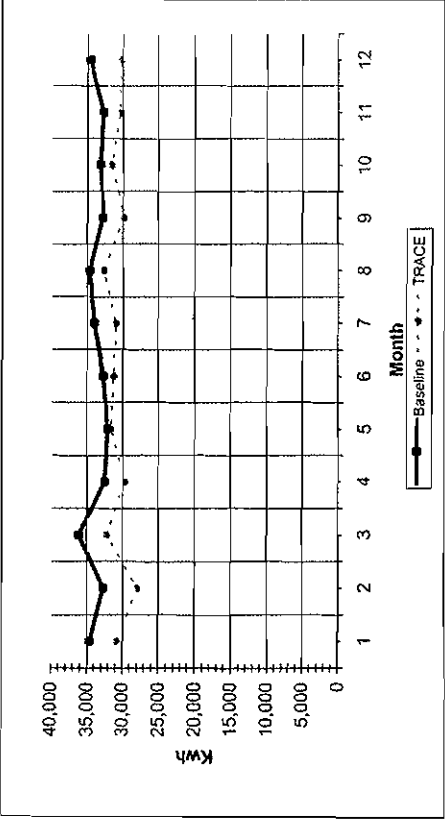
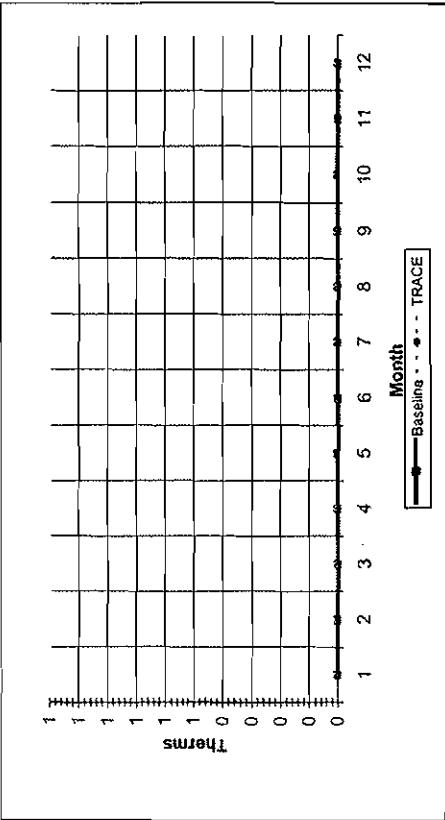


Figure 2

Arapahoe County - Arapahoe Plaza West Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASELINE	MODEL
Jan	0	0 #DIV/0!
Feb	0	0 #DIV/0!
Mar	0	0 #DIV/0!
Apr	0	0 #DIV/0!
May	0	0 #DIV/0!
Jun	0	0 #DIV/0!
Jul	0	0 #DIV/0!
Aug	0	0 #DIV/0!
Sep	0	0 #DIV/0!
Oct	0	0 #DIV/0!
Nov	0	0 #DIV/0!
Dec	0	0 #DIV/0!
	0	0 #DIV/0!



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe Plaza Bldgs - Match Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
---------	-----	-----	-----	-----	-----	------	------	-----	------	-----	-----	-----	-------

Electric

On-Pk Cons. (kWh)	120,129	108,572	124,218	123,646	150,041	157,250	174,094	171,467	143,821	140,337	117,507	118,078	1,649,160
On-Pk Demand (kW)	271	271	271	342	398	416	458	439	413	370	271	271	458

Gas

On-Pk Cons. (therms)	4,401	4,013	3,706	2,406	1,602	1,203	691	1,129	1,596	2,418	3,477	4,222	30,865
On-Pk Demand (therms/hr)	18	19	11	9	8	7	6	7	8	9	11	18	19

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

91,864 Btu/(ft2-year)  
212,253 Btu/(ft2-year)  
94,870 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe Plaza Bldgs - East Light Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	118,071	106,775	122,061	121,729	147,526	154,642	171,372	168,814	141,501	138,154	115,482	116,070	1,622,198
On-Pk Demand (kW)	265	265	265	336	394	408	452	431	405	362	265	265	452
<b>Gas</b>													
On-Pk Cons. (therms)	4,437	4,045	3,743	2,437	1,620	1,218	692	1,143	1,617	2,452	3,511	4,256	31,170
On-Pk Demand (therms/hr)	18	18	11	9	8	7	6	7	8	9	11	18	18
Building Energy Consumption =	91,215 Btu/(ft2-year)												
Source Energy Consumption =	209,681 Btu/(ft2-year)												
Floor Area =	94,870 ft2												

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe Plaza Bldgs - East Emcs Run

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Monthly Energy Consumption													
Electric	On-Pk Cons. (kWh)	109,469	99,011	113,863	112,852	137,847	145,741	160,512	161,270	133,531	128,286	107,312	1,516,895
	On-Pk Demand (kW)	265	265	265	336	394	413	457	438	416	362	265	457
Gas	On-Pk Cons. (therms)	3,817	3,482	3,214	1,951	1,287	992	598	941	1,246	1,978	3,633	26,138
	On-Pk Demand (therms/hr)	13	14	10	8	6	5	5	5	6	7	9	14
Building Energy Consumption = 82,123 Btu/(ft2-year)													
Source Energy Consumption = 192,731 Btu/(ft2-year)													
Floor Area = 94,870 ft2													

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe Plaza Bldgs - South Light Run

Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
----- Monthly Energy Consumption -----														
Electric	On-Pk Cons. (kWh)	93,060	84,184	96,738	95,697	116,059	124,401	133,489	137,225	113,657	109,637	90,976	90,849	1,285,972
	On-Pk Demand (kW)	239	239	239	311	366	391	423	410	391	337	239	239	423
Gas	On-Pk Cons. (therms)	2,926	2,677	2,302	1,148	580	357	129	303	560	1,091	2,135	2,718	16,926
	On-Pk Demand (therms/hr)	12	12	10	7	4	3	3	3	4	5	9	11	12
Building Energy Consumption =		64,105 Btu/(ft2-year)												
Source Energy Consumption =		157,585 Btu/(ft2-year)												
Floor Area =		94,870 ft2												



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe Plaza Bldgs - South EMCS Run

Utility	Monthly Energy Consumption												Total	
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Electric	On-Pk Cons. (kWh)	77,494	70,071	82,261	80,380	100,815	110,366	112,393	123,313	101,119	94,994	76,802	75,110	1,105,118
	On-Pk Demand (kW)	239	239	239	317	390	405	423	414	402	357	250	239	423
Gas	On-Pk Cons. (therms)	1,815	1,673	1,403	307	33	0	0	0	0	262	1,220	1,613	8,326
	On-Pk Demand (therms/hr)	13	14	10	7	2	0	0	0	0	3	9	12	14
Building Energy Consumption = 48,534 Btu/(ft2-year)														
Source Energy Consumption = 128,522 Btu/(ft2-year)														
Floor Area = 94,870 ft2														

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe Plaza Bldgs - West Light Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kW/h)	106,284	96,069	110,478	109,641	133,731	141,541	155,871	156,690	129,723	124,651	104,109	104,026	1,472,813
On-Pk Demand (kW)	257	257	257	328	382	401	445	427	404	351	257	257	445
<b>Gas</b>													
On-Pk Cons. (therms)	3,843	3,505	3,237	1,968	1,277	980	581	928	1,240	1,995	3,023	3,657	26,234
On-Pk Demand (therms/hr)	12	13	10	8	6	5	4	5	6	7	9	13	13
Building Energy Consumption =	80,638 Btu/(ft2-year)												
Source Energy Consumption =	188,080 Btu/(ft2-year)												
Floor Area =	94,870 ft2												

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe Plaza Bldgs - West EMCS Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
---------	-----	-----	-----	-----	-----	------	------	-----	------	-----	-----	-----	-------

## Electric

On-Pk Cons. (kWh)	99,488	89,995	103,593	102,432	124,422	133,329	142,186	146,650	121,696	117,222	97,033	97,117	1,375,163
On-Pk Demand (kW)	257	257	257	333	390	415	446	432	414	366	257	257	446

## Gas

On-Pk Cons. (therms)	2,792	2,554	2,203	1,065	533	338	126	284	518	1,007	2,043	2,621	16,084
On-Pk Demand (therms/hr)	11	11	10	7	4	3	4	3	4	5	8	11	11

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

66,426 Btu/(ft2-year)  
166,277 Btu/(ft2-year)  
94,870 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ARAPAHOE PLAZA EAST BUILDING

ECM Run: Install New EMCS

Room/Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-E1	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF
AHU-E2	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,622,198  
Annual kW Usage: 4,116  
Annual Therms Usage: 31,170

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 1,516,895  
Annual kW Usage: 4,142  
Annual Therms Usage: 26,138

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 105,303  
Annual kW Savings: -27  
Annual Therms Savings: 5,032

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73

Natural Gas Savings Safety Factor: 0.5

## MODELING NOTES

### ARAPAHOE COUNTY - ARAPAHOE HUMAN SERVICES BUILDING

ECM Run: Install New EMCS

Room/Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-SW1	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF
AHU-SE1	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF
AHU-SW2	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF
AHU-SE2	Fan Schedule	M-F: 6am-10pm; Sat-Sun: 8am-4:30pm	M-F: 7am-6pm; Sat-Sun: OFF

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,285,972  
Annual kW Usage: 3,827  
Annual Therms Usage: 16,926

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 1,105,118  
Annual kW Usage: 3,916  
Annual Therms Usage: 8,326

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 180,854  
Annual kW Savings: -89  
Annual Therms Savings: 8,600

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.5

## MODELING NOTES

### ARAPAHOE COUNTY - ARAPAHOE PLAZA WEST BUILDING

ECM Run: Install New EMCS

Room/Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-W1	Fan Schedule	M-F: 24 h/d; Sat-Sun: 4am-6pm	M-F: 7am-6pm; Sat-Sun: OFF
AHU-W2	Fan Schedule	M-F: 24 h/d; Sat-Sun: 4am-6pm	M-F: 7am-6pm; Sat-Sun: OFF

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,472,813  
Annual kW Usage: 4,023  
Annual Therms Usage: 26,234

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 1,375,163  
Annual kW Usage: 4,081  
Annual Therms Usage: 16,084

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 97,650  
Annual kW Savings: -58  
Annual Therms Savings: 10,151

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.5

Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	121,594	112,997
Feb	103,244	100,020
Mar	112,618	114,465
Apr	112,883	107,205
May	120,411	113,295
Jun	122,653	116,146
Jul	139,482	122,622
Aug	138,135	125,874
Sep	126,767	109,882
Oct	120,855	112,745
Nov	119,468	107,850
Dec	126,428	107,003
	1,464,538	1,350,104
		8%

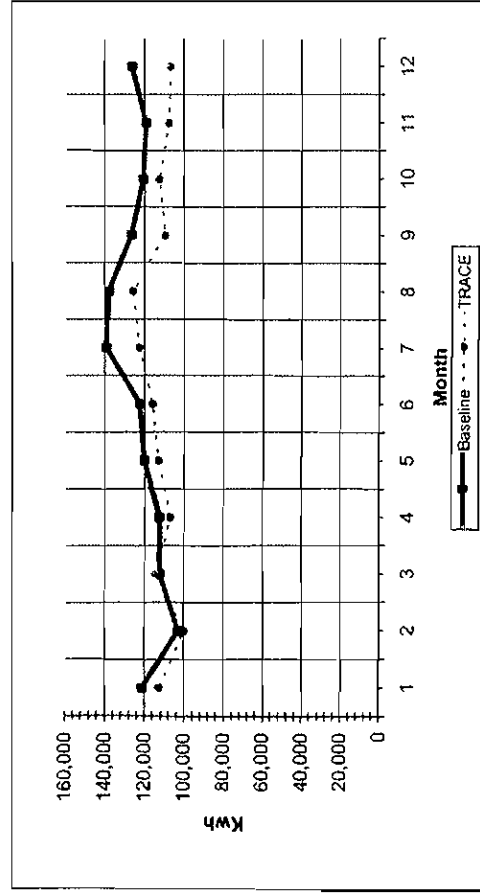
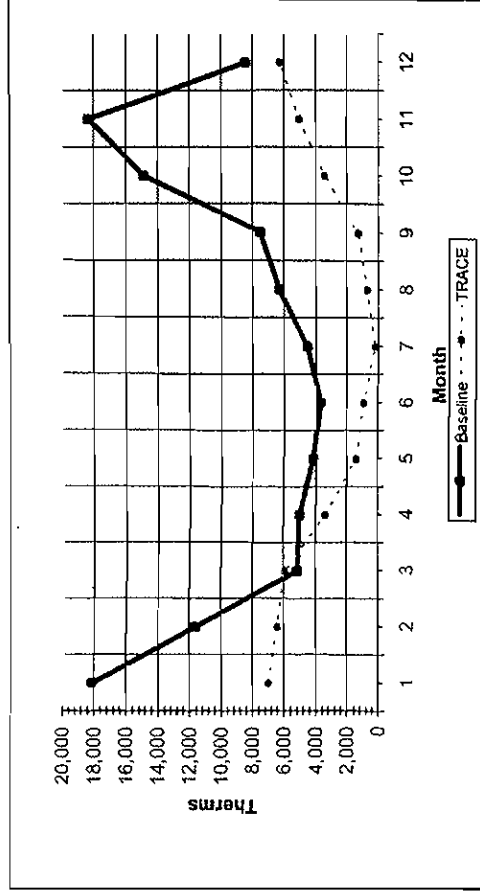


Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)	
	BASELINE	MODEL
Jan	18,160	7,038
Feb	11,670	6,450
Mar	5,160	5,962
Apr	5,010	3,362
May	4,150	1,450
Jun	3,700	933
Jul	4,530	186
Aug	6,300	682
Sep	7,530	1,276
Oct	14,900	3,421
Nov	18,330	5,074
Dec	8,440	6,277
	107,880	42,111
		61%



By Release 2.006

## Monthly Energy Consumption

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	112,997	130,020	114,465	107,205	113,235	116,146	122,622	125,874	108,882	112,745	107,650	107,003	1,350,105
On-Pk Demand (kW)	445	445	445	445	445	446	448	446	446	445	445	445	446
<b>Gas</b>													
On-Pk Cons. (therms)	7,038	6,450	5,962	3,362	1,450	933	188	682	1,276	3,421	5,074	5,277	42,112
On-Pk Demand (therms/hr)	19	19	17	13	9	7	4	5	8	12	15	18	19
<b>Water</b>													
Cons. (1000gals)	56	43	88	43	92	121	176	152	104	104	72	52	1,031

Building Energy Consumption =	134,046	Btu/(ft2-year)
Source Energy Consumption =	277,511	Btu/(ft2-year)
Floor Area =	65,792	ft2



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

Utility Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWht)	86,256	84,809	85,876	90,994	85,250	97,213	104,972	106,138	83,140	94,296	90,714	90,718	1,140,374
On-Pk Demand (kW)	364	364	364	364	364	365	366	365	365	365	364	364	366

Gas

On-Pk Cons. (therms)	7,147	6,548	6,042	3,441	1,493	958	186	725	1,301	3,445	5,125	6,373	42,783
On-Pk Demand (therms/hr)	19	19	17	13	9	7	4	5	8	12	15	18	19

Water

Cons. (1000gal)	44	31	53	30	77	104	159	135	90	88	58	39	908
-----------------	----	----	----	----	----	-----	-----	-----	----	----	----	----	-----

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

124,186 Btu/(ft2-year)  
245,941 Btu/(ft2-year)  
65,792 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	67,168	59,744	68,625	56,875	64,113	67,495	71,387	76,143	81,955	85,341	81,442	61,037	781,336
On-Pk Demand (kW)	364	364	364	364	364	365	366	365	365	365	367	384	367
<b>Gas</b>													
On-Pk Cons. (therms)	5,799	5,381	5,185	1,398	667	378	186	332	588	3,242	4,319	5,239	32,717
On-Pk Demand (therms/hr)	24	25	24	15	15	8	0	8	15	22	23	24	25
<b>Water</b>													
Cons. (1000gal)	33	25	44	27	65	88	120	111	72	88	44	30	725

Building Energy Consumption = 90,280 Btu/(ft2-year)  
 Source Energy Consumption = 173,954 Btu/(ft2-year)  
 Floor Area = 65,792 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

Utility Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	67,586	60,139	68,831	57,057	64,174	67,546	71,397	76,169	62,010	66,402	61,556	61,378	783,256
On-Pk Demand (kW)	364	364	364	364	364	365	366	365	365	365	366	364	368

Gas													
On-Pk Cons. (therms)	5,381	5,015	4,872	1,105	551	390	186	287	490	3,119	4,094	4,909	30,348
On-Pk Demand (therms/hr)	20	20	20	14	12	6	0	6	11	16	19	20	20

Water													
Cons. (1000gal)	33	25	44	27	65	86	120	111	72	58	44	30	725

Building Energy Consumption = 86,760 Btu/(ft2-year)  
 Source Energy Consumption = 170,483 Btu/(ft2-year)  
 Floor Area = 65,792 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ALTURA PLAZA

ECM Run: Install New EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
WSHP	Fan Schedule/Cycle with People	Available 100%	M-F: 6am-6:30pm; Sat-Sun: Off
Pre-Heat WSHP	Fan Schedule/Cycle with People	Available 100%	M-F: 7am-6:30pm; Sat-Sun: Off
Fan Coil	Fan Schedule/Cycle with People	Available 100%	M-F: 7am-6:30pm; Sat-Sun: Off

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,140,374  
Annual kW Usage: 4,374  
Annual Therm Usage: 42,784

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 781,336  
Annual kW Usage: 4,377  
Annual Therm Usage: 32,718

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 359,038  
Annual kW Savings: -3  
Annual Therm Savings: 10,066

#### Notes:

1. An additional 65,769 Therms were added to the 10,066 Therms savings shown above. This is a result of the building's existing natural gas usage being way out of line, so much so that we were unable to force our computer model to reflect the building's actual natural gas usage. So, the 65,769 Therms is the difference in the building's actual usage and the computer model's "match usage." Refer to the attached spreadsheet.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)			Adjusted Baseline Savings
	BASELINE	MODEL		
Jan	18,160	7,038	61%	11,122
Feb	11,670	6,450	45%	5,220
Mar	5,160	5,962	-16%	-802
Apr	5,010	3,362	33%	1,648
May	4,150	1,450	65%	2,700
Jun	3,700	938	75%	2,767
Jul	4,530	186	96%	4,344
Aug	6,300	682	89%	5,618
Sep	7,530	1,276	83%	6,254
Oct	14,900	3,421	77%	11,479
Nov	18,330	5,074	72%	13,256
Dec	8,440	6,277	26%	2,163
	107,880	42,111	61%	65,769

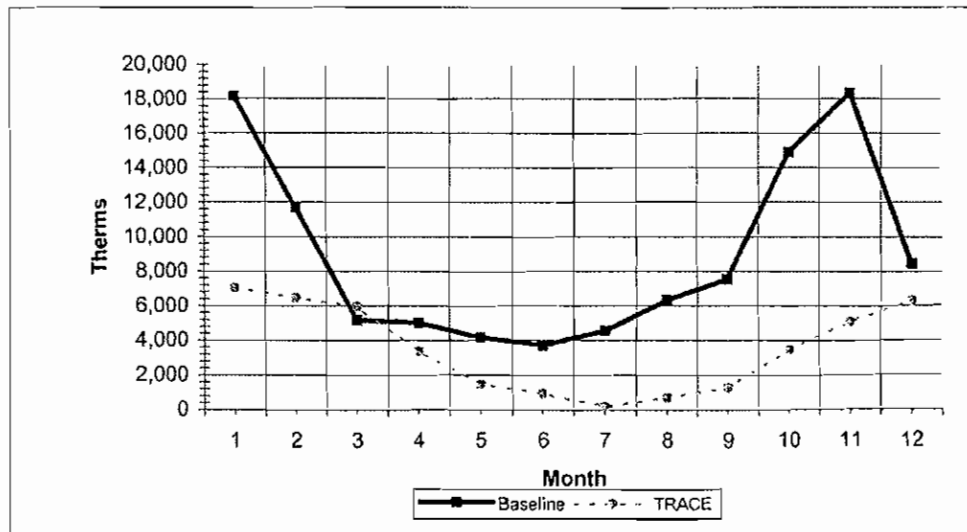


Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	202,551	197,435 3%
Feb	172,659	178,589 -3%
Mar	234,751	203,151 13%
Apr	234,674	190,309 19%
May	248,888	221,458 11%
Jun	247,557	224,685 9%
Jul	293,663	238,057 19%
Aug	276,365	238,231 14%
Sep	228,143	211,261 7%
Oct	214,985	213,383 1%
Nov	201,979	192,946 4%
Dec	199,199	194,492 2%
	2,755,414	2,503,997 9%

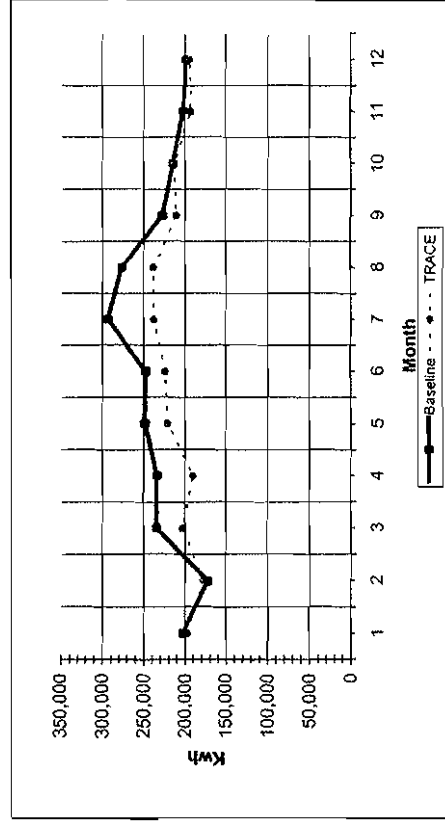
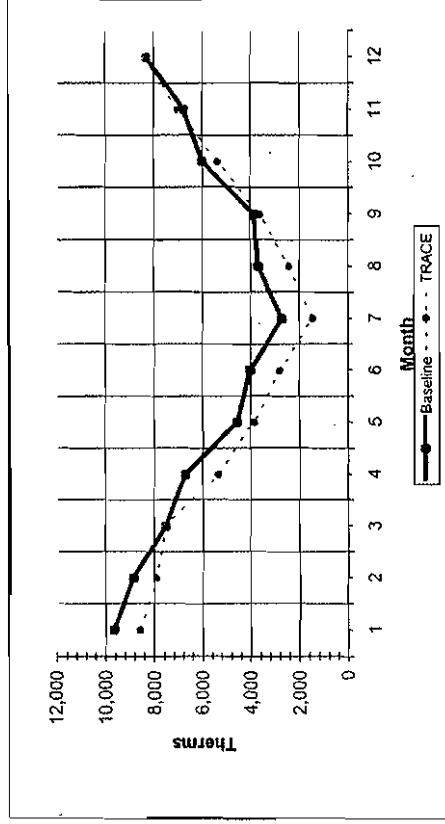


Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for NG usage

NG USAGE (Therms)		
Month	BASELINE	MODEL
Jan	9,680	8,570 11%
Feb	8,870	7,938 11%
Mar	7,540	7,540 0%
Apr	6,710	5,356 20%
May	4,560	3,860 15%
Jun	4,020	2,835 29%
Jul	2,730	1,484 46%
Aug	3,710	2,446 34%
Sep	3,870	3,639 6%
Oct	6,020	5,366 11%
Nov	6,770	7,029 -4%
Dec	8,320	8,374 -1%
	72,800	64,437 11%



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	197,435	178,589	203,151	221,458	224,685	235,057	238,231	211,281	213,383	192,946	194,492	2,503,985
	On-Pk Demand (kW)	409	409	409	436	583	581	574	516	490	409	409	581
Gas	On-Pk Cons. (therms)	8,570	7,838	7,540	3,880	2,835	1,484	2,446	3,639	5,368	7,029	8,374	64,439
	On-Pk Demand (therms/hr)	45	44	44	44	44	44	44	44	44	44	44	45
Water	Cons. (1000gal)	0	0	0	82	109	155	132	81	56	0	0	615

Building Energy Consumption = 142,485 Btu/(ft2-year)  
Source Energy Consumption = 308,201 Btu/(ft2-year)  
Floor Area = 105,204 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	172,576	155,952	177,036	166,190	194,011	196,562	206,966	208,391	185,310	186,583	166,343	169,990	2,189,927
On-Pk Demand (kW)	346	346	346	350	415	488	501	491	443	417	346	346	501
<b>Gas</b>													
On-Pk Cons. (therms)	8,696	8,063	7,873	5,455	3,915	2,859	1,436	2,445	3,694	5,460	7,148	8,475	65,319
On-Pk Demand (therms/hr)	42	42	42	42	42	42	42	42	42	42	42	42	42
<b>Water</b>													
Cons. (1000gal)	0	0	0	0	67	90	129	108	66	46	0	0	506
Building Energy Consumption = 133,133 Btu/(ft2-year) Source Energy Consumption = 278,513 Btu/(ft2-year) Floor Area = 105,204 ft2													



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	164,194	148,361	158,067	158,423	184,563	188,552	203,494	197,971	175,898	178,072	160,172	182,178	2,087,862
On-Pk Demand (kW)	346	346	346	350	415	488	501	491	443	417	346	346	501

## Gas

On-Pk Cons. (therms)	8,519	7,900	7,409	4,930	3,084	1,916	800	1,394	2,877	4,830	6,839	8,276	58,575
On-Pk Demand (therms/hr)	42	42	42	42	33	13	7	10	31	42	42	42	42

## Water

Cons. (1000gal)	0	0	0	0	65	85	133	104	62	46	0	0	496
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Building Energy Consumption = 123,411 Btu/(ft2-year)  
 Source Energy Consumption = 261,829 Btu/(ft2-year)  
 Floor Area = 105,204 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHU-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHIU-2	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 2,189,928  
Annual kW Usage: 4,835  
Annual Therm Usage: 65,319

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 2,087,853  
Annual kW Usage: 4,835  
Annual Therm Usage: 58,576

#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 102,075  
Annual kW Savings: 0  
Annual Therm Savings: 6,743

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	149,668	117,519
Feb	123,955	106,449
Mar	137,823	125,967
Apr	166,962	120,398
May	183,024	150,964
Jun	185,588	161,275
Jul	204,313	170,641
Aug	202,649	178,772
Sep	187,481	141,905
Oct	170,057	141,498
Nov	153,399	115,011
Dec	152,731	111,523
	2,017,650	1,641,920
		19%

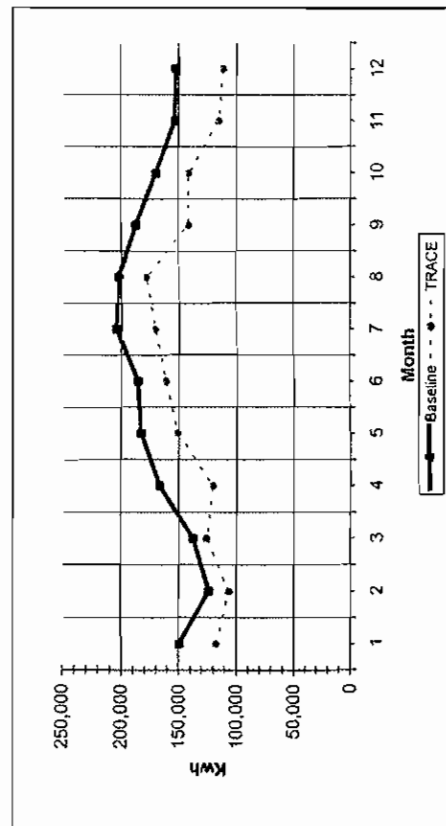
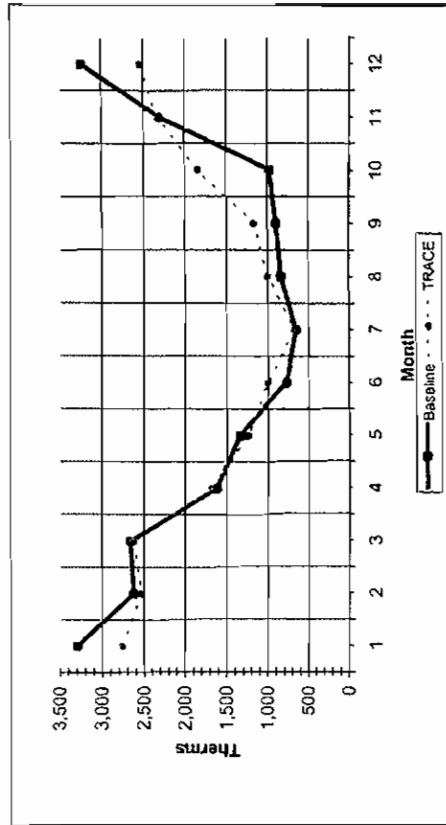


Figure 2

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASELINE	MODEL
Jan	3,292	2,762
Feb	2,623	2,527
Mar	2,661	2,629
Apr	1,611	1,677
May	1,342	1,242
Jun	773	1,001
Jul	650	672
Aug	841	999
Sep	897	1,175
Oct	977	1,842
Nov	2,320	2,343
Dec	3,238	2,547
	21,225	21,417
		-1%



By Release 2.007

Monthly Energy Consumption

Building Energy Consumption =	95,541	Btu/(ft2-year)
Source Energy Consumption =	235,198	Btu/(ft2-year)
Floor Area =	81,071	ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - Lighting Run

Monthly Energy Consumption											
Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total
Electric	On-Pk Cons. (kWh)	103,095	93,293	110,380	103,857	132,054	140,854	152,364	156,782	124,987	1,439,677
	On-Pk Demand (kW)	330	331	330	369	404	418	477	455	427	477
Gas	On-Pk Cons. (therms)	2,888	2,646	2,781	1,803	1,335	1,077	724	1,079	1,261	22,709
	On-Pk Demand (therms/hr)	13	13	12	10	10	9	9	9	9	13
Building Energy Consumption =		88,621 Btu/(ft2-year)									
Source Energy Consumption =		211,331 Btu/(ft2-year)									
Floor Area =		81,071 ft2									

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - EMCS Run

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	
Electric														
	On-Pk Cons. (kWh)	101,636	91,993	108,591	102,210	128,575	137,751	150,090	154,105	121,916	122,297	98,669	96,267	1,414,100
	On-Pk Demand (kW)	330	331	330	370	404	426	476	458	427	396	309	323	476
Gas														
	On-Pk Cons. (therms)	2,685	2,462	2,516	1,558	1,087	852	580	841	1,041	1,696	2,227	2,465	20,011
	On-Pk Demand (therms/hr)	12	13	12	10	7	6	5	6	8	10	11	12	13
Building Energy Consumption = 84,215 Btu/(ft2-year)														
Source Energy Consumption = 204,596 Btu/(ft2-year)														
Floor Area = 81,071 ft2														

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC ADMIN II BUILDING

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-1	Fan Schedule	M-F: 7am-10:30pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-2	Fan Schedule	M-F: 5:30am-10:30pm; Sat-Sun: OFF	M-F: 5:30am-8:30pm; Sat-Sun: OFF
AHU-4	Fan Schedule	M-F: 7am-10:45pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-6	Fan Schedule	M-F: 7am-11pm; Sat-Sun: 8am-5pm	M-F: 7am-8:30pm; Sat-Sun: 8am-5pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,439,677  
Annual kW Usage: 4,563  
Annual Therms Usage: 22,709

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 1,414,100  
Annual kW Usage: 4,581  
Annual Therms Usage: 20,011

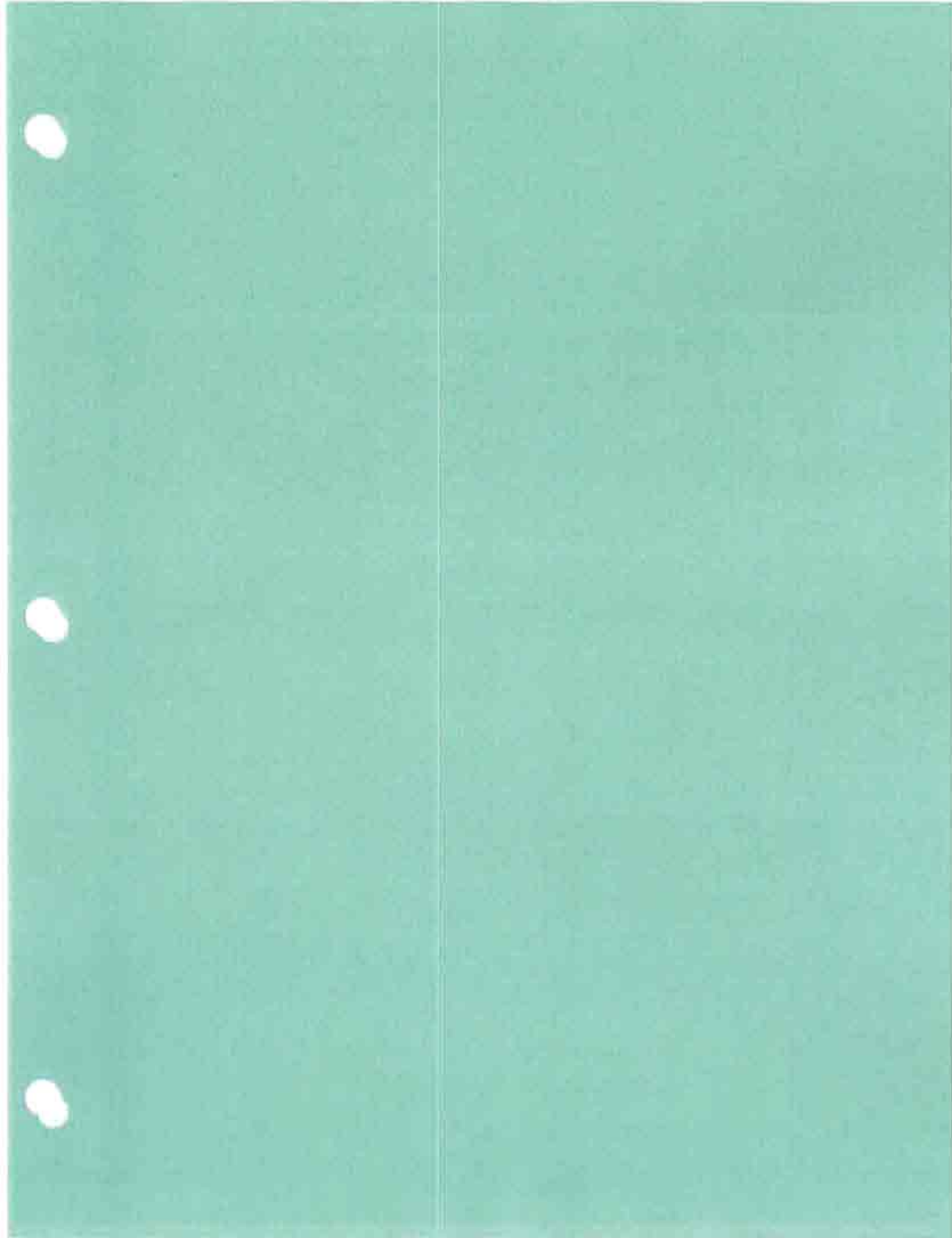
#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 25,577  
Annual kW Savings: -18  
Annual Therms Savings: 2,699

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73





#### ***ECM 4 – Install Programmable Thermostats***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

##### Existing Condition to Warrant an ECM Opportunity:

Many of the facilities within Arapahoe County currently don't have an energy management control system (EMCS). These facilities utilize non-programmable thermostats for control of their equipment. In most cases, the equipment operates during periods of little or no occupancy. The installation of programmable thermostats will allow the maintenance staff to easily modify the equipment operating schedules to better match the actual occupancy schedules.

##### Savings Calculation Methodology:

The implementation of this ECM shall result in both natural gas and electrical savings. The majority of the savings for this ECM were calculated utilizing two Trane Trace building energy simulation models. The first model included the existing operating schedules for each piece of equipment. The second model was modified to include the new operating schedules for each piece of equipment. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings.

Spreadsheet calculations were performed on the buildings that were not modeled. The spreadsheet calculations used the same methodology described above.

# Federal Warehouse EMCS & Programmable Thermostats Savings Summary

Building	Unit ID:	Fan Motor Savings (kWh)	Cooling Savings (kWh):	Heating Savings (Therms):	Total Savings (kWh):
Federal Warehouse	RTU-2,3,5,6,8,9	3,320	5,705	935	9,025
Federal Warehouse	RTU-7	552	861	169	1,413
Federal Warehouse	RTU-10	2,056	2,520	743	4,576
<b>TOTALS</b>		<b>5,928</b>	<b>9,086</b>	<b>1,847</b>	<b>15,014</b>

Date: 6/30/05  
Building: Federal Warehouse  
Equip. Name: RTU-235689(10 Tons)

NOTE: Highlighted Cells are user inputs.

Current Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From	To	Hours
SMTWRRFS			6	18	12
Mon			6	18	12
Tues			6	18	12
Wed			6	18	12
Thu			6	18	12
Fri			6	18	12
Sat			6	18	12
Sun			6	18	12

Supply Fan Motor Savings:

Inputs: HP: 3  
Efficiency: 0.8  
Load Factor: 0.75  
# of Fans: 16  
Existing Yearly Hrs: 773  
Proposed Yearly Hrs: 510

kWh\_savings: 3,320

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From	To	Hours
SMTWRRFS			6	18	12
Mon			6	18	0
Tues			6	17	11
Wed			6	17	11
Thu			6	17	11
Fri			6	17	11
Sat			6	17	0
Sun			6	17	55

Note: Enter Start hours as 5, for example 5.5 not 5.30

Date: 6/20/05  
Building: Federal Warehouse  
Equip. Name: RTU-2,3,5,6,9,10 (Tons)  
NOTE: Highlighted Cells are User Inputs

CURRENT CONDITIONS				PROPOSED CONDITIONS			
Heating Discharge Air Temp (DAT)	55.00	55.00	55.00	Heating Discharge Air Temp (DAT)	55.00	55.00	55.00
Cooling Discharge Air Temp (DAT)	55.00	55.00	55.00	Cooling Discharge Air Temp (DAT)	55.00	55.00	55.00
Heating Return Air Temp (RAT)	55.00	55.00	55.00	Heating Return Air Temp (RAT)	55.00	55.00	55.00
Cooling Return Air Temp (RAT)	55.00	55.00	55.00	Cooling Return Air Temp (RAT)	55.00	55.00	55.00
OA%	10%	10%	10%	OA%	10%	10%	10%
W/Wen range of air-cooled A/C Unit	55.00	55.00	55.00	W/Wen range of air-cooled A/C Unit	55.00	55.00	55.00
Supply Fan CFM	4000	4000	4000	Supply Fan CFM	4000	4000	4000
Min. OA CFM	400	400	400	Min. OA CFM	400	400	400
Cooling Minimum Mixed Air Temp	55.00	55.00	55.00	Cooling Minimum Mixed Air Temp	55.00	55.00	55.00
Furnace Efficiency (0.75-75%)	0.8	0.8	0.8	Furnace Efficiency (0.75-75%)	0.8	0.8	0.8

Current Occupancy Schedule:

	To	From
EXAMPLE (6 00am to 5 pm)	6	18
Mon	6	17
Tues	6	17
Wed	6	17
Thurs	6	17
Fri	6	17
Sat	0	0
Sun	0	0

Proposed Occupancy Schedule:

	To	From
EXAMPLE (6 00am to 5 pm)	6	18
Mon	6	17
Tues	6	17
Wed	6	17
Thurs	6	17
Fri	6	17
Sat	0	0
Sun	0	0

Existing Hours												Proposed Hours											
DAT	Cycling Factor	OAT BIN	CFM To Be Hld. Or Chg.	CFM To Be Hld. Or Chg.	Outside Air CFM	Mixed Air Temp	BTU/Hr	kW/Ton & Therm/Hr	kW & Therm/Hr	Run Hours	Energy kWh/yr & Therm/yr	OAT BIN	CFM To Be Hld. Or Chg.	CFM To Be Hld. Or Chg.	Outside Air CFM	Mixed Air Temp	BTU/Hr	kW/Ton & Therm/Hr	kW & Therm/Hr	Run Hours	Energy kWh/yr & Therm/yr		
55.00	0.05	97	4,000	4,000	400	73.10	80,924	1.1	8.16	5	44	107	4,000	4,000	400	73.10	80,924	1.1	8.16	4	33		
55.00	0.10	92	4,000	4,000	400	77.00	80,936	1.1	8.16	10	88	107	4,000	4,000	400	77.00	80,936	1.1	8.16	10	88		
55.00	0.15	87	4,000	4,000	400	77.00	81,158	1.1	8.16	15	132	107	4,000	4,000	400	77.00	81,158	1.1	8.16	15	132		
55.00	0.20	82	4,000	4,000	400	76.80	82,265	1.1	8.16	20	176	107	4,000	4,000	400	76.80	82,265	1.1	8.16	20	176		
55.00	0.25	77	4,000	4,000	400	76.00	83,379	1.1	8.16	25	220	107	4,000	4,000	400	76.00	83,379	1.1	8.16	25	220		
55.00	0.30	72	4,000	4,000	400	76.00	84,492	1.1	8.16	30	264	107	4,000	4,000	400	76.00	84,492	1.1	8.16	30	264		
55.00	0.35	67	4,000	4,000	400	75.40	85,605	1.1	8.16	35	308	107	4,000	4,000	400	75.40	85,605	1.1	8.16	35	308		
55.00	0.40	62	4,000	4,000	400	74.80	86,718	1.1	8.16	40	352	107	4,000	4,000	400	74.80	86,718	1.1	8.16	40	352		
55.00	0.45	57	4,000	4,000	400	74.80	87,831	1.1	8.16	45	396	107	4,000	4,000	400	74.80	87,831	1.1	8.16	45	396		
55.00	0.50	52	4,000	4,000	400	74.00	88,944	1.1	8.16	50	440	107	4,000	4,000	400	74.00	88,944	1.1	8.16	50	440		
55.00	0.55	47	4,000	4,000	400	73.60	90,057	1.1	8.16	55	484	107	4,000	4,000	400	73.60	90,057	1.1	8.16	55	484		
55.00	0.60	42	4,000	4,000	400	73.10	91,170	1.1	8.16	60	528	107	4,000	4,000	400	73.10	91,170	1.1	8.16	60	528		
55.00	0.65	37	4,000	4,000	400	73.10	92,283	1.1	8.16	65	572	107	4,000	4,000	400	73.10	92,283	1.1	8.16	65	572		
55.00	0.70	32	4,000	4,000	400	73.10	93,396	1.1	8.16	70	616	107	4,000	4,000	400	73.10	93,396	1.1	8.16	70	616		
55.00	0.75	27	4,000	4,000	400	73.10	94,509	1.1	8.16	75	660	107	4,000	4,000	400	73.10	94,509	1.1	8.16	75	660		
55.00	0.80	22	4,000	4,000	400	73.10	95,622	1.1	8.16	80	704	107	4,000	4,000	400	73.10	95,622	1.1	8.16	80	704		
55.00	0.85	17	4,000	4,000	400	73.10	96,735	1.1	8.16	85	748	107	4,000	4,000	400	73.10	96,735	1.1	8.16	85	748		
55.00	0.90	12	4,000	4,000	400	73.10	97,848	1.1	8.16	90	792	107	4,000	4,000	400	73.10	97,848	1.1	8.16	90	792		
55.00	0.95	7	4,000	4,000	400	73.10	98,961	1.1	8.16	95	836	107	4,000	4,000	400	73.10	98,961	1.1	8.16	95	836		
55.00	1.00	2	4,000	4,000	400	73.10	100,074	1.1	8.16	100	880	107	4,000	4,000	400	73.10	100,074	1.1	8.16	100	880		
55.00	0.95	-3	4,000	4,000	400	72.50	101,187	1.1	8.16	5	44	107	4,000	4,000	400	72.50	101,187	1.1	8.16	5	44		
55.00	0.90	-8	4,000	4,000	400	72.50	102,300	1.1	8.16	10	88	107	4,000	4,000	400	72.50	102,300	1.1	8.16	10	88		
55.00	0.85	-13	4,000	4,000	400	72.50	103,413	1.1	8.16	15	132	107	4,000	4,000	400	72.50	103,413	1.1	8.16	15	132		
55.00	0.80	-18	4,000	4,000	400	72.50	104,526	1.1	8.16	20	176	107	4,000	4,000	400	72.50	104,526	1.1	8.16	20	176		
55.00	0.75	-23	4,000	4,000	400	72.50	105,639	1.1	8.16	25	220	107	4,000	4,000	400	72.50	105,639	1.1	8.16	25	220		
55.00	1.00	-28	4,000	4,000	400	72.50	106,752	1.1	8.16	30	264	107	4,000	4,000	400	72.50	106,752	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	107,865	1.1	8.16	30	264	107	4,000	4,000	400	72.50	107,865	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	108,978	1.1	8.16	30	264	107	4,000	4,000	400	72.50	108,978	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	110,091	1.1	8.16	30	264	107	4,000	4,000	400	72.50	110,091	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	111,204	1.1	8.16	30	264	107	4,000	4,000	400	72.50	111,204	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	112,317	1.1	8.16	30	264	107	4,000	4,000	400	72.50	112,317	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	113,430	1.1	8.16	30	264	107	4,000	4,000	400	72.50	113,430	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	114,543	1.1	8.16	30	264	107	4,000	4,000	400	72.50	114,543	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	115,656	1.1	8.16	30	264	107	4,000	4,000	400	72.50	115,656	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	116,769	1.1	8.16	30	264	107	4,000	4,000	400	72.50	116,769	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	117,882	1.1	8.16	30	264	107	4,000	4,000	400	72.50	117,882	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	118,995	1.1	8.16	30	264	107	4,000	4,000	400	72.50	118,995	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	120,108	1.1	8.16	30	264	107	4,000	4,000	400	72.50	120,108	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	121,221	1.1	8.16	30	264	107	4,000	4,000	400	72.50	121,221	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	122,334	1.1	8.16	30	264	107	4,000	4,000	400	72.50	122,334	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	123,447	1.1	8.16	30	264	107	4,000	4,000	400	72.50	123,447	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	124,560	1.1	8.16	30	264	107	4,000	4,000	400	72.50	124,560	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	125,673	1.1	8.16	30	264	107	4,000	4,000	400	72.50	125,673	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	126,786	1.1	8.16	30	264	107	4,000	4,000	400	72.50	126,786	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	127,899	1.1	8.16	30	264	107	4,000	4,000	400	72.50	127,899	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	129,012	1.1	8.16	30	264	107	4,000	4,000	400	72.50	129,012	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	130,125	1.1	8.16	30	264	107	4,000	4,000	400	72.50	130,125	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	131,238	1.1	8.16	30	264	107	4,000	4,000	400	72.50	131,238	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	132,351	1.1	8.16	30	264	107	4,000	4,000	400	72.50	132,351	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	133,464	1.1	8.16	30	264	107	4,000	4,000	400	72.50	133,464	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	134,577	1.1	8.16	30	264	107	4,000	4,000	400	72.50	134,577	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	135,690	1.1	8.16	30	264	107	4,000	4,000	400	72.50	135,690	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	136,803	1.1	8.16	30	264	107	4,000	4,000	400	72.50	136,803	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	137,916	1.1	8.16	30	264	107	4,000	4,000	400	72.50	137,916	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	139,029	1.1	8.16	30	264	107	4,000	4,000	400	72.50	139,029	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	140,142	1.1	8.16	30	264	107	4,000	4,000	400	72.50	140,142	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	141,255	1.1	8.16	30	264	107	4,000	4,000	400	72.50	141,255	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	142,368	1.1	8.16	30	264	107	4,000	4,000	400	72.50	142,368	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	143,481	1.1	8.16	30	264	107	4,000	4,000	400	72.50	143,481	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000	400	72.50	144,594	1.1	8.16	30	264	107	4,000	4,000	400	72.50	144,594	1.1	8.16	30	264		
55.00	1.00	-28	4,000	4,000																			

NOTE: Highlighted Cells are User Inputs.

Date: 6/30/05  
Building: Federal Warehouse  
Equip. Name: RTU-7 (10 Tons)

Current Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)	From: 6	To: 18	Hours:
SMTWRFS			12
Mon	5	17	12
Tues	6	17	12
Wed	5	17	12
Thu	5	17	12
Fri	5	17	12
Sat	5	17	12
Sun	5	17	84

Supply Fan Motor Savings:

Inputs  
HP: 3  
Efficiency: 0.8  
Load Factor: 0.75  
# of Fans: 1  
Existing Yearly Hrs: 773  
Proposed Yearly Hrs: 510

kWh\_savings: 552

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)	From: 6	To: 18	Hours:
SMTWRFS			12
Mon	6	17	11
Tues	6	17	11
Wed	6	17	11
Thu	6	17	11
Fri	6	17	11
Sat	6	17	0
Sun	6	17	0
			55

Note: Enter Half hours as .5, for example 6.5 not 6.30

CURRENT CONDITIONS				PROPOSED CONDITIONS			
Heating Discharge Air Temp (DAT)	55 F	55 F	55 F	Heating Discharge Air Temp (DAT)	55 F	55 F	55 F
Cooling Discharge Air Temp (DAT)	55 F	55 F	55 F	Cooling Discharge Air Temp (DAT)	55 F	55 F	55 F
Heating Return Air Temp (RAT)	70 F	70 F	70 F	Heating Return Air Temp (RAT)	70 F	70 F	70 F
Cooling Return Air Temp (RAT)	70 F	70 F	70 F	Cooling Return Air Temp (RAT)	70 F	70 F	70 F
Supply Fan CFM	400	400	400	Supply Fan CFM	4000	4000	4000
kW/ton rating of air-cooled A/C Unit	1.1	1.1	1.1	kW/ton rating of air-cooled A/C Unit	1.1	1.1	1.1
Min. OA CFM	400	400	400	Min. OA CFM	4000	4000	4000
Cooling Minimum Mixed Air Temp	55 F	55 F	55 F	Cooling Minimum Mixed Air Temp	55 F	55 F	55 F
Furnace Efficiency (0.75-75%)	0.8	0.8	0.8	Furnace Efficiency (0.75-75%)	0.8	0.8	0.8
Current Occupancy Schedule				Proposed Occupancy Schedule			
EXAMPLE (6:00am to 6 pm)		From	To	EXAMPLE (6:00am to 6 pm)		From	To
SMTWRFSS		6	18	SMTWRFSS		6	18
Mon	0	0	0	Mon	0	0	0
Tues	5	17	17	Tues	6	17	17
Wed	5	17	17	Wed	6	17	17
Thurs	5	17	17	Thurs	6	17	17
Fri	5	17	17	Fri	6	17	17
Sat	5	17	17	Sat	0	0	0
Sun	5	17	17	Sun	0	0	0

Existing Hours										Proposed Hours									
DAT	Cycling Factor	CFM To Be In	CFM To Be Out	Macz Air	Temp	BTU/Hr	kW/Ton & Therm/Hr	Run Hours	Energy kWh/yr	OAT BIN	5°F CFM	4°F CFM	Outside Macz Air	Temp	BTU/Hr	kW/Ton & Therm/Hr	Run Hours	Energy kWh/yr	
																			QAT BIN
35.00	0.75	97	4,000	400	78.10	80,824	9.3	5	48	107	4,000	400	78.10	80,824	9.3	5	48	48	
50.00	0.50	42	4,000	400	77.60	84,038	1.1	8.33	21	57	4,000	400	77.60	84,038	1.1	8.33	21	11	
55.00	0.30	27	4,000	400	77.10	87,150	1.1	7.00	59	42	4,000	400	77.10	87,150	1.1	7.00	59	35	
59.00	0.20	32	4,000	400	76.60	88,285	1.1	7.82	68	37	4,000	400	76.60	88,285	1.1	7.82	68	31	
59.00	0.25	27	4,000	400	76.10	93,379	1.1	7.64	88	32	4,000	400	76.10	93,379	1.1	7.64	88	40	
59.00	0.20	32	4,000	400	75.60	94,402	1.1	7.47	98	27	4,000	400	75.60	94,402	1.1	7.47	98	40	
55.00	0.15	97	4,000	400	75.10	96,609	1.1	7.29	48	22	4,000	400	75.10	96,609	1.1	7.29	48	23	
55.00	0.10	92	4,000	400	74.60	97,723	1.1	7.12	48	17	4,000	400	74.60	97,723	1.1	7.12	48	16	
55.00	0.08	92	4,000	400	74.10	98,837	1.1	6.96	48	14	4,000	400	74.10	98,837	1.1	6.96	48	12	
55.00	0.05	92	4,000	400	73.60	99,951	1.1	6.80	48	12	4,000	400	73.60	99,951	1.1	6.80	48	11	
95.00	0.15	42	4,000	400	70.30	78,852	0.8	0.99	18	57	4,000	400	70.30	78,852	0.8	0.99	18	25	
95.00	0.10	42	4,000	400	70.80	87,529	0.8	1.09	34	52	4,000	400	70.80	87,529	0.8	1.05	25	22	
95.00	0.15	37	4,000	400	70.30	89,415	0.8	1.12	47	52	4,000	400	71.30	85,643	0.8	1.07	29	31	
95.00	0.20	32	4,000	400	69.80	91,302	0.8	1.14	60	42	4,000	400	70.80	87,529	0.8	1.09	38	41	
95.00	0.25	27	4,000	400	69.30	92,188	0.8	1.16	59	37	4,000	400	70.30	89,415	0.8	1.12	37	41	
95.00	0.30	22	4,000	400	68.80	95,075	0.8	1.18	48	32	4,000	400	69.80	91,302	0.8	1.14	29	33	
95.00	0.35	17	4,000	400	68.30	96,961	0.8	1.21	33	27	4,000	400	69.30	93,188	0.8	1.16	20	23	
95.00	0.40	12	4,000	400	67.80	98,847	0.8	1.24	22	22	4,000	400	68.30	95,075	0.8	1.19	13	16	
95.00	0.45	7	4,000	400	67.30	102,734	0.8	1.28	16	17	4,000	400	68.30	96,961	0.8	1.21	10	12	
95.00	0.50	2	4,000	400	66.80	104,620	0.8	1.28	14	14	4,000	400	67.80	98,847	0.8	1.24	7	8	
95.00	0.55	2	4,000	400	66.30	106,506	0.8	1.31	5	7	4,000	400	67.30	102,734	0.8	1.28	3	3	
95.00	0.60	1	4,000	400	65.80	108,392	0.8	1.33	2	3	4,000	400	66.30	104,620	0.8	1.28	1	2	
95.00	0.65	13	4,000	400	65.30	109,279	0.8	1.35	1	2	4,000	400	65.30	106,506	0.8	1.31	0	1	
95.00	0.70	18	4,000	400	64.80	110,166	0.8	1.38	1	2	4,000	400	65.30	106,506	0.8	1.33	1	1	
95.00	1.00	23	4,000	400	64.30	112,052	0.8	1.40	0	1	-13	4,000	400	65.30	106,506	0.8	1.35	0	0
95.00	1.00	28	4,000	400	63.80	113,939	0.8	1.42	0	-18	4,000	400	64.80	110,166	0.8	1.38	0	0	
										773									
										310									

Date: 6/30/05  
Building: Federal Warehouse  
Equip. Name: RTU-10 (10 Tons)

NOTE: Highlighted Cells are user inputs.

Current Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
SMTWRFSS			6	18	12
Mon	0.0001	24			0
Tues	0.0001	24			24
Wed	0.0001	24			24
Thu	0.0001	24			24
Fri	0.0001	24			24
Sat	0.0001	24			24
Sun	0.0001	24			24

Note: Enter Half hours (0.5) for example 6.5 - at 6:30

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
SMTWRFSS			6	18	12
Mon	6	17			0
Tues	6	17			11
Wed	6	17			11
Thu	6	17			11
Fri	6	17			11
Sat					0
Sun					0

Note: Enter Half hours (0.5) for example 6.5 not 6.30

Supply Fan Motor Savings:

Inputs:

HP: 3  
Efficiency: 0.8  
Load Factor: 0.75  
# of Fans: 1  
Existing Yearly Hrs: 1,489  
Proposed Yearly Hrs: 510

kWh savings: 2,056





## Tri County Health EMCS & Programmable Thermostats Savings Summary

Building	Unit ID:	Fan Motor Savings (kWh)	Cooling Savings (kWh):	Heating Savings (Therms):	Total Savings (kWh):
Tri County Health	RTU-1 & RTU-3	391	1,472	451	1,863
Tri County Health	AC-1, F-3 to F-6	979	4,906	1,505	5,884
Tri County Health	RTU-2	381	1,226	376	1,607
<b>TOTALS</b>		<b>1,750</b>	<b>7,604</b>	<b>2,332</b>	<b>9,354</b>

Date: 6/30/05  
Building: TriCounty Health  
Equip. Name: RTU-1 & RTU-3 (3 Tons)

NOTE: Highlighted Cells are user inputs

Current Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
			6	18	12
SMTWRFSS					0
Mon			0.0001	24	24
Tues			0.0001	24	24
Wed			0.0001	24	24
Thu			0.0001	24	24
Fri			0.0001	24	24
Sat			0.0001	24	24
Sun			0.0001	24	169

Note: Enter Half hours as .5, for example 6.5 not 6:30

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
			6	18	12
SMTWRFSS					0
Mon			7	18	11
Tues			7	18	11
Wed			7	18	11
Thu			7	18	11
Fri			7	18	11
Sat					0
Sun					55

Note: Enter Half hours as .5, for example 6.5 not 6:30

Supply Fan Motor Savings:

Inputs:

HP: 0.25  
Efficiency: 0.7  
Load Factor: 0.75  
# of Fans: 2  
Existing Yearly Hrs: 1,489  
Proposed Yearly Hrs: 510

kWh\_savings: 391

Date: 6/30/05  
Building: Tri County Health  
Equip Name: RTU-1 & RTU-3 (3 Tons)

NOTE: Highlighted Cells are user inputs

CURRENT CONDITIONS				PROPOSED CONDITIONS			
Heating Discharge Air Temp (DAT)	55 F	Heating Discharge Air Temp (DAT)	55 F	Heating Discharge Air Temp (DAT)	55 F	Heating Discharge Air Temp (DAT)	55 F
Cooling Discharge Air Temp (DAT)	55 F	Cooling Discharge Air Temp (DAT)	55 F	Cooling Discharge Air Temp (DAT)	55 F	Cooling Discharge Air Temp (DAT)	55 F
Heating Return Air Temp (RAT)	74 F	Heating Return Air Temp (RAT)	74 F	Heating Return Air Temp (RAT)	74 F	Heating Return Air Temp (RAT)	74 F
Cooling Return Air Temp (RAT)	78 F	Cooling Return Air Temp (RAT)	78 F	Cooling Return Air Temp (RAT)	78 F	Cooling Return Air Temp (RAT)	78 F
OA%	10%	OA%	10%	OA%	10%	OA%	10%
IR%*	10%	IR%*	10%	IR%*	10%	IR%*	10%
W/W ratio rating of air-cooled A/C Unit	1.1	W/W ratio rating of air-cooled A/C Unit	1.1	W/W ratio rating of air-cooled A/C Unit	1.1	W/W ratio rating of air-cooled A/C Unit	1.1
Supply Fan CFM	1200 cfm	Supply Fan CFM	1200 cfm	Supply Fan CFM	1200 cfm	Supply Fan CFM	1200 cfm
Cooling Minimum Mixed Air Temp	55 F	Cooling Minimum Mixed Air Temp	55 F	Cooling Minimum Mixed Air Temp	55 F	Cooling Minimum Mixed Air Temp	55 F
Furnace Efficiency (0.75-75%)	0.8	Furnace Efficiency (0.75-75%)	0.8	Furnace Efficiency (0.75-75%)	0.8	Furnace Efficiency (0.75-75%)	0.8

CURRENT OCCUPANCY SCHEDULE				PROPOSED OCCUPANCY SCHEDULE			
From	To	From	To	From	To	From	To
EXAMPLE (6:00am to 6:00pm)							
Mon	0:0001	24	0	Mon	0:0001	24	0
Tue	0:0001	24	0	Tue	0:0001	24	0
Wed	0:0001	24	0	Wed	0:0001	24	0
Thu	0:0001	24	0	Thu	0:0001	24	0
Fri	0:0001	24	0	Fri	0:0001	24	0
Sat	0:0001	24	0	Sat	0:0001	24	0
Sun	0:0001	24	0	Sun	0:0001	24	0

Existing Hours										Proposed Hours									
DAY	Cycling Factor	CFM To 8c Hid Q-C-4	QAT BIN	CFM To 8c Hid Q-C-4	Outside Air Temp	BTU/Hr	kW & Therm/Hr		Run Hours	Energy kW/HR & Therm/HR	QAT BIN	SF CFM	Outside Air Temp	BTU/Hr	kW & Therm/Hr		Run Hours	Energy kW/HR & Therm/HR	
							kW/Ton & Bk Eff	Therm/Hr							kW/Ton & Bk Eff	Therm/Hr			
55.00	0.75	1200	80	1200	78.10	23,217	4.1	2.50	5	13	107	1200	78.10	23,400	4.1	2.60	4	10	
54.00	0.50	1200	80	1200	77.30	24,711	4.1	2.45	5	13	107	1200	77.30	24,711	4.1	2.45	4	10	
53.00	0.40	1200	80	1200	77.10	25,166	4.1	2.40	70	167	107	1200	77.10	25,166	4.1	2.40	70	167	
53.00	0.24	1200	80	1200	76.80	25,430	4.1	2.34	206	206	97	1200	76.80	25,430	4.1	2.34	206	206	
55.00	0.24	1200	80	1200	78.10	25,014	4.1	2.28	94	220	97	1200	78.10	25,014	4.1	2.28	94	220	
55.00	0.40	1200	80	1200	77.50	24,440	4.1	2.24	94	223	97	1200	77.50	24,440	4.1	2.24	94	223	
55.00	0.45	1200	80	1200	78.10	23,882	4.1	2.18	43	203	97	1200	78.10	23,882	4.1	2.18	43	203	
55.00	0.10	1200	80	1200	74.60	25,315	4.1	2.04	79	100	97	1200	74.60	25,315	4.1	2.04	79	100	
55.00	0.05	1200	80	1200	74.10	22,765	4.1	2.04	39	100	97	1200	74.10	22,765	4.1	2.04	39	100	
55.00	0.05	1200	80	1200	73.80	22,168	4.1	2.08	32	73	57	1200	73.80	22,168	4.1	2.08	32	73	
55.00	0.10	1200	80	1200	73.80	22,168	4.1	0.34	75	21	57	1200	73.80	22,168	4.1	0.34	75	21	
55.00	0.15	1200	80	1200	73.30	25,825	4.1	0.34	109	36	42	1200	73.30	25,825	4.1	0.34	109	36	
55.00	0.20	1200	80	1200	73.80	27,391	4.1	0.34	141	48	42	1200	73.80	27,391	4.1	0.34	141	48	
55.00	0.25	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.30	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.35	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.40	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.45	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.50	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.55	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.60	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.65	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.70	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.75	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.80	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.85	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.90	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	0.95	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
55.00	1.00	1200	80	1200	73.80	27,552	4.1	0.36	118	42	32	1200	73.80	27,552	4.1	0.36	118	42	
Cooling Savings (KWh): 1,472										Cooling Savings (Thermal): 461									
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Cooling Savings (KWh): 1,472										Cooling Savings (Thermal): 461									

Date: 6/30/05  
Building: Tri County Health  
Equip. Name: AC-1 & F-3 to F-8 (4 Tons)

NOTE: Highlighted Cells are user inputs

Current Occupancy Schedule

EXAMPLE (6:00am to 6 pm)			
	From:	To:	Hours
SMTWTFSS	6	18	12
Mon	0.0001	24	24
Tues	0.0001	24	24
Wed	0.0001	24	24
Thu	0.0001	24	24
Fri	0.0001	24	24
Sat	0.0001	24	24
Sun	0.0001	24	24
			168

Notes: Enter Hall hours as 5, for example 6:5 am to 6:30

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			
	From:	To:	Hours:
SMTWTFSS	6	18	12
Mon	7	18	11
Tues	7	18	11
Wed	7	18	11
Thu	7	18	11
Fri	7	18	11
Sat			0
Sun			0
			55

Notes: Enter Hall hours as 5, for example 6:5 am to 6:30

Supply Fan Motor Savings.

Inputs:

HP: 0.25  
Efficiency: 0.7  
Load Factor: 0.75  
# of Fans: 5  
Existing Yearly Hrs: 1,489  
Proposed Yearly Hrs: 510

kWh\_savings: 979

		Existing Hours										Proposed Hours									
DAT	Cycling Factor	kW & Therm					Energy					kW & Therm					Energy				
		QAT Bin	CFM To Be	Outside Air	Mixed Air	BTU/Hr	kWTrn & Bk Eff	kWh/Tr & kWh/Tr	Run Hours	QAT Bin	CFM	Outside Air	Mixed Air	BTU/Hr	kWTrn & Bk Eff	kWh/Tr & kWh/Tr	Run Hours				
35.003	0.78	97	1800	160	78.10	36,370	1.4	3.3	18	107	1800	160	78.10	36,370	1.4	3.3	18				
35.002	0.49	97	1800	160	77.40	35,615	1.1	3.20	20	97	1800	160	77.40	35,615	1.1	3.20	20				
35.003	0.49	97	1800	160	77.10	35,011	1.1	3.20	70	97	1800	160	77.10	35,011	1.1	3.20	70				
35.005	0.32	97	1800	160	76.10	34,166	1.1	3.13	87	97	1800	160	76.10	34,166	1.1	3.13	87				
35.006	0.28	97	1800	160	75.10	33,382	1.1	3.09	96	97	1800	160	75.10	33,382	1.1	3.09	96				
35.007	0.20	97	1800	160	75.00	32,597	1.1	2.99	98	97	1800	160	75.00	32,597	1.1	2.99	98				
35.008	0.18	97	1800	160	75.00	31,942	1.1	2.92	83	97	1800	160	75.00	31,942	1.1	2.92	83				
35.009	0.15	97	1800	160	74.80	31,035	1.1	2.86	78	97	1800	160	74.80	31,035	1.1	2.86	78				
35.010	0.10	97	1800	160	75.00	30,543	1.1	2.78	39	97	1800	160	75.00	30,543	1.1	2.78	39				
35.011	0.10	97	1800	160	74.60	31,473	1.1	2.71	35	97	1800	160	74.60	31,473	1.1	2.71	35				
35.012	0.10	97	1800	160	74.50	31,141	1.1	2.69	14	97	1800	160	74.50	31,141	1.1	2.69	14				
35.013	0.10	97	1800	160	70.80	25,012	0.8	2.45	75	97	1800	160	71.30	24,257	0.8	2.43	29				
35.014	0.13	97	1800	160	59.80	38,521	0.8	2.45	141	64	42	1800	160	70.80	35,012	0.8	2.43	37			
35.015	0.20	32	1800	160	59.30	37,275	0.8	2.45	139	58	32	1800	160	70.30	35,768	0.8	2.43	35			
35.016	0.23	37	1800	160	63.80	38,030	0.8	2.45	118	56	32	1800	160	69.80	36,521	0.8	2.46	28			
35.017	0.30	22	1800	160	58.30	38,784	0.8	2.48	85	41	27	1800	160	69.30	37,275	0.8	2.47	19			
35.018	0.35	17	1800	160	58.30	39,539	0.8	2.49	55	27	22	1800	160	66.80	38,030	0.8	2.48	12			
35.019	0.40	12	1800	160	67.80	40,254	0.8	2.50	38	19	17	1800	160	65.30	38,784	0.8	2.48	9			
35.020	0.45	7	1800	160	67.30	40,254	0.8	2.50	38	19	17	1800	160	67.80	39,539	0.8	2.48	6			
35.021	0.50	2	1800	160	65.80	41,048	0.8	2.51	27	14	12	1800	160	67.80	40,284	0.8	2.50	3			
35.022	0.55	3	1800	160	68.80	41,803	0.8	2.52	12	6	7	1800	160	68.80	41,048	0.8	2.51	1			
35.023	0.60	3	1800	160	65.80	42,557	0.8	2.53	8	4	2	1800	160	68.80	41,553	0.8	2.52	1			
35.024	0.65	1	1800	160	65.30	43,312	0.8	2.54	2	2	1	1800	160	68.30	42,557	0.8	2.53	0			
35.025	0.70	1	1800	160	64.80	44,067	0.8	2.55	2	1	1	1800	160	67.80	43,312	0.8	2.54	0			
35.026	0.75	1	1800	160	64.30	44,821	0.8	2.56	1	1	1	1800	160	67.30	43,312	0.8	2.54	0			
35.027	0.80	1	1800	160	63.80	45,575	0.8	2.57	0	0	0	1800	160	66.80	44,066	0.8	2.55	0			
35.028	0.85	1	1800	160	63.30	46,329	0.8	2.58	0	0	0	1800	160	66.30	44,821	0.8	2.55	0			
35.029	0.90	1	1800	160	62.80	47,083	0.8	2.59	0	0	0	1800	160	65.80	45,575	0.8	2.55	0			
35.030	0.95	1	1800	160	62.30	47,837	0.8	2.60	0	0	0	1800	160	65.30	46,329	0.8	2.55	0			
35.031	1.00	1	1800	160	61.80	48,591	0.8	2.61	0	0	0	1800	160	64.80	47,083	0.8	2.55	0			
35.032	1.05	1	1800	160	61.30	49,345	0.8	2.62	0	0	0	1800	160	64.30	47,837	0.8	2.55	0			
35.033	1.10	1	1800	160	60.80	50,099	0.8	2.63	0	0	0	1800	160	63.80	48,591	0.8	2.55	0			
35.034	1.15	1	1800	160	60.30	50,853	0.8	2.64	0	0	0	1800	160	63.30	49,345	0.8	2.55	0			
35.035	1.20	1	1800	160	59.80	51,607	0.8	2.65	0	0	0	1800	160	62.80	50,099	0.8	2.55	0			
35.036	1.25	1	1800	160	59.30	52,361	0.8	2.66	0	0	0	1800	160	62.30	50,853	0.8	2.55	0			
35.037	1.30	1	1800	160	58.80	53,115	0.8	2.67	0	0	0	1800	160	61.80	51,607	0.8	2.55	0			
35.038	1.35	1	1800	160	58.30	53,869	0.8	2.68	0	0	0	1800	160	61.30	52,361	0.8	2.55	0			
35.039	1.40	1	1800	160	57.80	54,623	0.8	2.69	0	0	0	1800	160	60.80	53,115	0.8	2.55	0			
35.040	1.45	1	1800	160	57.30	55,377	0.8	2.70	0	0	0	1800	160	60.30	53,869	0.8	2.55	0			
35.041	1.50	1	1800	160	56.80	56,131	0.8	2.71	0	0	0	1800	160	59.80	54,623	0.8	2.55	0			
35.042	1.55	1	1800	160	56.30	56,885	0.8	2.72	0	0	0	1800	160	59.30	55,377	0.8	2.55	0			
35.043	1.60	1	1800	160	55.80	57,639	0.8	2.73	0	0	0	1800	160	58.80	56,131	0.8	2.55	0			
35.044	1.65	1	1800	160	55.30	58,393	0.8	2.74	0	0	0	1800	160	58.30	56,885	0.8	2.55	0			
35.045	1.70	1	1800	160	54.80	59,147	0.8	2.75	0	0	0	1800	160	57.80	57,639	0.8	2.55	0			
35.046	1.75	1	1800	160	54.30	59,901	0.8	2.76	0	0	0	1800	160	57.30	58,393	0.8	2.55	0			
35.047	1.80	1	1800	160	53.80	60,655	0.8	2.77	0	0	0	1800	160	56.80	59,147	0.8	2.55	0			
35.048	1.85	1	1800	160	53.30	61,409	0.8	2.78	0	0	0	1800	160	56.30	59,901	0.8	2.55	0			
35.049	1.90	1	1800	160	52.80	62,163	0.8	2.79	0	0	0	1800	160	55.80	60,655	0.8	2.55	0			
35.050	1.95	1	1800	160	52.30	62,917	0.8	2.80	0	0	0	1800	160	55.30	61,409	0.8	2.55	0			
35.051	2.00	1	1800	160	51.80	63,671	0.8	2.81	0	0	0	1800	160	54.80	62,163	0.8	2.55	0			
35.052	2.05	1	1800	160	51.30	64,425	0.8	2.82	0	0	0	1800	160	54.30	62,917	0.8	2.55	0			
35.053	2.10	1	1800	160	50.80	65,179	0.8	2.83	0	0	0	1800	160	53.80	63,671	0.8	2.55	0			
35.054	2.15	1	1800	160	50.30	65,933	0.8	2.84	0	0	0	1800	160	53.30	64,425	0.8	2.55	0			
35.055	2.20	1	1800	160	49.80	66,687	0.8	2.85	0	0	0	1800	160	52.80	65,179	0.8	2.55	0			
35.056	2.25	1	1800	160	49.30	67,441	0.8	2.86	0	0	0	1800	160	52.30	65,933	0.8	2.55	0			
35.057	2.30	1	1800	160	48.80	68,195	0.8	2.87	0	0	0	1800	160	51.80	66,687	0.8	2.55	0			
35.058	2.35	1	1800	160	48.30	68,949	0.8	2.88	0	0	0	1800	160	51.30	67,441	0.8	2.55	0			
35.059	2.40	1	1800	160	47.80	69,703	0.8	2.89	0	0	0	1800	160	50.80	68,195	0.8	2.55	0			
35.060	2.45	1	1800	160	47.30	70,457	0.8	2.90	0	0	0	1800	160	50.30	68,949	0.8	2.55	0			
35.061	2.50	1	1800	160	46.80	71,211	0.8	2.91	0	0	0	1800	160	49.80	69,703	0.8	2.55	0			
35.062	2.55	1	1800	160	46.30	71,965	0.8	2.92	0	0	0	1800	160	49.30	70,457	0.8	2.55	0			
35.063	2.60	1	1800	160	45.80	72,719	0.8	2.93	0	0	0	1800	160	48.80	71,211	0.8	2.55	0			
35.064	2.65	1	1800	160	45.30	73,473	0.8	2.94	0	0	0	1800	160	48.30	71,965	0.8	2.55	0			
35.065	2.70	1	1800	160	44.80	74,227	0.8	2.95	0	0	0	1800	160	47.80	72,719	0.8	2.55	0			
35.066	2.75	1	1800	160	44.30	74,981	0.8	2.96	0	0	0	1800	160	47.30	73,473	0.8	2.55	0			
35.067	2.80	1	1800	160	43.80	75,735	0.8	2.97	0	0	0	1800	160	46.80	74,227	0.8	2.55	0			
35.068	2.85	1	1800	160	43.30	76,489	0.8	2.98	0	0	0	1800	160	46.30	74,981	0.8	2.55	0			
35.069	2.90	1	1800	160	42.80	77,243	0.8	2.99	0	0	0	1800	160	45.80	75,735	0.8	2.55	0			
35.070	2.95	1	1800	160	42.30	77,997	0.8	3.00	0	0	0	1800	160	45.30	76,489	0.8	2.55	0			
35.071	3.00	1	1800	160	41.80	78,751	0.8	3.01	0	0	0	1800	160	44.80	77,243	0.8	2.55	0			
35.072	3.05	1	1800	160	41.30	79,505	0.8	3.02	0	0	0	1800	160	44.30	77,997	0.8	2.55	0			
35.073	3.10	1	1800	160	40.80	80,259	0.8	3.03	0	0	0	1800	160	43.80	78,751	0.8	2.55	0			
35.074	3.15	1	1800	160	40.30	81,013	0.8	3.04	0	0	0	1800	160	43.30	79,505	0.8	2.55	0			
35.075	3.20	1	1800	160	39.80	81,767	0.8	3.05	0	0	0	1800	160	42.80	80,259	0					

NOTE: Highlighted Cells are user inputs.

Date: 6/30/05  
Building: Tri County Health  
Equip Name: RTU-2 (5-Tons)

Current Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
SMTWRFSS			6	18	12
Mon	0.0001	24			24
Tues	0.0001	24			24
Wed	0.0001	24			24
Thu	0.0001	24			24
Fri	0.0001	24			24
Sat	0.0001	24			24
Sun	0.0001	24			24
					168

Proposed Occupancy Schedule:

EXAMPLE (6:00am to 6 pm)			From:	To:	Hours:
SMTWRFSS			6	18	12
Mon	0.0001	24			24
Tues	0.0001	24			24
Wed	0.0001	24			24
Thu	0.0001	24			24
Fri	0.0001	24			24
Sat	0.0001	24			24
Sun	0.0001	24			24
					168

Note: Enter Half hours as 0.5, for example 6.5 and 6.30

Note: Enter Half hours as 0.5, for example 6.5 and 6.30

Supply Fan Motor Savings:

Inputs: HP: 0.5  
Efficiency: 0.72  
Load Factor: 0.75  
# of Fans: 1  
Existing Yearly Hrs: 1489  
Proposed Yearly Hrs: 510  
kWh\_savings: 381

Date: 6/30/05  
Building: Tri County Health  
Enab. Name: RTU-2 (S Ford)

NOTE: Highlighted Cells are user inputs

CURRENT CONDITIONS		PROPOSED CONDITIONS	
Heating Design Air Temp (DAT)	55.00 F	Heating Design Air Temp (DAT)	55.00 F
Cooling Design Air Temp (DAT)	55.00 F	Cooling Design Air Temp (DAT)	55.00 F
Heating Return Air Temp (RAT)	74.00 F	Heating Return Air Temp (RAT)	74.00 F
Cooling Return Air Temp (RAT)	74.00 F	Cooling Return Air Temp (RAT)	74.00 F
OAT	100%	OAT	100%
RAV	90%	RAV	90%
kW/Ton rating of air-cooled A/C Unit			
Supply Fan CFM	2000 cfm	Supply Fan CFM	2000 cfm
Min OA CFM	200	Min OA CFM	200
Cooling Maximum Mixed Air Temp	55.00 F	Cooling Maximum Mixed Air Temp	55.00 F
Purified Efficiency (0.75-75%)	0.8	Purified Efficiency (0.75-75%)	0.8

Current Occupancy Schedule		Proposed Occupancy Schedule	
EXAMPLE (6.00am to 6 pm)	From To	EXAMPLE (6.00am to 6 pm)	From To
SMTWTFSS	0 0 18	SMTWTFSS	0 0 18
Mon	7 18	Mon	7 18
Tues	7 18	Tues	7 18
Wed	7 18	Wed	7 18
Thur	7 18	Thur	7 18
Fri	7 18	Fri	7 18
Sat	0 0	Sat	0 0
Sun	0 0	Sun	0 0

		Existing Hours										Proposed Hours									
DAT	Cycling Factor	OAT BIN	CFM To Be Htg Or Cg	Outside Air CFM	Mixed Air Temp	BTU/Hr	kW/Ton & Therms/Hr	Br. Eff.	Run Hours	Energy kWh/yr & Therms/yr	kW & Therms/Hr	kW/Ton & Therms/Hr	Br. Eff.	Run Hours	Energy kWh/yr & Therms/yr						
55.00	0.75	97	2,000	2,000	73.10	45,482	1.1	4.17	5	22	107	2,000	2,000	73.10	41,348	1.1	4.17	5	22		
55.00	0.50	92	2,000	2,000	77.60	41,510	1.1	4.08	38	192	102	2,000	2,000	78.10	41,735	1.1	4.08	38	192		
55.00	0.40	87	2,000	2,000	77.10	42,578	1.1	3.98	70	378	97	2,000	2,000	77.10	41,619	1.1	3.98	70	378		
55.00	0.30	82	2,000	2,000	78.80	42,625	1.1	3.91	80	420	92	2,000	2,000	77.50	42,619	1.1	3.91	80	420		
55.00	0.25	77	2,000	2,000	78.10	41,685	1.1	3.92	85	435	87	2,000	2,000	78.80	42,625	1.1	3.92	85	435		
55.00	0.20	72	2,000	2,000	75.10	39,810	1.1	3.74	69	367	82	2,000	2,000	75.10	39,810	1.1	3.74	69	367		
55.00	0.15	67	2,000	2,000	75.10	39,810	1.1	3.65	83	335	77	2,000	2,000	73.10	41,348	1.1	3.65	83	335		
55.00	0.10	62	2,000	2,000	73.60	38,873	1.1	3.54	76	285	72	2,000	2,000	72.60	41,746	1.1	3.54	76	285		
55.00	0.05	57	2,000	2,000	74.10	37,917	1.1	3.48	35	185	67	2,000	2,000	73.60	38,873	1.1	3.48	35	185		
55.00	0.05	52	2,000	2,000	73.60	38,873	1.1	3.38	37	195	72	2,000	2,000	74.10	37,917	1.1	3.38	37	195		
55.00	0.05	47	2,000	2,000	73.10	39,425	0.8	0.49	35	185	62	2,000	2,000	73.10	39,425	0.8	0.49	35	185		
55.00	0.10	37	2,000	2,000	70.80	43,784	0.8	0.55	75	411	57	2,000	2,000	71.80	41,878	0.8	0.52	21	111		
55.00	0.15	32	2,000	2,000	70.30	44,709	0.8	0.58	109	561	47	2,000	2,000	71.30	42,821	0.8	0.54	29	151		
55.00	0.20	27	2,000	2,000	69.80	45,651	0.8	0.57	141	691	42	2,000	2,000	70.80	43,784	0.8	0.55	37	201		
55.00	0.25	22	2,000	2,000	69.30	46,594	0.8	0.56	139	681	37	2,000	2,000	70.30	44,709	0.8	0.56	35	201		
55.00	0.30	17	2,000	2,000	68.80	47,537	0.8	0.56	119	621	32	2,000	2,000	69.30	45,651	0.8	0.57	28	161		
55.00	0.35	12	2,000	2,000	68.30	48,480	0.8	0.55	89	471	27	2,000	2,000	68.80	46,594	0.8	0.58	19	111		
55.00	0.40	7	2,000	2,000	67.80	49,424	0.8	0.53	55	341	22	2,000	2,000	68.30	47,537	0.8	0.56	12	71		
55.00	0.45	2	2,000	2,000	67.30	50,367	0.8	0.63	38	241	17	2,000	2,000	67.80	48,480	0.8	0.61	9	81		
55.00	0.50	-3	2,000	2,000	66.80	51,310	0.8	0.64	27	171	12	2,000	2,000	67.30	49,424	0.8	0.62	6	41		
55.00	0.55	-8	2,000	2,000	66.30	52,253	0.8	0.65	12	81	7	2,000	2,000	67.30	50,367	0.8	0.63	3	21		
55.00	0.60	-8	2,000	2,000	65.80	53,196	0.8	0.66	8	51	2	2,000	2,000	66.80	51,310	0.8	0.64	1	11		
55.00	0.65	-13	2,000	2,000	65.30	54,140	0.8	0.68	3	21	-3	2,000	2,000	66.30	52,253	0.8	0.65	0	0		
55.00	0.70	-18	2,000	2,000	64.80	55,083	0.8	0.69	2	11	-8	2,000	2,000	65.80	53,196	0.8	0.66	0	0		
55.00	1.00	-23	2,000	2,000	64.30	56,026	0.8	0.70	1	1	-13	2,000	2,000	64.80	54,140	0.8	0.68	0	0		
55.00	1.00	-28	2,000	2,000	63.80	56,969	0.8	0.71	0	0	-18	2,000	2,000	64.30	55,083	0.8	0.69	0	0		

CFM 2000  
Correction Factor 0.9432  
Existing Cooling Usage (kWh): 2,403  
Existing Heating Usage (Therms): 495  
Cooling Savings (kWh): 1,226  
Heating Savings (Therms): 376

## MODELING NOTES

### ARAPAHOE COUNTY - PEORIA SHOPS

ECM Run: Install a New EMCS/Programmable Thermostats

Fan System	Item Changed	Previous Run Input	Current Run Input
Rm 1 (UHs & MAUs)	Heating Driftpoint	70F	55F
Rm 2 (RTU-3)	Heating Driftpoint	70F	55F
Rm 3 (RTU-1 & RTU-2)	Cooling Driftpoint	75F	95F
	Heating Driftpoint	70F	55F

**NOTE:** The units above shall cycle on during the occupied period to maintain the space temperature setpoint as governed by the existing space thermostat. The units above shall cycle on during the unoccupied period to maintain the night setback temperatures above as governed by the new EMCS or programmable thermostat.

**Previous Run (New Lighting Run):**

Annual kWh Usage:	194,579
Annual kW Usage:	773
Annual Therms Usage:	24,278

**Current Run (Install New EMCS/Prog Tstat Run):**

Annual kWh Usage:	186,287
Annual kW Usage:	778
Annual Therms Usage:	12,476

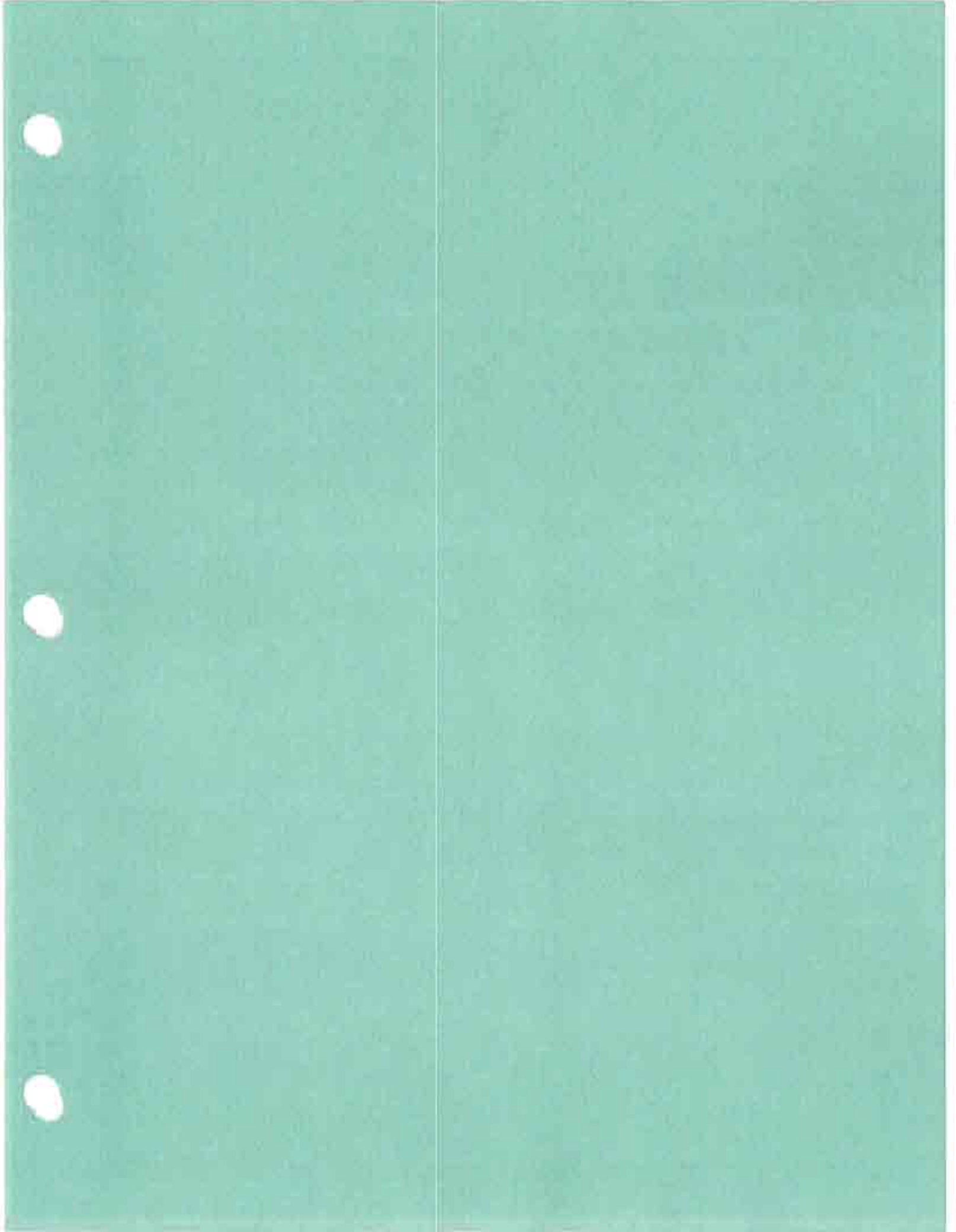
**Savings (Install New EMCS/Prog Tstat Savings):**

Annual kWh Savings:	8,292
Annual kW Savings:	-5
Annual Therms Savings:	11,801

**Notes:**

1. The negative kW savings is the result of all of the unit heaters coming on at once in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall heat each space up gradually.





## ***ECM 5 – Replace the Existing Chillers and Cooling Tower***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

### Existing Condition to Warrant an ECM Opportunity:

Currently, cooling is provided to building 01-Administration Building by two water-cooled, reciprocating chillers that have heat recovery capabilities. Each chiller is equipped with two different condensers. The first condenser is piped to a cooling tower which transfers the heat generated in the building to the outdoors. The second condenser is piped to the building's hot water system which transfers the heat generated in the building to the hot water return line, preheating the hot water before it re-enters the boilers. This type of chilled water system works best when there is a need for chilled water throughout the entire winter, which is not the case at this facility. The four main air handling units in this building are equipped with air-side economizers which can be utilized during the winter to provide cooling, instead of the chillers. This type of chilled water system has caused some operational problems due to the complexity of the system. For example, the hot water return water flows through the heat recovery condenser at all times, there are no valves installed to enable the hot water return to bypass the condenser. This causes the chiller to operate in heat recovery mode whenever the hot water pumps are running, which may not always be the ideal time for the heat recovery condenser to be running. The chiller operates at a lower efficiency using the heat recovery condenser since the water temperature entering the condenser is a lot hotter than the water coming from the cooling tower, thus causing the chiller to consume more energy. The chillers have also reached the end of their useful lives and their efficiencies have started to deteriorate. The cooling tower has reached the end of its useful life too. This ECM concerns replacing the existing chillers and cooling tower. The two new chillers shall be high efficient, water-cooled chillers.

### Savings Calculation Methodology:

The implementation of this ECM shall result in positive electrical savings and negative natural gas savings. The savings for this ECM were calculated utilizing two Trane Trace building energy simulation models. The first model included the existing heat recovery chillers and the second model was modified to include the new high efficient chillers. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings. The negative natural gas savings reflects the effects of the heat recovery chiller no longer being used to preheat the hot water return.

Figure 1

Arapahoe County - Admin I Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	217,183	160,605
Feb	189,788	145,184
Mar	229,311	168,223
Apr	218,456	194,211
May	243,374	236,417
Jun	248,088	246,541
Jul	270,700	246,323
Aug	264,710	258,730
Sep	243,348	223,995
Oct	232,915	230,945
Nov	220,561	174,307
Dec	216,466	156,768
	2,794,900	2,442,249
		13%

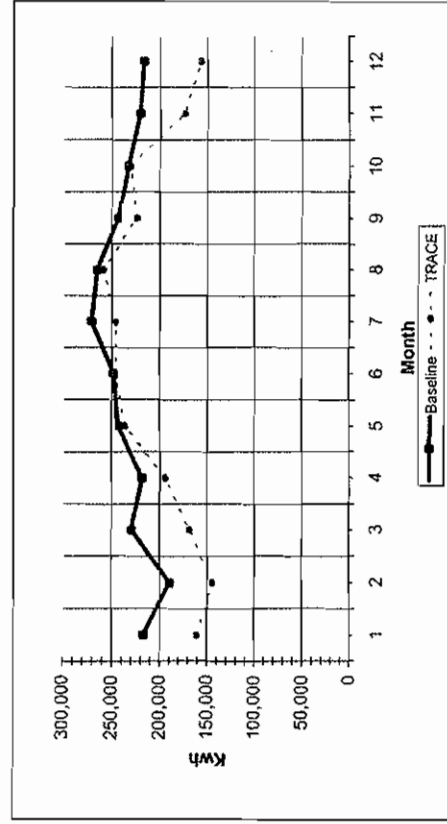
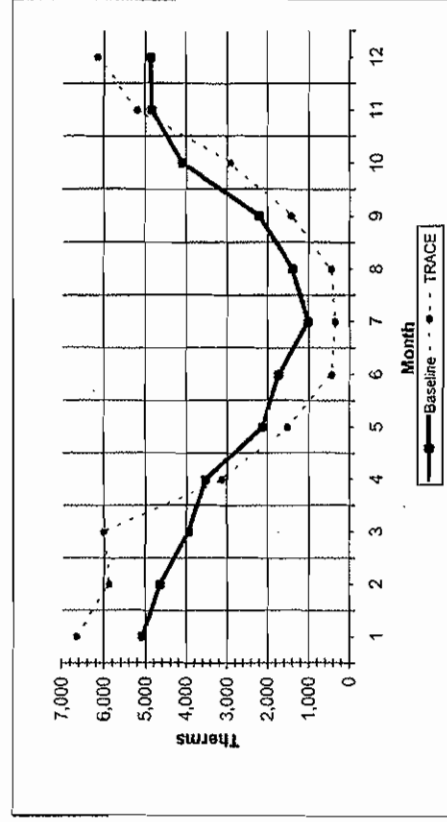


Figure 2

Arapahoe County - Admin I Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASELINE	MODEL
Jan	5,080	6,648
Feb	4,650	5,870
Mar	3,950	6,011
Apr	3,550	3,128
May	2,140	1,521
Jun	1,740	449
Jul	1,010	353
Aug	1,390	443
Sep	2,220	1,421
Oct	4,110	2,921
Nov	4,850	5,181
Dec	4,870	6,142
	39,560	40,089
		-1%



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe County - Admin I - Match

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	160,605	145,184	168,223	194,211	236,417	246,541	246,323	258,730	223,995	230,945	174,307	2,442,249
	On-Pk Demand (kW)	410	410	410	648	665	673	684	676	665	664	575	684
Gas	On-Pk Cons. (therms)	6,648	5,870	6,011	3,128	1,521	449	353	443	1,421	2,921	5,181	40,089
	On-Pk Demand (therms/hr)	38	39	38	36	35	6	2	3	35	36	37	39
Water	Cons. (1000gal)	0	0	0	104	215	258	298	281	197	155	24	1,533
Building Energy Consumption = 110,260 Btu/(ft2-year)													
Source Energy Consumption = 261,072 Btu/(ft2-year)													
Floor Area = 111,956 ft2													

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe County - Admin I - Lighting Run

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	
----- Monthly Energy Consumption -----														
Electric	On-Pk Cons. (kWh)	140,796	127,277	147,458	172,897	212,943	223,527	222,829	233,874	199,514	211,337	138,488	137,436	2,168,375
	On-Pk Demand (kW)	358	358	358	586	593	609	619	612	607	600	358	358	619
Gas	On-Pk Cons. (therms)	6,751	5,968	6,114	3,168	1,499	476	353	465	1,708	2,917	5,907	6,238	41,562
	On-Pk Demand (therms/hr)	37	37	37	35	34	6	2	3	35	35	36	37	37
Water	Cons. (1000gal)	0	0	0	91	197	235	277	260	179	145	0	0	1,385
Building Energy Consumption = 103,227 Btu/(ft2-year)														
Source Energy Consumption = 237,407 Btu/(ft2-year)														
Floor Area = 111,956 ft2														

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - EMCS Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kW/h)	130,120	117,639	137,067	149,284	177,616	184,908	184,820	196,456	161,483	176,125	128,253	126,618	1,870,390
On-Pk Demand (kW)	358	358	358	586	616	638	646	636	614	600	358	358	646
<b>Gas</b>													
On-Pk Cons. (therms)	4,845	4,278	3,815	1,265	415	388	353	405	353	1,373	3,805	4,449	25,743
On-Pk Demand (therms/hr)	37	37	36	34	12	2	2	2	2	31	36	37	37
<b>Water</b>													
Cons. (1000gal)	0	0	0	70	145	186	200	210	124	103	0	0	1,037
<b>Building Energy Consumption = 80,013 Btu/(ft2-year)</b>													
<b>Source Energy Consumption = 195,278 Btu/(ft2-year)</b>													
<b>Floor Area = 111,956 ft2</b>													

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe County - Admin I - Chiller Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
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## Electric

On-Pk Cons. (kWh)	130,120	117,639	137,067	137,608	162,083	169,765	170,264	180,497	148,025	153,040	128,253	126,618	1,760,979
On-Pk Demand (kW)	358	358	358	457	569	585	588	585	566	465	358	358	588

## Gas

On-Pk Cons. (therms)	4,845	4,278	3,815	1,442	477	388	353	405	419	2,048	3,805	4,449	26,723
On-Pk Demand (therms/hr)	37	37	36	34	12	2	2	2	4	31	36	37	37

## Water

Cons. (1000gal)	0	0	0	61	130	170	184	193	111	92	0	0	940
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Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

77,553 Btu/(ft2-year)  
186,192 Btu/(ft2-year)  
111,956 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - Boiler Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	131,144	118,565	138,188	138,242	162,302	169,765	170,264	180,497	148,163	153,880	129,276	127,593	1,767,880
On-Pk Demand (kW)	362	362	362	461	569	585	588	585	566	469	362	362	588
<b>Gas</b>													
On-Pk Cons. (therms)	4,335	3,829	3,426	1,318	467	388	353	405	412	1,858	3,414	3,982	24,186
On-Pk Demand (therms/hr)	33	33	32	30	11	2	2	2	3	27	32	33	33
<b>Water</b>													
Cons. (1000gal)	0	0	0	61	130	170	184	193	111	92	0	0	940
<b>Building Energy Consumption =</b>													
Source Energy Consumption =	75,497 Btu/(ft2-year)												
Floor Area =	184,439 Btu/(ft2-year)												
	111,956 ft2												



## MODELING NOTES

### ARAPAHOE COUNTY - ADMIN I BUILDING

ECM Run: Install New EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-2	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-3	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-4	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off

#### Previous Run (New Lighting Run):

Annual kWh Usage: 2,168,375  
Annual kW Usage: 6,016  
Annual Therms Usage: 41,562

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 1,870,390  
Annual kW Usage: 6,125  
Annual Therms Usage: 25,743

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 297,985  
Annual kW Savings: -109  
Annual Therms Savings: 15,819

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

### Admin I - DHW Pump EMCS Savings

Pump ID:	HP:	LF:	Efficiency:	kW:	Existing Run Hrs:	New Run Hrs:	kWh Savings:
DHWP-1	0.17	0.75	0.7	0.13	8,760	3,259	733
HX Pump	0.25	0.75	0.7	0.20	8,760	3,259	1,099
Total kWh Savings:							1,832

Note: The existing run hours are 24 h/d, 7 d/w. The new run hours are 12.5 h/d, 5 d/w. These savings shall be added to the EMCS savings that were calculated in the Trane Trace building simulation model.

## MODELING NOTES

### ARAPAHOE COUNTY - ADMIN I BUILDING

ECM Run: Replace the Existing Chillers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
Heat Recovery Chillers	Equipment Type	Water-Cooled Recip Chiller w/ Ht. Rec. (Clg.-1 kW/ton @ 260 Tons, Ht. Rec.-1.35 kW/ton @ 220 Tons)	New Admin I Chiller (0.625 kW/ton @ 100% Load)

**Previous Run (New EMCS Run):**

Annual kWh Usage: 1,870,390  
Annual kW Usage: 6,125  
Annual Therms Usage: 25,743

**Current Run (Replace the Existing Chillers Run):**

Annual kWh Usage: 1,760,979  
Annual kW Usage: 5,606  
Annual Therms Usage: 26,723

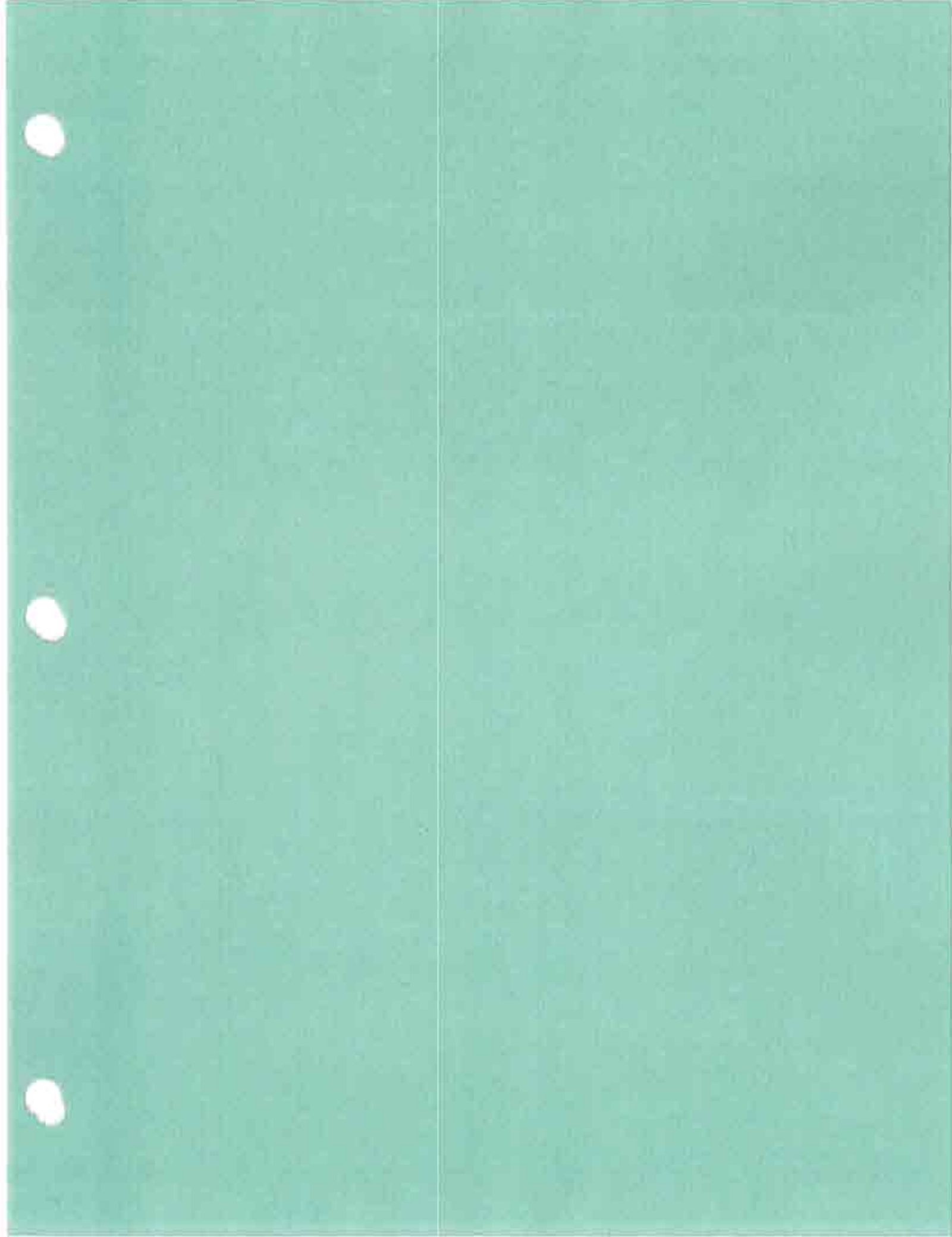
**Savings (Replace the Existing Chillers Savings):**

Annual kWh Savings: 109,411  
Annual kW Savings: 519  
Annual Therms Savings: -980

**Notes:**

1. The negative therms savings is the result of the heat recovery chiller no longer being used to preheat the hot water return. So, now the boiler has to burn more natural gas to account for this. These negative savings shall not be accounted for since the heat recovery system no longer functions properly.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73



### ***ECM 6 – Replace the Existing Natural Gas-Fired Boilers***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

#### Existing Condition to Warrant an ECM Opportunity:

The majority of the hot water boilers used for heating in the Arapahoe County facilities are natural gas-fired, atmospheric boilers. Atmospheric boilers aren't the most efficient boilers available. Also, these boilers are beginning to reach the end of their useful lives. This ECM concerns replacing each of the atmospheric boilers with a more efficient natural gas-fired, forced draft boiler.

#### Savings Calculation Methodology:

The implementation of this ECM shall result in positive natural gas savings and negative electrical savings. The savings for this ECM were calculated utilizing two Trane Trace building energy simulation models. The first model included the existing atmospheric boiler and the second model was modified to include the new forced draft boiler. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings. The negative electrical savings reflects the energy usage of the new boiler's forced draft fan.

Figure 1

Arapahoe County - Admin I Building  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	217,183	160,605
Feb	189,788	145,184
Mar	229,311	168,223
Apr	218,456	194,211
May	243,374	236,417
Jun	248,088	246,541
Jul	270,700	246,323
Aug	264,710	258,730
Sep	243,348	223,995
Oct	232,915	230,945
Nov	220,561	174,307
Dec	216,466	156,768
	2,794,900	2,442,249
		13%

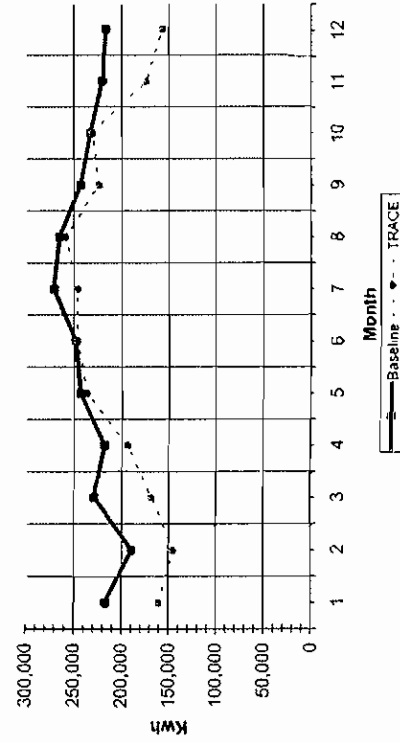
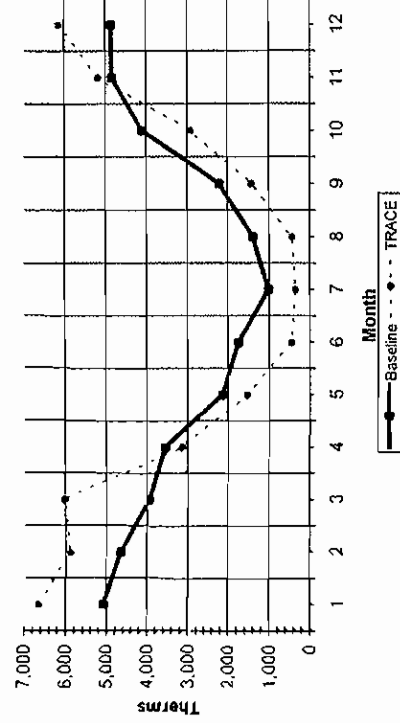


Figure 2

Arapahoe County - Admin I Building  
Computer Model Calibration for Natural Gas

Month	NATURAL GAS USAGE (Therms)	
	BASELINE	MODEL
Jan	5,080	6,648
Feb	4,650	5,870
Mar	3,950	6,011
Apr	3,550	3,128
May	2,140	1,521
Jun	1,740	449
Jul	1,010	353
Aug	1,390	443
Sep	2,220	1,421
Oct	4,110	2,921
Nov	4,850	5,181
Dec	4,870	6,142
	39,560	40,089
		-1%



By Release 2.007

Monthly Energy Consumption

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area = .

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1      Arapahoe County - Admin I - Lighting Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	140,796	127,277	147,458	172,897	212,943	223,527	222,829	233,874	199,514	211,337	138,488	137,436	2,168,375
On-Pk Demand (kW)	358	358	358	586	593	609	619	612	607	600	358	358	619
<b>Gas</b>													
On-Pk Cons. (therms)	6,751	5,968	6,114	3,168	1,499	476	353	465	1,708	2,917	5,907	6,238	41,562
On-Pk Demand (therms/hr)	37	37	37	35	34	6	2	3	35	35	36	37	37
<b>Water</b>													
Cons. (1000gal)	0	0	0	91	197	235	277	260	179	145	0	0	1,385
<b>Building Energy Consumption =</b>													
Source Energy Consumption =									103,227	Btu/(ft2-year)			
Floor Area =									237,407	Btu/(ft2-year)			
									111,956	ft2			



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - EMCS Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	130,120	117,639	137,067	149,284	177,616	184,908	184,820	196,456	161,483	176,125	128,253	126,618	1,870,390
On-Pk Demand (kW)	358	358	358	586	616	638	646	636	614	600	358	358	646
<b>Gas</b>													
On-Pk Cons. (therms)	4,845	4,278	3,815	1,255	415	388	353	405	353	1,373	3,805	4,449	25,743
On-Pk Demand (therms/hr)	37	37	36	34	12	2	2	2	2	31	36	37	37
<b>Water</b>													
Cons. (1000gal)	0	0	0	70	145	186	200	210	124	103	0	0	1,037

Building Energy Consumption = 80,013 Btu/(ft2-year)  
Source Energy Consumption = 195,278 Btu/(ft2-year)  
Floor Area = 111,956 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - Chiller Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	130,120	117,539	137,067	137,608	162,083	169,765	170,264	180,497	148,025	153,040	128,253	126,618	1,760,979
On-Pk Demand (kW)	358	358	358	457	569	585	588	585	566	465	358	358	588
<b>Gas</b>													
On-Pk Cons. (therms)	4,845	4,278	3,815	1,442	477	388	353	405	419	2,048	3,805	4,449	26,723
On-Pk Demand (therms/hr)	37	37	36	34	12	2	2	2	4	31	36	37	37
<b>Water</b>													
Cons. (1000gal)	0	0	0	61	130	170	184	193	111	92	0	0	940
<b>Building Energy Consumption =</b>													
Source Energy Consumption =													
Floor Area =													
			77,553	Btu/(ft2-year)									
			186,192	Btu/(ft2-year)									
			111,956	ft2									

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 Arapahoe County - Admin I - Boiler Run

----- Monthly Energy Consumption -----													
Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	131,144	118,565	138,188	138,242	162,302	169,765	170,264	180,497	148,163	129,276	127,593	1,767,880
	On-Pk Demand (kW)	362	362	362	461	569	585	588	585	566	362	362	588
Gas	On-Pk Cons. (therms)	4,335	3,829	3,426	1,318	467	388	353	405	412	3,414	3,982	24,186
	On-Pk Demand (therms/hr)	33	33	32	30	11	2	2	2	3	32	33	33
Water	Cons. (1000gal)	0	0	0	61	130	170	184	193	111	0	0	940
Building Energy Consumption = 75,497 Btu/(ft2-year)													
Source Energy Consumption = 184,439 Btu/(ft2-year)													
Floor Area = 111,956 ft2													

## MODELING NOTES

### ARAPAHOE COUNTY - ADMIN I BUILDING

ECM Run: Install New EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-2	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-3	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off
AH-4	Fan Schedule	M-F: 5am-11pm; Sat-Sun: 8am-4pm	M-F: 6am-6:30pm; Sat-Sun: Off

**Previous Run (New Lighting Run):**

Annual kWh Usage: 2,168,375  
Annual kW Usage: 6,016  
Annual Therms Usage: 41,562

**Current Run (Install New EMCS Run):**

Annual kWh Usage: 1,870,390  
Annual kW Usage: 6,125  
Annual Therms Usage: 25,743

**Savings (Install New EMCS Savings):**

Annual kWh Savings: 297,985  
Annual kW Savings: -109  
Annual Therms Savings: 15,819

**Notes:**

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

**Electric Savings Safety Factor:** 0.73  
**Natural Gas Savings Safety Factor:** 0.73

### Admin I - DHW Pump EMCS Savings

Pump ID:	HP:	LF:	Efficiency:	kW:	Existing Run Hrs:	New Run Hrs:	kWh Savings:
DHWP-1	0.17	0.75	0.7	0.13	8,760	3,259	733
HX Pump	0.25	0.75	0.7	0.20	8,760	3,259	1,099

**Total kWh Savings: 1,832**

Note: The existing run hours are 24 h/d, 7 d/w. The new run hours are 12.5 h/d, 5 d/w. These savings shall be added to the EMCS savings that were calculated in the Trane Trace building simulation model.

**MODELING NOTES**  
**ARAPAHOE COUNTY - ADMIN I BUILDING**

ECM Run: Replace the Existing Chillers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
Heat Recovery Chillers	Equipment Type	Water-Cooled Recip Chiller w/ Ht. Rec. (Clg.-1 kW/ton @ 260 Tons, Ht. Rec.-1.35 kW/ton @ 220 Tons)	New Admin I Chiller (0.625 kW/ton @ 100% Load)

**Previous Run (New EMCS Run):**

Annual kWh Usage: 1,870,390  
Annual kW Usage: 6,125  
Annual Therms Usage: 25,743

**Current Run (Replace the Existing Chillers Run):**

Annual kWh Usage: 1,760,979  
Annual kW Usage: 5,606  
Annual Therms Usage: 26,723

**Savings (Replace the Existing Chillers Savings):**

Annual kWh Savings: 109,411  
Annual kW Savings: 519  
Annual Therms Savings: -980

**Notes:**

1. The negative therms savings is the result of the heat recovery chiller no longer being used to preheat the hot water return. So, now the boiler has to burn more natural gas to account for this. These negative savings shall not be accounted for since the heat recovery system no longer functions properly.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ADMIN I BUILDING

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
NG Fired HW Boilers	Equipment Type	Atmospheric Boiler (70% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Replace the Existing Chillers Run):**

Annual kWh Usage: 1,760,979  
Annual kW Usage: 5,606  
Annual Therms Usage: 26,723

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 1,767,880  
Annual kW Usage: 5,634  
Annual Therms Usage: 24,186

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -6,901  
Annual kW Savings: -28  
Annual Therms Savings: 2,536

**Notes:**

1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	121,594	112,997
Feb	103,244	100,020
Mar	112,618	114,465
Apr	112,883	107,205
May	120,411	113,295
Jun	122,653	116,146
Jul	139,482	122,622
Aug	138,135	125,874
Sep	126,767	109,882
Oct	120,855	112,745
Nov	119,468	107,850
Dec	126,428	107,003
	1,464,538	1,350,104
		8%

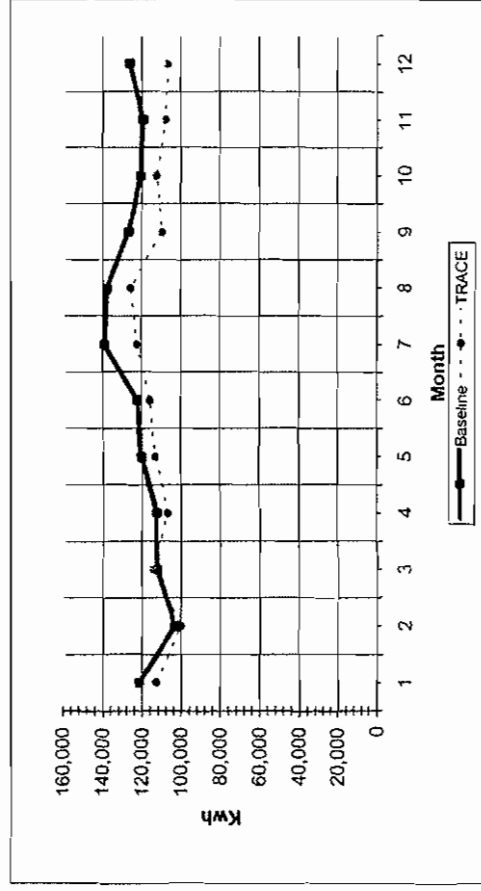
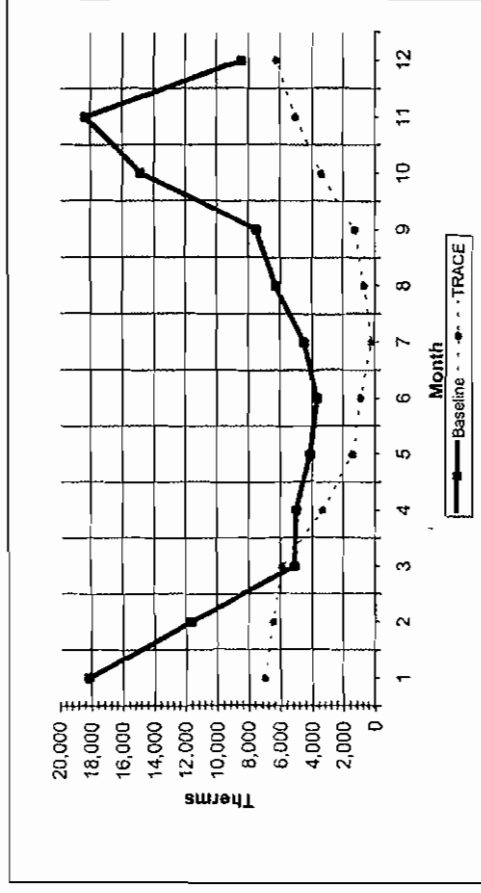


Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)	
	BASELINE	MODEL
Jan	18,160	7,038
Feb	11,670	6,450
Mar	5,160	5,962
Apr	5,010	3,362
May	4,150	1,450
Jun	3,700	933
Jul	4,530	186
Aug	6,300	682
Sep	7,530	1,276
Oct	14,900	3,421
Nov	18,330	5,074
Dec	8,440	6,277
	107,880	42,111
		61%





# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	112,997	100,020	114,485	107,205	113,295	116,146	122,922	125,874	109,862	112,745	107,550	107,003	1,350,105
On-Pk Demand (kW)	445	445	445	445	445	445	445	445	445	445	445	445	445
<b>Gas</b>													
On-Pk Cons. (therms)	7,038	6,450	5,982	3,362	1,450	503	186	682	1,276	3,421	5,074	6,277	42,112
On-Pk Demand (therms/hr)	19	19	17	13	9	7	4	5	8	12	15	18	19
<b>Water</b>													
Cons. (1000gal)	56	43	66	43	92	121	176	152	104	104	72	52	1,031

Building Energy Consumption = 134,046 Btu/(ft2-year)  
 Source Energy Consumption = 277,511 Btu/(ft2-year)  
 Floor Area = 65,792 ft2

By Release 2.006

## Monthly Energy Consumption

Building Energy Consumption =	124,186	Btu/(ft <sup>2</sup> -year)
Source Energy Consumption =	245,941	Btu/(ft <sup>2</sup> -year)
Floor Area =	65,792	ft <sup>2</sup>

Dataset Name: C:\CDSD\TRACE700\Project\Arapahoe\Altura Plaza\Altura Plaza-1-LIGHTING RUN1.crc

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	67,188	58,744	68,625	50,875	64,113	67,496	71,397	76,143	81,955	85,341	81,442	81,037	781,398
On-Pk Demand (kW)	364	364	364	364	364	365	368	365	365	365	367	364	367
<b>Gas</b>													
On-Pk Cons. (therms)	5,799	5,391	5,185	1,398	667	378	186	332	588	3,242	4,319	5,233	32,717
On-Pk Demand (therms/hr)	24	25	24	18	16	6	0	8	15	22	23	24	25
<b>Water</b>													
Cons. (1000gal)	33	25	44	27	65	88	120	111	72	68	44	30	725

Building Energy Consumption = 90,280 Btu/(ft2-year)  
 Source Energy Consumption = 173,954 Btu/(ft2-year)  
 Floor Area = 85,792 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Altura Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	67,596	60,139	68,831	57,057	64,174	67,546	71,397	76,169	82,040	65,402	61,558	61,378	783,258
On-Pk Demand (kW)	364	364	364	364	364	365	366	365	365	365	368	364	368
<b>Gas</b>													
On-Pk Cons. (therms)	5,381	5,015	4,872	1,105	551	330	186	287	490	3,119	4,084	4,909	30,348
On-Pk Demand (therms/hr)	20	20	20	14	12	6	0	6	11	18	19	20	20
<b>Water</b>													
Cons. (1000gal)	33	25	44	27	65	88	120	111	72	68	44	30	725

Building Energy Consumption = 86,760 Btu/(ft2-year)  
 Source Energy Consumption = 170,463 Btu/(ft2-year)  
 Floor Area = 65,782 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ALTURA PLAZA

ECM Run: Install New EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
WSHP	Fan Schedule/Cycle with People	Available 100%	M-F: 6am-6:30pm; Sat-Sun: Off
Pre-Heat WSHP	Fan Schedule/Cycle with People	Available 100%	M-F: 7am-6:30pm; Sat-Sun: Off
Fan Coil	Fan Schedule/Cycle with People	Available 100%	M-F: 7am-6:30pm; Sat-Sun: Off

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,140,374  
Annual kW Usage: 4,374  
Annual Therm Usage: 42,784

#### Current Run (Install New EMCS Run):

Annual kWh Usage: 781,336  
Annual kW Usage: 4,377  
Annual Therm Usage: 32,718

#### Savings (Install New EMCS Savings):

Annual kWh Savings: 359,038  
Annual kW Savings: -3  
Annual Therm Savings: 10,066

#### Notes:

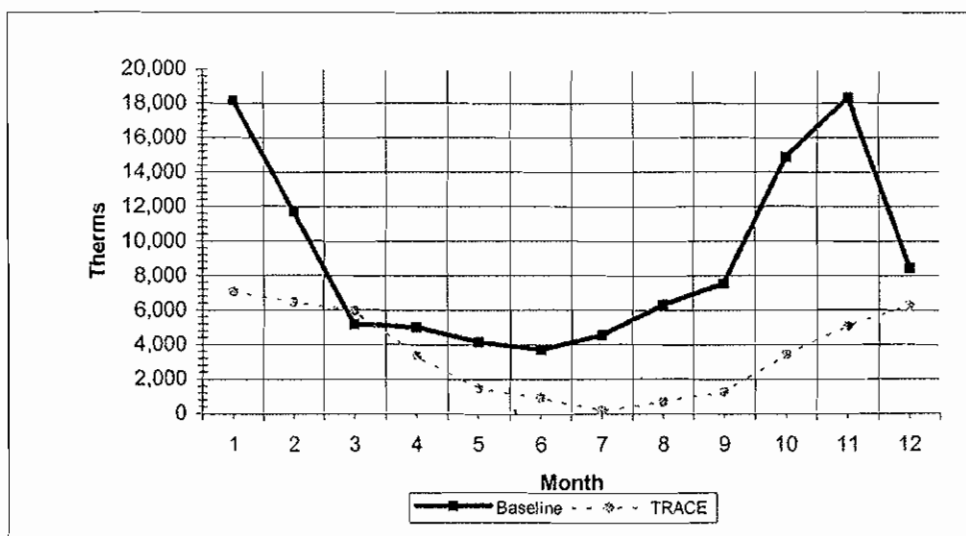
1. An additional 65,769 Therms were added to the 10,066 Therms savings shown above. This is a result of the building's existing natural gas usage being way out of line, so much so that we were unable to force our computer model to reflect the building's actual natural gas usage. So, the 65,769 Therms is the difference in the building's actual usage and the computer model's "match usage." Refer to the attached spreadsheet.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - Altura Plaza  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)			Adjusted Baseline Savings
	BASELINE	MODEL		
Jan	18,160	7,038	61%	11,122
Feb	11,670	6,450	45%	5,220
Mar	5,160	5,962	-16%	-802
Apr	5,010	3,362	33%	1,648
May	4,150	1,450	65%	2,700
Jun	3,700	933	75%	2,767
Jul	4,530	186	96%	4,344
Aug	6,300	682	89%	5,618
Sep	7,530	1,276	83%	6,254
Oct	14,900	3,421	77%	11,479
Nov	18,330	5,074	72%	13,256
Dec	8,440	6,277	26%	2,163
	107,880	42,111	61%	65,769



## MODELING NOTES

### ARAPAHOE COUNTY - ALTURA PLAZA

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
NG Fired HW Boilers	Efficiency	Gas Fired Hot Water Boiler (60% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Install New EMCS Run):**

Annual kWh Usage: 781,336  
Annual kW Usage: 4,377  
Annual Therm Usage: 32,718

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 783,257  
Annual kW Usage: 4,378  
Annual Therm Usage: 30,349

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -1,921  
Annual kW Savings: -1  
Annual Therm Savings: 2,369

**Notes:**

1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

**Electric Savings Safety Factor:** 0.73

**Natural Gas Savings Safety Factor:** 0.73

Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	202,551	197,435 3%
Feb	172,659	178,589 -3%
Mar	234,751	203,151 13%
Apr	234,674	190,309 19%
May	248,888	221,458 11%
Jun	247,557	224,685 9%
Jul	293,663	238,057 19%
Aug	276,365	238,231 14%
Sep	228,143	211,261 7%
Oct	214,985	213,383 1%
Nov	201,979	192,946 4%
Dec	199,199	194,492 2%
	2,755,414	2,503,997 9%

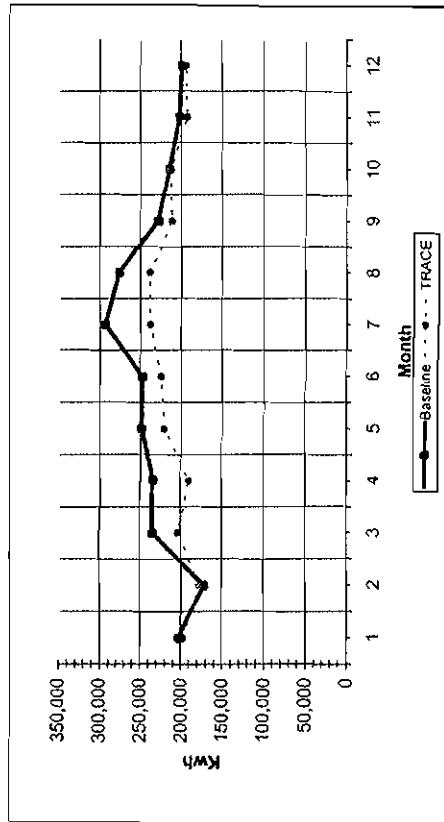
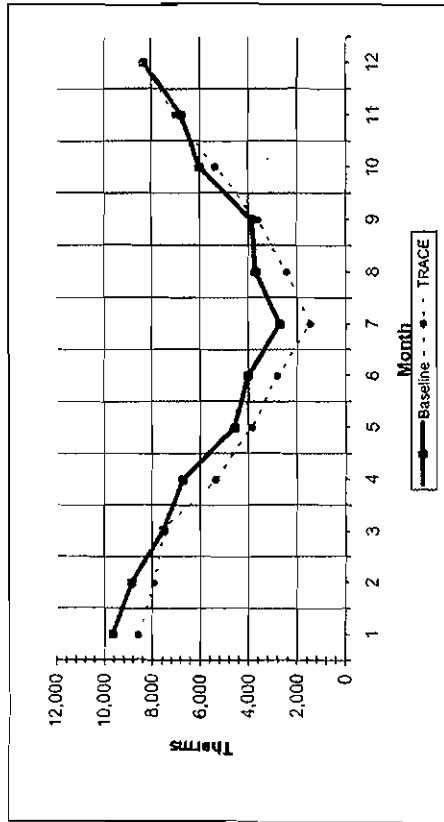


Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)	
	BASELINE	MODEL
Jan	9,680	8,570 11%
Feb	8,870	7,938 11%
Mar	7,540	7,540 0%
Apr	6,710	5,356 20%
May	4,560	3,860 15%
Jun	4,020	2,835 29%
Jul	2,730	1,484 46%
Aug	3,710	2,446 34%
Sep	3,870	3,639 6%
Oct	6,020	5,366 11%
Nov	6,770	7,029 -4%
Dec	8,320	8,374 -1%
	72,800	64,437 11%





# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

		Monthly Energy Consumption												Total
Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Electric	On-Pk Cons. (kWh)	197,435	178,589	203,151	190,308	221,458	224,885	238,057	238,231	211,281	213,383	192,946	194,492	2,503,985
	On-Pk Demand (kW)	409	409	409	430	486	583	581	574	516	490	409	409	581
Gas	On-Pk Cons. (therms)	8,570	7,938	7,540	5,356	3,860	2,835	1,494	2,446	3,639	5,366	7,029	8,374	64,439
	On-Pk Demand (therms/hr)	45	44	44	44	44	44	44	44	44	44	44	44	45
Water	Cons. (1000gal)	0	0	0	0	82	109	155	132	81	56	0	0	615

Building Energy Consumption = 142,485 Btu/(ft2-year)  
 Source Energy Consumption = 308,201 Btu/(ft2-year)  
 Floor Area = 105,204 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	172,576	155,952	177,035	166,190	194,041	198,562	208,985	208,391	185,310	186,583	188,343	189,990	2,189,927
On-Pk Demand (kW)	346	346	346	350	415	488	501	491	443	417	346	346	501
<b>Gas</b>													
On-Pk Cons. (therms)	8,695	8,063	7,873	5,455	3,915	2,859	1,436	2,445	3,654	5,460	7,149	8,475	66,319
On-Pk Demand (therms/hr)	42	42	42	42	42	42	42	42	42	42	42	42	42
<b>Water</b>													
Cons. (1000gal)	0	0	0	0	67	90	129	108	65	46	0	0	506

Building Energy Consumption = 133,133 Btu/(ft2-year)  
 Source Energy Consumption = 278,513 Btu/(ft2-year)  
 Floor Area = 105,204 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kW/h)	154,194	148,361	158,067	158,423	184,563	186,552	203,494	197,971	175,808	178,072	160,172	162,176	2,087,862
On-Pk Demand (kW)	346	346	346	350	415	468	501	491	443	417	346	346	501
<b>Gas</b>													
On-Pk Cons. (therms)	8,519	7,900	7,409	4,930	3,084	1,916	600	1,394	2,877	4,830	6,839	8,278	58,575
On-Pk Demand (therms/hr)	42	42	42	42	33	13	7	10	31	42	42	42	42
<b>Water</b>													
Cons. (1000gal)	0	0	0	0	65	85	133	104	62	46	0	0	496
<b>Building Energy Consumption =</b>													
<b>Source Energy Consumption =</b>													
<b>Floor Area =</b>													
			123,411	Btu/(ft2-year)									
			261,829	Btu/(ft2-year)									
			105,204	ft2									

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

Utility	Monthly Energy Consumption												Total	
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Electric	On-Pk Cons. (kWh)	165,187	149,258	169,078	159,381	185,535	187,457	204,004	198,853	176,722	178,073	161,138	163,159	2,098,842
	On-Pk Demand (kW)	349	349	349	353	417	488	501	481	446	420	349	349	501
Gas	On-Pk Cons. (therms)	7,042	6,530	6,129	4,089	2,570	1,608	527	1,180	2,399	4,007	5,659	6,844	48,583
	On-Pk Demand (therms/hr)	35	34	34	34	27	10	6	6	26	34	34	34	35

Water

Cons. (1000gal)	0	0	0	0	65	85	133	104	62	46	0	0	486
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Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

114,269 Btu/(ft2-year)  
252,800 Btu/(ft2-year)  
105,204 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHU-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHU-2	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 2,189,928  
Annual kW Usage: 4,835  
Annual Therm Usage: 65,319

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 2,087,853  
Annual kW Usage: 4,835  
Annual Therm Usage: 58,576

#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 102,075  
Annual kW Savings: 0  
Annual Therm Savings: 6,743

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
NG Fired HW Boilers	Efficiency	Atmospheric Boiler (65% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 2,087,853  
Annual kW Usage: 4,835  
Annual Therm Usage: 58,576

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 2,098,843  
Annual kW Usage: 4,861  
Annual Therm Usage: 48,584

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -10,990  
Annual kW Savings: -26  
Annual Therm Savings: 9,992

Notes:

1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

Electric Savings Safety Factor: 0.73

Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	149,668	117,519
Feb	123,955	106,449
Mar	137,823	125,967
Apr	166,962	120,398
May	183,024	150,964
Jun	185,588	161,275
Jul	204,313	170,641
Aug	202,649	178,772
Sep	187,481	141,905
Oct	170,057	141,498
Nov	153,399	115,011
Dec	152,731	111,523
	2,017,650	1,641,920
		19%

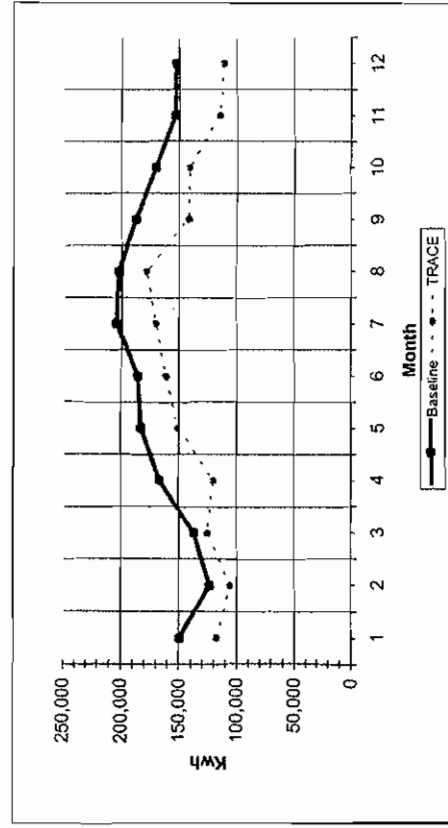
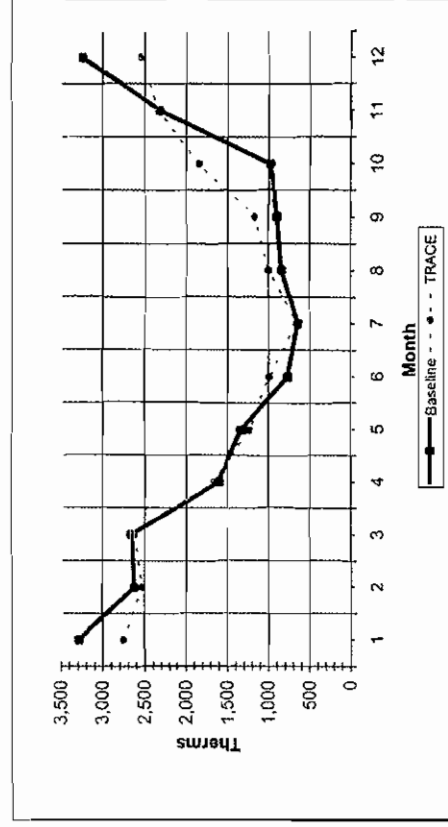


Figure 2

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Natural Gas

Month	NATURAL GAS USAGE (Therms)	
	BASELINE	MODEL
Jan	3,292	2,762
Feb	2,623	2,527
Mar	2,661	2,629
Apr	1,611	1,677
May	1,342	1,242
Jun	773	1,001
Jul	650	672
Aug	841	999
Sep	897	1,175
Oct	977	1,842
Nov	2,320	2,343
Dec	3,238	2,547
	21,225	21,417
		-1%



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - Match Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	117,519	106,449	125,967	120,398	150,964	161,275	170,641	178,772	141,905	141,498	115,011	111,523	1,641,920
On-Pk Demand (kW)	370	371	363	420	455	470	530	508	478	446	349	349	530
<b>Gas</b>													
On-Pk Cons. (therms)	2,762	2,527	2,629	1,677	1,242	1,001	672	999	1,175	1,842	2,343	2,547	21,417
On-Pk Demand (therms/hr)	12	12	11	10	9	9	7	9	9	10	10	12	12
<b>Building Energy Consumption =</b>													
Source Energy Consumption =	95,541 Btu/(ft2-year)												
Floor Area =	235,198 Btu/(ft2-year)												
	81,071 ft2												



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - Lighting Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	103,095	93,293	110,380	103,857	132,054	140,854	152,364	156,782	124,987	123,969	100,353	97,688	1,439,677
On-Pk Demand (kW)	330	331	330	369	404	418	477	455	427	391	309	323	477
<b>Gas</b>													
On-Pk Cons. (therms)	2,888	2,646	2,781	1,803	1,335	1,077	724	1,079	1,261	1,963	2,476	2,675	22,709
On-Pk Demand (therms/hr)	13	13	12	10	10	9	9	9	9	10	11	12	13
<b>Building Energy Consumption =</b>													
<b>Source Energy Consumption =</b>													
<b>Floor Area =</b>													

88,621 Btu/(ft2-year)  
211,331 Btu/(ft2-year)  
81,071 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - EMCS Run

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	101,636	91,993	108,591	102,210	128,575	137,751	150,090	154,105	121,916	122,297	98,669	96,267	1,414,100
On-Pk Demand (kW)	330	331	330	370	404	426	476	458	427	396	309	323	476
Gas													
On-Pk Cons. (therms)	2,685	2,462	2,516	1,558	1,087	852	580	841	1,041	1,696	2,227	2,465	20,011
On-Pk Demand (therms/hr)	12	13	12	10	7	6	5	6	8	10	11	12	13
Building Energy Consumption = 84,215 Btu/(ft2-year)													
Source Energy Consumption = 204,596 Btu/(ft2-year)													
Floor Area = 81,071 ft2													

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - New Boiler Run

		Monthly Energy Consumption												
Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	102,620	92,871	109,497	102,881	129,228	138,360	150,581	154,695	122,547	123,036	99,480	97,162	1,422,959
	On-Pk Demand (kW)	333	333	332	373	406	428	476	458	430	399	311	325	476
Gas	On-Pk Cons. (therms)	2,353	2,157	2,206	1,368	957	752	514	743	916	1,489	1,953	2,160	17,568
	On-Pk Demand (therms/hr)	11	11	10	9	6	5	4	5	7	8	9	11	11
Building Energy Consumption =		81,575 Btu/(ft2-year)												
Source Energy Consumption =		202,544 Btu/(ft2-year)												
Floor Area =		81,071 ft2												

**MODELING NOTES****ARAPAHOE COUNTY - ACJC ADMIN II BUILDING**

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-1	Fan Schedule	M-F: 7am-10:30pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-2	Fan Schedule	M-F: 5:30am-10:30pm; Sat-Sun: OFF	M-F: 5:30am-8:30pm; Sat-Sun: OFF
AHU-4	Fan Schedule	M-F: 7am-10:45pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-6	Fan Schedule	M-F: 7am-11pm; Sat-Sun: 8am-5pm	M-F: 7am-8:30pm; Sat-Sun: 8am-5pm

**Previous Run (New Lighting Run):**

Annual kWh Usage: 1,439,677  
Annual kW Usage: 4,563  
Annual Therms Usage: 22,709

**Current Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 1,414,100  
Annual kW Usage: 4,581  
Annual Therms Usage: 20,011

**Savings (Upgrade Existing EMCS Savings):**

Annual kWh Savings: 25,577  
Annual kW Savings: -18  
Annual Therms Savings: 2,699

**Notes:**

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC ADMIN II BUILDING

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
HW Boilers	Equipment Type	Atmospheric Boiler (69% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 1,414,100  
Annual kW Usage: 4,581  
Annual Therms Usage: 20,011

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 1,422,959  
Annual kW Usage: 4,605  
Annual Therms Usage: 17,568

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -8,859  
Annual kW Savings: -24  
Annual Therms Savings: 2,443

**Notes:**

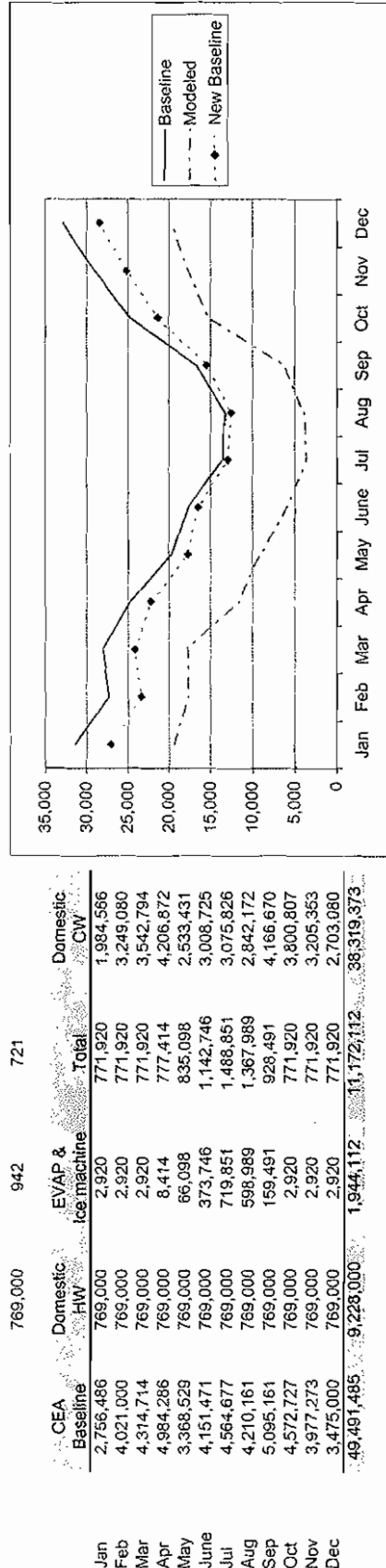
1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

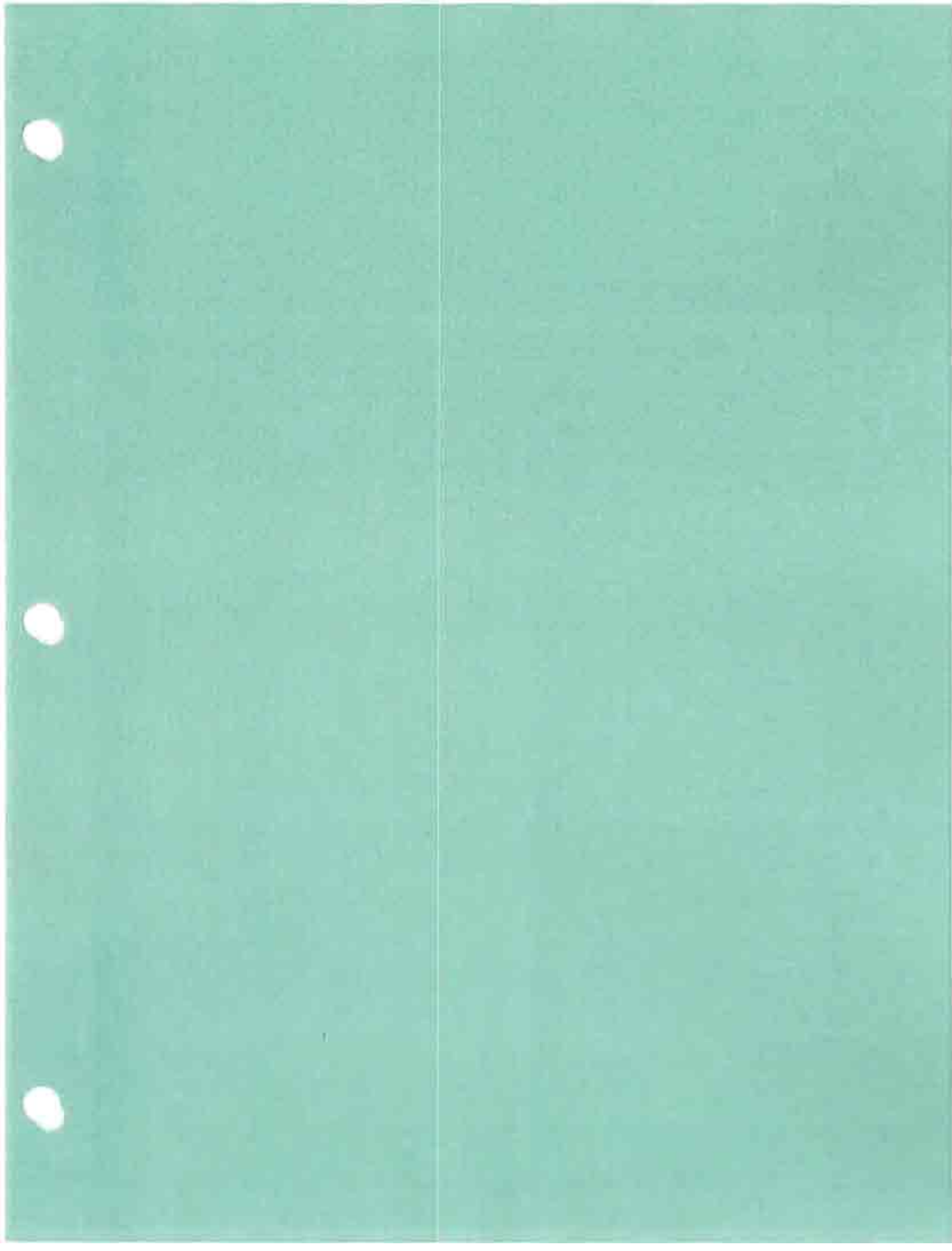
**Electric Savings Safety Factor:** 0.73

**Natural Gas Savings Safety Factor:** 0.73

Total Savings HHW	32,135	x Safety Factor of .73	yields	23,459 Therms
Total Savings DHW	222			

Grindrod Calculated	Multiplier <sub>1</sub>	LWT		EWT		Boiler Efficiency	Boiler Efficiency
Domestic	452,000	434	332	55	130	65%	85%
Laundry	197,000	316	241	55	180	65%	85%
Kitchen	120,000	192	147	55	180	65%	85%





### ***ECM 7– Install a New VFD on the Existing Exhaust Fan***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

#### Existing Condition to Warrant an ECM Opportunity:

The two main air handling systems (AH-3 and AH-4) at building 01-Administration Building are variable air volume (VAV) reheat systems. The supply fans on each unit are equipped with variable frequency drives (VFD's) that modulate the speed of the fan in accordance to the building's heating/cooling load. But, the exhaust/return fan on each unit is constant volume – it operates at 100% of its capacity at all times. The installation of a VFD on the exhaust/return fan shall enable the fan to operate in the same manner as the supply fan.

#### Savings Calculation Methodology:

The implementation of this ECM shall result in electrical savings. The first step in the savings calculation was to determine what the heating and cooling loads are for each air handling unit. These loads were calculated utilizing a Trane Trace building simulation model. Once the loads were calculated then the new exhaust/return fan energy (with the VFD installed) required at each load condition was calculated. The new fan energy consumption was then subtracted from the existing fan energy consumption.



### Install VFD on AH-3 Return/Exhaust Fan Savings Calculation

Total Run Hours (6am to 6:30pm, M-F): 3,259  
 % Total Cooling Run Hours: 0.49  
 % Total Heating Run Hours: 0.51

#### Cooling Period Electric Savings

Percent Design Load:	Capacity (Tons):	Run Hours (%):	Run Hours:	Exist. Fan kW:	New Fan kW:	kW Savings:	kWh Savings:
0 - 5	5.79	0	0	6.51	0.59	5.92	0
5 - 10	11.58	0	0	6.51	0.59	5.92	0
10 - 15	17.37	0	0	6.51	0.59	5.92	0
15 - 20	23.15	0	0	6.51	0.59	5.92	0
20 - 25	28.94	0	0	6.51	0.59	5.92	0
25 - 30	34.73	0	0	6.51	0.59	5.92	0
30 - 35	40.52	0	0	6.51	0.59	5.92	0
35 - 40	46.31	0	0	6.51	0.59	5.92	0
40 - 45	52.1	0	0	6.51	0.59	5.92	0
45 - 50	57.89	0	0	6.51	0.81	5.70	0
50 - 55	63.67	0	0	6.51	1.08	5.43	0
55 - 60	69.46	2	32	6.51	1.41	5.10	163
60 - 65	75.25	26	416	6.51	1.79	4.72	1,966
65 - 70	81.04	18	288	6.51	2.23	4.28	1,232
70 - 75	86.83	10	160	6.51	2.75	3.76	602
75 - 80	92.62	13	208	6.51	3.33	3.18	661
80 - 85	98.41	3	48	6.51	4.00	2.51	121
85 - 90	104.19	6	96	6.51	4.75	1.76	169
90 - 95	109.98	8	128	6.51	5.58	0.93	119
95 - 100	115.77	15	240	6.51	6.51	0.00	0

Total Cooling Period kWh Savings: 5,034

#### Heating Period Electric Savings

Percent Design Load:	Capacity (Btu/Hr):	Run Hours (%):	Run Hours:	Exist. Fan kW:	New Fan kW:	kW Savings:	kWh Savings:
0 - 5	-65,602	12	199	6.51	0.59	5.92	1,177
5 - 10	-131,204	7	116	6.51	0.59	5.92	687
10 - 15	-196,806	7	116	6.51	0.59	5.92	687
15 - 20	-262,408	15	249	6.51	0.59	5.92	1,472
20 - 25	-328,010	11	182	6.51	0.59	5.92	1,079
25 - 30	-393,612	10	166	6.51	0.59	5.92	981
30 - 35	-459,214	8	133	6.51	0.59	5.92	785
35 - 40	-524,817	5	83	6.51	0.59	5.92	491
40 - 45	-590,419	3	50	6.51	0.59	5.92	294
45 - 50	-656,021	2	33	6.51	0.81	5.70	189
50 - 55	-721,623	3	50	6.51	1.08	5.43	270
55 - 60	-787,225	0	0	6.51	1.41	5.10	0
60 - 65	-852,827	0	0	6.51	1.79	4.72	0
65 - 70	-918,429	0	0	6.51	2.23	4.28	0
70 - 75	-984,031	0	0	6.51	2.75	3.76	0
75 - 80	-1,049,633	1	17	6.51	3.33	3.18	53
80 - 85	-1,115,235	2	33	6.51	4.00	2.51	83
85 - 90	-1,180,837	0	0	6.51	4.75	1.76	0
90 - 95	-1,246,439	1	17	6.51	5.58	0.93	15
95 - 100	-1,312,041	12	199	6.51	6.51	0.00	0

Total Heating Period kWh Savings: 8,262

**TOTAL KWH SAVINGS: 13,296**

### Install VFD on AH-4 Return/Exhaust Fan Savings Calculation

Total Run Hours (6am to 6:30pm, M-F): 3,259  
 % Total Cooling Run Hours: 0.49  
 % Total Heating Run Hours: 0.51

#### Cooling Period Electric Savings

Percent Design Load:	Capacity (Tons):	Run Hours (%):	Run Hours:	Exist. Fan kW:	New Fan kW:	kW Savings:	kWh Savings:
0 - 5	4.86	0	0	6.51	0.59	5.92	0
5 - 10	9.72	0	0	6.51	0.59	5.92	0
10 - 15	14.57	0	0	6.51	0.59	5.92	0
15 - 20	19.43	0	0	6.51	0.59	5.92	0
20 - 25	24.29	0	0	6.51	0.59	5.92	0
25 - 30	29.15	0	0	6.51	0.59	5.92	0
30 - 35	34.01	0	0	6.51	0.59	5.92	0
35 - 40	38.87	0	0	6.51	0.59	5.92	0
40 - 45	43.72	0	0	6.51	0.59	5.92	0
45 - 50	48.58	0	0	6.51	0.81	5.70	0
50 - 55	53.44	0	0	6.51	1.08	5.43	0
55 - 60	58.3	1	16	6.51	1.41	5.10	82
60 - 65	63.16	23	371	6.51	1.79	4.72	1,750
65 - 70	68.02	12	193	6.51	2.23	4.28	827
70 - 75	72.87	13	209	6.51	2.75	3.76	788
75 - 80	77.73	7	113	6.51	3.33	3.18	358
80 - 85	82.59	9	145	6.51	4.00	2.51	364
85 - 90	87.45	3	48	6.51	4.75	1.76	85
90 - 95	92.31	9	145	6.51	5.58	0.93	134
95 - 100	97.16	23	371	6.51	6.51	0.00	0

Total Cooling Period kWh Savings: 4,389

#### Heating Period Electric Savings

Percent Design Load:	Capacity (Btu/Hr):	Run Hours (%):	Run Hours:	Exist. Fan kW:	New Fan kW:	kW Savings:	kWh Savings:
0 - 5	-54,819	5	82	6.51	0.59	5.92	487
5 - 10	-109,639	7	115	6.51	0.59	5.92	682
10 - 15	-164,458	11	181	6.51	0.59	5.92	1,072
15 - 20	-219,277	15	247	6.51	0.59	5.92	1,462
20 - 25	-274,096	18	297	6.51	0.59	5.92	1,755
25 - 30	-328,916	12	198	6.51	0.59	5.92	1,170
30 - 35	-383,735	6	99	6.51	0.59	5.92	585
35 - 40	-438,554	3	49	6.51	0.59	5.92	292
40 - 45	-493,374	1	16	6.51	0.59	5.92	97
45 - 50	-548,193	3	49	6.51	0.81	5.70	282
50 - 55	-603,012	0	0	6.51	1.08	5.43	0
55 - 60	-657,831	1	16	6.51	1.41	5.10	84
60 - 65	-712,651	0	0	6.51	1.79	4.72	0
65 - 70	-767,470	2	33	6.51	2.23	4.28	141
70 - 75	-822,289	1	16	6.51	2.75	3.76	62
75 - 80	-877,109	1	16	6.51	3.33	3.18	52
80 - 85	-931,928	0	0	6.51	4.00	2.51	0
85 - 90	-986,747	0	0	6.51	4.75	1.76	0
90 - 95	-1,041,566	0	0	6.51	5.58	0.93	0
95 - 100	-1,096,386	14	231	6.51	6.51	0.00	0

Total Heating Period kWh Savings: 8,226

**TOTAL KWH SAVINGS: 12,615**

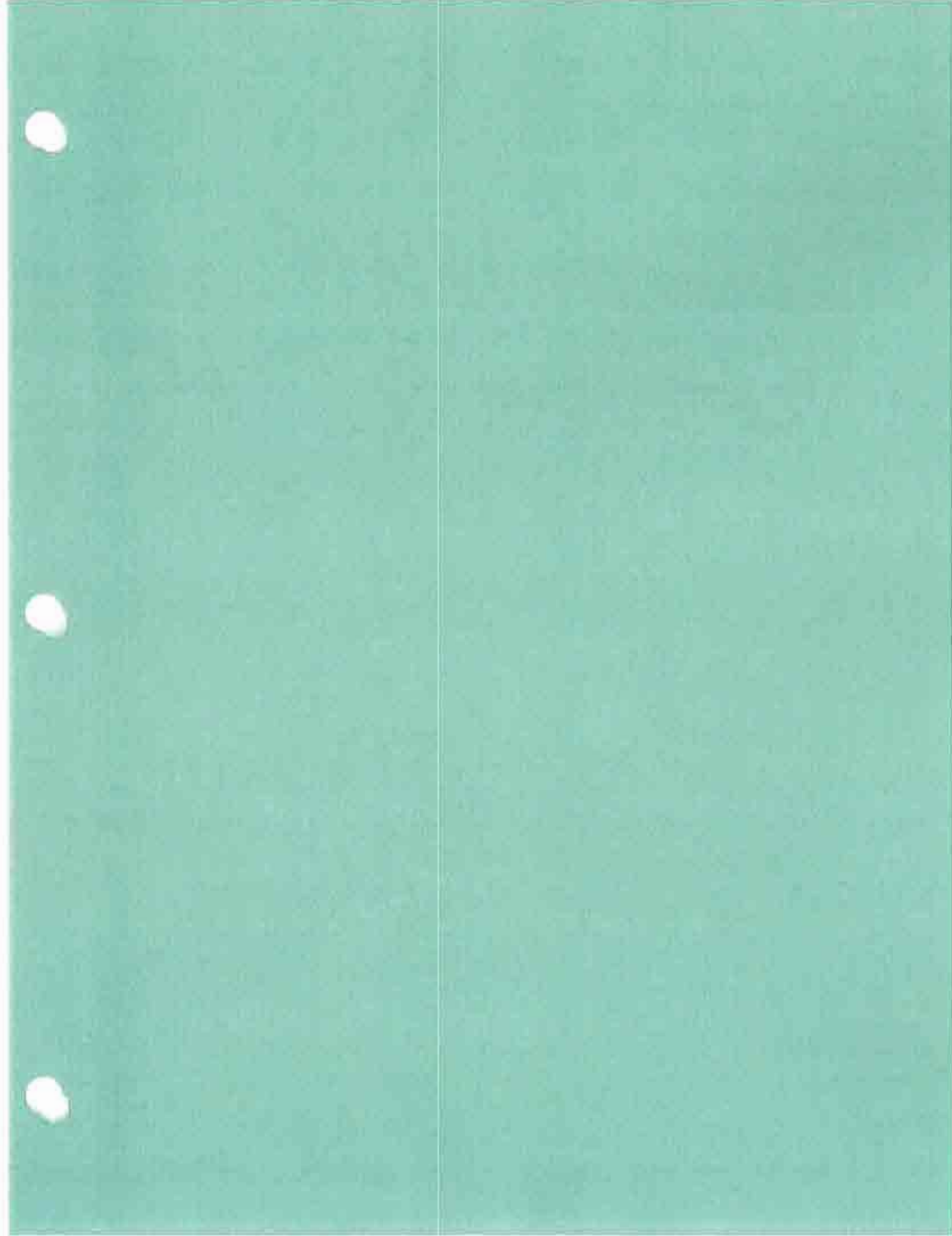
Trane Trace Load Profiles Used to Calculate Return/Exhaust Fan VFD Savings at Admin I

AH-3 Htg. & Clg. Load Profile

Percent	---- Cooling Load ----	----- Heating Load -----	----- Cooling Airflow -----	----- Heating Design -----	Cap.
0 - 5	5.8	0	270	0	0
5 - 10	11.6	-131,204.1	171	0.0	0
10 - 15	17.4	-196,806.2	133	0.0	0
15 - 20	23.2	-262,408.3	254	0.0	0
20 - 25	28.9	-328,010.3	187	0.0	0
25 - 30	34.7	-393,612.4	176	0.0	0
30 - 35	40.5	-459,214.4	64	0.0	0
35 - 40	46.3	-524,816.5	154	0.0	0
40 - 45	52.1	-590,418.6	8	0.0	0
45 - 50	57.9	-656,020.6	33	0.0	0
50 - 55	63.7	-721,622.7	4	0.0	0
55 - 60	69.5	-787,224.8	0	0.0	0
60 - 65	75.3	-852,826.8	1	0.0	0
65 - 70	81.0	-918,428.9	17	0.0	0
70 - 75	86.8	-984,030.9	3	0.0	0
75 - 80	92.6	-1,049,633.0	36	2,948	0
80 - 85	98.4	-1,115,235.1	20	30	0
85 - 90	104.2	-1,180,837.1	24	15	0
90 - 95	110.0	-1,246,439.3	0	19	0
95 - 100	115.8	-1,312,041.3	305	277	0
Hours Off	0.0	0.0	6,885	5,471	8,760

AH-4 Htg. & Clg. Load Profile

Percent	---- Cooling Load ----	----- Heating Load -----	----- Cooling Airflow -----	----- Heating Design -----	Cap.
0 - 5	4.9	-54,819.3	111	0	0
5 - 10	9.7	-109,638.6	89	0.0	0
10 - 15	14.6	-164,457.8	178	0.0	0
15 - 20	19.4	-219,277.1	238	0.0	0
20 - 25	24.3	-274,096.4	269	0.0	0
25 - 30	29.2	-328,915.7	203	0.0	0
30 - 35	34.0	-383,735.0	87	0.0	0
35 - 40	38.9	-438,554.3	44	0.0	0
40 - 45	43.7	-493,373.5	16	0.0	0
45 - 50	48.6	-548,192.8	21	0.0	0
50 - 55	53.4	-603,012.1	3	0.0	0
55 - 60	58.3	-657,831.4	36	0.0	0
60 - 65	63.2	-712,650.7	16	0.0	0
65 - 70	68.0	-767,469.9	21	0.0	0
70 - 75	72.9	-822,289.3	0	0.0	0
75 - 80	77.7	-877,108.5	0	0.0	0
80 - 85	82.6	-931,927.8	0	0.0	0
85 - 90	87.5	-986,747.1	24	2,889	0
90 - 95	92.3	-1,041,566.4	0	56	0
95 - 100	97.2	-1,096,385.6	17	30	0
Hours Off	0.0	0.0	7,098	314	-760



### ***ECM 8 – Install a VFD on Existing Vane Axial Fan***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

#### Existing Condition to Warrant an ECM Opportunity:

The two main air handling systems (AHU-1 and AHU-2) at building 35-ACJC Courthouse are variable air volume (VAV) reheat systems. The supply and return fans on each unit are vane axial fans that modulate the airflow in accordance to the building's heating/cooling load. These two air handling systems are also equipped with evaporative heat recovery systems. The coils and evaporative cooling pads in the heat recovery system have "scaled up" so bad that the fans have to operate at nearly 100% of their capacity at all times in order to provide enough air pressure to deliver the appropriate amount of air. The maintenance staff has recently cleaned up the heat recovery system so that the fans don't have to operate at 100% capacity at all times anymore. This ECM concerns recognizing the energy savings that have resulted from the cleaning of the coils and pads. Also, a VFD shall be installed on each fan motor and the existing vanes shall be locked in the 100% open position.

#### Savings Calculation Methodology:

The implementation of this ECM shall result in electrical savings. The first step in the savings calculation was to determine what the heating and cooling loads are for each air handling unit. These loads were calculated utilizing a Trane Trace building simulation model. Once the loads were calculated then the new supply and return fan energy (with the VFD installed) required at each load condition was calculated. The new fan energy consumption was then subtracted from the existing fan energy consumption.

# Install VFD on AHU-1 Supply/Return Fan Savings Calculation

Total Run Hours (5am to 9:30pm, M-F, 8am-5pm): 4,849  
 % Total Cooling Run Hours: 0.34  
 % Total Heating Run Hours: 0.66

## Supply Fan Cooling Period Electric Savings

Percent Design Load:	Capacity (Tons):	Run Hours (%)	Run Hours	Exist. SF Max kW:	Exist. SF kW:	New SF kW:	SF kW Savings:	Supply Fan kWh Savings:	Exist. RF kW:	Exist. RF kW:	RF kW Savings:	Return Fan kWh Savings:
0-5	4.67	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
5-10	9.34	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
10-15	14	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
15-20	18.67	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
20-25	23.34	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
25-30	28.01	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
30-35	32.68	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
35-40	37.34	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
40-45	42.01	0	0	61.48	39.35	5.60	33.75	0	18.86	13.62	172	11.91
45-50	46.68	0	0	61.48	39.35	7.69	31.66	0	18.86	13.62	235	11.27
50-55	51.35	0	0	61.48	39.35	10.23	29.12	0	18.86	13.62	3.14	10.49
55-60	56.01	1	16	61.48	39.35	13.28	26.07	425	18.86	13.62	4.07	9.55
60-65	60.68	5	81	61.48	39.35	16.88	22.47	1,829	18.86	13.62	5.18	8.45
65-70	65.35	11	179	61.48	39.35	21.09	18.26	3,271	18.86	13.62	6.47	7.16
70-75	70.02	46	749	61.48	39.35	25.94	13.41	10,046	18.86	13.62	7.96	5.67
75-80	74.69	16	261	61.48	39.35	31.48	7.87	2,050	18.86	13.62	9.66	3.97
80-85	79.35	6	130	61.48	44.41	37.75	6.66	868	18.86	13.62	11.58	2.04
85-90	84.02	3	49	61.48	49.79	44.81	4.98	243	18.86	15.28	13.75	1.53
90-95	88.69	3	49	61.48	55.48	52.71	2.78	136	18.86	17.02	16.17	0.65
95-100	93.36	7	114	61.48	61.48	61.48	0.00	0	18.86	18.86	18.86	0.00
Total Cooling Period kWh Savings:												7,786
Total Cooling Period kWh Savings:												18,868

## Heating Period Electric Savings

Percent Design Load:	Capacity (Btu/HR):	Run Hours (%)	Run Hours	Exist. SF Max kW:	Exist. SF kW:	New Fan kW:	kW Savings:	Supply Fan kWh Savings:	Exist. RF kW:	Exist. RF kW:	RF kW Savings:	Return Fan kWh Savings:
0-5	-68,871	9	290	61.48	39.35	5.60	33.74	9,782	18.86	13.63	172	11.91
5-10	-137,743	9	290	61.48	39.35	5.60	33.74	9,782	18.86	13.63	172	11.91
10-15	-206,614	10	322	61.48	39.35	5.60	33.74	10,886	18.86	13.63	172	11.91
15-20	-275,486	11	354	61.48	39.35	5.60	33.74	11,956	18.86	13.63	172	11.91
20-25	-344,357	14	451	61.48	39.35	5.60	33.74	15,217	18.86	13.63	172	11.91
25-30	-413,229	9	290	61.48	39.35	5.60	33.74	9,782	18.86	13.63	172	11.91
30-35	-482,100	4	129	61.48	39.35	5.60	33.74	4,349	18.86	13.63	172	11.91
35-40	-550,971	7	225	61.48	39.35	5.60	33.74	7,603	18.86	13.63	172	11.91
40-45	-619,843	5	161	61.48	39.35	5.60	33.74	5,435	18.86	13.63	172	11.91
45-50	-688,714	5	161	61.48	39.35	7.69	31.66	5,099	18.86	13.63	236	11.27
50-55	-757,586	1	32	61.48	39.35	10.23	29.12	938	18.86	13.63	3.14	10.49
55-60	-826,457	1	32	61.48	39.35	13.28	26.07	840	18.86	13.63	4.07	9.55
60-65	-895,328	2	64	61.48	39.35	16.88	22.46	1,447	18.86	13.63	5.18	8.45
65-70	-964,200	1	32	61.48	39.35	21.09	18.26	568	18.86	13.63	6.47	7.16
70-75	-1,033,071	0	0	61.48	39.35	25.94	13.41	0	18.86	13.63	7.96	5.67
75-80	-1,101,943	1	32	61.48	39.35	31.48	7.87	253	18.86	13.63	9.66	3.97
80-85	-1,170,814	1	32	61.48	44.42	37.76	6.66	215	18.86	13.63	11.58	2.04
85-90	-1,239,686	0	0	61.48	49.80	44.82	4.98	0	18.86	15.28	13.75	1.53
90-95	-1,308,557	10	322	61.48	55.49	52.71	2.77	894	18.86	17.02	16.17	0.85
95-100	-1,377,428	0	0	61.48	61.48	61.48	0.00	0	18.86	18.86	18.86	0.00
Total Heating Period kWh Savings:												33,620
Total Heating Period kWh Savings:												95,054

TOTAL KWH SAVINGS FOR AHU-1: 155,328

# Install VFD on AHU-2 Supply/Return Fan Savings Calculation

Total Run Hours (5am to 9:30pm, M-F, 8am-5pm): 4,849  
 % Total Cooling Run Hours: 0.33  
 % Total Heating Run Hours: 0.67

## Cooling Period Electric Savings

Percent Design Load:	Capacity (Tons):	Run Hours (%)	Run Hours	Exist. SF Max kW:	Exist. SF kW:	New SF kW:	kW Savings:	Supply Fan kWh Savings:	Exist. RF Max kW:	Exist. RF kW:	RF kW Savings:	RF kW Savings:	Return Fan kWh Savings:
0 - 5	4.94	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
5 - 10	9.88	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
10 - 15	14.82	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
15 - 20	19.75	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
20 - 25	24.69	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
25 - 30	29.63	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
30 - 35	34.57	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
35 - 40	39.51	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
40 - 45	44.45	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
45 - 50	49.39	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
50 - 55	54.32	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
55 - 60	59.26	0	0	61.48	44.41	5.60	38.81	0	18.86	13.62	1.72	11.91	0
60 - 65	64.2	2	32	61.48	44.41	16.88	27.53	883	18.86	13.62	5.18	8.45	271
65 - 70	69.14	2	32	61.48	44.41	21.09	23.33	748	18.86	13.62	6.47	7.16	230
70 - 75	74.08	7	112	61.48	44.41	25.94	18.48	2,075	18.86	13.62	7.96	5.67	636
75 - 80	79.02	19	305	61.48	44.41	31.48	12.93	3,942	18.86	13.62	9.66	3.97	1,209
80 - 85	83.95	34	545	61.48	44.41	37.75	6.66	3,635	18.86	13.62	11.58	2.04	1,115
85 - 90	88.89	16	257	61.48	49.80	44.81	4.98	1,276	18.86	15.28	13.75	1.53	392
90 - 95	93.83	7	112	61.48	55.48	52.71	2.78	312	18.86	17.02	16.17	0.85	96
95 - 100	98.77	12	192	61.48	61.48	61.48	0.00	0	18.86	18.86	18.86	0.00	0
Total Cooling Period kWh Savings:													3,949

## Heating Period Electric Savings

Percent Design Load:	Capacity (Tons):	Run Hours (%)	Run Hours	Exist. SF Max kW:	Exist. SF kW:	New SF kW:	kW Savings:	Supply Fan kWh Savings:	Exist. RF Max kW:	Exist. RF kW:	RF kW Savings:	RF kW Savings:	Return Fan kWh Savings:
0 - 5	54.819	5	162	61.48	44.42	5.60	38.82	6,298	18.86	13.63	1.72	11.91	1,932
5 - 10	109.639	7	227	61.48	44.42	5.60	38.82	8,816	18.86	13.63	1.72	11.91	2,705
10 - 15	164.458	11	357	61.48	44.42	5.60	38.82	13,056	18.86	13.63	1.72	11.91	4,251
15 - 20	219.277	15	487	61.48	44.42	5.60	38.82	18,995	18.86	13.63	1.72	11.91	5,795
20 - 25	274.096	18	584	61.48	44.42	5.60	38.82	22,674	18.86	13.63	1.72	11.91	6,956
25 - 30	328.916	12	369	61.48	44.42	5.60	38.82	15,116	18.86	13.63	1.72	11.91	4,637
30 - 35	383.735	6	185	61.48	44.42	5.60	38.82	7,558	18.86	13.63	1.72	11.91	2,319
35 - 40	438.554	3	97	61.48	44.42	5.60	38.82	3,779	18.86	13.63	1.72	11.91	1,159
40 - 45	493.374	1	32	61.48	44.42	5.60	38.82	1,260	18.86	13.63	1.72	11.91	386
45 - 50	548.193	3	97	61.48	44.42	7.69	36.73	3,576	18.86	13.63	2.36	11.27	1,097
50 - 55	603.012	0	0	61.48	44.42	10.23	34.19	0	18.86	13.63	3.14	10.49	0
55 - 60	657.831	1	32	61.48	44.42	13.28	31.14	1,011	18.86	13.63	4.07	9.55	310
60 - 65	712.651	0	0	61.48	44.42	16.88	27.54	0	18.86	13.63	5.18	8.45	0
65 - 70	767.470	2	65	61.48	44.42	21.09	23.33	1,514	18.86	13.63	6.47	7.16	465
70 - 75	822.289	1	32	61.48	44.42	25.94	18.48	600	18.86	13.63	7.96	5.67	184
75 - 80	877.109	1	32	61.48	44.42	31.48	12.94	420	18.86	13.63	9.66	3.97	129
80 - 85	931.928	0	0	61.48	44.42	37.76	6.66	0	18.86	13.63	11.58	2.04	0
85 - 90	986.747	0	0	61.48	49.80	44.82	4.98	0	18.86	15.28	13.75	1.53	0
90 - 95	1,041.566	0	0	61.48	55.49	52.71	2.77	0	18.86	17.02	16.17	0.85	0
95 - 100	1,096.386	13	422	61.48	61.48	61.48	0.00	0	18.86	18.86	18.86	0.00	0
Total Heating Period kWh Savings:													32,325

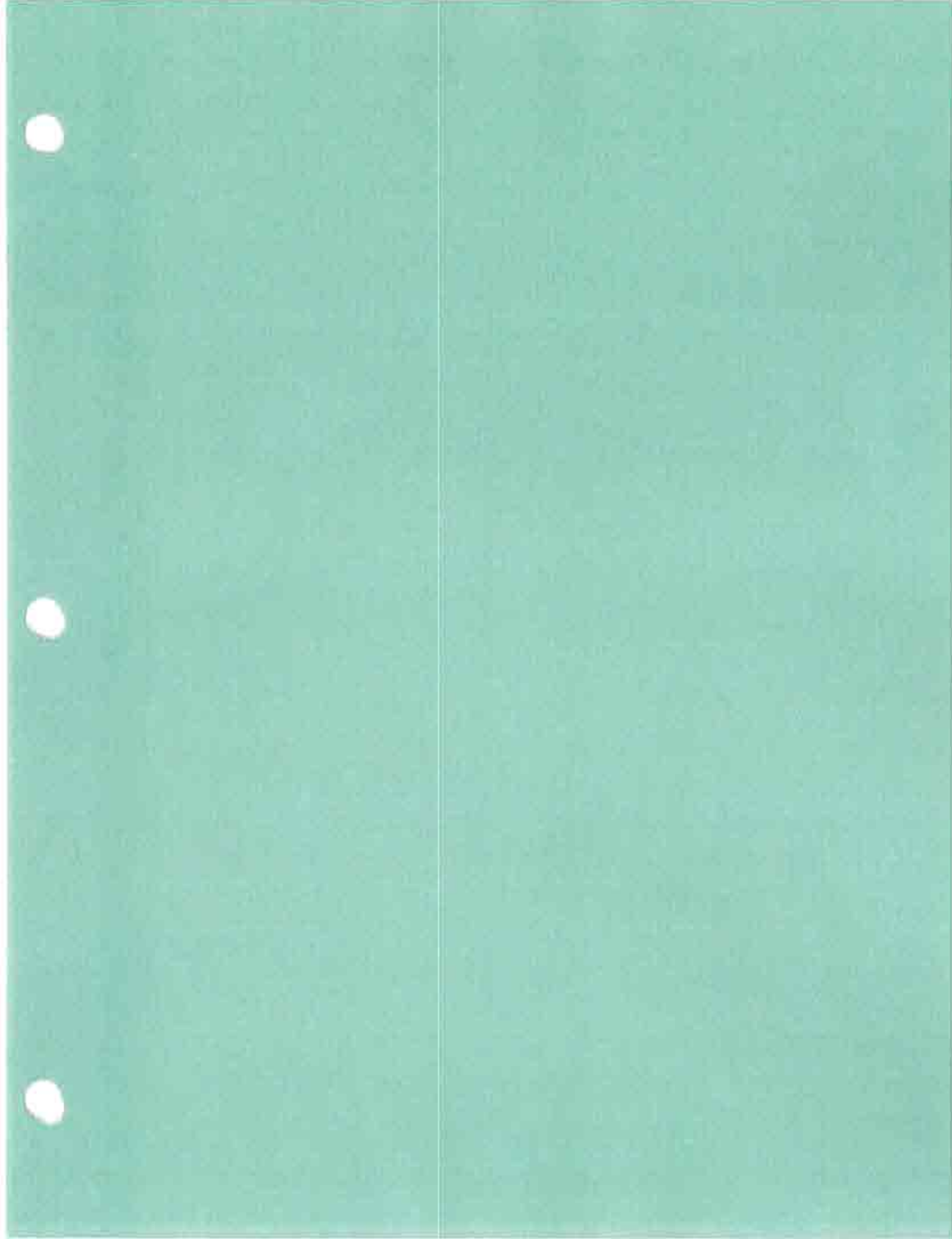
TOTAL KWH SAVINGS FOR AHU-2: 154,521

# Trane Trace Load Profiles for AHU-1 & AHU-2 at the ACJC Courthouse

## AHU-1 Htg. & Clg. Load Profile

Percent Design Load	---- Cooling Load ----			---- Heating Load ----			---- Cooling Airflow ---			---- Heating Airflow----		
	Cap. (Tons)	Hours (%)	Hours	Cap. (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	4.67	0	0	-68871.42	9	320	4632.72	0	0	1309.43	8	293
5 - 10	9.34	0	0	-137742.84	9	339	9265.45	0	0	2618.87	9	327
10 - 15	14	0	0	-206614.27	10	354	13898.17	0	0	3928.3	10	352
15 - 20	18.67	0	0	-275485.69	11	393	18530.89	0	0	5237.74	7	270
20 - 25	23.34	0	0	-344357.09	14	505	23163.62	0	0	6547.17	12	457
25 - 30	28.01	0	0	-413228.53	9	342	27796.34	0	0	7856.61	11	393
30 - 35	32.68	0	0	-482099.94	4	151	32429.06	0	0	9166.04	8	288
35 - 40	37.34	0	0	-550971.38	7	251	37061.79	0	0	10475.48	5	166
40 - 45	42.01	0	0	-619842.75	5	164	41694.51	0	0	11784.91	6	208
45 - 50	46.68	0	0	-688714.19	5	184	46327.23	0	0	13094.35	5	170
50 - 55	51.35	0	0	-757585.62	1	44	50959.96	0	0	14403.78	3	127
55 - 60	56.01	1	22	-826457.06	1	32	55592.68	0	0	15713.22	1	31
60 - 65	60.68	5	87	-895328.44	2	60	60225.41	0	0	17022.65	1	32
65 - 70	65.35	11	193	-964199.88	1	31	64858.13	0	0	18332.09	2	60
70 - 75	70.02	46	851	-1033071.31	0	12	69490.85	0	0	19641.52	1	31
75 - 80	74.69	16	294	-1101942.75	1	38	74123.58	0	0	20950.96	0	12
80 - 85	79.35	8	154	-1170814.12	1	19	78756.3	93	4483	22260.39	1	38
85 - 90	84.02	3	56	-1239685.5	0	18	83389.02	2	80	23569.83	1	19
90 - 95	88.69	3	49	-1308557	10	365	88021.75	2	81	24879.26	0	8
95 - 100	93.36	7	125	-1377428.37	0	0	92654.47	3	159	26188.7	10	375
Hours Off	0	0	6929	0	0	5138	0	0	3957	0	0	5103
			1,831			3,622						
						5,453						





### ***ECM 10-- Install an A/C Unit to Serve Computer Equipment Room***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

#### Existing Condition to Warrant an ECM Opportunity:

Currently, there are multiple computer equipment rooms located throughout building 37-ACJC Administrative II that require cooling 24 hours a day, seven days a week. So, two of the building's main air handling units (AHU-3 and AHU-5) have to operate at all times in order to provide cooling to these rooms. The installation of individual A/C units to serve each room will eliminate the need to operate the two main air handling systems 24 hours a day, seven days a week.

#### Savings Calculation Methodology:

The implementation of this ECM shall result in both electrical and natural gas savings. Two different Trane Trace building energy simulation models were developed to calculate the energy savings for this ECM. The first model was developed to reflect the existing energy used by AHU-3 and AHU-5 to provide cooling to the computer equipment rooms at all times. The second model was created to reflect the energy used by individual A/C units (air-cooled, split systems) to provide cooling to the computer equipment rooms. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings.

Figure 1

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	149,668	117,519 21%
Feb	123,955	106,449 14%
Mar	137,823	125,967 9%
Apr	166,962	120,398 28%
May	183,024	150,964 18%
Jun	185,588	161,275 13%
Jul	204,313	170,641 16%
Aug	202,649	178,772 12%
Sep	187,481	141,905 24%
Oct	170,057	141,498 17%
Nov	153,399	115,011 25%
Dec	152,731	111,523 27%
	2,017,650	1,641,920 19%

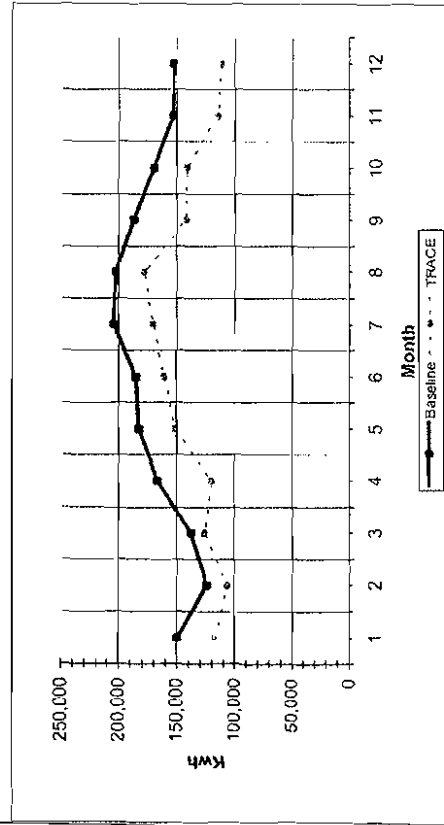
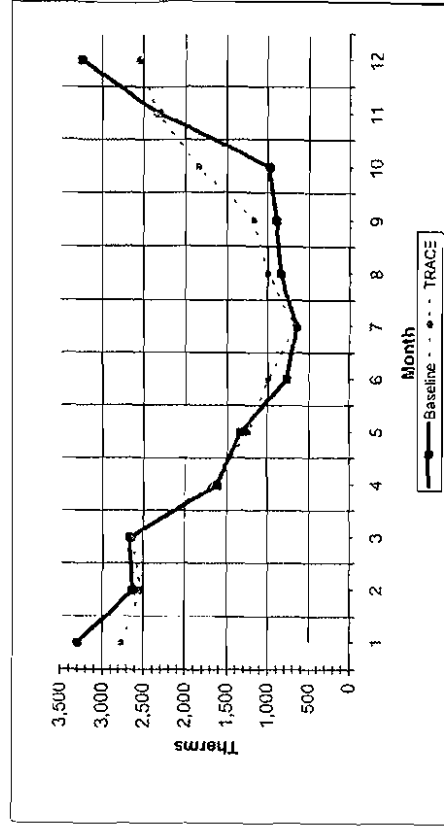


Figure 2

Arapahoe County - ACJC Admin II Building  
Computer Model Calibration for Natural Gas

NATURAL GAS USAGE (Therms)		
Month	BASELINE	MODEL
Jan	3,292	2,762 16%
Feb	2,623	2,527 4%
Mar	2,661	2,629 1%
Apr	1,611	1,677 -4%
May	1,342	1,242 7%
Jun	773	1,001 -30%
Jul	650	672 -3%
Aug	841	999 -19%
Sep	897	1,175 -31%
Oct	977	1,842 -89%
Nov	2,320	2,343 -1%
Dec	3,238	2,547 21%
	21,225	21,417 -1%



# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - Match Run

Utility Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec Total

Electric

On-Pk Cons. (kWh) 117,519 106,449 125,967 120,398 150,964 161,275 170,641 178,772 141,905 141,498 115,011 111,523 1,641,920

530

On-Pk Demand (kW)

370 371

363

420

455

470

530

508

478

446

349

349

Gas

On-Pk Cons. (therms)  
On-Pk Demand (therms/hr)

2,762 12

2,527 12

2,629 11

1,677 10

1,242 9

1,001 9

672 7

999 9

1,175 9

1,842 10

2,343 10

2,547 12

21,417 12

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

95,541 Btu/(ft2-year)  
235,198 Btu/(ft2-year)  
81,071 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - Lighting Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	103,095	93,293	110,380	103,857	132,054	140,854	152,364	156,782	124,987	123,969	100,353	97,688	1,439,677
On-Pk Demand (kW)	330	331	330	369	404	418	477	455	427	391	309	323	477
<b>Gas</b>													
On-Pk Cons. (therms)	2.888	2.646	2.781	1.803	1.335	1.077	724	1,079	1,261	1,963	2,476	2,675	22,709
On-Pk Demand (therms/hr)	13	13	12	10	10	9	9	9	9	10	11	12	13
Building Energy Consumption =			88,621	Btu/(ft2-year)									
Source Energy Consumption =			211,331	Btu/(ft2-year)									
Floor Area =			81,071	ft2									

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - EMCS Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	101,636	91,993	108,591	102,210	128,575	137,751	150,090	154,105	121,916	122,297	98,669	96,267	1,414,100
On-Pk Demand (kW)	330	331	330	370	404	426	476	458	427	396	309	323	476
Gas													
On-Pk Cons. (therms)	2,685	2,462	2,516	1,558	1,087	852	580	841	1,041	1,696	2,227	2,465	20,011
On-Pk Demand (therms/hr)	12	13	12	10	7	6	5	6	8	10	11	12	13
Building Energy Consumption =													
Source Energy Consumption =													
Floor Area =													

84,215 Btu/(ft2-year)  
204,596 Btu/(ft2-year)  
81,071 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - New Boiler Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	102,620	92,871	109,497	102,881	129,228	138,360	150,581	154,695	122,547	123,036	99,480	97,162	1,422,959
On-Pk Demand (kW)	333	333	332	373	406	428	476	458	430	399	311	325	476
<b>Gas</b>													
On-Pk Cons. (therms)	2,353	2,157	2,206	1,368	957	752	514	743	916	1,489	1,953	2,160	17,568
On-Pk Demand (therms/hr)	11	11	10	9	6	5	4	5	7	8	9	11	11
<b>Building Energy Consumption =</b>													
<b>Source Energy Consumption =</b>													
<b>Floor Area =</b>													
			81,575	81,575	81,575	81,575	81,575	81,575	81,575	81,575	81,575	81,575	81,575
			202,544	202,544	202,544	202,544	202,544	202,544	202,544	202,544	202,544	202,544	202,544
			81,071	81,071	81,071	81,071	81,071	81,071	81,071	81,071	81,071	81,071	81,071

# MONTHLY ENERGY CONSUMPTION

By Release 2.007

Alternative: 1 ACJC Admin II - New A/C Unit Run

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	101,970	92,318	109,079	100,610	122,947	131,522	137,542	145,021	114,520	120,309	99,115	96,496	1,371,450
On-Pk Demand (kW)	338	338	337	368	407	441	488	465	425	385	317	330	488
<b>Gas</b>													
On-Pk Cons. (therms)	2,154	1,978	1,989	1,075	590	406	202	389	593	1,188	1,782	1,995	14,341
On-Pk Demand (therms/hr)	10	11	10	9	6	5	3	4	6	8	9	10	11
<b>Building Energy Consumption =</b>													
Source Energy Consumption =	75,427 Btu/(ft2-year)												
Floor Area =	191,848 Btu/(ft2-year)												
	81,071 ft2												



## MODELING NOTES

### ARAPAHOE COUNTY - ACJC ADMIN II BUILDING

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AHU-1	Fan Schedule	M-F: 7am-10:30pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-2	Fan Schedule	M-F: 5:30am-10:30pm; Sat-Sun: OFF	M-F: 5:30am-8:30pm; Sat-Sun: OFF
AHU-4	Fan Schedule	M-F: 7am-10:45pm; Sat-Sun: OFF	M-F: 7am-8:30pm; Sat-Sun: OFF
AHU-6	Fan Schedule	M-F: 7am-11pm; Sat-Sun: 8am-5pm	M-F: 7am-8:30pm; Sat-Sun: 8am-5pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 1,439,677  
Annual kW Usage: 4,563  
Annual Therms Usage: 22,709

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 1,414,100  
Annual kW Usage: 4,581  
Annual Therms Usage: 20,011

#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 25,577  
Annual kW Savings: -18  
Annual Therms Savings: 2,699

#### Notes:

1. The negative kW savings is the result of the chiller have to work harder in the mornings due to the schedule change. These negative savings shall not be accounted for since the upgraded EMCS shall cool each space down gradually without having to "overload" the chillers in the morning.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC ADMIN II BUILDING

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
HW Boilers	Equipment Type	Atmospheric Boiler (69% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 1,414,100  
Annual kW Usage: 4,581  
Annual Therms Usage: 20,011

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 1,422,959  
Annual kW Usage: 4,605  
Annual Therms Usage: 17,568

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -8,859  
Annual kW Savings: -24  
Annual Therms Savings: 2,443

**Notes:**

1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC ADMIN II BUILDING

ECM Run: Install an A/C Unit to Serve the Computer Equipment Room

Fan System/Clg. Equip.	Item Changed	Previous Run Input	Current Run Input
Rm 6 - AHU-3	Cooling Driftpoint	72	90
Rm 8 - AHU-5	Cooling Driftpoint	72	90
Create A New Fan System	System Type Fan Cycling Schedule Fan Schedule	None None None	Computer Room Unit Cycle With Cooling Loads Only Available (100%)
ASSIGN ROOMS 2 & 3 TO THE NEW COMPUTER ROOM UNIT FAN SYSTEM			
AHU-3	Fan Schedule	24 Hours/Day, 7 Days/Week	M-F: 5am-8:30pm; Sat-Sun: OFF
AHU-5	Fan Schedule	24 Hours/Day, 7 Days/Week	M-F: 5am-8:30pm; Sat-Sun: OFF
Create A New Clg. Plant	Equip. Type/Category Energy Rate	None None	Air-Cooled Unitary 1.237 kW/Ton
ASSIGN THE CLG COIL FOR THE NEW COMPUTER ROOM UNIT TO THIS CLG PLANT			

**Previous Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 1,422,959  
 Annual kW Usage: 4,605  
 Annual Therms Usage: 17,568

**Current Run (Install New A/C Units Run):**

Annual kWh Usage: 1,371,450  
 Annual kW Usage: 4,638  
 Annual Therms Usage: 14,341

**Savings (Install New A/C Units Savings):**

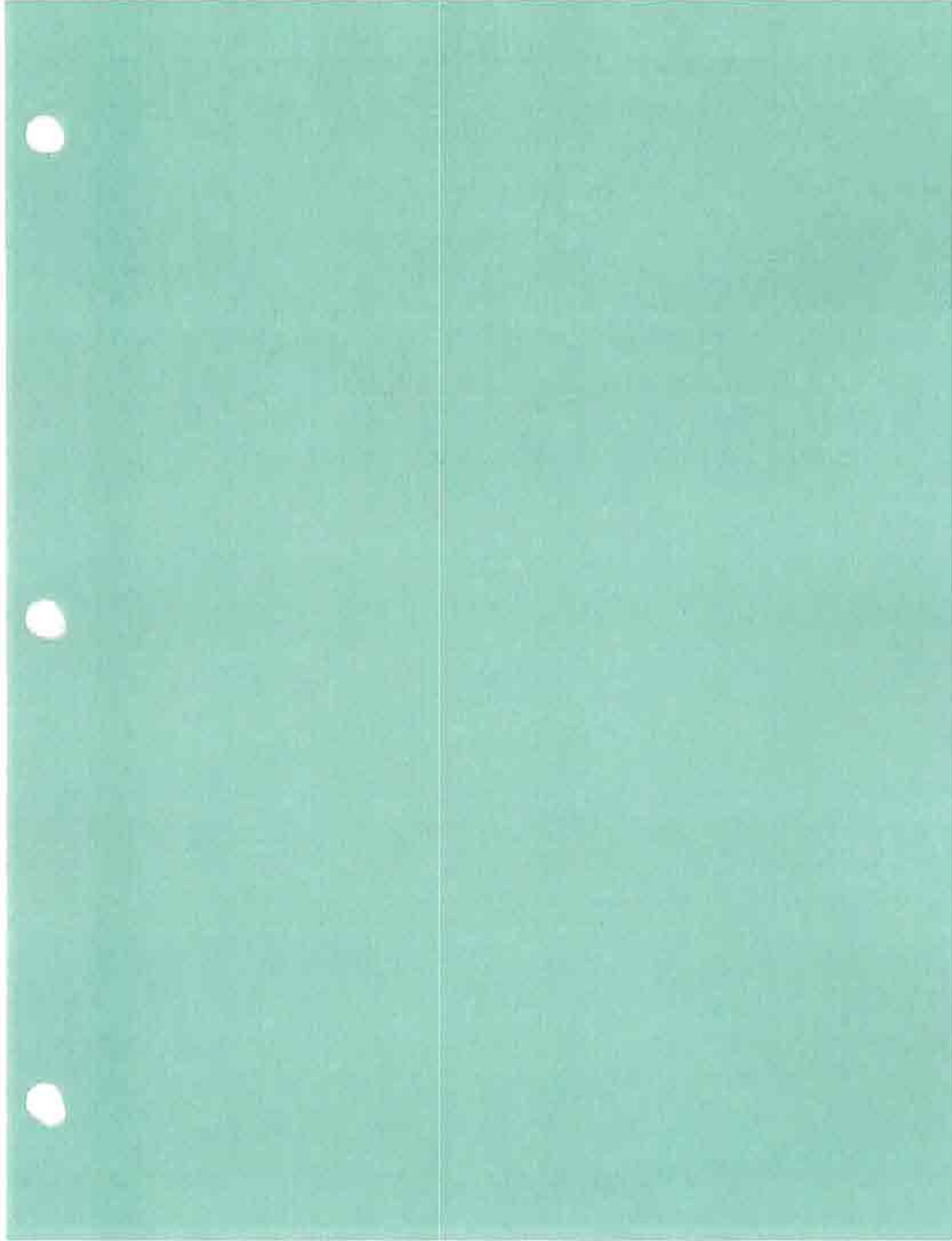
Annual kWh Savings: 51,509  
 Annual kW Savings: -34  
 Annual Therms Savings: 3,227

**Notes:**

1. The negative kW savings is the energy used by the new A/C units.

**Electric Savings Safety Factor:** 0.73

**Natural Gas Savings Safety Factor:** 0.73



## **ECM 12 – Install Water Softener**

Buildings Included –

- ✓ ACJC Administration II
- ✓ ACJC Detention Center
- ✓ ACJC Courthouse

Spreadsheet savings used (see attached).

For the Justice Center (ACJC Courthouse) the building water usage was modeled. The modeling notes can be seen in the ECM 2 section.

The two penthouse air handlers utilize indirect and direct evaporative heat recovery system as well as a direct evaporative cooling section. Cooling is supplemented with a chilled water cooling system that utilizes a cooling tower. The heat recovery system has never worked correctly in either air handler. The hard water has clogged the direct side media with so much mineral the pads have virtually turned to stone. On the indirect side the nozzles have corroded and leaked over the years making this system use an abundance of water. This recovery coils have so much mineral in them it has restricted air flow through them. The maintenance staff has been forced to open the service doors to allow air pressure to be relieved. The heat recovery system has been disabled as of last fall and water usage has plummeted.

The cooling tower has been operating on a 1.7 cycle or virtually a once through water vessel (as confirmed through the service representative). The bleed line was measured at a rate of 4 gallons per minute to confirm. With the implementation of the water softener the cooling tower will be able to operate in excess of 5 cycles thus saving an immense amount of water.

As both of these cases are relatively difficult to calculate savings a baseline comparison method was used. The baseline water usage (Section 2) for this facility was compared to modeled usage. A .7 safety factor was applied to these savings to be conservative.

For the Detention Center a spreadsheet calculation was also used. There are currently sixteen rooftop units that use direct/indirect evaporative cooling. As the case at the Courthouse the nozzles on the indirect side are constantly calcifying and leaking. The direct side media is also filling with mineral at an alarming rate. The staff has cut the overflow pans to constantly allow water to drain in each air handler. This is a tremendous waste of water. It was estimated that approximately 1 gpm of water was being wasted per unit. With the installation of water softeners for the evaporative cooling units the pans will be fixed and blow down controls will be installed on each unit.

Arapahoe County  
Dentention Center  
Water Softenner Savings

	BILLING DATA Average last year Gallons	Days per month	GPM per Unit	Number of Untis	Total Water Saved kGals
Jan	2,756,486				
Feb	4,021,000				
Mar	4,314,714				
Apr	4,984,286				
May	3,368,529	31	1.0	16	714
June	4,151,471	30	1.0	16	691
Jul	4,564,677	31	1.0	16	714
Aug	4,210,161	31	1.0	16	714
Sep	5,095,161	30	1.0	16	691
Oct	4,572,727	31	1.0	16	714
Nov	3,977,273				
Dec	3,475,000				
	49,491,485				

4,239

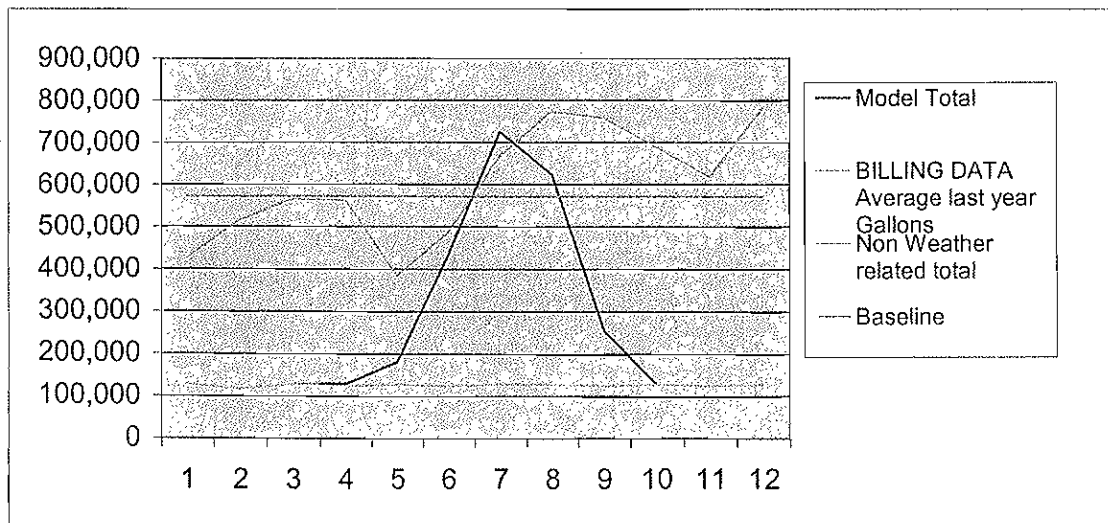
- 1) Drian pan of each unit was cut to allow water to "bleed" off.
- 2) Several units were observed to be flowing in excess of 1 gpm.
- 3) With new water softener the pans will be replaced and water will be able to be re-used.
- 4) Above does not include water savings for increaded efficiency of evaporative cooling.

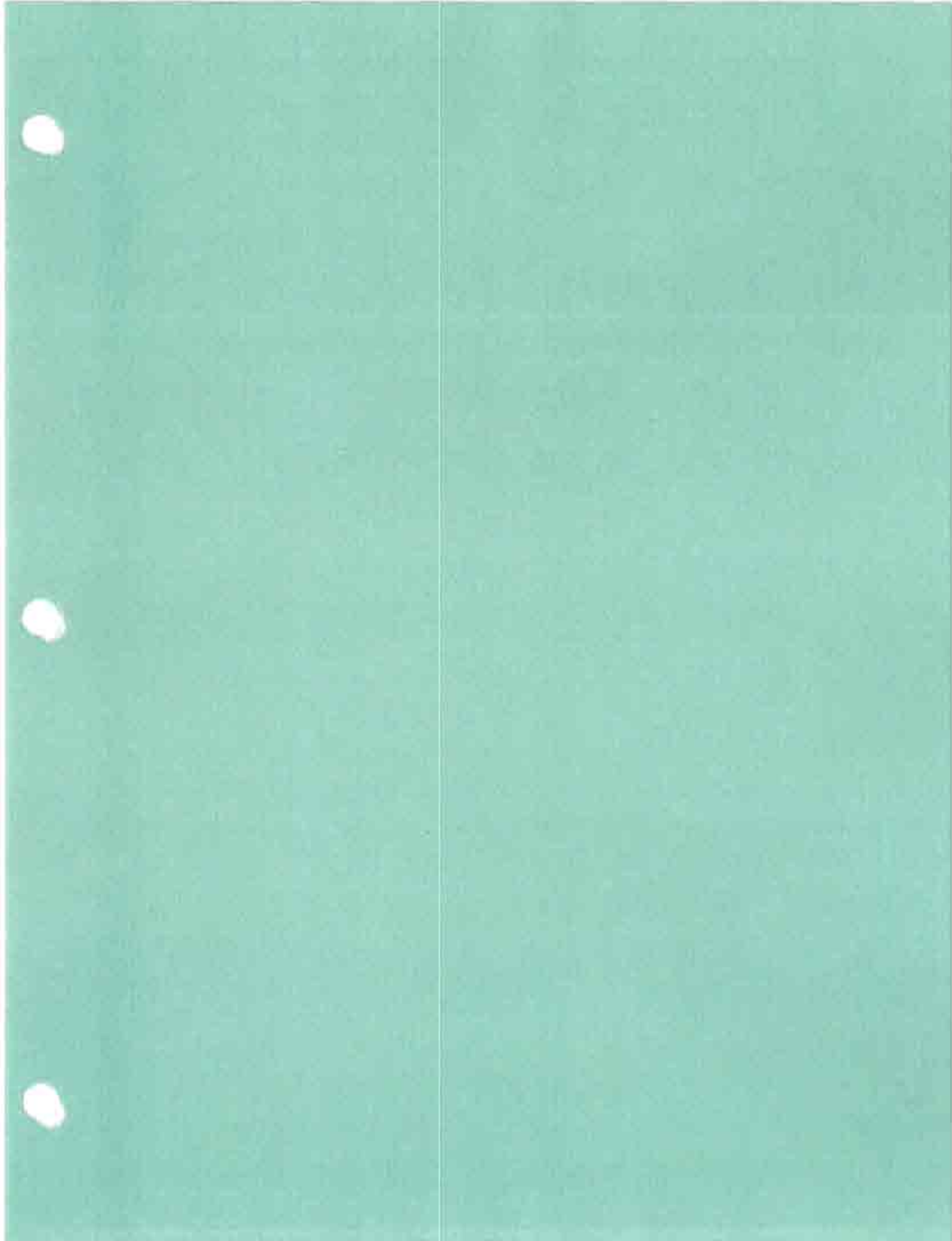
ArapahoeCounty Justice Center

	BILLING DATA Average last year	Work days per month	Sanitary Water Use Model	Kitchen	Non Weather related total	Baseline	Balance	Gallons Saved
Jan	425,622	22	119,038	9,125	128,163	572,173	306,584	45,312
Feb	514,533	20	107,518	9,125	116,643	572,173	407,015	40,927
Mar	565,324	22	119,038	9,125	128,163	572,173	446,286	45,312
Apr	563,143	21	115,198	9,125	124,323	572,173	447,945	43,850
May	383,824	22	119,038	9,125	128,163	572,173	264,786	45,312
June	486,176	21	115,198	9,125	124,323	572,173	370,978	43,850
Jul	667,161	22	119,038	9,125	128,163	572,173	548,123	45,312
Aug	773,075	22	119,038	9,125	128,163	572,173	654,037	45,312
Sep	758,773	21	115,198	9,125	124,323	572,173	643,575	43,850
Oct	689,563	22	119,038	9,125	128,163	572,173	570,525	45,312
Nov	617,494	21	115,198	9,125	124,323	572,173	502,296	43,850
Dec	783,212	22	119,038	9,125	128,163	572,173	664,174	45,312
	7,227,900	261	1,401,571	73,000	1,013,781	6,866,073	5,826,329	533,511

	Non Sanitary Use	Non Sanitary Use Kgal	Ice machine	Evaporative coolers	Laundry	Total	Model Total	Balance (gal)	Model total to billing	Savings From Original Baseline
Jan	306,584	307	0	0	0	0	128,163	297,459	30%	297,459
Feb	407,015	407	0	0	0	0	116,643	397,890	23%	397,890
Mar	446,286	446	0	0	0	0	128,163	437,161	23%	437,161
Apr	447,945	448	0	4,572	0	4,572	128,895	434,248	23%	434,248
May	264,786	265	0	52,579	0	52,579	180,742	203,082	47%	203,082
June	370,978	371	0	308,617	0	308,617	432,940	53,236	89%	53,236
Jul	548,123	548	0	596,659	0	596,659	724,822	-57,661	109%	-57,661
Aug	654,037	654	0	496,073	0	496,073	624,236	148,839	81%	148,839
Sep	643,575	644	0	130,305	0	130,305	254,628	504,145	34%	504,145
Oct	570,525	571	0	0	0	0	128,163	561,400	19%	561,400
Nov	502,296	502	0	0	0	0	124,323	493,171	20%	493,171
Dec	664,174	664	0	0	0	0	128,163	655,049	16%	655,049
	5,826,329	5,826	0	1,588,806	0	1,594,632	3,099,877	4,128,023	43%	4,128,023

1588.805762







### *ECM 13 – Install Waterside Economizer*

Buildings Included –

- ✓ Administration I

Spreadsheet savings used coupled with Bin Data (see attached). The spreadsheets were broken into three parts:

- January through April
- May through October
- November through December

These were broken into three sections as operating variables can change per season in some buildings such as schedule or lock-out temperatures. The intent was to capture all these variables in the most conservative fashion. All variables were received from operations personnel.

Demand savings was only taken in the winter months when little cooling is needed.

Savings was calculated for reduced run times on the chillers. Currently the staff operates the chillers on the following schedule:

Monday through Friday	5:00 AM to 11:00 PM
Saturday and Sunday	8:00 AM to 4:00 PM

This spreadsheet takes into account the benefit of utilizing the plate & frame heat exchanger during low wet bulb conditions or approximately up to 43°WB under certain conditions.

Arapahoe County  
Administration I Building  
H2O Economizer

Assumptions:

- 1) CH-1 & CH-2 operation from 5:00 AM to 7:00 PM and greater than 50 degrees F OA.
- 2) Uses Trace 700 unloading curve.
- 3) Assumes load varies directly with OA temperature.
- 4) Setup load simulated by reduction of OA temp equal to setup differential:  
Setup cfm =  $\text{MIN}[(\text{OAT} - (\text{Setup T} - \text{Space T}) - \text{Cooling zero load T}), 0] / (\text{Cooling full load T} - \text{Cooling zero load T})$

Basis:

Trace 700 Coefficients:

Total Chiller Tonnage: 260  
Coefficient A: 0.0005  
Existing Chiller KW/Ton 0.55  
Max WB for Economizer 43  
Coefficient B: 0.5614  
Coefficient C: -1.1412  
Coefficient D: 2.2214  
Coefficient E: -0.6455

Occupied Load profile characteristics:

Cooling lockout temperature: 50°  
First month of cooling season: 11 November  
Min load: 50°  
Last month of cooling season: 12 December  
Cooling full load at: 90°  
Cooling temp. setup ends: 6  
Cooling min. load at: 60°  
Cooling temp. setup begins: 19  
Delta: 30°  
Weather data: Denver Temperature Bins

Load Adjustments:

Occupied space temperature: 74°  
Cooling setup temperature: 85°

Bin Average (°F)	Occupied Cooling Nov-Dec: 6:00-19:00			Unoccupied Cooling Hours (Nov thru Feb)			Savings		
	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	kWh
107.5°	0.0		100%	0.0		0.0	100%	0.0	0.0
102.5°	0.0		100%	0.0		0.0	100%	0.0	0.0
97.5°	0.0		100%	0.0		0.0	88%	0.0	0.0
92.5°	0.0		100%	0.0		0.0	72%	0.0	0.0
87.5°	0.0		92%	0.0		0.0	55%	0.0	0.0
82.5°	0.0		75%	0.0		0.0	50%	0.0	0.0
77.5°	0.0		58%	0.0	0.0	0.0	50%	0.0	0.0
72.5°	0.0		50%	0.0	1.0	0.0	50%	71.5	357.5
67.5°	0.0		50%	0.0	5.0	0.0	50%	71.5	357.5
62.5°	9.0	42.2	50%	71.5	20.0	44.1	50%	71.5	1430.0
57.5°	44.9	40.8	50%	71.5	47.0	42.0	50%	71.5	3360.5
52.5°	62.5	38.3	50%	71.5	84.0	39.8	50%	71.5	6006.0
47.5°	79.3	35.7	50%	0.0	146.0	37.5	50%	0.0	0.0
42.5°	95.6	33.0	50%	0.0		0.0	50%	0.0	0.0
37.5°	104.4	30.1	50%	0.0		0.0	50%	0.0	0.0
32.5°	113.6	27.2	50%	0.0		0.0	50%	0.0	0.0
27.5°	99.1	23.6	50%	0.0		0.0	50%	0.0	0.0
22.5°	60.1	19.6	50%	0.0		0.0	50%	0.0	0.0
17.5°	36.3	15.3	50%	0.0		0.0	50%	0.0	0.0
705				303				19,475	

Max DB Bin: kW Savings:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
											62.5	71.5	62.5

0.0 kW-months (June-Sept)  
0.0 Peak kW (July - Sept)

**Arapahoe County  
Administration I Building  
H2O Economizer**

**Assumptions:**

- 1) CH-1 and CH-2 operation from 5:00 AM to 7:00 PM and greater than 50 degrees F OA.
- 2) Uses Trace 700 unloading curve.
- 3) Assumes load varies directly with OA temperature.
- 4) Setup load simulated by reduction of OA temp equal to setup differential:  
Setup cfm = MIN((OAT - (Setup T - Space T)-Cooling zero load T),0) / (Cooling full load T - Cooling zero load T)

**Basis:**

Total Chiller Tonnage: 260  
Existing Chiller KW/Ton 0.55  
Max WB for Economizer 43

Trace 700 Coefficients:  
Coefficient A: 0.0005  
Coefficient B: 0.5614  
Coefficient C: -1.1412  
Coefficient D: 2.2214  
Coefficient E: -0.6455

**Occupied Load profile characteristics:**

Cooling lockout temperature: 50°  
Min load: 50%  
Cooling full load at: 90°  
Cooling min. load at: 60°  
Delta: 30°

First month of cooling season: 1 January  
Last month of cooling season: 4 April  
Cooling temp. setup ends: 6  
Cooling temp. setup begins: 19  
Weather data: Denver Temperature Bins

**Load Adjustments:**

Occupied space temperature: 74°  
Cooling setup temperature: 85°

Bin	Occupied Cooling Jan-Apr: 6:00-19:00				Unoccupied Cooling Hours (Nov thru Feb)			Savings		
Average (°F)	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	kWh	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	kWh
107.5°	0.0		100%	0.0			0.0	100%	0.0	0.0
102.5°	0.0		100%	0.0			0.0	100%	0.0	0.0
97.5°	0.0		100%	0.0			0.0	88%	0.0	0.0
92.5°	0.0		100%	0.0			0.0	72%	0.0	0.0
87.5°	0.0		92%	0.0			0.0	55%	0.0	0.0
82.5°	0.0		75%	0.0			0.0	50%	0.0	0.0
77.5°	0.0		58%	0.0		0.0	0.0	50%	0.0	0.0
72.5°	0.0		50%	0.0		1.0	0.0	50%	71.5	357.5
67.5°	0.0		50%	0.0	0.0	5.0	0.0	50%	71.5	1430.0
62.5°	40.6	42.1	50%	71.5	2904.7	20.0	44.1	50%	71.5	3360.5
57.5°	64.9	40.0	50%	71.5	4638.6	47.0	42.0	50%	71.5	6006.0
52.5°	147.0	39.1	50%	71.5	10510.5	84.0	39.8	50%	71.5	16516.5
47.5°	173.9	36.7	50%	0.0	0.0	146.0	37.5	50%	0.0	0.0
42.5°	201.3	34.0	50%	0.0	0.0		0.0	50%	0.0	0.0
37.5°	195.1	30.8	50%	0.0	0.0		0.0	50%	0.0	0.0
32.5°	198.9	27.7	50%	0.0	0.0		0.0	50%	0.0	0.0
27.5°	145.0	23.8	50%	0.0	0.0		0.0	50%	0.0	0.0
22.5°	95.9	19.5	50%	0.0	0.0		0.0	50%	0.0	0.0
17.5°	53.5	15.0	50%	0.0	0.0		0.0	50%	0.0	0.0
1316						303	29,208			

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Max DB Bin:	62.5	62.5	62.5										
kW Savings:	71.5	71.5	71.5										214.5

0.0 kW-months (June-Sept)  
0.0 Peak kW (July - Sept)

**Arapahoe County  
Administration i Building  
H2O Economizer**

**Assumptions:**

- 1) CH-1 & CH-2 operation from 5:00 AM to 7:00 PM and greater than 50 degrees F OA.
- 2) Uses Trace 700 unloading curve.
- 3) Assumes load varies directly with OA temperature.
- 4) Setup load simulated by reduction of OA temp equal to setup differential:  
Setup cfm =  $\text{MIN}[(\text{OAT} - (\text{Setup T} - \text{Space T}) - \text{Cooling zero load T}), 0] / (\text{Cooling full load T} - \text{Cooling zero load T})$

**Basis:**

Total Chiller Tonnage: 260  
Existing Chiller KW/Ton 0.55  
Max WB for Economizer 43

Trace 700 Coefficients:  
Coefficient A: 0.0005  
Coefficient B: 0.5614  
Coefficient C: -1.1412  
Coefficient D: 2.2214  
Coefficient E: -0.6455

**Occupied Load profile characteristics:**

Cooling lockout temperature: 50°  
Min load: 50°  
Cooling full load at: 90°  
Cooling min. load at: 60°  
Delta: 30°

First month of cooling season: 5 May  
Last month of cooling season: 10 October  
Cooling temp. setup ends: 5  
Cooling temp. setup begins: 19  
Weather data: Denver Temperature Bins

**Load Adjustments:**

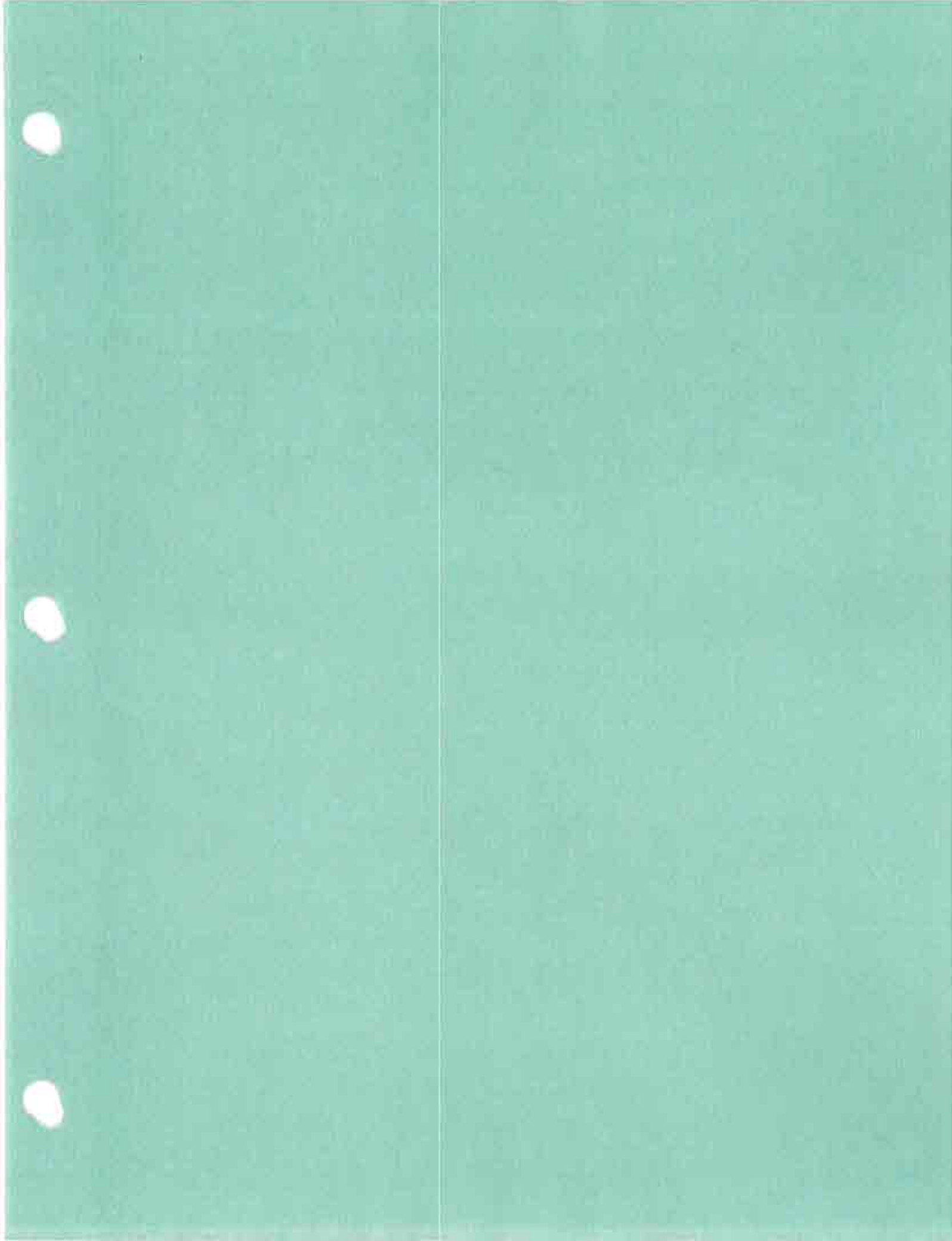
Occupied space temperature: 74°  
Cooling setup temperature: 85°

Bin Average (°F)	Occupied Cooling			May-Oct: 5:00-19:00			Unoccupied Cooling Hours (Nov thru Feb)			Savings		
	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	kWh	Cooling (hrs)	AVG WB	Load Profile	CH-1 kW	kWh	kWh	kWh
107.5°	0.0		100%	0.0				100%	0.0		0.0	0.0
102.5°	0.0		100%	0.0				100%	0.0		0.0	0.0
97.5°	0.0		100%	0.0				88%	0.0		0.0	0.0
92.5°	0.0		100%	0.0				72%	0.0		0.0	0.0
87.5°	0.0		92%	0.0				55%	0.0		0.0	0.0
82.5°	0.0		75%	0.0				50%	0.0		0.0	0.0
77.5°	0.0		58%	0.0		0.0	0.0	50%	0.0		0.0	0.0
72.5°	0.0		50%	0.0		1.0	0.0	50%	71.5	357.5	357.5	0.0
67.5°	0.0		50%	0.0	0.0	5.0	0.0	50%	71.5	1430.0	1430.0	0.0
62.5°	0.0		50%	0.0	0.0	20.0	44.1	50%	71.5	3360.5	3360.5	0.0
57.5°	0.0		50%	0.0	0.0	47.0	42.0	50%	71.5	6006.0	6006.0	0.0
52.5°	56.5	41.0	50%	71.5	4048.7	84.0	39.8	50%	71.5	10054.7	10054.7	0.0
47.5°	139.0	40.7	50%	0.0	0.0	146.0	37.5	50%	0.0	0.0	0.0	0.0
42.5°	101.6	37.4	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
37.5°	57.4	33.2	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
32.5°	38.5	29.6	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
27.5°	10.3	25.0	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
22.5°	3.3	20.5	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
17.5°	1.8	16.5	50%	0.0	0.0		0.0	50%	0.0	0.0	0.0	0.0
	408					303					15,203	

Max DB Bin: kW Savings:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
													0.0

0.0 kW-months  
0.0 kW-months (June-Sept)  
0.0 Peak kW (July - Sept)





63

## ***ECM 16 – Irrigation Control System Upgrade***

### **Administration Building 1:**

The water economy at the Administration Building 1 is divided between sanitation services, cooling tower make up water, ice machine, irrigation and boiler water make up.

Sanitary water use is calculated based on survey observations of fixture type capacity and condition, population levels integrated with schedules.

Because of seasonal variability in water use rates due to cooling tower and irrigation demand, the year round monthly use rate of sanitary water use is assumed to be at the winter month levels when the only other water use is boiler water makeup (which is normally very low) and the ice machine.

The warm weather increase in water use rates is due to the cooling tower and irrigation usage. The seasonal water use by the cooling tower and irrigation is easily discerned from the water use curve. The cooling tower usage was determined by hand calculations using Denver dry bulb and wet bulb historical data and using a psychrometric chart to estimate the evaporative losses. These results were compared to water tower water consumption results in the Trane Trace computer model.

The irrigation use was assumed to be the balance of the water consumption:

$\text{Irrigation Use} = \text{Total Usage} - \text{Sanitary} - \text{HVAC} - \text{Ice Machine.}$
--

Administration Building 1 has 3.1 acres of irrigated landscape. The irrigated areas include lawn and landscaped area near and between the buildings and area bordering the parking lots and entry roadways.

Two Rainmaster Sentar™ RME timers, control the system. The maintenance staff has set up the system so that each zone is set to ensure the lawn area it serves remains green during the summer months. This is a proven method of maintaining turf, but often leads to over watering.

The water use requirements for turf maintenance vary over the summer. For the purposes of this study, precipitation requirements were calculated from the evapotranspiration rates typical to Denver, actual rain data for 2004 with the assumption that turf applied to the lawn is comprised of cool season grasses.

The gallons per day required was calculated by the following formula:

$$\text{Irrigation required (in)} = (\text{ET}_o \times K_c) - \text{Precipitation (in)}$$

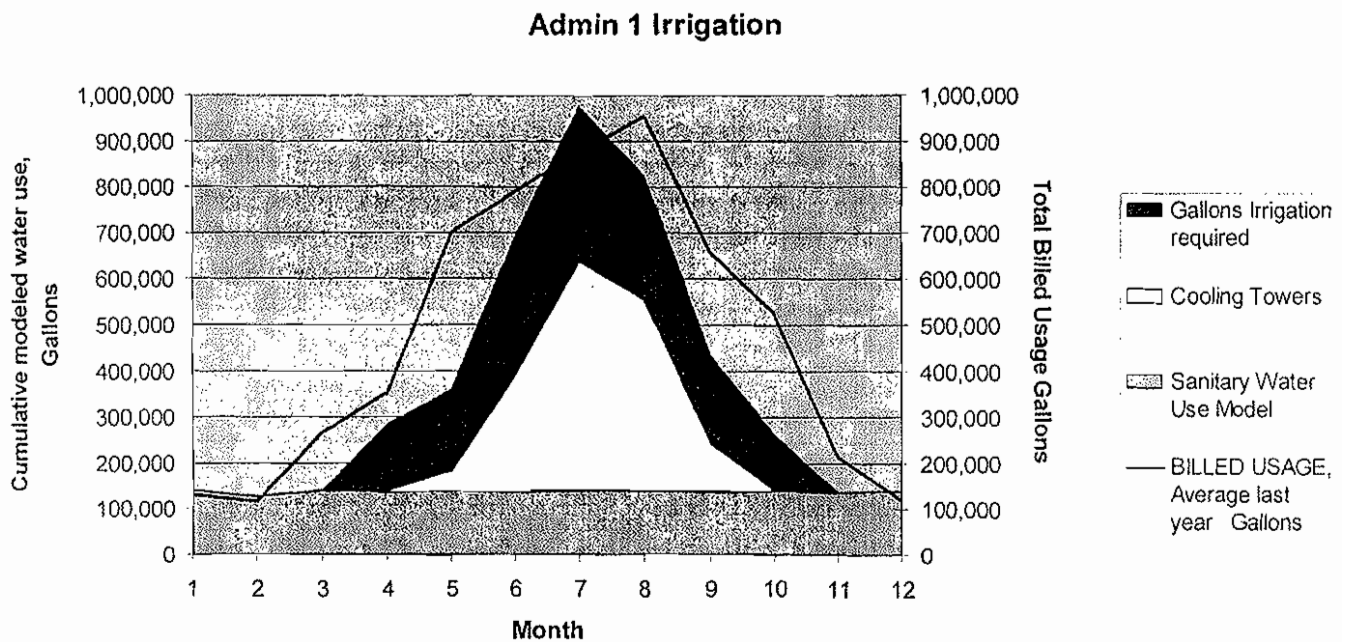
ET<sub>o</sub> – reference evapotranspiration rate from weather data

K<sub>c</sub> – Crop coefficient. A constant applied to correct for the transpiration losses for a particular planting or crop. In this case the “crop” is cool season turf, i.e. eastern bluegrass.

Precipitation – Denver average precipitation

Water savings for this measure is 75% of the difference between the modeled water use and the calculated water requirements of the landscape.

The following chart illustrates the results of the various components of the water model as a stacked area plot; each calculation result is shown as a solid area on the chart and scaled on the left side. The billing data is represented by the solid line and is scaled on the right side. The chart demonstrates that the sum of the models is a well within the billed usage. The ice machine usage was calculated to less than 800 gallons per month and does not show on this chart.





Arapahoe County Domestic Water  
Administration Building

Units  
S/Facre 43,850  
L/Facre side 209  
Gall/CF 7,481  
Lawn Area 135,191 SF  
2000/2010 Acres

Northern Front Range % of July

April	May	June	July	August	September	October
0.90	1.10	1.40	1.40	1.20	0.90	0.60
60%	75%	93%	100%	80%	60%	40%

Colorado Springs % of July

April	May	June	July	August	September	October
0.50	0.75	1.25	1.50	1.39	0.83	0.33
33%	50%	83%	100%	82%	55%	22%

April	May	June	July	August	September	October
3.88	4.93	6.04	6.52	5.47	4.01	7.76
Per month	0.13	0.16	0.2	0.21	0.18	0.13
Per day						

Predicted Irr use 0 gallons  
Estimated Irr billing use 0  
0

Increase by 30%

Month	Days	ET Required/ week (inches)	ET Required/ month (inches)	Precip (inches)	Kc	Gallons Irrigation
Jan						
Feb						
Mar						
April	30	0.90	2.85	1.70	0.80	145,444
May	31	1.40	4.37	2.40	0.85	177,049
June	30	1.40	4.20	1.90	0.85	177,049
July	31	1.50	4.64	1.90	0.85	300,881
August	31	1.20	3.84	1.90	0.85	339,770
September	30	0.90	2.85	1.50	0.85	273,248
October	31	0.80	2.66	1.20	0.85	189,353
November						118,715
December						154,329
						1545460 2009098

Denver Precipitation  
Precipitation (inches)  
Days with Precipitation 0.01 inch or More  
Monthly Snowfall (inches)

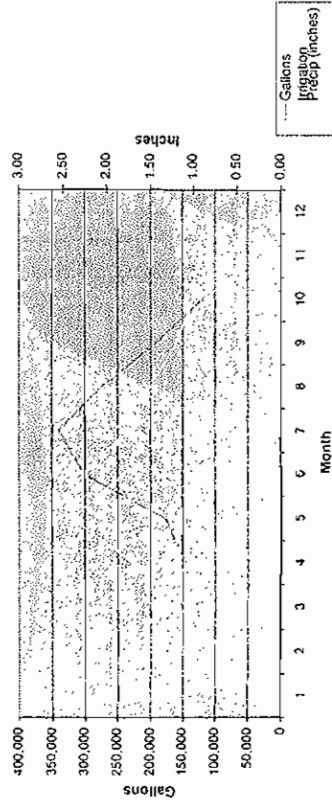
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.5	0.6	1.3	1.7	2.4	1.8	1.9	1.5	1.2	1.0	0.9	0.8	15.4
6	6	9	9	11	9	9	9	6	5	6	5	89
81	7.5	12.5	8.9	1.6	0	<0.05	<0.05	1.6	3.7	3.1	7.3	60.3

Denver Precipitation

Precip Days Monthly Snowfall (inches)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.5	0.6	1.3	1.7	2.4	1.8	1.9	1.5	1.2	1.0	0.9	0.8	15.4
6	6	9	9	11	9	9	9	6	5	6	5	89
81	7.5	12.5	8.9	1.6	0	<0.05	<0.05	1.6	3.7	3.1	7.3	60.3

Admin 1 Irrigation



Arapahoe County Domestic Water  
Administration Building

**Rainmaster "iCentral" Setup:**

All prices off web published pricelist RETAIL pricing.

Labor Rate @ \$50.00

1 man Day

Rep said installation ~ 15 minutes

Trade-in on old panels and discount because we are going to use the old cases not included

Controller

Zones:	36	24	24
Eagle EG	\$0.00	\$1,619.00	\$1,619.00
iCentral	\$0.00	\$795.00	\$795.00
Service Plan	\$0.00	\$275.00	\$275.00
First Year cost	\$0.00	\$2,689.00	\$2,689.00
Grand total	\$5,378.00		
Labor	\$400.00		
Total	\$5,778.00		

Total Estimated Usage (Gals)	2,009,098
Total Required (Gals)	1,545,460
Gallons of over use	463,638
Assume 75% over use can be save by tighter control savings:	347,729
% savings gallons	17%

Rainmaster Rep expects 30% to 40% savings

Gallons of over use	347,729
Rate	\$5.57
Model Overuse:	\$1,937
Assume 50% over use can be save by tighter control	\$968
Annual Service Cost:	\$550

ROI

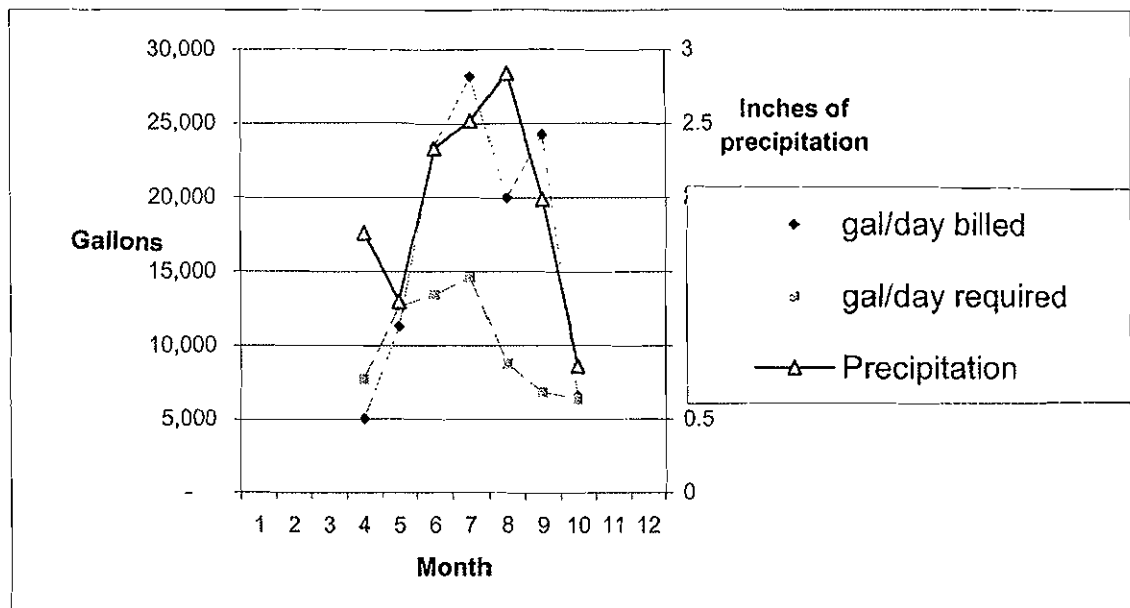
13.81 years

## **ECM 16 - Irrigation**

### **Justice Center Irrigation:**

#### **I. General:**

- A. There are four meters serving the irrigation system at the Justice Center complex. The irrigation system is one network that can be served by any number of four meters feeding the system. As the demand increases, the maintenance staff turns on valves associated with additional meters. All irrigations services share four meters. The meters are read monthly.
- B. Justice Center Building has on a 1,944,000 sqft. (45 acre) parcel. The total area not occupied by buildings or covered with pavement is 25 acres. The building maintenance measured the irrigation area to be 176,000 square feet. The irrigated areas include lawn and landscaped area near and between the buildings and area bordering the parking lots and entry roadways. Areas west of the detention center, north of the north parking lot, and certain areas east of the northeast parking lot and north east of the Administration 1 building are not irrigated.
- C. Three Rainmaster Sentar <sup>TM</sup> RME timers, 2 with 36 zones and one with 24 zones, control the system. The maintenance staff has set up the system so that each zone is set to ensure the lawn area it serves remains green during the summer months. This is a proven method of maintaining turf, but often leads to over watering.
- D. The water use requirements for turf maintenance vary over the summer. For the purposes of this study, precipitation were requirements calculated from the evapotranspiration rates typical to Denver, actual rain data for 2004 and assuming turf applied to the lawn is comprised of cool season grasses. The following graph shows the moisture requirements relative to the irrigation applied according to the irrigation billing data.



The Gallons per day required was calculated by the following formula:

$$\text{Irrigation required (in)} = (\text{ETo} \times \text{Kc}) - \text{Precipitation (in)}$$

ETo -- reference evapotranspiration rate from weather data

Kc - Crop coefficient. A constant applied to correct for the transpiration losses for a particular planting or crop. In this case the "crop" is cool season turf, i.e. eastern bluegrass.

The second y-axis illustrated rainfall is 2004. There is an indication from the data that some control is being applied to the system in that a drop in the water use rate accompanies the spike in August rainfall. In general, however, there appears to be room for improvement and optimization on the system. The water use rates greatly exceed requirements for most of the season.

- E. There is a 3600 square foot area nearby the day program entry way irrigated using water from the detention center meter with its own timer and controls.

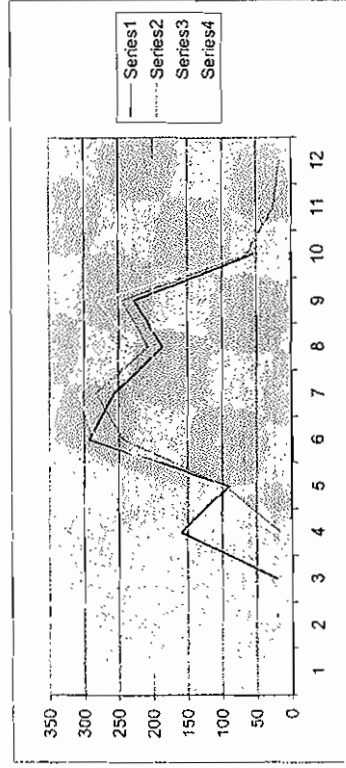


ACJC Complex

Irrigation

Service Charge Calculated\$/gal	26.44 per acct per Kgal	3.305	2.32	Less than 25 25 - 200 Greater than 200
------------------------------------	----------------------------	-------	------	--

Date	1	2	3	4	Total	Kgal/day	
1 1/31/2004 12/25/2003	Kgal \$ 18.56	\$ 26.44	\$ 26.44	\$ 26.44	\$ 97.88	-	\$ (7.88)
2 2/25/2004 1/31/2004	\$ 18.56	\$ 26.44	\$ 26.44	\$ 26.44	\$ 97.88	-	\$ (7.88)
3 3/26/2004 2/25/2004	\$ 18.56	20 \$ 61.44	\$ 26.44	\$ 26.44	\$ 132.88	0.67	\$ 27.12
4 4/30/2004 3/26/2004	\$ 18.56	159 \$ 582.16	16 \$ 49.44	\$ 26.44	\$ 656.60	5.00	\$ 550.84
5 5/26/2004 4/30/2004	\$ 18.56	89 \$ 308.06	95 \$ 329.84	110 \$ 384.29	\$ 1,040.75	11.31	\$ 934.99
6 6/30/2004 5/26/2004	\$ 18.56	293 \$ 1,115.54	244 \$ 902.39	283 \$ 1,072.04	\$ 3,108.53	23.43	\$ 3,002.77
7 7/30/2004 6/30/2004	\$ 18.56	256 \$ 954.59	282 \$ 1,067.69	307 \$ 1,176.44	\$ 3,217.28	28.17	\$ 3,111.52
8 8/30/2004 7/30/2004	\$ 18.56	186 \$ 660.17	207 \$ 741.44	227 \$ 828.44	\$ 2,248.61	20.00	\$ 2,142.85
9 9/30/2004 8/30/2004	\$ 18.56	228 \$ 832.79	245 \$ 906.74	279 \$ 1,054.64	\$ 2,812.73	24.26	\$ 2,706.97
10 10/28/2004 9/30/2004	\$ 18.56	54 \$ 181.01	63 \$ 228.20	67 \$ 228.20	\$ 655.97	6.57	\$ 550.21
11 11/30/2004 10/28/2004	\$ 18.56	\$ 26.44	26 \$ 79.37	\$ 26.44	\$ 150.81	0.79	\$ 45.05
12 12/31/2004 11/30/2004	\$ 18.56	\$ 26.44	16 \$ 49.64	\$ 26.44	\$ 121.08	0.52	\$ 15.32
				\$ 5,019.35	\$ 14,341.00		\$ 3.39
							\$ 6.78



ACIC Complex  
Irrigation

Units:  
SF/acre 43,650  
LF/acre side 209  
Gal/CF 7.48

Lawn Area 176,200 SF  
4.04 Acres

Northern Front Range % of July

April	May	June	July	August	September	October
0.90	1.10	1.40	1.50	1.20	0.90	0.60
60%	73%	93%	100%	80%	60%	40%

Colorado Springs % of July

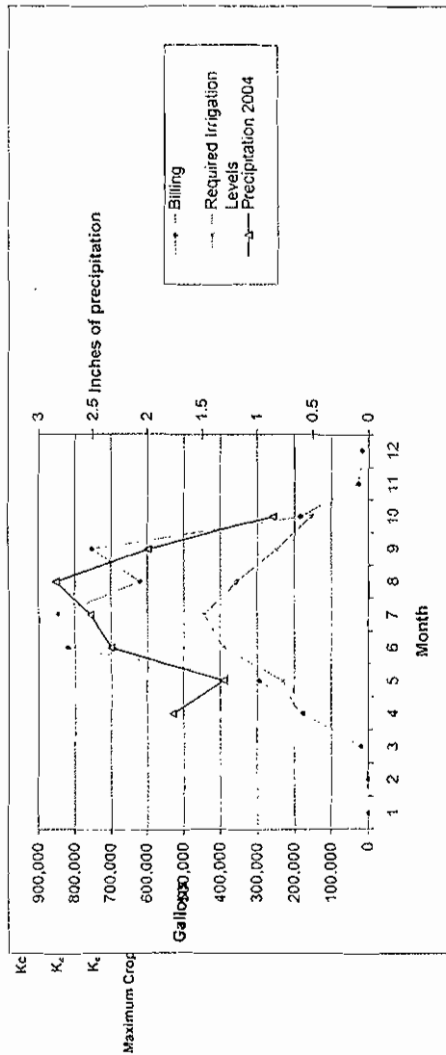
April	May	June	July	August	September	October
0.50	0.75	1.25	1.50	1.38	0.83	0.33
33%	50%	83%	100%	92%	55%	22%

Per month	April	May	June	July	August	September	October
Per day	3.88	4.93	5.04	5.47	6.52	4.01	2.76
	0.13	0.16	0.2	0.21	0.18	0.13	0.09

Area 2

Month	Days	E.T. Required/ week	E.T. Required/ month	Kc	Historical Precipitation	Precipitation 2004	Required Irrigation Levels	Billing	differential
January	31								
February	30								
March	31			0.8				20,000	0
April	30	0.90	3.86	0.80	1.7	1.76	189,538	175,000	-14,538
May	31	1.10	4.87	0.85	2.4	1.3	230,724	294,000	63,276
June	30	1.40	6.00	0.85	1.8	2.33	392,098	820,000	427,902
July	31	1.50	6.64	0.85	1.9	2.52	442,777	845,000	402,223
August	31	1.20	5.31	0.85	1.5	2.84	356,089	620,000	263,911
September	30	0.90	3.86	0.85	1.2	1.99	248,082	752,000	503,938
October	31	0.60	2.66	0.85	1	0.85	154,705	134,000	-20,705
November	30							26,000	0
December	31							16,000	0
							14	2,013,993	3,690,000
									1,676,007

Crop - cool sear - warm season is Reduced Kc with careful management



<http://www.crh.noaa.gov/cgi-bin-den/showProduct.pl?title=Denver's+2004+Climatological+Summary&product=annsum04.htm&backto=2>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Denver Precipitation													
Precipitation (inches)	0.5	0.6	1.3	1.7	2.4	1.8	1.9	1.5	1.2	1	0.9	0.6	15.4
Days with Precipitation 0.01 inch or More	6	6	9	9	11	9	9	9	6	5	6	5	89
Monthly Snowfall (inches)	8.1	7.5	12.5	8.9	1.6	0	<0.05	<0.05	1.6	3.7	9.1	7.3	60.3

[illegible]



ACJC Complex  
Irrigation

**Rainmaster "iCentral" Setup:**

All prices off web published pricelist RETAIL pricing.  
<http://www.rainmaster.com/PDF/2004TURF-AGPRICELIST.pdf>

Labor Rate @ \$50.00

1 man Day

Rep said installation ~ 15 minutes

Trade-in on old panels and discount because we are going to use the old cases not included

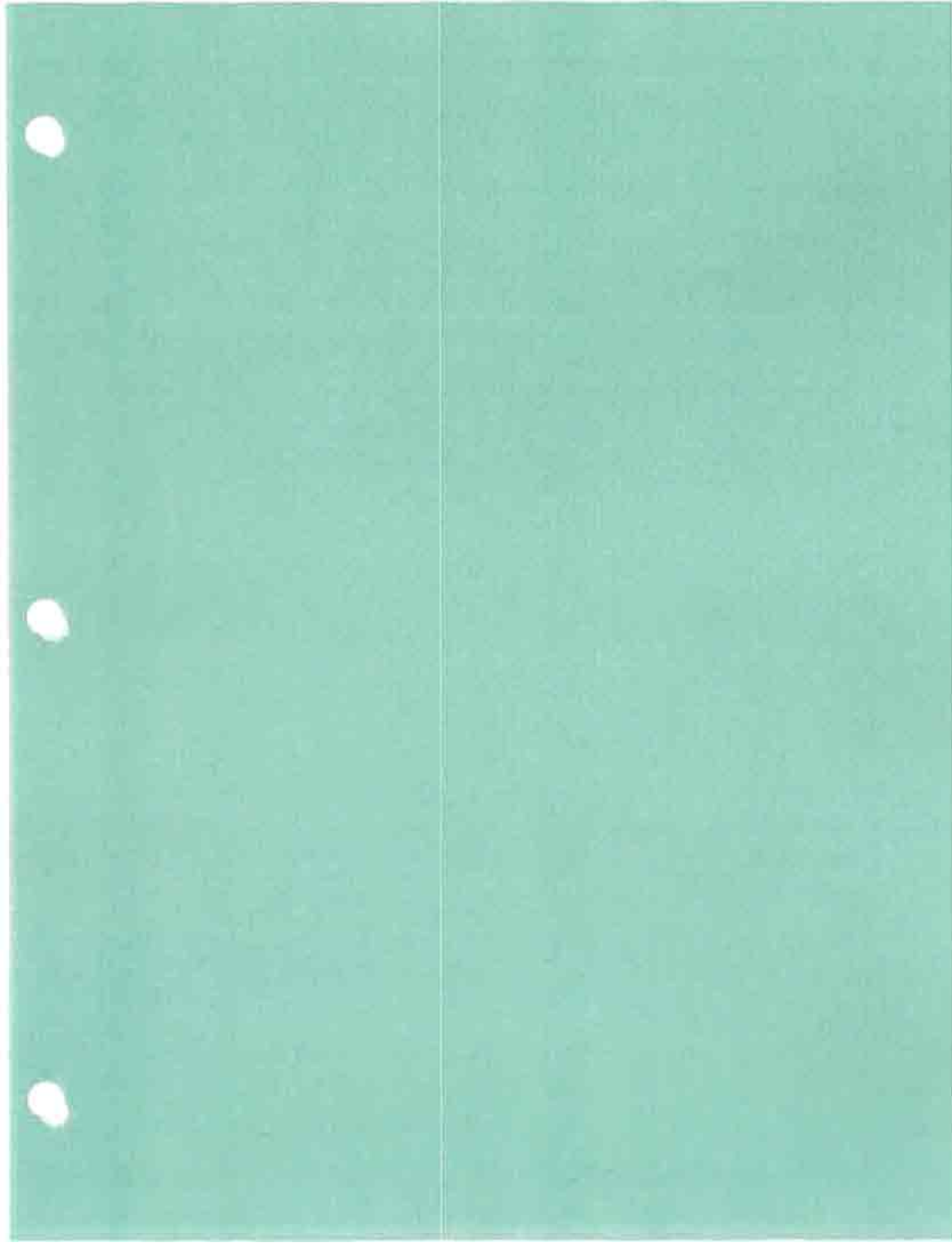
**Controller**

Zones:	36	36	24
Eagle SCSB	\$2,660.00	\$2,660.00	\$2,265.00
iCentral	\$795.00	\$795.00	\$795.00
Service Plan	\$275.00	\$275.00	\$275.00
First Year cost	\$3,766.00	\$3,766.00	\$3,359.00
Grand total	\$10,891.00		
Labor	\$400.00		
Total	\$11,291.00		

Total Billed Usage (Gals)	3,690,000
Total Required (Gals)	2,013,993
Gallons of over use	1,676,007
Assume 50% over use can be save by tighter control savings:	
% savings gallons	838,004
	23%

Rainmaster Rep expects 30% to 40% savings

Gallons of over use	838,004
Rate	\$6.96
Model Overuse:	\$5,833
Assume 50% over use can be save by tighter control	\$2,916
Annual Service Cost:	\$275



## ECM 17 – Programmable Flush Valve Controls

### General:

Domestic Water usage for the Detention Center was modeled using population figures, staff, inmates, and visitors, occupancy schedules, fixture usage rates as determined in the survey and average estimates of fixture usage. The model is then compared to the metered usage and reasonable adjustments to the model are made to reflect the metered usage. In general, the fixture rates were adjusted to bring the model rates safely below the metered rates. After matching the water model to the building use, various water conservation scenarios were applied to the model to analyze potential savings.

The water usage is determined by:

$$(\text{Number of People}) \times (\text{Fixture Rate}) \times (\text{Uses per Day}) \times (\text{Days Occupied per Year})$$

Visitor populations were also included. Visitation period was assumed to be for 2 hours for the detention center, and then the population was normalized to an 8 hr day and added to the given population figure using the following formula:

$$(\text{Number of Hours Visitation}) \div (8 \text{ hours}) \times (\text{Visitors/Day}) = \text{Normalized Visitor Population}$$

### Fixture use rates:

There were some adjustments made to the fixture rates to bring the modeled usage in line with the metered data. Some of the adjustments were downward (lower GPF). Some were adjusted upward; this is justified as long as all water is accounted for. Maladjusted flush valves and leaking tank valves can account for significant losses. Also, where there was a mix of fixtures, a weighted average was applied to the model, which also lowered the modeled fixture rate.

The following table illustrates the uses per day per person used in the models.

Uses per day	Inmates		Staff		Visitors		Units
	Male	Female	Male	Female	Male	Female	
Toilet	12	12	1	5	1	5	Flushes
Urinal	0	0	4	0	4	0	Flushes
Lav Faucet	1	1	2	2	2	2	Minutes
Shower (M F)		10	0	0	0	0	Minutes

\*Based on: "A Water Conservation Guide for Commercial Institutional and Industrial Users", Water Use and Conservation Bureau, New Mexico Office of the State Engineer.

Schedules are considered only to the extent that the days that the buildings are open and the building are populated.

Schedules:

	Office (staff and visitors)	Detention Center
Work days	250	365
Holidays	-10	-10
Vacation	-14	-14
Total	226	341

Population assumptions are listed below:

	Population (1)	Visitors / day (2)	Quantity of toilets
P.J. Sullivan Detention Center	195	163	71
P.J. Sullivan Detention Center (Comby)	1215	0	413
Total			484

(1) Population figures are as given by the Maintenance Staff.

(2) Visitor figures as per Arapahoe County Staff.

The ECM recommended placing programmable flush controls on the existing combination penal units. Savings were calculated by adjusting the 'Uses per day' from 12 per inmate to 8.

Savings =

4,952,530 gallons x .73 (Safety Factor) = 3,615,347 gallons per year

Arapahoe County Domestic Water  
ACJC Detention Center

Building Area 231,955

Future Diversity			
	GFY	Quantity	Weighted Average
Total	1.6	0	1.90
Female	0.5	1	0.5
Male	0.5	2	1.35
Unlabeled	0.5	4	0.85
Unlabeled	1	0	2.00
Unlabeled	2	22	0.22

Inmates: pools 24.5			
Population	400	Pool ratio	0.2
Inmates: Men	200	Pool ratio	0.2
Inmates: Women	200	Pool ratio	0.2
Unlabeled	100	Pool ratio	0.2
Unlabeled	0.0008		

Inmates: pools 24.5			
Population	400	Pool ratio	0.2
Inmates: Men	200	Pool ratio	0.2
Inmates: Women	200	Pool ratio	0.2
Unlabeled	100	Pool ratio	0.2
Unlabeled	0.0008		

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Population	400	Pool ratio	0.2
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Inmates: Men	200	Pool ratio	0.2
Inmates: Women	200	Pool ratio	0.2
Unlabeled	100	Pool ratio	0.2
Unlabeled	0.0008		

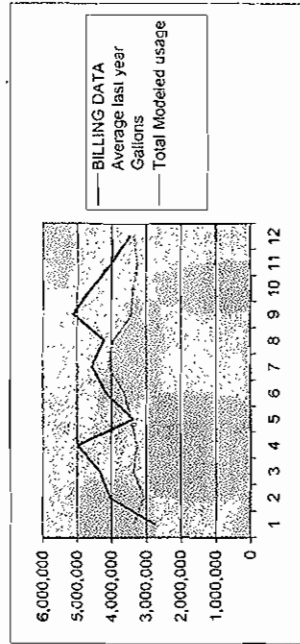
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Population	400	Pool ratio	0.2
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Unlabeled	0.0008		

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Population	400	Pool ratio	0.2
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Inmates: Women	200	Pool ratio	0.2
Unlabeled	100	Pool ratio	0.2
Unlabeled	0.0008		

Arapahoe County Domestic Water  
ACJC Detention Center

BILLING DATA	Average last year Gallons	Staff days per month	Visitors days per month	Population days	Sanitary Water Use Model	Water		Sewer		Water		Sewer		Differential
						Balance	Gallons Saved	Water Dollars Saved	Sewer Dollars Saved	Total Dollars Saved	Differential	Differential	Differential	
							< 25,000 gal	\$0.00290	\$0.00232					
							25,001-200,000	\$0.00363	\$0.00290					
							>200,000	\$0.00435	\$0.00346					
Jan	2,756,486	31	31	6,820	3,028,525	-272,039	557,531	\$2,425	\$1,940	\$4,365	-9%			
Feb	4,021,000	28	28	6,160	2,735,442	1,285,558	503,576	\$2,191	\$1,752	\$3,943	47%			
Mar	4,314,714	31	31	6,820	3,028,525	1,286,189	557,531	\$2,425	\$1,940	\$4,365	42%			
Apr	4,984,286	30	30	6,600	2,930,831	2,053,455	539,546	\$2,347	\$1,878	\$4,225	70%			
May	3,368,529	31	31	6,820	3,028,525	340,004	557,531	\$2,425	\$1,940	\$4,365	11%			
June	4,151,471	30	30	6,600	2,930,831	1,220,640	539,546	\$2,347	\$1,878	\$4,225	42%			
Jul	4,564,877	31	31	6,820	3,028,525	1,536,152	557,531	\$2,425	\$1,940	\$4,365	51%			
Aug	4,210,161	31	31	6,820	3,028,525	1,181,636	557,531	\$2,425	\$1,940	\$4,365	39%			
Sep	5,095,161	30	30	6,600	2,930,831	2,164,330	539,546	\$2,347	\$1,878	\$4,225	74%			
Oct	4,572,727	31	31	6,820	3,028,525	1,544,202	557,531	\$2,425	\$1,940	\$4,365	51%			
Nov	3,977,273	30	30	6,600	2,930,831	1,046,442	539,546	\$2,347	\$1,878	\$4,225	36%			
Dec	3,475,000	31	31	6,820	3,028,525	446,475	557,531	\$2,425	\$1,940	\$4,365	15%			
	49,491,485	365		80,300	35,658,442	13,833,043	6,564,473	28,555	\$22,844	\$51,400	13%			

Non Sanitary Use	kgals	Ice machine	Evaporative coolers	Laundry	Kitchen	Impaction	Total		Total		Modeled to Billing ratio
							Balance	Usage	Balance	Usage	
Jan	-272,039	2,920	0	197,731	120,861	0	321,513	3,350,038	-593,552	3,350,038	-22%
Feb	1,285,558	1,286	0	197,731	120,861	0	321,513	3,056,955	964,045	3,056,955	24%
Mar	1,286,189	1,286	0	197,731	120,861	0	321,513	3,350,038	964,676	3,350,038	22%
Apr	2,053,455	2,053	5,494	197,731	120,861	4,707	327,066	3,257,837	1,726,449	3,257,837	35%
May	340,004	340	63,178	197,731	120,861	8,015	384,690	3,413,215	-44,696	3,413,215	-1%
June	1,220,640	1,221	2,920	370,826	197,731	8,237	692,338	3,623,169	528,302	3,623,169	13%
Jul	1,536,152	1,536	2,920	716,330	197,731	9,253	1,038,443	4,086,968	497,709	4,086,968	11%
Aug	1,181,636	1,182	2,920	596,088	197,731	5,553	917,581	3,946,106	264,055	3,946,106	5%
Sep	2,164,330	2,164	2,920	156,571	197,731	4,190	478,083	3,408,914	1,686,247	3,408,914	33%
Oct	1,544,202	1,544	2,920	0	197,731	4,033	321,513	3,350,038	1,222,669	3,350,038	27%
Nov	1,046,442	1,046	2,920	0	197,731	0	321,513	3,252,343	724,930	3,252,343	18%
Dec	446,475	446	2,920	0	197,731	0	321,513	3,350,038	124,962	3,350,038	4%
	13,833,043	13,833	35,045	1,909,067	1,581,852	39,282	4,506,862	41,425,659	8,065,826	41,425,659	16%



Arapahoe County Domestic Water  
ACJC Detention Center

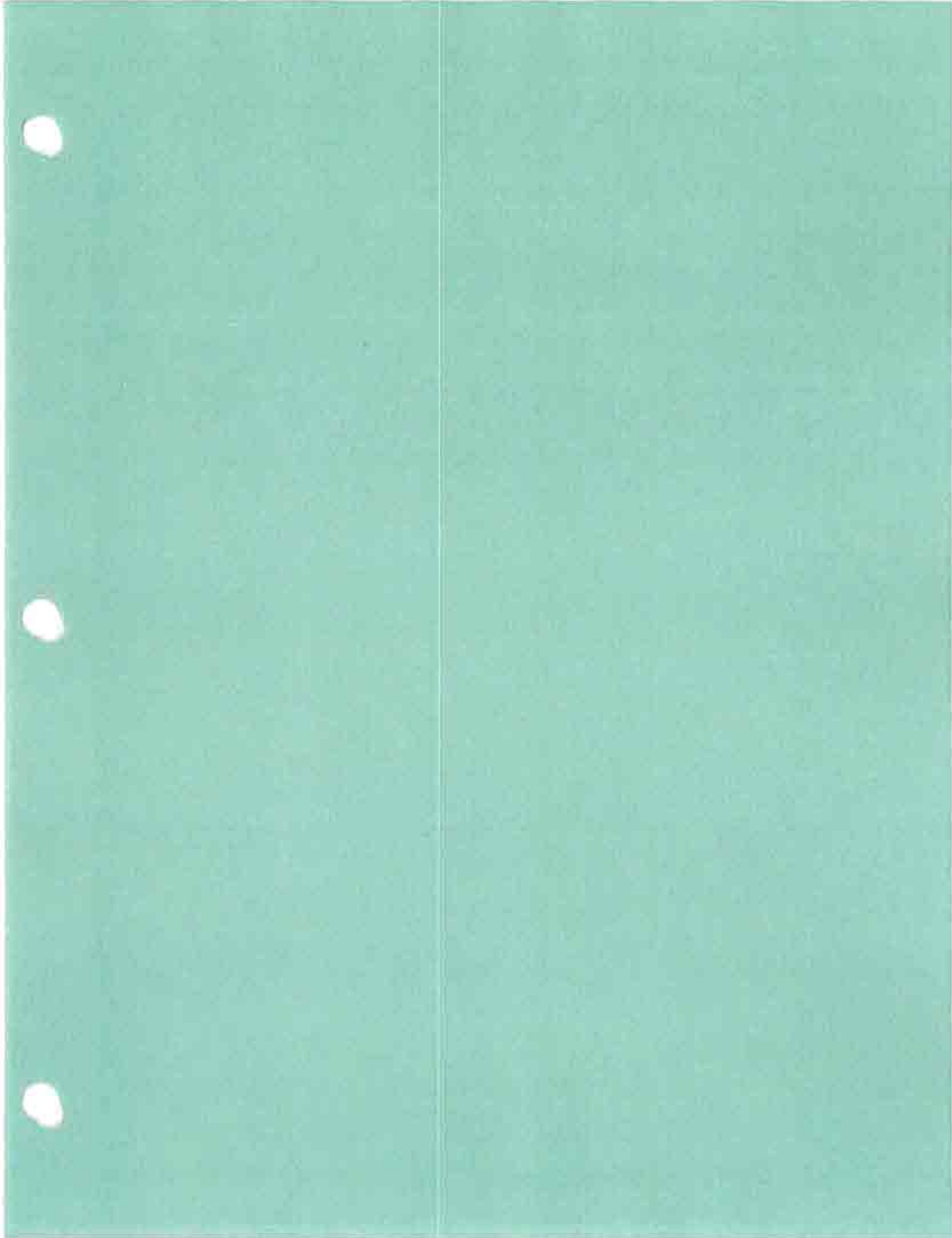
<b>Assumptions</b>		
Staff Population	195	
Pop Ratio Female	60.00%	
Visitor Population		
Pop Ratio Female		
Inmate Population		
Pop Ratio Female		
Population Inmate		
Staff Absentee rate	0.00%	
Visitors/day	163	
Visitor ratio Female	0.8	
Length of stay(hours)	1.2	
Days/year	365	
Site Type (Res Comm)	res	
Common Laundry?	no	
Quantity of Machines	6	
Quantity of Apt Units	88	
Laundry Population	0	
non resident factor	0.01	
<b>Water Temperature</b>		
Street	54	
DHW supply	130	
DHW Efficiency	0.7	
<b>Laundry</b>		
Cycle/person/day	0	
Gallons/load Pre	37.5	
Gallons/load Post	25	
<b>Ice Machine Calc.</b>		
Lbs/ Day	300	lbs
lbs/year	109500	lbs/year
Gallons / year	13145.3	gallons/year
Gallons of water/100 lbs of ice procees waste	4	gallons/day
Process waste	4380	gallons/year
Storage waste / day	24	gallons/day
Est. Storage Waste	8760	gallons/year
Number of Ice Machines	2	gai
Total Storage Waste	17520	gallons/year
Total Ice Machine Usage (Gallons)	35045	gallons/year

Energy Inputs	Billing units	\$/unit
DHW heating source	NG	\$0.5300
Fuel conversion source	GG	\$0.6500
Nat. Gas System Efficiency		82.00%

0.020831	29.997
----------	--------





### ECM 18 – Water Reclaim

There are three primary uses of water at the Peoria Shops: sanitary, road maintenance and vehicle washing. After estimating the sanitary usage in a manner identical to the methods used to analyze the sanitary water usage at the other buildings, the billing records indicate that the sanitary usage is a minor component of the total usage. The road maintenance water use was estimated and the balance of the water use is assumed to be the vehicle-washing load.

Water usage is determined by:

Sanitary Usage + Road Maintenance Usage + Vehicle Washing Usage
---

The road maintenance usage was estimated using the following assumptions based on interviews with the road construction staff.

<b>Street Sweepers</b>	
Capacity (gallons)	250
Quantity	4
Frequency (days each unit filled per year)	237
Total Usage (product of above) (gallons)	59,365
<b>Patch Trucks</b>	
Capacity (gallons)	50
Quantity	3
Frequency (days each unit filled per year)	150
Total Usage (product of above) (gallons)	22,500
<b>Tankers</b>	
Capacity (gallons)	3000
Quantity	2
Frequency (days each unit filled per year)	0
Total Usage (product of above) (gallons)	0
<b>Grand Total (Gallons)</b>	<b>81,865</b>

Street sweeper trucks go out every working day when it is above 20 °F. The number of days used accounts for the cold days. The patch trucks work during the summer construction season and fill or top off their tanks once a day.

There are large 3000 + gallon tank trucks used on road repair and road building projects for dust control. These trucks are filled at a remote standpipe and Shop water is not used for this function.

The vehicle-washing component includes washing passenger vehicles and trucks to maintain a presentable appearance and “mucking” out dump truck and cleaning mud and grime from the undercarriage. For the purposes of the estimating savings, it was assumed that the total vehicle wash water usage is divided equally between the vehicle washing and mucking operations and that 100 % of the mucking wash water would be recycled.

Water Savings:

$$\text{Total Usage} - \text{Sanitary Usage} - \text{Road Work Usage} = \text{Total Vehicle Washing Usage}$$

$$\text{Washing Recycle Savings} = \text{Total Vehicle Washing Usage} / 2$$

The electrical usage for the new system is summarized below:

Electric Calc: Washer pump	Washer Pump	Sump Pump
HP	10	1
kW/HP	0.746	0.746
Load Factor	0.70	0.70
Efficiency	0.80	0.70
kW (HP x .746 hp/kW x load factor / efficiency)	6.53	0.75
GPM	25	25
Gallons used for washing	640,000	640,000
Run Time	427	427
Total kWh	2,785	318
	Total kWh	3,103

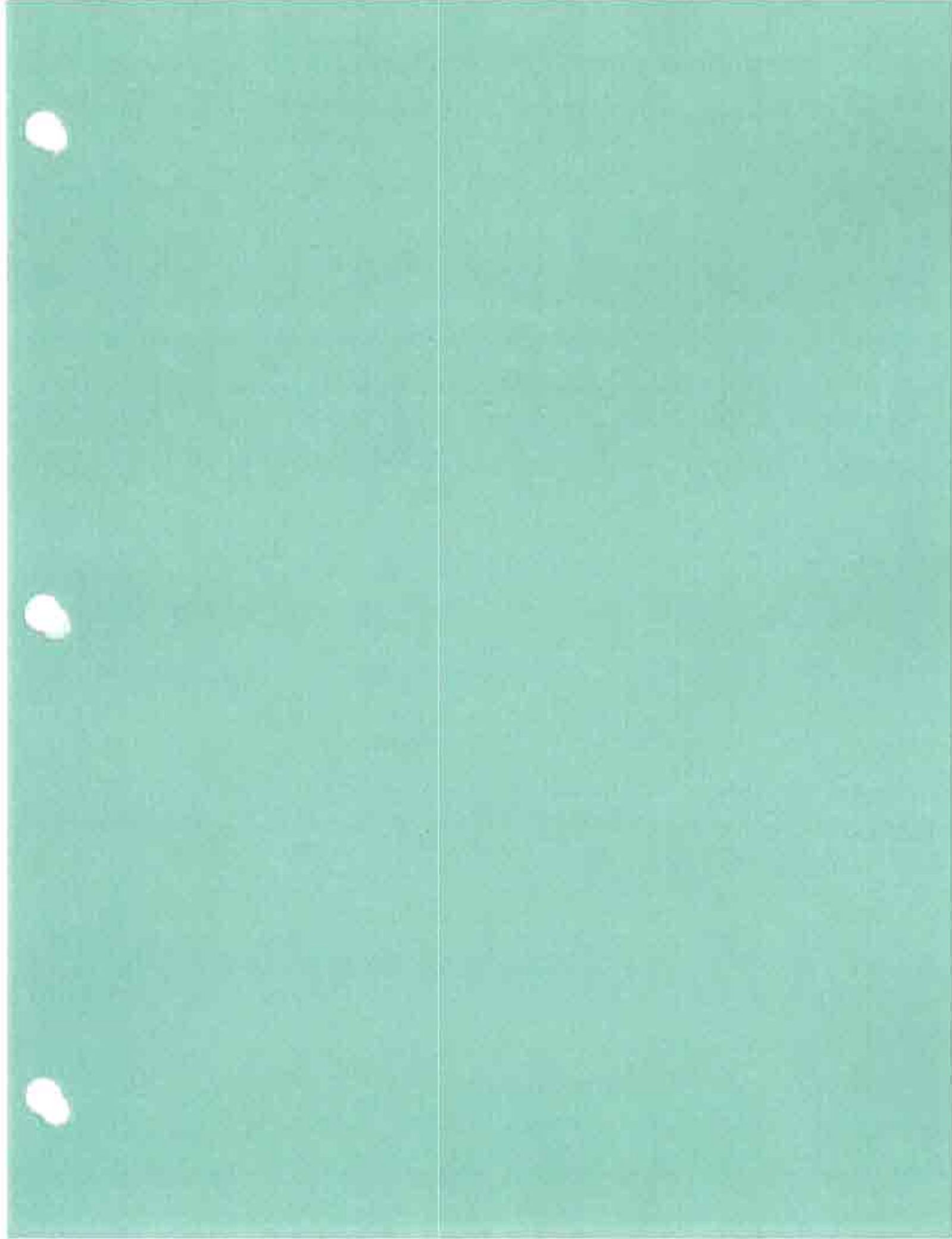
**Arapahoe County Domestic Water**  
**Peoria Shops**  
 Road Maintenance

Street sweepers are deployed when Temps are above 20 °F

Street Sweepers	250	actions
Capacity	4	
Quantity	237	
Frequency	59,365	
Total Usage		
Patch Trucks	50	
Capacity	3	
Quantity	150	
Frequency	22,500	
Total Usage		
Tankers	0	
Capacity	2	
Quantity	150	
Frequency	0	
Total Usage		
Grand Total	81,865	

Recycle factor 0.5  
 Total recycle savings 640000  
 Estimated cost savings 9600

Total Hours		20
average	Denver	
97	4	0
92	42	0
87	168	0
82	280	0
77	397	0
72	498	0
67	634	0
62	798	0
57	799	0
52	769	0
47	737	0
42	710	0
37	672	0
32	678	0
27	582	0
22	436	0
17	242	242
12	137	137
7	80	80
2	46	46
-3	20	20
-8	11	11
-13	3	3
-18	2	2
		541
		23



## ECM 19 – Laundry Conservation

The savings from the use of an ozone sanitizer comes from water savings produced by reducing the number of fills in a wash cycle and energy savings produced by the reduction of wash and rinse water temperatures. The reductions are based on the track record of ozone units installed at other facilities per manufacturer data and on data gathered from the facility including the quantity and size of loads and the degree of soiling. The reduction in water volume use and the reduction in water temperature are the manufactures estimates.

The following assumptions were used in calculating the savings:

Wash Load	LBS/day
Total Pounds/day	2,289
% Light Soil	90%
% Heavy Soil	10%

Wash Duty	Pre Measure Gallons/ Pound	Ozone Gallons per Pound	Percent Savings
Light Soil	2.8	2.1	26%
Heavy Soil	3.2	2.6	19%

Water Temperature °F	
Street	55.0
DHW supply	170.0

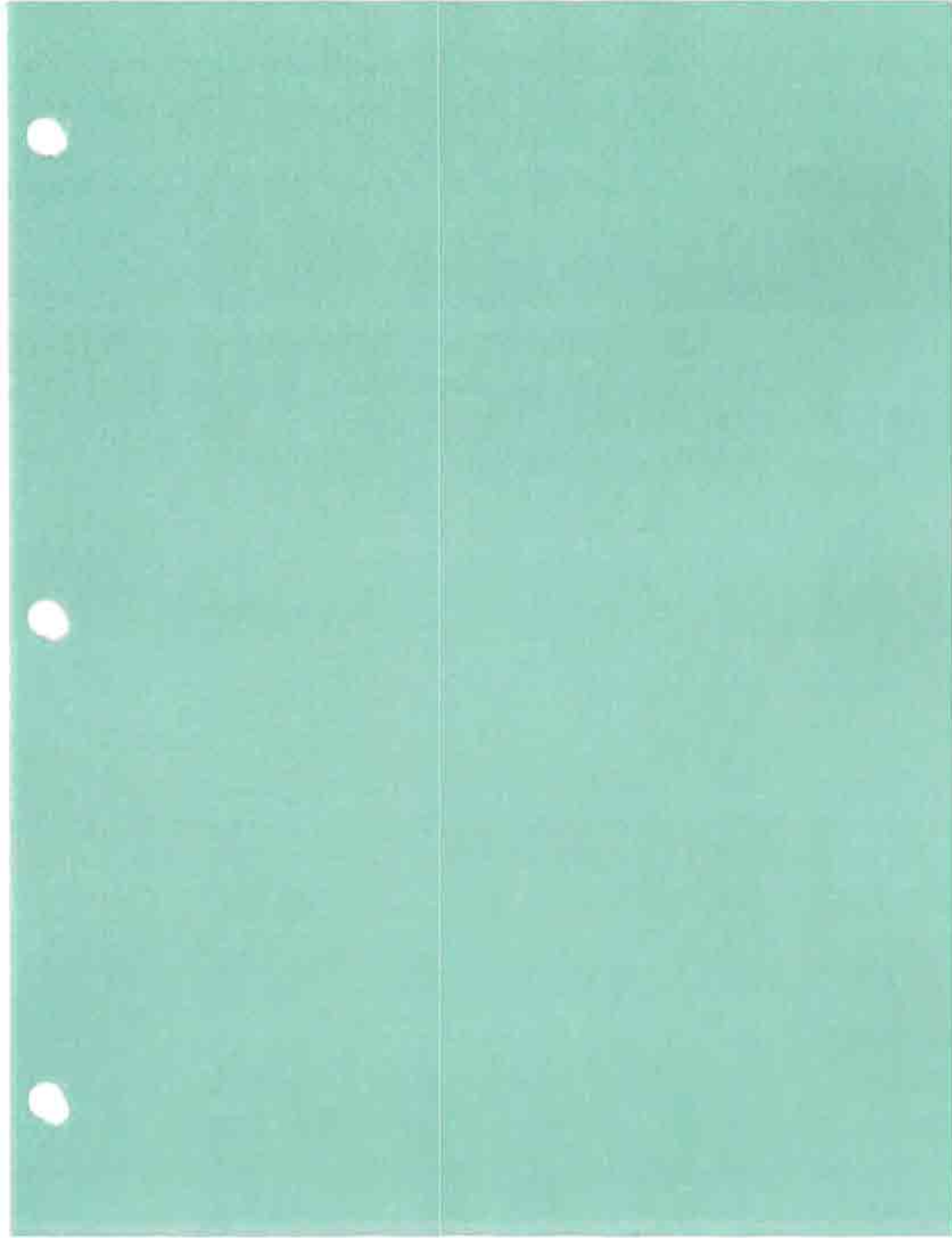
Laundry	Hot Water Fraction	
	Pre measure condition	Ozone Condition
Light Wash	65%	5%
Heavy Wash	73%	14%

Model pre measure	Light Soil			Heavy Soil		
	Cold	Hot	Total	Cold	Hot	Total
Gal/lb	0.98	1.82	2.80	0.86	2.34	3.20
lb/day	2,060	2,060	4,120	229	229	458
Gal/day	2,019	3,749	5,768	198	535	732
total gals/year	736,898	1,368,524	2,105,422	72,186	195,169	267,355
Model Ozone	Cold	Hot	Total	Cold	Hot	Total
Gal/lb	1.96	0.10	2.07	2.27	0.31	2.58
lb/day	2,060	2,060	4,120	229	229	458
Gal/day	4,046	213	4,259	521	71	591
total gals/year	1,476,728	77,676	1,554,404	190,006	25,841	215,846

Total Gallons Saved = (2,105,422-1,554,404) + (267,355-215,846) = 602,527

Hot Water Gallons Saved = (1,368,524 – 77,676) + (195,169 – 25,841) = 1,460,176

Therms Saved = (1460\*(8.33\*(170-55))/1000/0.8) = 1,748



## ***ECM 20 – Replace DHW HX with a New DHW Heater***

Please refer to the Energy Conservation Measure (ECM) section of this report for additional information.

### Existing Condition to Warrant an ECM Opportunity:

Currently, the domestic hot water (DHW) for building 01-Administration Building is produced by a heat exchanger (HX) that is served by the building's heating hot water loop. So, the two big natural gas-fired boilers that provide heating hot water must operate throughout the entire year in order to serve the building's DHW system. The replacement of the DHW HX with a stand-alone DHW heater will eliminate the need to operate the two boilers throughout the entire year, and DHW with a higher efficient heating source.

### Savings Calculation Methodology:

The implementation of this ECM shall result in natural gas savings. The first step in the savings calculation was to determine what the building's DHW load is. Once the actual DHW load was calculated then the amount of natural gas that is currently being consumed by the existing DHW system was calculated utilizing a 70% heating efficiency. Also, the amount of natural gas that will be consumed by the new DHW heater to meet the building's DHW load was calculated using an 85% heating efficiency. These two values were then subtracted from each other to produce a natural gas savings that is the result of a higher efficient heating source. Additional savings were calculated by subtracting the new DHW heater's summer usage from the billed summer usage which reflects the natural gas saved by not having to operate the boilers in the summer months.

Existing DHW Heater		Staff		Visitor	
		Faucet Usage women	Faucet Usage men	Faucet Usage women	Faucet Usage men
Days/year		237	237	251	251
Population:		231	154	41	41
Minutes		1	1	1	1
Use per day					
Uses or minutes		54,747	36,498	10,291	10,291
Diversity (account for absentee)		0.95	0.95	0.95	0.95
GPU present					
GPM present (PRE)		2.5	2.5	2.5	2.5
GPM Proposed					
GPM Proposed (POST)		1.5	1.5	1.5	1.5
Total Usage Pre (Gals)		130,024	86,683	24,441	24,441
Total Usage Post (Gals)		78,014	52,010	14,665	14,665
Savings		52,010	34,673	9,776	9,776

	100% Efficiency	70% Efficiency (Existing)
Total (Gals/yr.)	265,589	379,413
Yearly Usage/Annual Therms	1,681	2,402
% HW	0.67	
Total HW (Gals/yr.) PRE	178,237	254,624
Yearly Usage/Annual Therms HW	1,128	1,612

Monthly Therms / DHW		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Days		31	28	31	30	31	30	31	31	30	31	30	31
Monthly Usage/Therms (100%)		143	129	143	138	143	138	143	143	138	143	138	143
Monthly Usage/Therms (100%) HW		96	87	96	93	96	93	96	96	93	96	93	96
Existing DHW Heater		Total Therms in Summer HW 284											
Monthly Usage/Therms (70%)		204	184	204	197	204	197	204	204	197	204	197	204
Monthly Usage/Therms (70%) HW		137	124	137	132	137	132	137	137	132	137	132	137
New DHW Heater		Total Therms in Summer HW 406											
Monthly Usage/Therms (85%)		168	152	168	162	168	162	168	168	162	168	162	168
Monthly Usage/Therms (85%) HW		113	102	113	109	113	109	113	113	109	113	109	113
85% Efficiency		Total Therms in Summer HW 334											
Total (Gals/yr.)		312,458											
Yearly Usage/Annual Therms		1,978											
% HW		0.67											
Total HW (Gals/yr.) PRE		209,690											
Yearly Usage/Annual Therms HW		1,328											

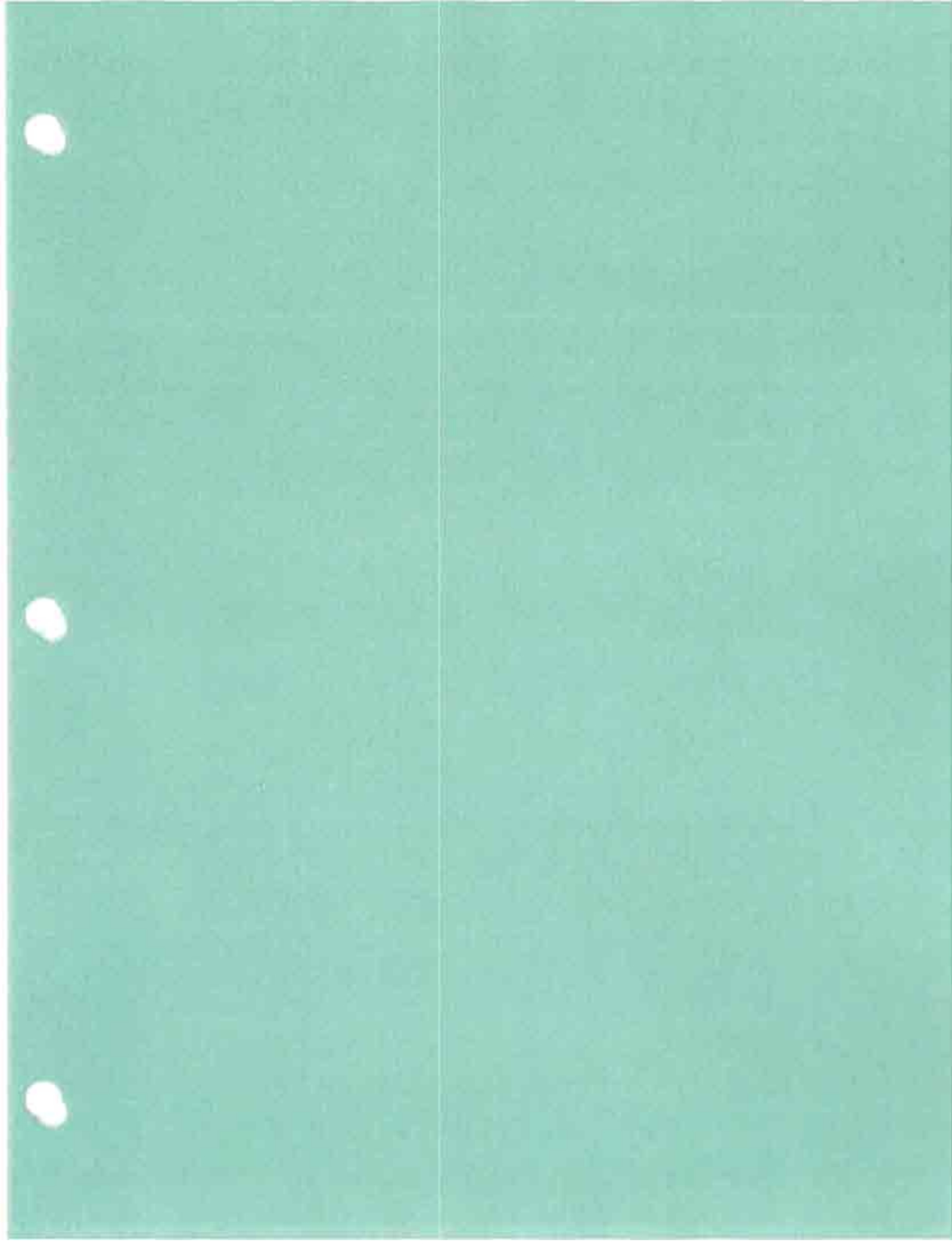
Savings		Savings (therms)	
Savings by Efficiency (12 mo.)	70% Efficiency	85% Efficiency	
Yearly Usage	2,402	1,978	424
Savings by Summer (boilers off)			
Summer Usage	3,030	498	
Total Savings			2,956
Yearly Usage (therms)			



### Admin I - DHW Pump EMCS Savings

Pump ID:	HP:	LF:	Efficiency:	kW:	Existing Run Hrs:	New Run Hrs:	kWh Savings:
DHWP-1	0.17	0.75	0.7	0.13	8,760	3,259	733
HX Pump	0.25	0.75	0.7	0.20	8,760	3,259	1,099
Total kWh Savings:							1,832

Note: The existing run hours are 24 h/d, 7 d/w. The new run hours are 12.5 h/d, 5 d/w. These savings shall be added to the EMCS savings that were calculated in the Trane Trace building simulation model.



### ***ECM 21 - Change Natural Gas Utility Provider***

#### **Savings Calculation Description:**

The savings for this ECM result from using a cheaper gas rate. The current natural gas utility provider, Xcel Energy, at Building 13-Arapahoe Human Services charges \$0.74946/therm. The new natural gas utility provider, Seminole Energy Services, shall charge \$0.63481/therm.

The dollar savings for this ECM were calculated by taking the difference in the two utility rates (\$0.11465/therm) and multiplying it the target natural gas usage of the facility. The target natural gas usage was calculated with the following equation:

**Target Natural Gas Usage** = Baseline Natural Gas Usage - Total Natural Gas Saved

where,

**Total Natural Gas Saved** = Total Natural Gas Saved at Building 12-Arapahoe Plaza Building +  
Total Natural Gas Saved at Building 13-Arapahoe Human Services + Total Natural Gas Saved at  
Building 14-Arapahoe Plaza West Building

Note: The natural gas-fired boilers at Building 13-Arapahoe Human Services provide heating to Buildings 12 and 14, that is why these two buildings are included in the calculation above.

**Project: Arapahoe County**  
**Building: 13-Arapahoe Human Services**

**Natural Gas Usage Baseline**

Baseline Units: therms

Account #(s): 53-3441672-9

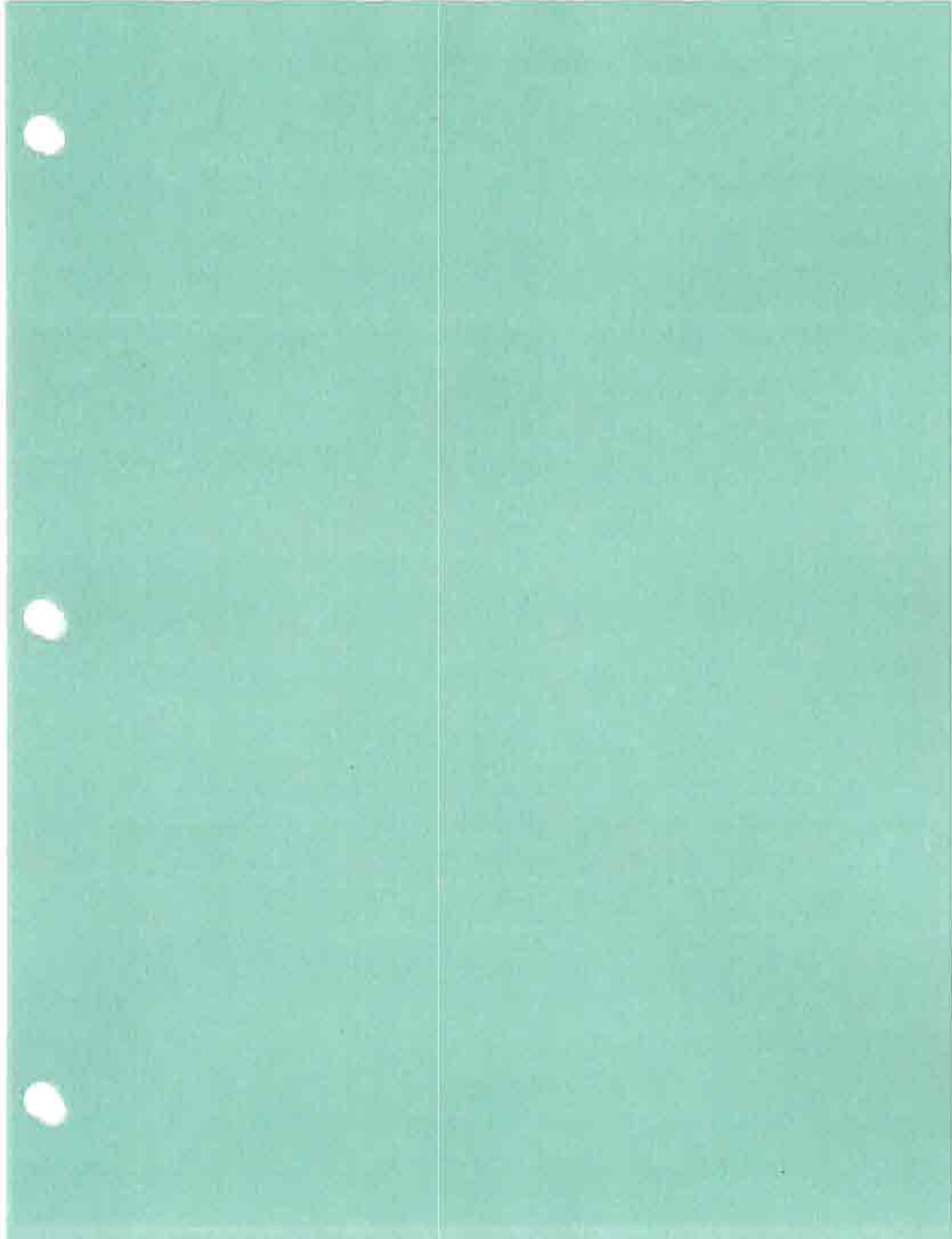
Meter #(s): 1015025

Total Monthly Natural Gas Usage (therms)					CEA Baseline	Average All Data	Average Last 2 Years	Most Recent 12 Months
Month	2002	2003	2004	2005				
Jan			7,719	6,316	6,316	7,018	7,018	6,316
Feb			6,785	5,567	5,567	6,176	6,176	5,567
Mar			4,638	5,364	5,364	5,001	5,001	5,364
Apr	2,333		3,074		3,074	2,704	3,074	3,074
May	1,388		2,324		2,324	1,856	2,324	2,324
Jun	587		1,054		1,054	821	1,054	1,054
Jul			605		605	605	605	605
Aug		524	873		873	699	699	873
Sep		1,193	1,523		1,523	1,358	1,358	1,523
Oct	3,702	3,570	4,029		4,029	3,767	3,800	4,029
Nov	5,787	5,918	6,131		6,131	5,945	6,025	6,131
Dec		7,347	6,336		6,336	6,842	6,842	6,336
Totals	13,797	18,552	45,091	17,247	43,196	42,792	43,976	43,196

The CEA Baseline is the Most Recent Twelve Months Data Collected.

The Initial Monitoring Baseline will be reviewed and determined before the start of monitoring.

Performance Contract Savings:	16280
New Baseline:	26,916
0.11465 \$	3,086

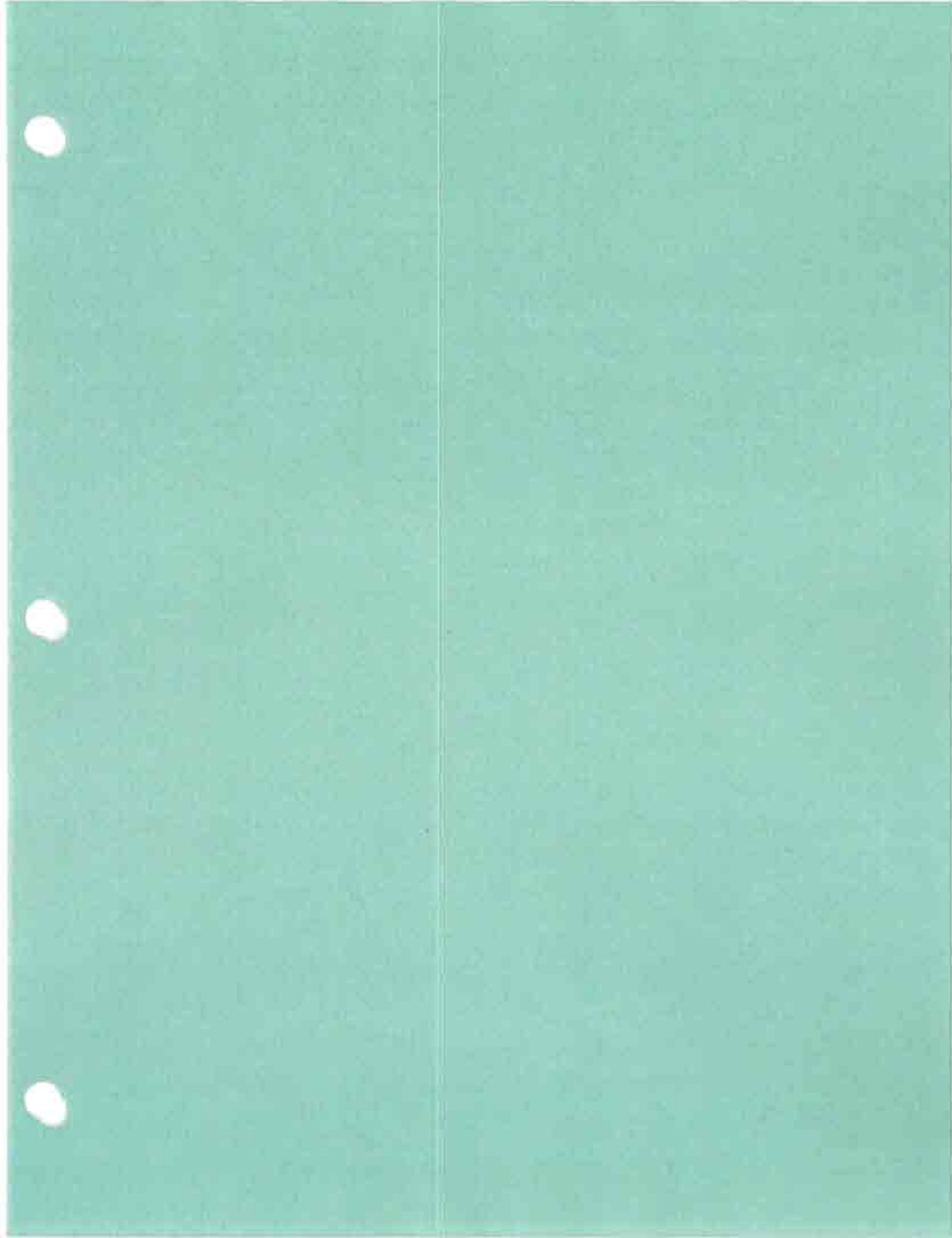


### ***ECM 23 – Energy Resource Conservation Manager***

Savings will be achieved through behavioral modifications of occupants (convincing them to turn their lights off, don't mess with thermostats, etc.). See ECM write-up #23 in Section 4 of this Report for more information. The savings for this ECM are stipulated.

Arapahoe County's utility budget over the past twelve months was \$2,274,106 including water, electrical, and natural gas usage. Table 2-4 in Volume I of this report illustrates this.

- The current recommended program estimates that \$431,264 in energy savings thus reducing the energy budget to \$1,842,842.
- A conservative estimate of savings for this program is 1% of budget or \$18,428.
- \$15,000 is used in the program.



*ECM 24 – Replace Cooling Tower*



Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	202,551	197,435 3%
Feb	172,659	178,589 -3%
Mar	234,751	203,151 13%
Apr	234,674	190,309 19%
May	248,888	221,458 11%
Jun	247,557	224,685 9%
Jul	293,663	238,057 19%
Aug	276,365	238,231 14%
Sep	228,143	211,261 7%
Oct	214,985	213,383 1%
Nov	201,979	192,946 4%
Dec	199,199	194,492 2%
	2,755,414	2,503,997 9%

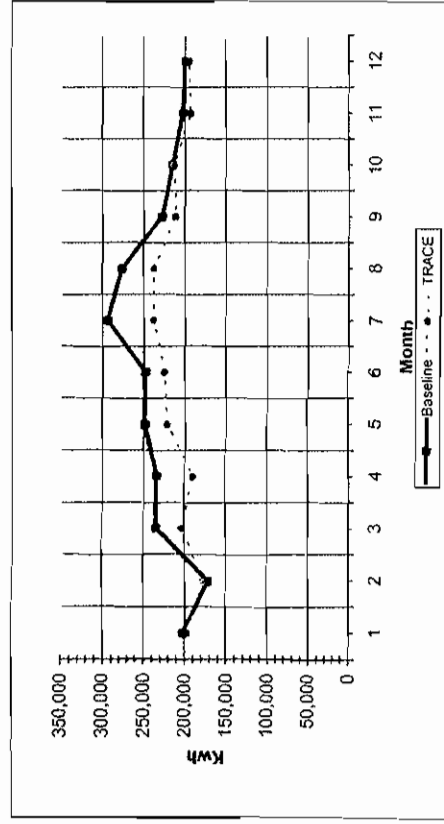
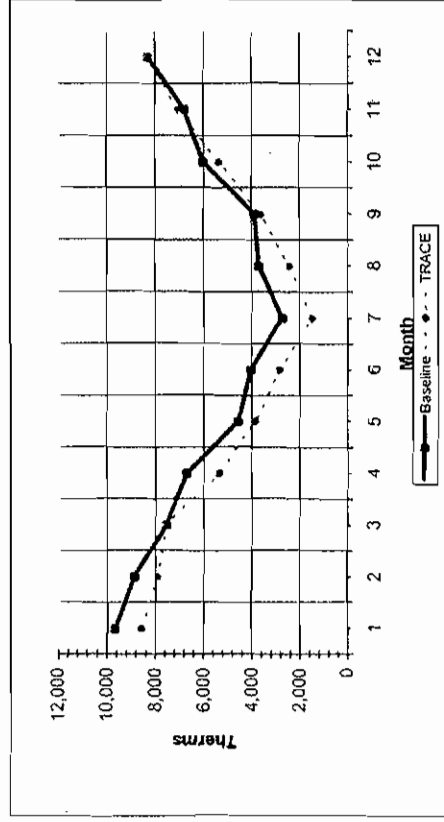


Figure 1

Arapahoe County - ACJC Courthouse  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)	
	BASELINE	MODEL
Jan	9,680	8,570 11%
Feb	8,870	7,938 11%
Mar	7,540	7,540 0%
Apr	6,710	5,356 20%
May	4,560	3,860 15%
Jun	4,020	2,835 29%
Jul	2,730	1,484 46%
Aug	3,710	2,446 34%
Sep	3,870	3,639 6%
Oct	6,020	5,366 11%
Nov	6,770	7,029 -4%
Dec	8,320	8,374 -1%
	72,800	64,437 11%



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kW/h)	197,435	178,589	203,151	190,309	221,453	224,865	238,057	238,231	211,281	213,383	192,946	194,492	2,503,985
On-Pk Demand (kW)	409	409	409	430	486	583	581	574	516	490	409	409	581
<b>Gas</b>													
On-Pk Cons. (therms)	8,570	7,938	7,540	5,356	3,860	2,835	1,484	2,446	3,639	5,368	7,029	8,374	64,439
On-Pk Demand (therms/hr)	45	44	44	44	44	44	44	44	44	44	44	44	45
<b>Water</b>													
Cons. (1000gal)	0	0	0	0	82	109	155	132	81	56	0	0	615
<b>Building Energy Consumption = 142,485 Btu/(ft2-year)</b>													
<b>Source Energy Consumption = 308,201 Btu/(ft2-year)</b>													
<b>Floor Area = 105,204 ft2</b>													

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	172,576	155,952	166,190	194,011	196,562	208,985	208,391	185,310	186,583	168,343	189,960	2,189,927
	On-Pk Demand (kW)	346	346	350	415	488	501	491	443	417	348	346	501
Gas	On-Pk Cons. (therms)	8,695	8,063	7,673	3,915	2,859	1,436	2,445	3,694	5,460	7,149	8,475	66,319
	On-Pk Demand (therms/hr)	42	42	42	42	42	42	42	42	42	42	42	42
Water	Cons. (1000gal)	0	0	0	67	90	129	108	66	46	0	0	506

Building Energy Consumption = 133,133 Btu/(ft2-year)  
 Source Energy Consumption = 278,513 Btu/(ft2-year)  
 Floor Area = 105,204 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	164,194	148,381	158,067	158,423	184,563	168,552	203,494	197,971	175,808	178,072	160,172	162,178	2,087,862
On-Pk Demand (kW)	346	346	346	350	415	488	501	491	443	417	346	346	501
<b>Gas</b>													
On-Pk Cons. (therms)	8,519	7,900	7,409	4,930	3,084	1,916	800	1,394	2,877	4,630	6,839	8,278	58,575
On-Pk Demand (therms/hr)	42	42	42	42	33	13	7	10	31	42	42	42	42
<b>Water</b>													
Cons. (1000gal)	0	0	0	0	65	85	133	104	62	46	0	0	496
<b>Building Energy Consumption =</b>													
Source Energy Consumption =	123,411 Btu/(ft2-year)												
Floor Area =	261,828 Btu/(ft2-year)												
	105,204 ft2												

## By Release 2.006

## Monthly Energy Consumption

Building Energy Consumption =	114,269	Btu/(ft <sup>2</sup> -year)
Source Energy Consumption =	252,900	Btu/(ft <sup>2</sup> -year)
Floor Area =	105,204	ft <sup>2</sup>

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 ACJC Courthouse

Utility Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
---------	-----	-----	-----	-----	-----	------	------	-----	------	-----	-----	-----	-------

## Electric

On-Pk Cons. (kWh)	165,187	149,258	169,076	159,381	184,637	186,273	202,080	197,420	175,861	178,439	161,738	163,159	2,091,908
On-Pk Demand (kW)	349	349	348	353	414	483	494	485	442	476	349	349	494

## Gas

On-Pk Cons. (therms)	7,042	5,530	6,129	4,089	2,570	1,608	527	1,180	2,399	4,007	5,659	6,844	40,583
On-Pk Demand (therms/hr)	35	34	34	34	27	10	6	8	26	34	34	34	35

## Water

Cons. (1000gal)	0	0	0	0	64	84	132	103	62	45	0	0	490
-----------------	---	---	---	---	----	----	-----	-----	----	----	---	---	-----

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

114,045 Btu/(ft2-year)  
252,226 Btu/(ft2-year)  
105,204 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
AH-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHU-1	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm
AHIU-2	Fan Schedule Changed	M-F - 4am-11pm, Sat-Sun: 8am-17pm	M-F: 5:30am-9:30pm; Sat-Sun: 8am-17pm

**Previous Run (New Lighting Run):**

Annual kWh Usage: 2,189,928  
Annual kW Usage: 4,835  
Annual Therm Usage: 65,319

**Current Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 2,087,853  
Annual kW Usage: 4,835  
Annual Therm Usage: 58,576

**Savings (Upgrade Existing EMCS Savings):**

Annual kWh Savings: 102,075  
Annual kW Savings: 0  
Annual Therm Savings: 6,743

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Replace the Existing Boilers

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
NG Fired HW Boilers	Efficiency	Atmospheric Boiler (65% Efficient Energy Rate)	Gas Fired Hot Water Boiler (79% Efficient Energy Rate)

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 2,087,853  
Annual kW Usage: 4,835  
Annual Therm Usage: 58,576

**Current Run (Replace the Existing Boilers Run):**

Annual kWh Usage: 2,098,843  
Annual kW Usage: 4,861  
Annual Therm Usage: 48,584

**Savings (Replace the Existing Boilers Savings):**

Annual kWh Savings: -10,990  
Annual kW Savings: -26  
Annual Therm Savings: 9,992

**Notes:**

1. The negative kW and kWh savings is the energy used by the forced draft burner on the new boiler.

**Electric Savings Safety Factor:** 0.73  
**Natural Gas Savings Safety Factor:** 0.73



## MODELING NOTES

### ARAPAHOE COUNTY - ACJC COURTHOUSE

ECM Run: Replace Cooling Tower

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
Water Cooled Chiller	Energy Rate	0.8536 kW/ton	0.776 kW/ton

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 2,098,843  
Annual kW Usage: 4,861  
Annual Therm Usage: 48,584

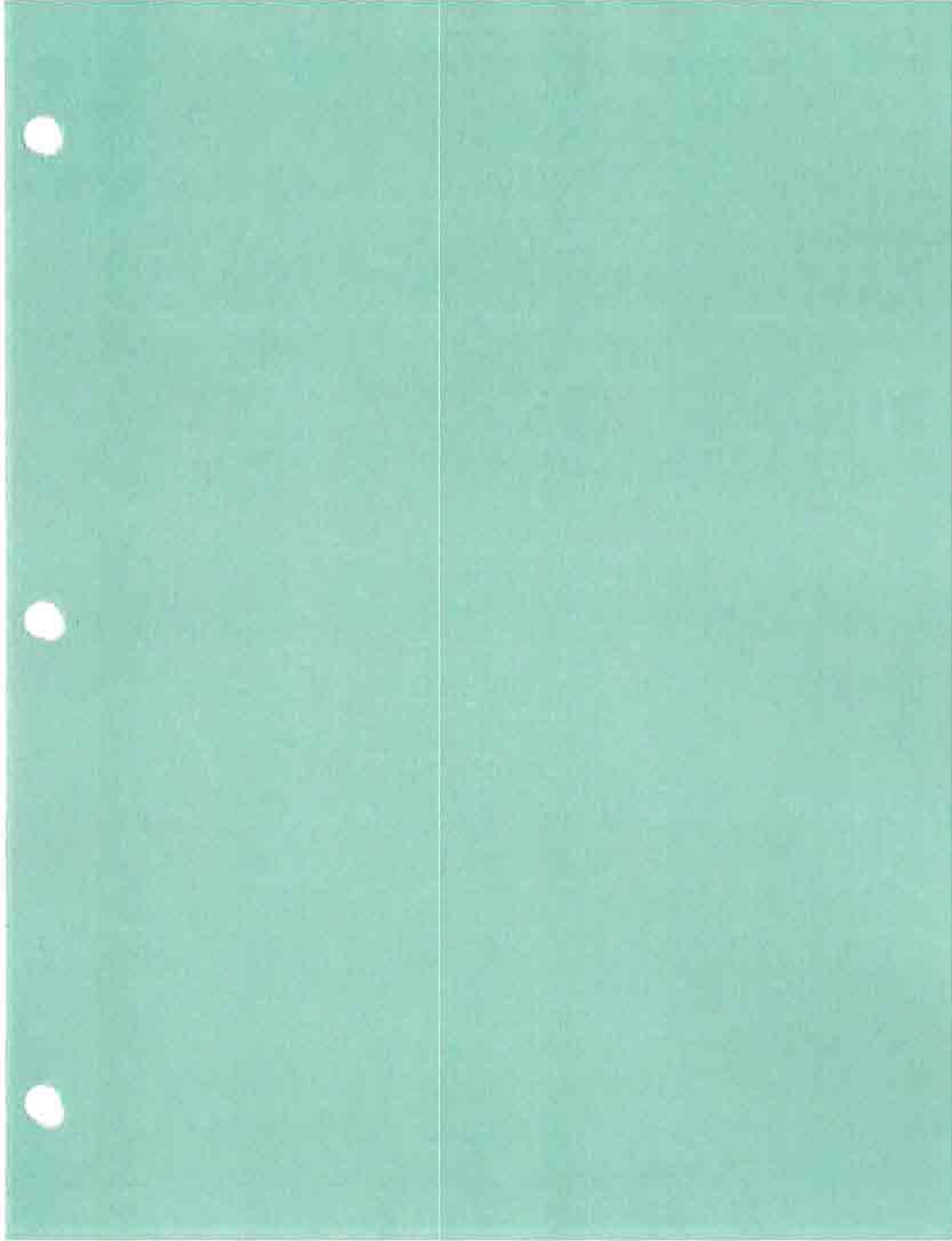
**Current Run (Replace the Cooling Tower Run):**

Annual kWh Usage: 2,091,909  
Annual kW Usage: 4,832  
Annual Therm Usage: 48,584

**Savings (Replace Cooling Tower Savings):**

Annual kWh Savings: 6,934  
Annual kW Savings: 29  
Annual Therm Savings: 0

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73



## ***ECM 25 – Retro-commissioning***

Details of Retro-commissioning services can be found in ECM write-up #25, located in Volume 1 of 2 of this Comprehensive Energy Analysis.

### Existing Condition to Warrant an ECM Opportunity:

The Sheriff's Coroners and Centrepont Facilities are two recently built buildings that currently have an energy management control system (EMCS). In both cases, the equipment in these facilities operates during periods of the little or no occupancy. So, some of the existing operating schedules programmed into the EMCS can be modified to better match the actual occupancy schedules. Also much of the HVAC equipment has fallen out of calibration and is not operating very efficiently.

### Savings Calculation Methodology:

The savings for this ECM were calculated utilizing two Trane Trace building energy simulation models. The first model included the existing operating schedules for each piece of equipment. The second model was modified to include the new operating schedules to set back areas within the facilities during unoccupied periods. As each facility utilizes electric reheat the models were also programmed to allow the natural gas preheat to operate in lieu of the electric reheat during morning warm-up as this is a more efficient way to operate the equipment. This made gas usage increase but saved considerable amount of electric energy. The annual energy consumption calculated from each model was subtracted from one another to produce the annual energy savings.

Spreadsheet calculations were performed on the buildings that were not modeled. The spreadsheet calculations used the same methodology described above.

Figure 1

Arapahoe County - Centrepont Plaza  
Computer Model Calibration for Electric Energy Use

Month	ELECTRIC ENERGY USAGE (kWh)	
	BASELINE	MODEL
Jan	260,048	165,144 36%
Feb	230,963	151,316 34%
Mar	252,724	169,175 33%
Apr	215,531	151,954 29%
May	211,119	199,585 5%
Jun	213,078	216,752 -2%
Jul	224,479	245,758 -9%
Aug	222,248	240,887 -8%
Sep	210,752	190,230 10%
Oct	215,706	171,451 21%
Nov	230,257	153,726 33%
Dec	256,230	156,570 39%
	2,743,135	2,212,548 19%

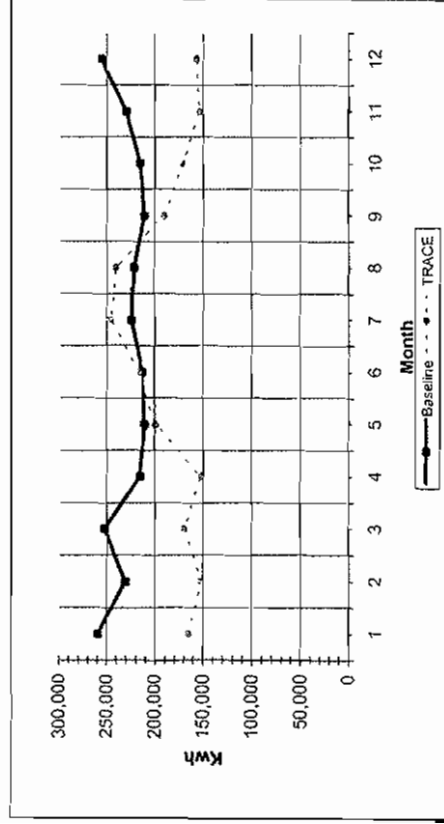
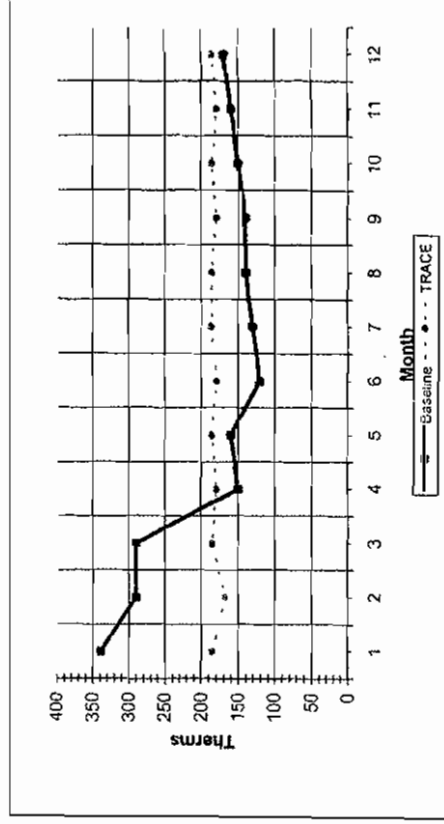


Figure 1

Arapahoe County - Centrepont Plaza  
Computer Model Calibration for NG usage

Month	NG USAGE (Therms)	
	BASELINE	MODEL
Jan	340	186 45%
Feb	290	168 42%
Mar	290	186 36%
Apr	150	180 -20%
May	160	186 -16%
Jun	120	180 -50%
Jul	130	186 -43%
Aug	140	186 -33%
Sep	140	180 -29%
Oct	150	186 -24%
Nov	160	180 -13%
Dec	170	186 -9%
	2,240	2,190 2%



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Centrepont Plaza

Utility Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	165,144	151,316	169,175	151,964	159,565	216,752	245,758	240,887	190,230	171,451	153,728	156,570	2,212,549
On-Pk Demand (kW)	560	509	548	509	606	657	797	715	647	560	514	589	797

Gas													
On-Pk Cons. (therms)	186	188	186	180	166	180	186	186	180	186	180	186	2,190
On-Pk Demand (therms/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0

Building Energy Consumption = 57,380 Btu/(ft2-year)  
 Source Energy Consumption = 169,007 Btu/(ft2-year)  
 Floor Area = 135,421 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1      Centrepont Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	161,443	147,980	155,165	147,758	194,701	211,758	240,844	235,560	185,659	186,738	149,436	152,822	2,159,865
On-Pk Demand (kW)	547	557	539	494	590	841	774	698	690	545	506	557	774
<b>Gas</b>													
On-Pk Cons. (therms)	186	188	186	180	186	180	186	186	180	186	180	186	2,190
On-Pk Demand (therms/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Building Energy Consumption =</b>													
<b>Source Energy Consumption =</b>													
<b>Floor Area =</b>													
			58,052	Btu/(ft2-year)									
			165,023	Btu/(ft2-year)									
			135,421	ft2									

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Centrepoint Plaza

		----- Monthly Energy Consumption -----												
Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	144,780	132,997	149,824	134,020	180,345	156,001	221,271	217,840	171,107	152,455	136,386	137,896	1,973,523
	On-Pk Demand (kW)	547	557	553	494	591	642	786	701	635	545	509	557	788
Gas	On-Pk Cons. (therms)	188	188	188	180	186	180	186	186	180	186	180	186	2,190
	On-Pk Demand (therms/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Building Energy Consumption =		51,353 Btu/(ft2-year)												
Source Energy Consumption =		150,955 Btu/(ft2-year)												
Floor Area =		135,421 ft2												

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1      Centrepoin Plaza

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
<b>Electric</b>													
On-Pk Cons. (kWh)	111,981	88,612	125,980	131,508	180,345	196,001	221,271	217,840	171,107	150,770	120,902	108,691	1,834,807
On-Pk Demand (kW)	448	447	458	494	591	642	786	701	635	545	457	446	788
<b>Gas</b>													
On-Pk Cons. (therms)	1,655	1,708	1,248	294	186	180	186	186	180	261	827	1,500	8,408
On-Pk Demand (therms/hr)	11	11	11	9	0	0	0	0	0	3	11	11	11
<b>Building Energy Consumption =</b>													
<b>Source Energy Consumption =</b>													
<b>Floor Area =</b>													
			52,451										
			145,277										
			135,421										
			ft2										



## MODELING NOTES

### ARAPAHOE COUNTY - CENTREPOINT PLAZA

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
Rm-1	Fan Schedule Changed	M-F - 5am-11pm, Sat-Sun: 8am-5pm	M-F: 6am-10pm; Sat-Sun: 8am-5pm
Rm-2	Fan Schedule Changed	M-F - 5am-11pm, Sat-Sun: 8am-5pm	M-F: 6:30am-9pm; Sat-Sun: 8am-5pm
Rm-3	Fan Schedule Changed	M-F - 5am-11pm, Sat-Sun: 8am-5pm	M-F: 7am-7pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 2,159,864  
Annual kW Usage: 7,078  
Annual Therm Usage: 2,190

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 1,973,822  
Annual kW Usage: 7,119  
Annual Therm Usage: 2,190

#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 186,042  
Annual kW Savings: -41  
Annual Therm Savings: 0

#### Notes:

1. The negative kW savings is the result of the electric reheat coils all coming 100% on in the morning to bring the space temperature up from 55F in the morning. These negative savings shall not be accounted for since the EMCS shall warm each space up gradually without having to energize each reheat coil to 100% of its capacity.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

## MODELING NOTES

### ARAPAHOE COUNTY - CENTREPOINT PLAZA

ECM Run: Utilize Natural Gas Preheat

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
Heating System 01	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil
Heating System 02	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil
Heating System 03	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 1,973,822  
Annual kW Usage: 7,119  
Annual Therm Usage: 2,190

**Current Run (Utilize Natural Gas Preheat Run):**

Annual kWh Usage: 1,834,806  
Annual kW Usage: 6,652  
Annual Therm Usage: 8,409

**Savings (Utilize Natural Gas Preheat Savings):**

Annual kWh Savings: 139,016  
Annual kW Savings: 467  
Annual Therm Savings: -6,219

**Notes:**

1. The air handling units are equipped with natural gas burners that can be utilized to preheat the mixed air stream before it enters the electric reheat VAV boxes. Currently they are not being utilized to do this, the electric reheat coils are handling the entire heating load. So this ECM, which is included with the Upgrade Existing EMCS ECM, includes utilizing the existing natural gas fired burners to preheat the mixed air stream.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73

Figure 1

Arapahoe County - Sheriff/Coroner Facility  
Computer Model Calibration for Electric Energy Use

ELECTRIC ENERGY USAGE (kWh)		
Month	BASELINE	MODEL
Jan	233,435	165,528
Feb	205,024	154,600
Mar	222,636	161,209
Apr	199,959	138,039
May	202,483	177,411
Jun	194,728	193,133
Jul	204,941	222,406
Aug	203,837	218,283
Sep	191,029	170,089
Oct	190,813	159,069
Nov	185,731	140,385
Dec	238,052	154,695
	2,472,668	2,054,847
		17%

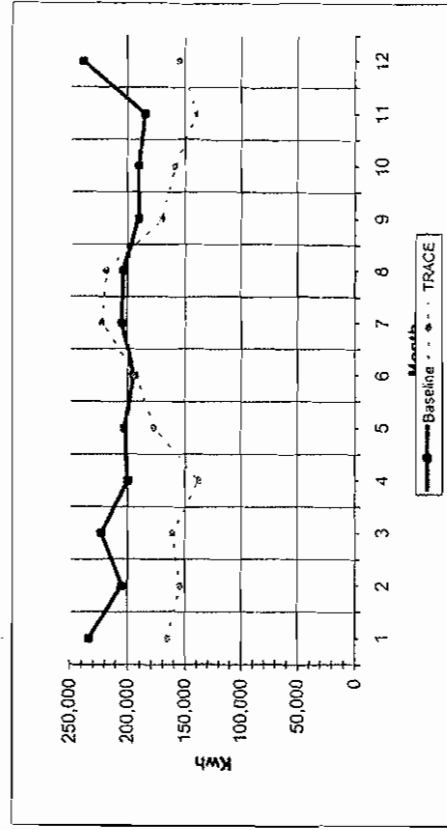
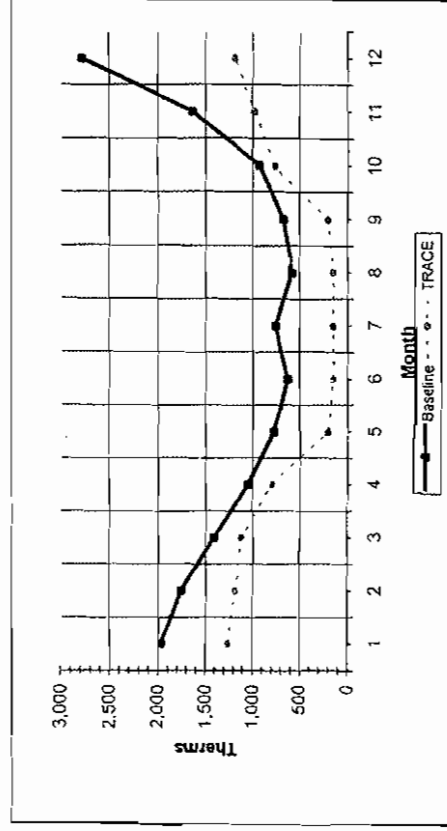


Figure 1

Arapahoe County - Sheriff/Coroner Facility  
Computer Model Calibration for NG usage

NG USAGE (Therms)		
Month	BASELINE	MODEL
Jan	1,970	1,262
Feb	1,760	1,187
Mar	1,410	1,122
Apr	1,050	796
May	770	205
Jun	630	150
Jul	760	149
Aug	580	149
Sep	670	207
Oct	930	764
Nov	1,640	978
Dec	2,780	1,191
	14,950	8,160
		45%



# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1      Sheffs Corners

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	165,528	154,600	161,209	138,039	177,411	198,133	222,406	218,283	170,089	159,069	140,385	154,895	2,054,848
On-Pk Demand (kW)	541	550	550	485	567	603	681	643	593	528	472	550	681

Gas

On-Pk Cons. (therms)	1,262	1,187	1,122	796	205	150	149	149	207	764	978	1,191	8,160
On-Pk Demand (therms/hr)	3	3	3	3	2	1	0	0	2	3	3	3	3

Building Energy Consumption =

Source Energy Consumption =

Floor Area =

67,883 Btu/(ft2-year)  
189,887 Btu/(ft2-year)  
115,335 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Sheriffs Coroners

		Monthly Energy Consumption												Total
Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Electric	On-Pk Cons. (kWh)	163,364	152,857	158,758	135,413	174,026	189,585	218,813	214,423	168,914	155,869	138,032	152,880	2,020,714
	On-Pk Demand (kW)	530	538	538	471	552	588	665	627	577	514	463	538	665

Gas

On-Pk Cons. (therms)	1,285	1,189	1,125	797	206	151	149	149	208	208	765	980	1,194	8,178
On-Pk Demand (therms/hr)	3	3	3	3	2	1	0	0	0	2	3	3	3	3

Building Energy Consumption =  
Source Energy Consumption =  
Floor Area =

66,888 Btu/(ft2-year)  
186,873 Btu/(ft2-year)  
115,335 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1 Sheriffs Coronnars

----- Monthly Energy Consumption -----

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	151,251	142,104	147,554	125,359	137,510	182,224	210,780	205,749	180,183	149,444	128,938	142,603	1,917,713
On-Pk Demand (kW)	530	538	538	470	552	589	666	628	578	514	463	538	686
Gas													
On-Pk Cons. (therms)	1,265	1,189	1,125	797	206	151	149	149	208	765	980	1,194	8,178
On-Pk Demand (therms/hr)	3	3	3	3	2	1	0	0	2	3	3	3	3

Building Energy Consumption = 63,840 Btu/(ft2-year)  
 Source Energy Consumption = 177,728 Btu/(ft2-year)  
 Floor Area = 115,335 ft2

# MONTHLY ENERGY CONSUMPTION

By Release 2.006

Alternative: 1      Sheriffs Coroners

----- Monthly Energy Consumption -----

Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric	On-Pk Cons. (kWh)	105,678	96,450	112,233	120,952	167,510	182,224	210,760	205,749	190,183	142,626	104,390	102,092	1,706,948
	On-Pk Demand (kW)	427	427	426	470	552	589	666	628	578	514	427	427	666
Gas	On-Pk Cons. (therms)	3,288	3,257	2,892	1,212	206	151	149	149	208	1,070	2,071	2,994	17,446
	On-Pk Demand (therms/hr)	12	12	12	9	2	1	0	0	2	7	12	12	12

Building Energy Consumption = 65,698 Btu/(ft2-year)  
 Source Energy Consumption = 167,652 Btu/(ft2-year)  
 Floor Area = 115,335 ft2

## MODELING NOTES

### ARAPAHOE COUNTY - SHERIFF/CORONER FACILITY

ECM Run: Upgrade Existing EMCS

Fan System	Item Changed	Previous Run Input	Current Run Input
Rm-4	Fan Schedule Changed	M-F - 4am-1am, Sat-Sun: 8am-5pm	M-F: 5am-10pm; Sat-Sun: 8am-5pm
Rm-5	Fan Schedule Changed	M-F - 4am-1am, Sat-Sun: 8am-5pm	M-F: 6am-10pm; Sat-Sun: 8am-5pm

#### Previous Run (New Lighting Run):

Annual kWh Usage: 2,020,714  
Annual kW Usage: 6,601  
Annual Therm Usage: 8,178

#### Current Run (Upgrade Existing EMCS Run):

Annual kWh Usage: 1,917,714  
Annual kW Usage: 6,604  
Annual Therm Usage: 8,178

#### Savings (Upgrade Existing EMCS Savings):

Annual kWh Savings: 103,000  
Annual kW Savings: -3  
Annual Therm Savings: 0

#### Notes:

1. The negative kW savings is the result of the electric reheat coils all coming 100% on in the morning to bring the space temperature up from 55F in the morning. These negative savings shall not be accounted for since the EMCS shall warm each space up gradually without having to energize each reheat coil to 100% of its capacity.

Electric Savings Safety Factor: 0.73  
Natural Gas Savings Safety Factor: 0.73



## MODELING NOTES

### ARAPAHOE COUNTY - SHERIFF/CORONER FACILITY

ECM Run: Utilize Natural Gas Preheat

Cooling Equipment Tag	Item Changed	Previous Run Input	Current Run Input
Heating System 01	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil
Heating System 02	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil
Heating System 03	Preheat Coil Plant Type	No Preheat Coil	NG Preheat Coil

**Previous Run (Upgrade Existing EMCS Run):**

Annual kWh Usage: 1,917,714  
Annual kW Usage: 6,604  
Annual Therm Usage: 8,178

**Current Run (Utilize Natural Gas Preheat Run):**

Annual kWh Usage: 1,708,947  
Annual kW Usage: 6,131  
Annual Therm Usage: 17,447

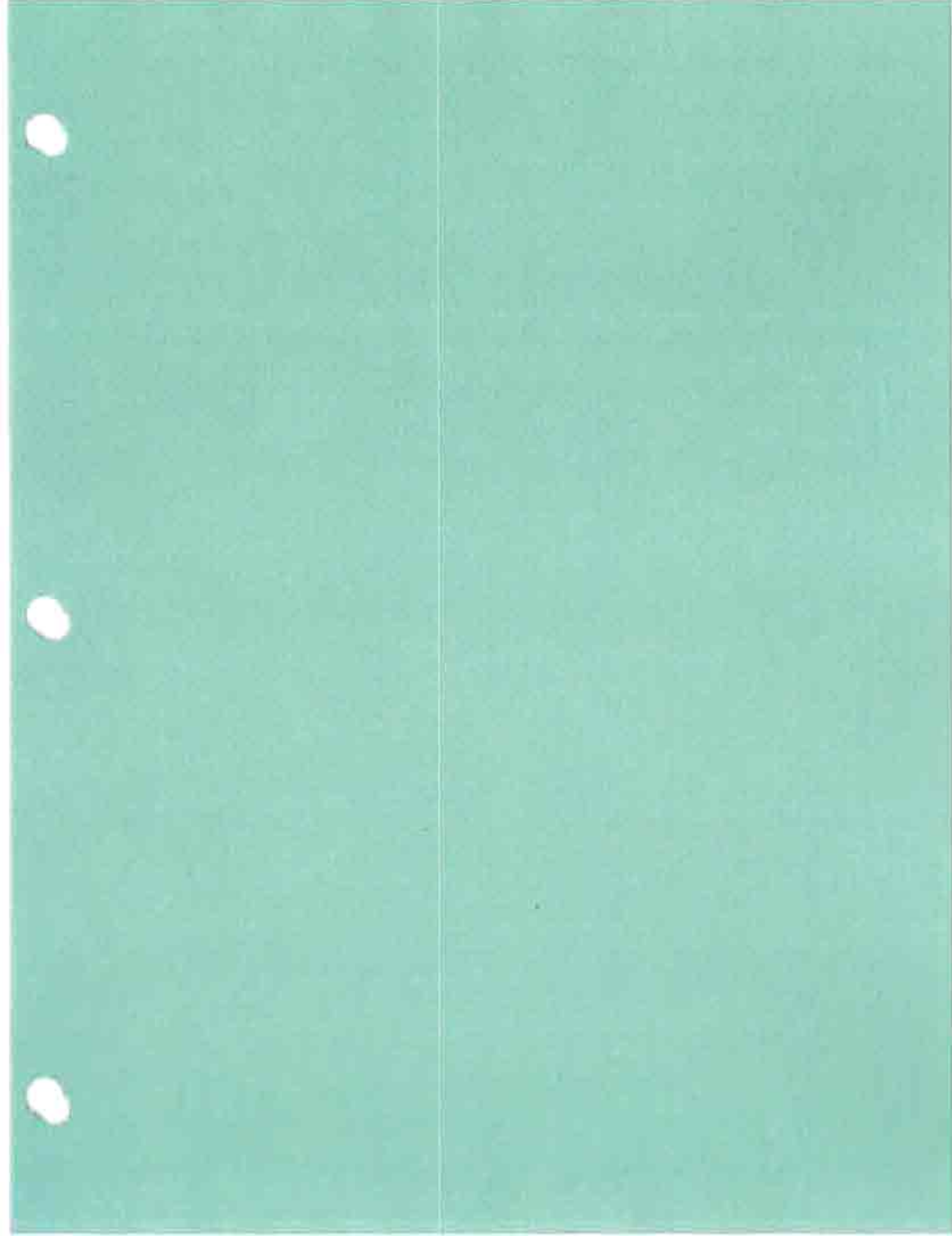
**Savings (Utilize Natural Gas Preheat Savings):**

Annual kWh Savings: 208,767  
Annual kW Savings: 473  
Annual Therm Savings: -9,269

**Notes:**

1. The air handling units are equipped with natural gas burners that can be utilized to preheat the mixed air stream before it enters the electric reheat VAV boxes. Currently they are not being utilized to do this, the electric reheat coils are handling the entire heating load. So this ECM, which is included with the Upgrade Existing EMCS ECM, includes utilizing the existing natural gas fired burners to preheat the mixed air stream.

**Electric Savings Safety Factor:** 0.73  
**Natural Gas Savings Safety Factor:** 0.73



***ECM 26 – Replace Modulines, Install VAV Boxes, Diffusers, and Add Controls***

There are no savings associated with the ECM.