92/2023

Ameresco, Inc.

Supplier Response

Event Information

Number: 92/2023
Title: Professional Services: Energy & Utility Resource Conservation Program Services
Type: Request for Proposal
Issue Date: 5/16/2024
Deadline: 6/14/2024 05:00 PM (CT)
Notes: Proposals may be submitted in a sealed envelope at the Purchasing Division office or uploaded electronically on this e-bidding website. Sealed proposals must be delivered to the Purchasing Division, 701 E. Broadway, 5th Floor, Columbia, MO 65201 by the closing date and time. Proposals received after the appointed time will be time stamped and marked as late. Late proposals will not be opened and will not be considered in the evaluation.

Proposals must be in a sealed envelope and marked in bold letters “RFP 92/2023."

No fax or e-mail proposals shall be accepted.

Contact Information

Contact: Cale Turner
Address: Finance/Purchasing
City Hall
5th Floor
City of Columbia, Missouri
701 E. Broadway, 5th Floor

Columbia, MO 65205
Phone: 1 (573) 8747375
Email: cale.turner@como.gov

Ameresco, Inc. Information

Contact: Sarah Price
Address: 10 LaSalle Street
Suite 3450
Chicago, IL 01701
Phone: (480) 499-9150
Email: sprice@ameresco.com
Web Address: www.ameresco.com

By submitting your response, you certify that you are authorized to represent and bind your company.

Ron Haxton
Signature

southwest@ameresco.com
Email

Submitted at 6/14/2024 01:40:32 PM (CT)

Response Attachments

AMERESCO_City of Columbia RFP 912023_Exhibit G.pdf

Exhibit G. Sample Audit

AMERESCO_City of Columbia RFP 912023_Proposal.pdf

Ameresco, Inc. Proposal, inclusive of Exhibits A-G.

AMERESCO



Exhibit G. Sample Audit

Professional Services: Energy & Utility Resource Conservation Services

Solicitation No.: Request for Proposal (RFP) 91/2023

Prepared for

City of Columbia, MO
Cale Turner, Purchasing Agent
701 E. Broadway, 5th Floor
Columbia, MO 65201
Submitted via City's E-Bidding Site

Submitted by

Ameresco, Inc.
Dana Dunn, Senior Account Executive
10 S. LaSalle Street, Suite 3450
Chicago, IL 60603
P. 314.325.6048 | E. ddunn@ameresco.com

June 14, 2024

TABLE OF CONTENTS

1. Purpose of Study 1
2. Executive Summary 2
Overview 2
Project Description 2
Summary of Energy and Environmental Benefits 4
Summary of Financial Benefits 4
3. Building Descriptions 5
City Hall 7
Franklin Annex/North Sister/Middle Sister 8
South Sister 9
Wall Street Annex 10
Bend Centennial Parking 11
Crow's Feet Commons 12
Streets and Shops at Pilot Butte 13
Boyd Acres Campus 14
Bend Police Department 16
Bend Municipal Airport 17
Fire Department Administration 18
Bend Fire Department (North, South, East, West) 19
Fire Department Training and Warehouse 20
Water Reclamation Facility (WRF) 21
Water Filtration Facility 22
4. Utility Data Analysis 23
City Hall 25

"Page content is subject to Confidentiality Restrictions"

Bond Annex 26
Franklin Annex 27
South Sister 28
Bend Centennial Parking Plaza 29
Streets and Shops 30
Boyd A 31
Boyd B 32
Boyd C 33
Boyd D 34
Bend Municipal Airport 35
Bend Police Department 36
Outback Water Filtration Facility 37
Water Reclamation Facility 37
Bend Fire Administration 38
Bend Fire East 39
Bend Fire South 40
Bend Fire West 41
Bend Fire Training 42
Bend Fire North 43
Bend Fire Training Warehouse 44
Awbrey Reservoir 44
Westside Lift Station 45
Pump Station 45

5. Methodology 46
Mechanical Systems 46
Lighting Systems 46
Water Systems 46

5. Scope of Work 48
List of All Measures Studied 48

"Page content is subject to Confidentiality Restrictions"

List of Recommended and/or Selected Measures 52
Detailed Scopes of Work 53
Preliminary Project Schedule 53
6. Energy Conservation Measure Descriptions 54
7. Financials 83
Project Cost 85
Cash Flow 85
Incentives 85
8. Conclusion 89
Appendices 90

FIGURES

Figure 1: City Hall Front Entrance 7
Figure 2: Franklin Annex and North Sister looking Southwest 8
Figure 3: South Sister front entrance 9
Figure 4: Wall Street Annex 10
Figure 5: Bend Centennial Parking Facade 11
Figure 6: Streets and Shops at Pilot Butte 13
Figure 7: Boyd A 14
Figure 8: Boyd Acres B 15
Figure 9: Boyd Acres C 15
Figure 10: Boyd Acres D 15
Figure 11: Bend Police HQ 16
Figure 12: Bend Airport Lobby and Restaurant 17
Figure 13: Fire Department Administration Building 18
Figure 14: Fire Department Training Building 20
Figure 15: Fire Department Warehouse 20
Figure 16: Cumulative (Estimated) Cash Flow 87
Figure 17: Annual (Estimated) Cash Flow 88

"Page content is subject to Confidentiality Restrictions"

TABLES

Table 1: Summary of Energy Savings Guarantee 4
Table 2: Summary of Greenhouse Gas Reductions 4
Table 3: Building Summary Table 5
Table 4: Baseline and Proposed Energy Use 24
Table 5: Data Logging Equipment Used 47
Table 6: All Measures Studied 48
Table 7: Recommended and/or Selected Measures 52
Table 8: General M&V Methodology (All ECMs) 70
Table 9: Recommended Project Financials 83
Table 10: Project Cash Flow for Selected Measures 86

"Page content is subject to Confidentiality Restrictions"

1. Purpose of Study

The purpose of this report is to evaluate opportunities to save resources and improve the facilities for the City of Bend, Oregon. This study evaluates the existing facilities and equipment and provides proposed modifications aimed at improving the functionality, maintainability, and resource efficiency.

Facility improvements analyzed include:

- Heating, ventilation, and air conditioning (HVAC) system replacements
- Building direct digital controls (DDC) installation and optimization for HVAC Systems
- Variable flow pumping and fan systems
- Domestic water heating systems
- Domestic plumbing systems
- Wastewater system efficiency improvements and high-level innovative revenue strategies
- Lighting systems
- Solar photovoltaic (PV) systems
- In-line hydroelectric turbines
- Building envelope improvements, including roofing
- City-wide streetlighting conversion to light emitting diode (LED) fixtures

Upon selection of the preferred retrofit alternatives by the City of Bend, Ameresco will present a proposal for the Project Development Plan (PDP) that will guarantee the maximum project cost, equipment performance and energy savings for the project.

We would like to take this opportunity to thank those involved in providing information, ideas, and feedback throughout the audit. Individuals from the City of Bend provided support throughout the Technical Energy Audit process. The City staff were especially knowledgeable, insightful and helpful.

"Page content is subject to Confidentiality Restrictions"

2. Executive Summary

Overview

This TEA presents an opportunity to greatly improve the systems at the following facilities within City of Bend while saving resources:

- City Hall
- Franklin Annex
- North/Middle/South Sister
- Wall Street Annex
- Bend Centennial Parking
- Crow's Feet Commons
- Streets and Shops at Pilot Butte
- Boyd Acres Campus
- Bend Police Department
- Bend Municipal Airport
- Bend Fire Department
- Water Reclamation Facility
- Water Filtration Facility

The studied improvements also have non-energy benefits, including increased occupant comfort, improved indoor air quality, enhanced HVAC system control, improved lighting, reduction in system maintenance, and significant reductions in greenhouse gas emissions. The full list of potential improvements in the TEA will be reduced to the improvements selected by the City for implementation, and those will be presented in the subsequent Project Development Plan (PDP). The measures identified in this report that are not included in the PDP may be studied further to be included in an additional phase of work.

Project Description

In addition to the facility improvement categories listed below, several unique energy efficiency opportunities were analyzed at the Outback Water Filtration Facility and the water reclamation facility. These improvements include changes to pumping and fan systems, water-source heat pumps for space conditioning, in-line hydroelectricity generation, and biogas utilization improvements.

Mechanical Upgrades

The mechanical systems that serve the City facilities are well maintained and in fair physical condition. Most of the equipment is 10-20 years old and is not high efficiency. These systems

"Page content is subject to Confidentiality Restrictions"

function well enough to serve the buildings; however, most of the systems are controlled with stand-alone thermostats. These controls are inefficient, unreliable, and do not provide remote monitoring capability for the maintenance department.

HVAC Control System Upgrades

The conservation measures related to HVAC controls studied in this report include the installation of networked thermostats that can be accessed, scheduled, and adjusted remotely via a user-friendly graphical web interface. In the case of the Police Department, the existing DDC system is recommended to be retro-commissioned to optimize efficiency without the cost of capital improvements.

Lighting System Upgrades

The lighting systems throughout the City consist mainly of T8 lamps and electronic ballast, which are recommended to be retrofit or replaced with LED lamps and fixtures. Exterior building lighting, exit signs, induction lighting, and various incandescent fixtures will be replaced with LED.

The new lighting systems are recommended to be controlled automatically with occupancy sensors.

High-pressure sodium and mercury vapor street lighting fixtures are recommended to be replaced with LED fixtures throughout the City.

Building Envelope Upgrades

Many of the buildings throughout the City would benefit from improved sealing of exterior penetrations and weather stripping at doorways. A comprehensive building-envelope energy efficiency study is included in this TEA.

Water System Upgrades

Some plumbing fixtures at City facilities pre-date modern low-consumption equipment. By replacing the existing toilets with new low consumption toilets, retrofitting urinals with new flush valves and diaphragm kits, and retrofitting lavatories with new faucet aerators, the associated water consumption can be reduced by an average of more than 50%.

Solar Photovoltaic Systems

Several facilities and sites were analyzed to determine the benefits of installing solar PV systems to generate on-site electricity to offset facility electricity usage.

"Page content is subject to Confidentiality Restrictions"

Summary of Energy and Environmental Benefits

This summary presents the potential energy savings by installing the thirty-four recommended measures outlined Table 7. All documented energy conservation measures have been analyzed using data collected by onsite measurements, short term data logging, operator interviews, and historical utility data. The following table outlines the energy savings associated with the recommended measures at 100% of the energy savings and at the guaranteed level of 90%.

Table 1: Summary of Energy Savings Guarantee

	100% of the Energy Savings		90% of the Energy Savings	
	Units of Energy	Cost Savings	Units of Energy	Cost Savings
Electricity – kWh	2,225,389	$197,061	2,002,850	$177,355
Electricity – kW	243	(incl. above)	218.7	(incl. above)
Natural Gas – therms	8,693	$5,430	7,823	$4,887
Water Savings – CCF	1,079	$6,119	971	$5,507

In addition to the facility improvements and energy savings, the recommended measures also have a significant positive impact on the environment by reducing the use of fossil fuel and electricity. The recommended measures will reduce greenhouse gases like carbon dioxide (CO_2) that adversely impact global climate, as well as reducing other emissions that contribute to the formation of smog – nitrogen oxides (NO_X), acid rain – sulfur dioxide (SO_2), and toxic heavy metals compounds like mercury (Hg).

Table 2: Summary of Greenhouse Gas Reductions

Pollutant	Approximate Annual Reduction
Carbon Dioxide (CO_2)	2,854,000 pounds (1,427 tons)
Nitrogen Oxides (NO_X)	713 pounds
Sulfur Dioxide (SO_2)	529 pounds
Mercury (Hg)	Approx. 2 ounces

On average, a single automobile produces 15,000 pounds of CO_2 annually and one acre of trees absorbs 7,333 pounds of CO_2 annually. By implementing these efficiency improvements, annual CO_2 greenhouse gas emissions are reduced by 1,427 tons, which is equivalent to removing over 190 cars from the road or preserving over 388 acres of mature trees.

Summary of Financial Benefits

Overall, the proposed project represents an excellent opportunity to save approximately $208,000 annually in utility costs and provides about $3,800,000 in improvements throughout the City of Bend's facility portfolio. Utility incentives and grants available for the proposed measures are estimated to be approximately $255,500. With the energy savings and incentives considered, the proposed project has a simple payback of about 17 years. We are eager to work with the City of Bend to implement these beneficial facility improvements.

"Page content is subject to Confidentiality Restrictions"

3. Building Descriptions

Table 3: Building Summary Table

Facility	Address	SqFt	Roof Age	Year Constructed	Significant Remodel Year(s)	Construction and Envelope Description	Efficiency Opportunities	Recent Upgrades	Recent Efficiency projects	Hours of Occupancy
City Hall	710 NW Wall Street	24,376	1996	1993	1996	Two-story, slab on grade, conventional wood framed construction. Combination of standing metal seam & EDPM roof system (Ballasted). Two storefront vestibule systems at entrances. Office windows are wood-cased and double-pane.	RTU optimization controllers; DDC system; Zoning; RCx and Air TAB; Lighting & controls. Weatherization & insulation.	2015 RTU replacement (Gas-paks)	2012 lighting upgrades (T-12 to T-8), partial exterior, exit signs,delamping; Replaced 20 of 21 RTU's in 2015	7:00 am to 7:pm M-F (HVAC) 7:00 am to 4:30 pm M-F (staff) 5:00 pm to 8:00 pm M-F (Janitorial) 9:00 am to 2:00 pm Sun (Janitorial)
Bond Annex	745 NW Bond Street	6,412	2005	1940's	None	Slab on grade, concrete walls, wood frame interior wall and roof construction. Roof is a TPO membrane. Storefront window system and residential-type windows.	Lighting & occupancy controls; RTU replacement/HVAC; RTU controllers; RCx; insulation & weatherization.	2016 lighting	2016 lighting upgrades (T-12 to T-8)	Sporadic/minimal
Franklin Annex	639 NW Franklin Ave	3,371	2006	1940's	2006 - Cosmetic TI	Slab on grad with elevated wood-framed floor. Concrete exterior walls with wood-framed interior walls. Ceiling and roof construction is conventional wood-framed. Roof system is TPO membrane. Storefront window system at entrances and the NE corner of the building. Clerestory windows are believed to be wood-cased double pane.	HVAC replacement/Upgrade; Controls; Lighting upgrades; Lighting controls (daylighting). Weatherization & insulation	None	Minor lighting upgrades to track lighting (LED)	7:00 am to 7:pm M-F (HVAC / staff) 8:00 pm to 9:00 pm M-F (Janitorial) 9:00 am to 11:00 am Sun (Janitorial)
Middle Sister	740 NW Wall St	1,725	Shared with Franklin Annex	1940's	2018	Shared with Franklin Annex		2018 full remodel TI		
North Sister	639#2 NW Franklin Ave	2,784	Shared with Franklin Annex	1940's	2001	Shared with Franklin Annex				City leases space to Oregon Store
South Sister	726 NW Wall St	2,792	1993	1946	2018	Single Story, slab on grade, Wood framed construction with masonary and stucco exterior. Ceiling and roof construction is conventional wood-framed with skylighting. Front windows are wood framed with double pane glass.				
Bend Centenial Parking Plaza	61 NW Oregon Ave	600	n/a	2006	2011/2012	Concrete, CMU, post-tension cable construction. The lobby has insulated storefront system windows.	Expand existing solar array; lighting/controls; Elevators	2011 lighting (HID to LED); 2011 Solar PV (33kW); 2012 lighting (HID to ind.)	2011 lighting (HID to LED); 2011 Solar PV (33kW); 2012 lighting (HID to ind.)	24/7
Crows Feet Commons - Rademacher House	869 NW Wall St	2,000	1990's	1904	1990's	Wood and plaster construction. Foundation was reconstructed in latest remodel. Historic structure with lead paned glass and pine wood shingled roof				
Streets and Shops at Pilot Butte Campus	575 NE 15th St	32,626	2009	1970's	1985	Concrete foundation with concrete, tilt-up exterior walls. Interior is two story, wood-framed construction with finished and unfinished areas throughout main building. The main building has a membrane sealed roof. Out buildings are located around property and are steel coregated with woodframe construction		Foundation		
Boyd Acres Bldg A	62975 Boyd Acres Rd	8,448	1990's	1980's	None	Slab on grade. Exterior walls are concrete tilt-up with wood framing. Wood framed interior walls and roof. Roof system is screw-down metal. Operable double-pane windows with storefront at main entrance.	Upgrade remaining T-8 &T-12 lighting; Lighting controls; HVAC upgrades & controls; Weatherization & insulation	Partial lighting	2015 lighting	WD: 6:30 am to 5:00 pm; 5:30pm to 10pm (janitorial) WE: 8:00 am to 11:00 am (janitorial,Sunday)
Boyd Acres Bldg B	62975 Boyd Acres Rd	8,520	1990's	1980's	None	Slab on grade. Metal building with insulated steel exterior walls. Wood and steel interior framing. Screw-down metal roof with insulation. No Windows.	Upgrade remaining T-12 lighting; Lighting controls; HVAC upgrades & controls; Weatherization & insulation	Partial lighting	2014 & 2016 lighting	Same as 8a
Boyd Acres Bldg C	62975 Boyd Acres Rd	11,733	1990's	1980's	2013 - conversion from warehouse to office/locker rm	Slab on grade. Metal building with insulated steel exterior walls. Wood interior framing. Screw-down metal roof with insulation. Storefront windows.	Upgrade remaining T-8 lighting; Weatherization & insulation	Partial lighting	2016 exterior lighting	Same as 8a
Boyd Acres BLDG D	62975 Boyd Acres Rd	17,768	1990's	1980's	None	Slab on grade. Metal building with insulated steel exterior walls. Wood interior framing. Screw-down metal roof with insulation. Minimal double-pane resifential type windows.	Replace electric heat & window shakers with centrilized RTU HP & controls; Upgrade remaining T-12 lighting; Lighting controls; Weatherization & insulation	Partial lighting	2016 lighting	Same as 8a
Bend Municipal Airport (FBO)	63136 Powell Butte Hwy	6,900	2007	1997	2007 - 2nd floor addition	Wood Frame, Metal exterior construction, vinyl double-pane windows.	Lighting, water heating, HPs and/or RTU controls	MH lighting being converted to LED as they burn out	None	7:00 am to 7:00 pm, 7 DPW

"Page content is subject to Confidentiality Restrictions"

Facility	Address	SqFt	Roof Age	Year Constructed	Significant Remodel Year(s)	Construction and Envelope Description	Efficiency Opportunities	Recent Upgrades	Recent Efficiency projects	Hours of Occupancy
Bend Police Department	555 NE 15th Street	47,545	2002/2009	2002	2009 - 15,486 sf addition	3-story, slab on grade construction with a mixture of CMU & wood-framed exterior walls. Interior wall, floor and roof construction is wood-framed. Roof system is TPO membrane on the flat and asphalt shingles on the slope. Windows are double pane, thermally insulated, fixed.	HVAC and DDC system RCx; Interior lighting; Exterior wall packs.	2016 Exterior lighting; 2016 DDC tune-up and DCV	2016 Exterior lighting; 2016 DDC tune-up and DCV	7:00 am to 5:30 pm M-F (HVAC & staff) 6:00 pm to 9:00 pm M-F (Janitorial) 8:00 am to 11:00 pm Sun (Janitorial Patrol area is 24/7
Outback Water Filtration Facility (multiple buildings)	18600 Skyliners Road	23,300	2015	2015	NA	Concrete block, concrete floor, metal roofing, and skylight.	Raw Water Energy Recovery; Lighting is fluorescent, induction, & HPS; Sewage System - currently pumped monthly	NA	NA	7:00 am to 3:30 pm M-F Emergency Events on weekends
Water Reclamation Facility (Admin Building)		7,000	2016	1981	2014/2016	Wood frame and concrete. Aluminum frame windows.	Additional lighting upgrades; water heaters; HVAC; Solar PV; Digester gas reclaim	Lighting upgrades in 2013; HVAC in 2014	Lighting upgrades	7:00 am to 3:30 pm 7 DPW
Bend Fire Department Administration Building	1212 SW Simpson Ave. "A"	8,736	2000	2000	NA	two-story, wood frame on concrete slab. Windows are double sash, double pane.	Lighting Controls; HVAC Controls; Solar PV; Weatherization	2016 4' fluorescent tube to TLED upgrade	2016 4' fluorescent tube to TLED upgrade	7:00 am to 6:00 pm, 7 DPW (HVAC 7:00 am to 6:00 pm M-F (Staff) Occational weekend occupancy
Bend Fire East Station	62420 Hamby Road	12,500	2002	2002	NA	two-story, wood frame on concrete slab. Windows are double sash, double pane.	Lighting Controls; HVAC Controls; Weatherization	None	None	24/7
Bend Fire South Station	61080 Country Club Drive	12,000	2000	2000	NA	two-story, wood frame on concrete slab. Windows are double sash, double pane.	Lighting Controls; HVAC Controls; Weatherization	None	None	24/7
Bend Fire West Station	1212 SW Simpson Ave. "A"	12,000	2000	2000	NA	two-story, wood frame on concrete slab. Windows are double sash, double pane.	Lighting Controls; HVAC Controls; Weatherization	None	None	24/7
Bend Fire Training - Training BLDG	63377 NE Jamison St	2,825	2002	2002	NA	Single-story, slab on grade with conventional wood framing. Wooden, double-pane windows.	Lighting Controls; HVAC Controls; Weatherization	None	None	8:00 am to 5:00 pm M-F
Bend Fire Training - Warehouse BLDG	63377 NE Jamison St	3,075	2002	2002	NA	Single-story, slab on grade with steel structure.	Lighting Controls; HVAC Controls; Weatherization	Cooling added in 2013	None	8:00 am to 5:00 pm M-F
Bend Fire North Station	63377 NE Jamison St	12,300	2000	2000	NA	two-story, wood frame on concrete slab. Windows are double sash, double pane.	Lighting Controls; HVAC Controls; Weatherization	None	None	24/7
Westside Lift Station	35 NW Portland Ave	1,346	1980's	1980's	2005	two story, wood and concrete construction, with floor grating over pumping areas. Small aluminum windows for ambient light.	Solar PV; Pump motors; Interior & Exterior lighting; electrical improvements; heating; lift station setpoints.	replacement of major pumps in 2016	None	NA - not an occupied building
Wall Street Annex	709 NW Wall St	14,758	1980's	1936	1980's/2014	(City leased building) Two story building with brick exterior finish. Windows are double pane tinted with vinyl frames.				

"Page content is subject to Confidentiality Restrictions"

City Hall



Figure 1: City Hall Front Entrance

Bend City Hall is a two-story building split into several office areas that house the City's Planning, Permitting, Recorders, and HR departments. It also serves as the location for the Mayor's office and City Council meetings. The building was constructed in 1993 and initially served as the police headquarters. Major renovations occurred in 1996 when the police department moved to a separate location. The 1996 remodel included expanding the second floor and adding additional HVAC equipment. In 2015 almost all the roof top unit HVAC units were replaced with modern gas-fired units.

Construction of the facility is slab on grade with wood framing. The exterior is masonry with stucco and brick façade. The front and back of the building have storefront vestibules to serve as entrances. Windows are wood-cased and double-paned throughout the building. The roof is comprised of both a standing metal seam and EDPM roof system (Ballasted).

Inside climate is controlled by 20 single zone air-handling units located on the roof of the building. The units range from 2 to 5.5 tons of cooling capacity. Most of the air handling equipment was replaced after 2015 and the equipment is in good condition. The air handlers are controlled by unitary touchscreen programmable thermostats. Domestic hot water is provided by a gas-fired heater that has been recently replaced. Interior lighting is provided mostly by fluorescent T8 fixtures with some pedant lights. Some spaces have occupancy sensors for automatic lighting control.

"Page content is subject to Confidentiality Restrictions"

Franklin Annex/North Sister/Middle Sister





Figure 2: Franklin Annex and North Sister looking Southwest

The Franklin Annex building is a single-story wood framed structure with an attic. It has concrete, masonry and stucco facades on the exterior. The Franklin Annex has tinted double-paned windows that are in good condition. The interior walls are finished with drywall and large skylights in the main workroom. Lighting is provided by LED can-lighting and some fluorescent fixtures as well. Attached to the Franklin Annex via the breakroom is an unconditioned storage room that is constructed of poured concrete with minimal insulation. The breakroom contains the access to the attic that has two gas-fired furnaces that have corresponding condensers, one of which is a 5-ton unit and the other is 1.5 tons. The condensers are located on the roof and in the adjacent alley. The roof of the three spaces (Franklin, North/Middle Sister) is shared and is of metal and sealed membrane construction.

The North Sister is currently leased to the Oregon Store and is constructed like Franklin Annex but has drop ceilings throughout the space with wood vinyl flooring. The building has unused space in the back that is unfinished and used primarily for storage.

Middle Sister is wood framed construction with red brick exterior. Windows are older, single paned glass. The interior consists of drywall and drop ceilings with upgraded two-foot by two-foot LED light fixtures throughout. A gas-fired furnace is in the back of the building within the closet area which utilizes a 4-ton condenser located on top the shared roof. The middle sister has also a mini-split packaged air conditioner that services the training room.

"Page content is subject to Confidentiality Restrictions"

South Sister



Figure 3: South Sister front entrance

The South Sister building is physically attached to the Franklin Annex complex and is slab on grade wood framed construction with an exterior of light colored brick, stucco, and wood paneled finish. Windows are double paned and wood framed and are in good condition with the exception of the edge seals. The roof is also wood framed construction with sky lighting "dog houses" extending out of the roof structure.

The interior is wood frame and plaster board construction with drop ceilings and sky lights on the south side offices and central hallway. The rear of the building features a closed in vestibule which provides secured bicycle parking. It has a poured concrete floor and unfinished sheet rock walls.

The South Sister building utilizes two 3-ton forced air handler units located on the roof of the building. The units were recently replaced and are operating efficiently. Domestic hot water for the two bathrooms and the break area is provided by an older AO Smith electric water heater that is approaching its end of life.

"Page content is subject to Confidentiality Restrictions"

Wall Street Annex



Figure 4: Wall Street Annex

The Wall Street Annex is leased by the City from a private owner. It was originally built in the 1930's and has gone through many remodels through the years, most recently in 2014. Although leased by the City, they are responsible for upkeep and maintenance of the structure. The outside finish is brick with upgraded double pane vinyl framed windows. The East side is an open area with walled off offices and a vaulted ceiling with skylights. The West side has a vaulted interior in the front half while the rear of the building has second story office spaces.

The building has an original subbasement that contains a boiler that was retired in place when the building was outfitted with roof top units. The roof top units primarily consist of heat pumps that have gone far beyond their useful lifetime. There are two newer units (a gas-fired rooftop unit and condenser for upper offices) that were part of the last remodel.

"Page content is subject to Confidentiality Restrictions"

Bend Centennial Parking



Figure 5: Bend Centennial Parking Facade

Bend Centennial Parking Plaza was constructed in 2006 of concrete, masonry brick, and post-tension cable. The structure has three covered levels and rooftop parking spaces. The ground level contains three stores that are leased to the U.S. Post Office, FedEx, and Framing Store. They have tiled flooring and drop ceiling combined with open framed ceiling in the Frame shop. Insulated plate glass windows are used in the store fronts as well. The parking garage entrance contains two restrooms that the City has locked with magnetic seals and remain locked from the public due to constant damage to the facilities when open. The ground level also features several roll up doors on the north side via the alley way for storage.

There is a Carrier mini-spit air-conditioner that serves the elevator mechanical room. The garage also has a centrifugal exhaust fan with installed VFD. The elevator rooms are cooled via two Carrier condensers serving air cassettes. An electric snow melt system is used on the rooftop, entry ramp, and sidewalk.

Lighting for the structure was updated in 2011 via an induction retrofit with some LED and fluorescent fixtures. Photocells are being utilized for the perimeter lighting control.

The top level features a 32 kW solar array that facilitates power production to offset the building's energy use that was installed in 2012 with help from Pacific Power's Blue Sky funds.

"Page content is subject to Confidentiality Restrictions"

Crow's Feet Commons

The Crow's Feet Commons Allen-Rademacher House (also known as the Goodwillie House) is a small, historic wood structure. Located at 875 Northwest Brooks Street in Bend, the house was built in 1904 and survives as a bicycle shop, a ski shop, a coffee shop, and a bar called Crows Feet Commons. The evaluation at this facility was limited to a potential roofing project. The existing cedar shingle roof is near end of life.

"Page content is subject to Confidentiality Restrictions"

Streets and Shops at Pilot Butte



Figure 6: Streets and Shops at Pilot Butte

Streets and Shops at Pilot Butte Campus (Dept. of Public Works) is a two-story, wood frame building with tilt-up concrete exterior. The windows are double pane tinted and in good condition. The front of the building has a plate glass vestibule with doors that remain locked and are opened via City issued key cards. The interior is primarily drywalled with drop ceiling on the bottom floor and upper southeast side. Lighting is from a majority of T8 fluorescent fixtures. Most of the upper floor is unfinished space with very worn flooring. The rear of the building contains an open area breakroom/storage room/locker-room that have unfinished walls and poured concrete flooring. Beyond that is an open storage space with roll up doors. Connected to the rear of the building is the main mechanical bays that service the City's vehicle fleet. The roof was completed in 2009 and is metal and sealed membrane construction.

The main building is minimally insulated and is conditioned via seven independently controlled furnace/rooftop conditioners. Two 93 kBtu units serve the training room. Two 97 kBtu units serve the lobby and upper north offices, a 56 kBtu unit serves the conference room, and two approximately 45 kBtu units serve the upper south and west office spaces. Some of the units have been replaced more recently while others were installed 20+ years ago. The maintenance garage also has radiant tube heaters.

The building is conditioned with seven furnaces with remote condensing units ranging in cooling capacity from 2-ton to 5-ton.

The Pilot Butte Campus has eight additional vehicle outbuildings which are wood frame constructed with corrugated steel exteriors. The buildings have screw down metal roofing except for the central building which has a membrane sealed roof similar to the office building. The outbuildings are heated by gas furnaces set at their minimum temperatures with the gravel/sweeper building having an additional oil burner. Most of the buildings have little insulation and have visible damage that affect the ability of maintaining temperatures. The outbuildings have older lighting systems while the front parking lot utilizes updated LED lights.

"Page content is subject to Confidentiality Restrictions"

Boyd Acres Campus



Figure 7: Boyd A

Boyd Acres building A is slab on grade construction, wood framed with tilt up concrete walls. The north and south ends of the building were completed separately. The roof is screw down metal type approximately 30 years old. The building's windows are tinted and double paned with aluminum framing that is well sealed and in good condition. The main entrance feature's storefront like windows and doors that are of good condition as well.

The interior features drywall with wallpaper and wood paneling throughout the structure. The ceilings are drop down with fluorescent light fixtures and some canned lighting as well. Lights have mostly be replaced with LED fixtures but a few T12s remain. The building is climate controlled through five gas-fired furnaces with outside condensers. There is also an additional mini-split system that services the IT closet.

Boyd B is a slab on grade metal building with wood and steel framing and insulated exterior tilt up concrete walls with large roll up industrial doors. The rear of the building is corrugated steel with screw down steel roofing. The spaces are heated with Reznor gas-fired space heaters. T12 light fixtures are located throughout the structure.

Boyd C was originally constructed like Boyd B with tilt up concrete walls and corrugated steel in the rear of the building. In 2013 the building was converted from storage to office space that includes locker rooms and shower facilities for the City operations department. The former industrial roll up doors were replaced with double pane aluminum framed windows. The interior is wood framed with painted drywall and drop ceilings. The floor is laminate with carpeting in some office spaces. There is fluorescent lighting throughout with occupancy sensors installed in the spaces as well. With the remodel, three gas-fired furnaces and condensing units were installed for climate control in the building as well. The north end of the building has storage bays that are heated by three Reznor units as part of the original construction of the space.

Boyd D is steel frame and insulated corrugated steel construction. It features several smaller office areas and large vehicle bays including a wash bay on the north end. The high bays have LED lighting while other areas have T8 fixtures. Gas-fired furnaces serve the wash bay and the offices with long spans of ductwork across the high bays. Another smaller furnace serves the south upper office and is located above the ceiling tiles.

"Page content is subject to Confidentiality Restrictions"



Figure 8: Boyd Acres B



Figure 9: Boyd Acres C



Figure 10: Boyd Acres D

Bend Police Department



Figure 11: Bend Police HQ

The City of Bend Police department was constructed in 2002 with a large addition added in 2009. It is a three-story, slab on grade structure with a mixture of CMU and wood-framed exterior walls. Windows are fixed type, double paned, and thermally insulated. The Roof is asphalt shingled on the sloped sections and utilizes a TPO membrane on the flat recessed surfaces that house the building's air handler units.

Inside, the building features primarily drop ceilings with painted and natural finish ceilings in the basement jail cells and main lobby. The lobby features updated LED lighting while the rest of the interior lighting is original to the 2002 construction. The building consists primarily of office space with a municipal court and holding cell area in the basement. The department does not contain the emergency calling center.

The primary air handling unit is a 75-ton gas-fired unit that serves multiple zones throughout the building. There are an additional four gas-fired units (5, 7, 9.5, 14.5 tons) that serve the upper and lower offices with the municipal court having a CO_2 sensor for extra control. The AHUs are controlled by a Reliable Controls DDC system installed by Sunbelt Controls. Several of the AHUs are tightly scheduled corresponding to building occupancy while others likely have opportunities to reduce the scheduled hours of occupancy. The building's domestic hot water is provided by a large electric water heater located in the basement.

The Police parking lot has updated two-stage LED lighting.

"Page content is subject to Confidentiality Restrictions"

Bend Municipal Airport



Figure 12: Bend Airport Lobby and Restaurant

The Bend municipal airport is a slab on grade, wood framed building with metal exterior construction. The outside windows are double pane vinyl. The interior is drywall with drop down ceiling tile. At the time of visiting, the lower level was undergoing significant remodel and many of the rooms were being reconfigured. The facility interior is lit with fluorescent fixtures, some of which are controlled automatically with occupancy sensors. The upper level contains offices and a restaurant. An upstairs utility closet houses three Carrier gas-fired furnaces with remote condensing units located outside the building, two of the condensing units are new while the third is approaching its end of life. Two furnaces serve the east and west ends of the lower level and the third services the upper floor. Domestic hot water for the building is provided by two electric water heaters. The large domestic water heater is located in the lower level while a smaller unit is located upstairs.

"Page content is subject to Confidentiality Restrictions"

Fire Department Administration



Figure 13: Fire Department Administration Building

Completed in 2000, the Fire Department Administration building is a two-story word frame building on concrete slab. The siding is a combination of wood and masonry with asphalt shingled roof. Windows are vinyl frame, double pane, and double sash.

Inside, the lower level consists of office space, storage, and a large conference room. The lobby and conference room have vaulted ceilings with exposed wood framing while the rest of the office spaces consist of drop down tiled ceilings. Wall finishes are painted drywall with wood paneling on the lower half. The upper level consists of office spaces and a locker room. The walls are painted drywall with drop down tile ceilings

Six gas-fired furnaces with outside condensing units with ratings between 3.5 and 4.5 tons serve the building. There appears to be some overlapping HVAC zones which may result in comfort and efficiency issues. Two smaller units each serve the conference room and entrance lobby. The other four serve the lower level offices and upper offices (two on each level). Domestic hot water is provided by one gas-fired domestic water heater.

Lighting is provided primarily by fluorescent fixtures, some of which have been retrofit to LED. The restroom lighting is controlled automatically by occupancy sensors.

"Page content is subject to Confidentiality Restrictions"

Bend Fire Department (North, South, East, West)



All built at approximately the same time around the year 2000, the Bend Fire Stations are two-story slab on grade with wood and masonry siding. They are wood framed with conventional asphalt roofing. The four stations are identical in layout except for the East Station which has a layout that is a mirror of the others and it was built in 2002. The vehicle bays have overhead radiant heaters that are interlocked with the overhead doors to prevent use while bays are open. Windows are double pane tinted with vinyl trim that are in good condition.

The laundry/storage rooms to the side of the vehicle bays share a gas-fired furnace that provides heating only. Additionally, on the first level there are two gas-fired units that serve the police annex and conference rooms on the first level that have a 4 and 4.5-ton exterior condenser.

The second level contains individual bunk rooms, office space, living space, a kitchen, gym, and locker facilities. Three gas-fired furnaces are located in the attic that serve the bunk rooms, gym, and great room. These units along with the two on the first floor have remote 4.5-ton condensing units outside the facilities. The domestic water heater is gas-fired as well and is located in the attic.

Lighting in the Fire Stations is provided by fluorescent fixtures with the exception of the West station which has LED upgrades in many areas.

"Page content is subject to Confidentiality Restrictions"

Fire Department Training and Warehouse



Figure 14: Fire Department Training Building

The Fire Department Training Building is a conventional, wood framed building with slab on grade construction built in 2002. It is a single story structure with wood siding and duel-paned vinyl windows and traditional shingled roof. Inside, there are offices on the west side of the building and a large training room on the east end with a room divider that splits the space into two. Ceilings are drop down type. Two gas-fired furnaces serve the training area and office spaces. Lighting is provided by fluorescent fixtures. There is a small electric water heater for domestic hot water.

The warehouse is slab on grade with steel frame and steel siding with industrial shelving and work space. A small office located on the south end that has a cooling unit located above the space. The open warehouse has a Reznor heating unit with a manual thermostat. Lighting in the warehouse is provided by fluorescent fixtures.



Figure 15: Fire Department Warehouse

"Page content is subject to Confidentiality Restrictions"

Water Reclamation Facility (WRF)



The City of Bend Water Reclamation Facility (WRF) is a municipal waste water plant located on 1,200 acres of City owned land. During the beginning of the audit the facility was finishing construction on a capacity upgrade. The plant has an Average Annual Design Capacity of 10.9 million gallons per day, with a typical flow of 6 million gallons per day. Most of the buildings at the site are concrete construction or metal pole buildings. The system is being upgraded to an IFAS solution for the aeration basins with new high efficiency turbo blowers. Solids are treated in three anaerobic digesters, one of which is 800,000 gallons and the other two are 400,000 gallons each. Dewatering is accomplished with one end of life belt press, which is currently in design for upgrades and eventual replacement. Dewatered solids are converted to class A solids with drying beds.

The laboratory, break, and office buildings are conditioned with roof top heat pumps controlled by a Johnson Controls DDC system. The outbuildings are heated with electric unit heaters. Interior lighting is primarily fluorescent technology and outdoor lighting is a combination of HID and fluorescent.

"Page content is subject to Confidentiality Restrictions"

Water Filtration Facility



The Water Filtration Facility (WFF) is located at the Outback Site. The WFF treats surface water and is the primary source of drinking water for the City. WFF is fed via an approximately 1,000 foot penstock with a large energy reducing valve that modulates flow to the plant. The water is cleaned through a membrane filtration process before being fed into the City's reservoir and distribution network.

Construction is slab on grade with tilt-up concrete walls. The roof is standing seam metal supported by metal trusses. Although the facility is modern, it is an industrial classification and was not subject to building energy codes at the time of construction.

The office spaces within the building are conditioned by air handlers with electric resistance heating located in the mechanical penthouse. Cooling is currently provided by passing potable water through the HVAC equipment. The membrane room is conditioned by multiple electric resistance unit heaters. Make-up air is provided by a large air handler with electric resistance heating that sees very little operation.

Facility lighting is a combination of fluorescent and LED fixtures.

"Page content is subject to Confidentiality Restrictions"

4. Utility Data Analysis

The average energy intensity (kBtu/ft^2) including electrical usage and fuel usage, as well as the percentage of total energy use by site, for each building is presented in the table and chart below. None of the facilities studied experienced any recent changes to usage; therefore, this data is representative of current typical energy consumption. Detailed energy use and cost is available on the following pages.

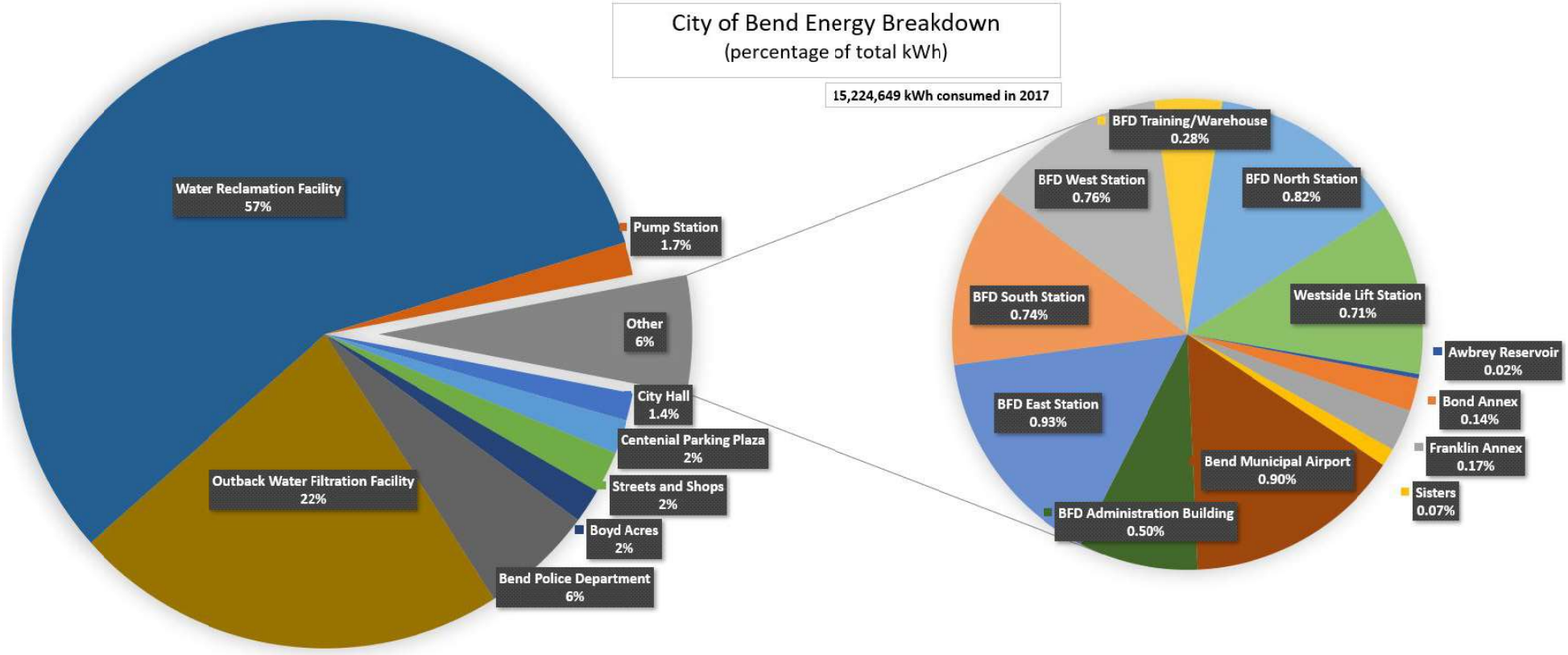


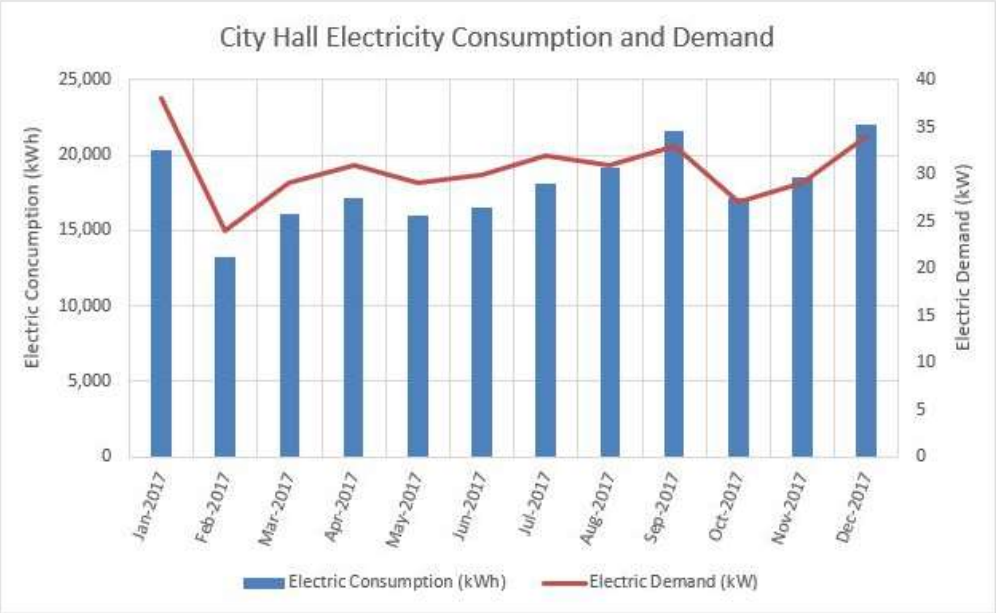
Table 4: Baseline and Proposed Energy Use

Building Resource Use Breakdown		Annual Electrical Usage		Annual Gas Usage		Electric EUI	Nat. Gas EUI	Overall EUI	Energy Cost	Energy Cost	Prorated Cost
Facility	Area (sqft)	(kWh)	(kBtu)	(Therms)	(kBtu)	(kBtu/sqft)	(kBtu/sqft)	(kBtu/sqft)	($/sqft)	($)	($/sqft)
City Hall	24,376	216,000	737,208	6,207	620,700	30	25	55.7	$ 1.04	$ 25,417	$ 0.09
Bond Annex	6,412	20,760	70,854	4,474	447,400	11	70	80.8	$ 0.87	$ 5,583	$ 0.02
Franklin Annex	3,371	26,331	89,868	1,707	170,700	27	51	77.3	$ 1.32	$ 4,444	$ 0.02
South Sister	2,792	11,312	38,608	1,707	170,700	14	61	75.0	$ 0.41	$ 1,144	$ 0.00
Middle Sister	1,725	0	0	0	0	0	0	0.0	$ -	$ -	$ -
North Sister	2,784	0	0	0	0	0	0	0.0	$ -	$ -	$ -
Bend Centenial Parking Plaza	600	265,840	907,312	0	0	1,512	0	1,512.2	$ 50.73	$ 30,439	$ 0.11
Crows Feet Commons		0	0	0	0				$ -	$ -	$ -
Streets and Shops at Pilot Butte Campus	32,626	324,800	1,108,542	18,781	1,878,100	34	58	91.5	$ 1.34	$ 43,689	$ 0.15
Boyd Acres Bldg A	8,448	60,479	206,415	4,616	461,600	24	55	79.1	$ 1.20	$ 10,180	$ 0.04
Boyd Acres Bldg B	8,520	18,395	62,782	2,471	247,100	7	29	36.4	$ 0.51	$ 4,362	$ 0.02
Boyd Acres Bldg C	11,733	73,926	252,309	3,318	331,800	22	28	49.8	$ 0.91	$ 10,620	$ 0.04
Boyd Acres Bldg D	17,768	113,840	388,536	2,706	270,600	22	15	37.1	$ 0.82	$ 14,530	$ 0.05
Bend Municipal Airport	7,200	137,440	469,083	451	45,100	65	6	71.4	$ 1.23	$ 8,821	$ 0.03
Airport Hangers (Blue and Red)		0	0	0	0				$ -	$ -	$ -
Bend Police Department	47,545	894,900	3,054,294	5,047	504,700	64	11	74.9	$ 1.73	$ 82,489	$ 0.29
Outback Water Filtration Facility (multiple buildings)	23,300	3,425,377	11,690,812	0	0	502	0	501.8	$ 14.88	$ 346,790	$ 1.21
Water Reclamation Facility (Admin Building)	7,000	8,652,000	29,529,276	0	0	4,218	0	4,218.5	$ 48.36	$ 338,531	$ 1.18
Bend Fire Department Administration Building	8,736	75,480	257,613	3,387	338,700	29	39	68.3	$ 1.21	$ 10,604	$ 0.04
Bend Fire East Station	12,500	141,760	483,827	4,229	422,900	39	34	72.5	$ 0.92	$ 11,527	$ 0.04
Bend Fire South Station	12,000	113,360	386,898	4,326	432,600	32	36	68.3	$ 1.25	$ 15,048	$ 0.05
Bend Fire West Station	12,000	115,650	394,713	4,534	453,400	33	38	70.7	$ 1.23	$ 14,760	$ 0.05
Bend Fire Training - Training BLDG	2,825	42,118	143,749	479	47,900	51	17	67.8	$ 1.79	$ 5,050	$ 0.02
Bend Fire Training - Warehouse BLDG	3,075	0	0	1,751	175,100	0	57	56.9	$ 0.39	$ 1,190	$ 0.00
Bend Fire North Station	12,300	124,800	425,942	4,485	448,500	35	36	71.1	$ 1.28	$ 15,696	$ 0.05
Westside Lift Station	1,346	108,380	369,901	0	0	275	0	274.8	$ 8.94	$ 12,028	$ 0.04
Wall Street Annex	14,758	0	0	0	0	0	0	0.0	$ -	$ -	$ -
Awbrey Reservoir		2,821	9,628	0	0				$ -	$ -	$ -
Pump Station		258,880	883,557	0	0				$ -	$ -	$ -

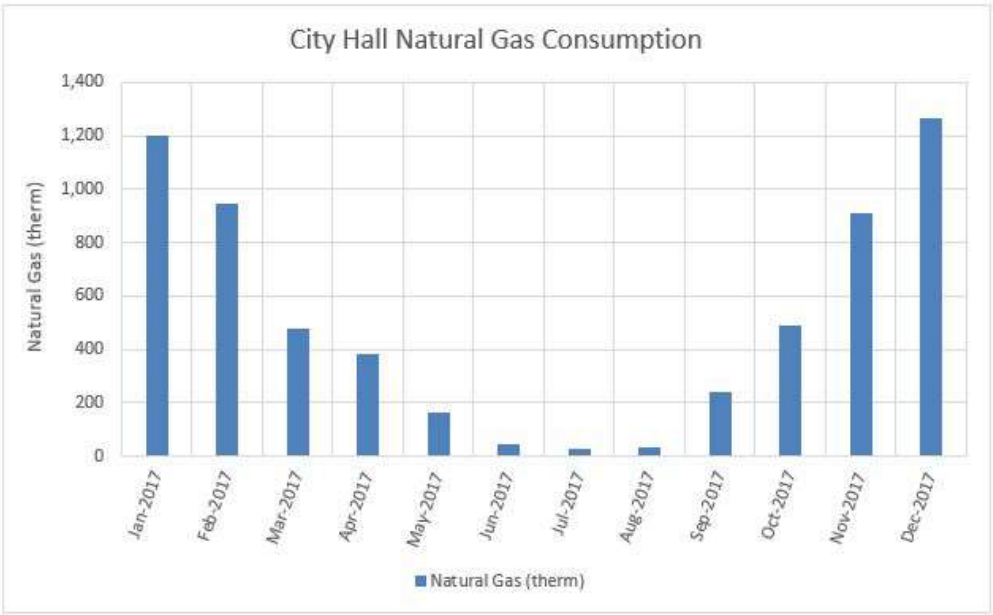
"Page content is subject to Confidentiality Restrictions"

City Hall

Electricity Use (kWh and kW)



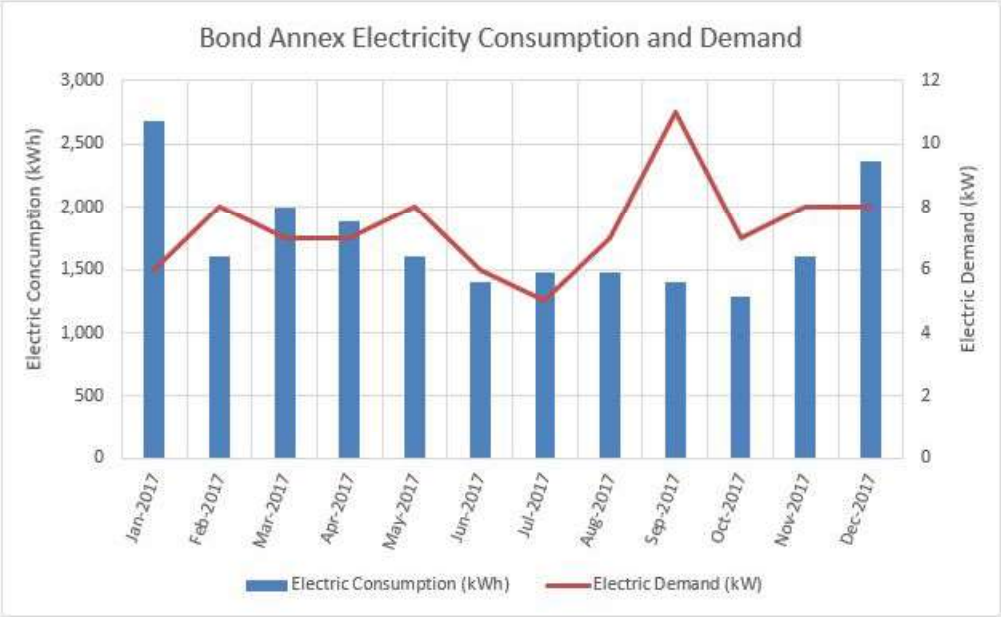
Natural Gas Use



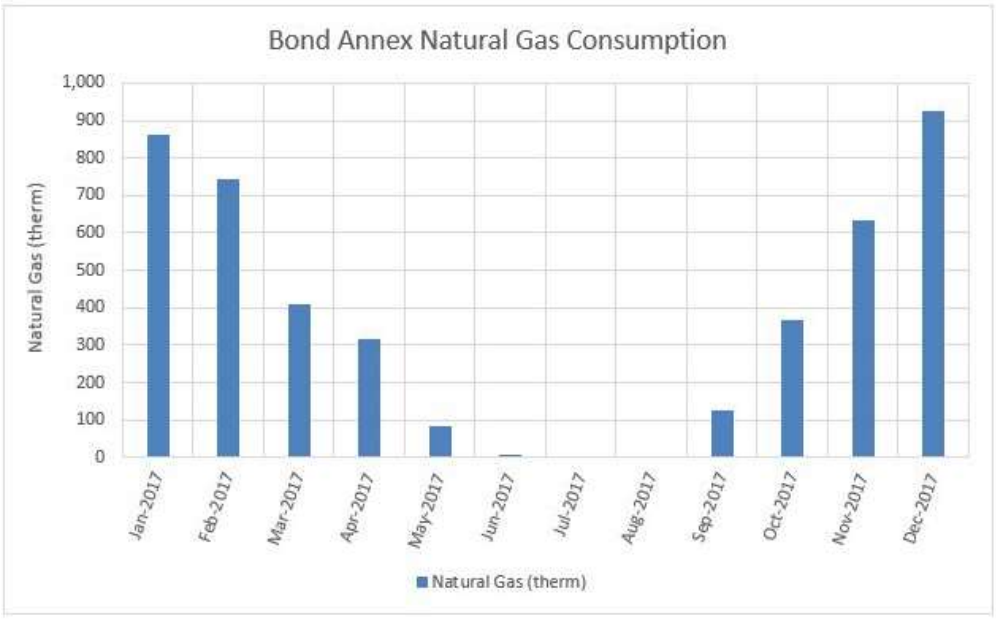
"Page content is subject to Confidentiality Restrictions"

Bond Annex

Electricity Use (kWh and kW)



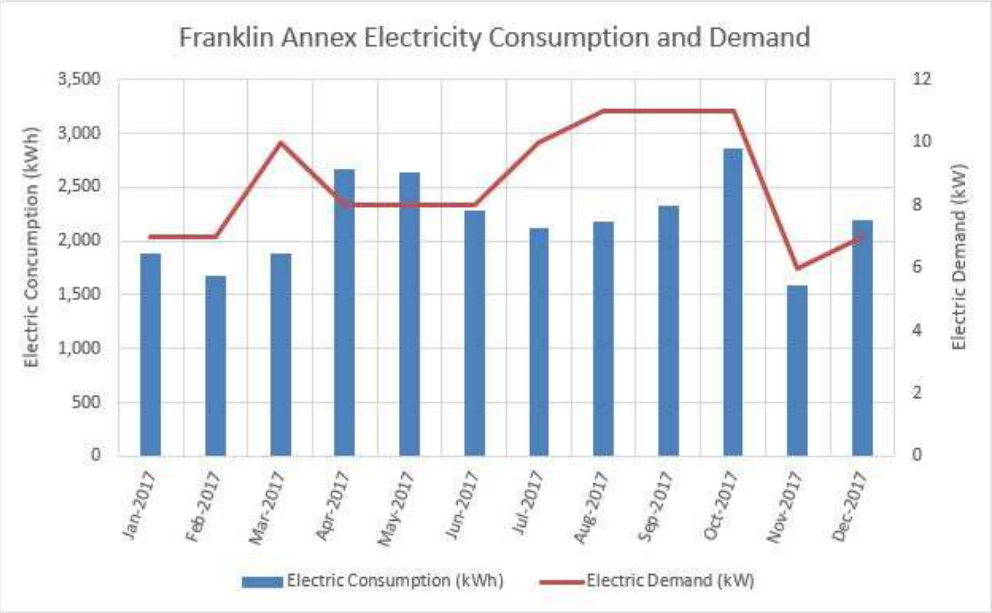
Natural Gas Use



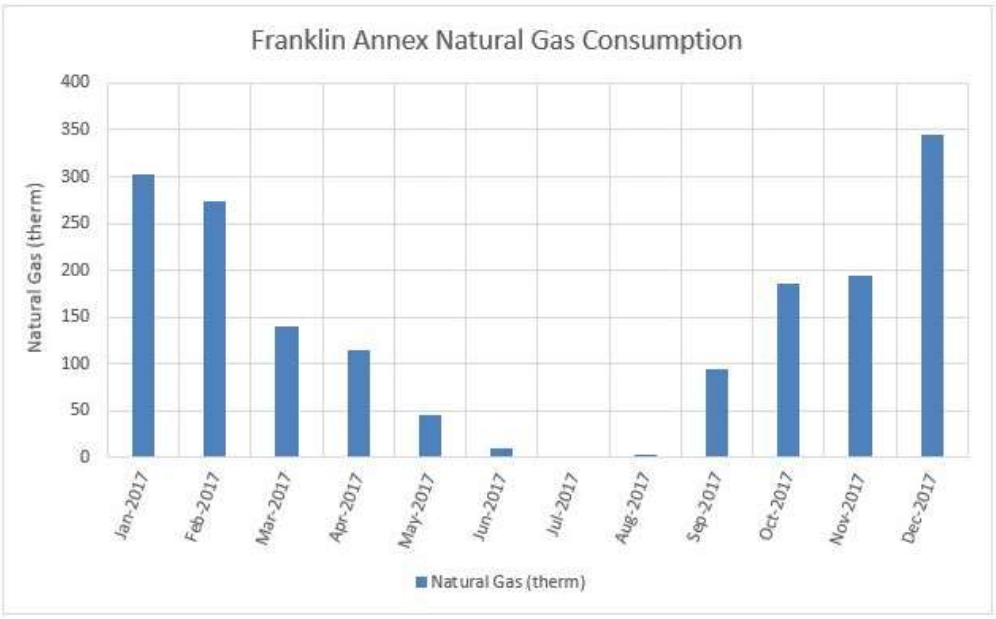
"Page content is subject to Confidentiality Restrictions"

Franklin Annex

Electricity Use (kWh and kW)



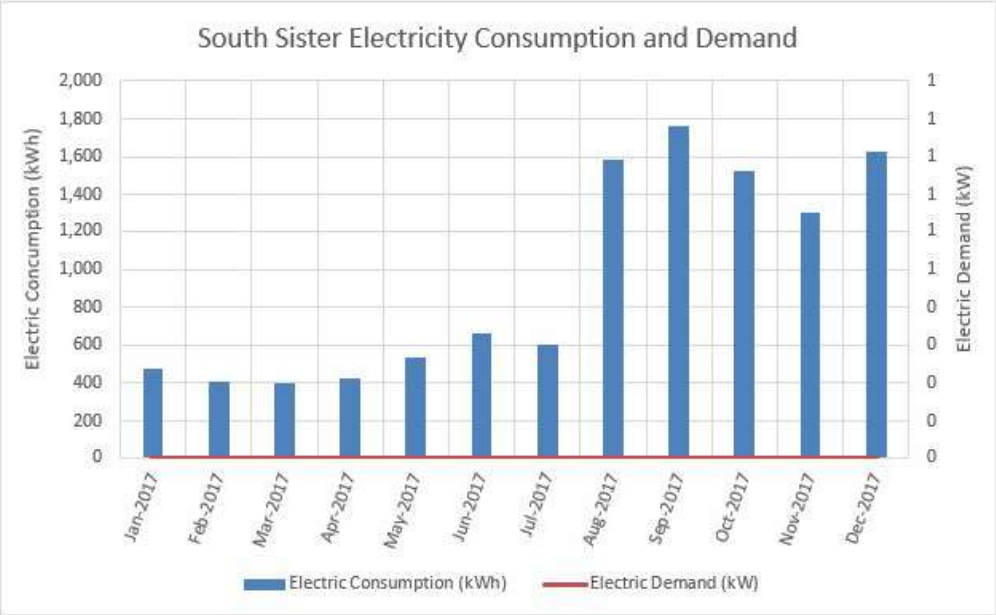
Natural Gas Use



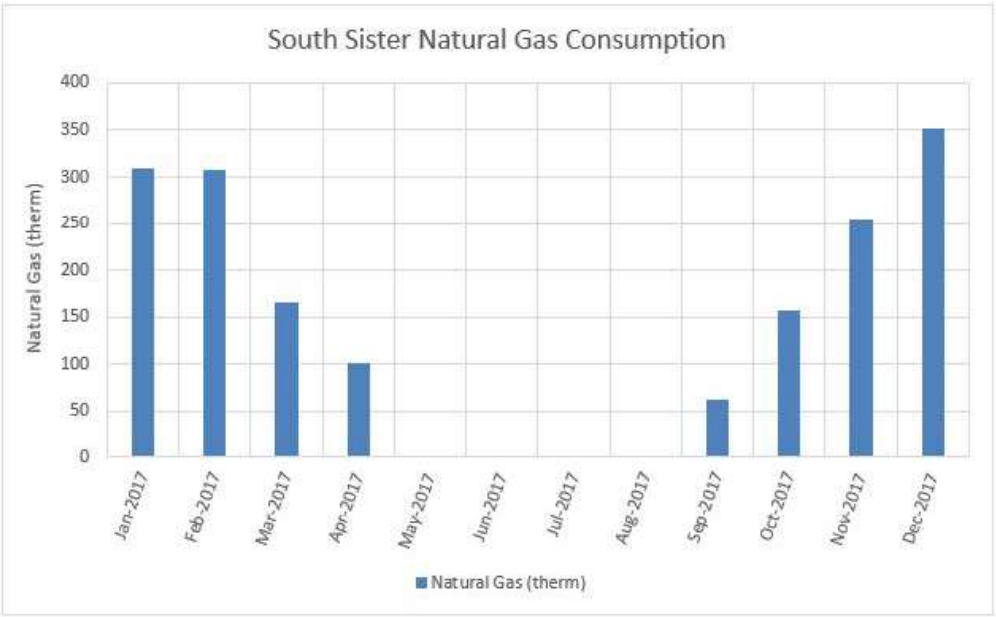
"Page content is subject to Confidentiality Restrictions"

South Sister

Electricity Use (kWh and kW)

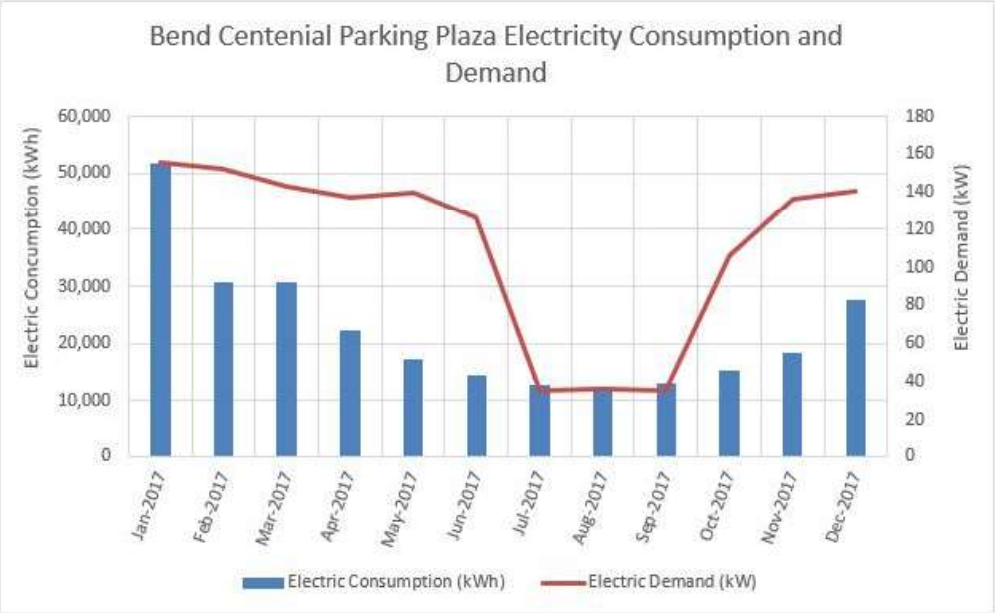


Natural Gas Use



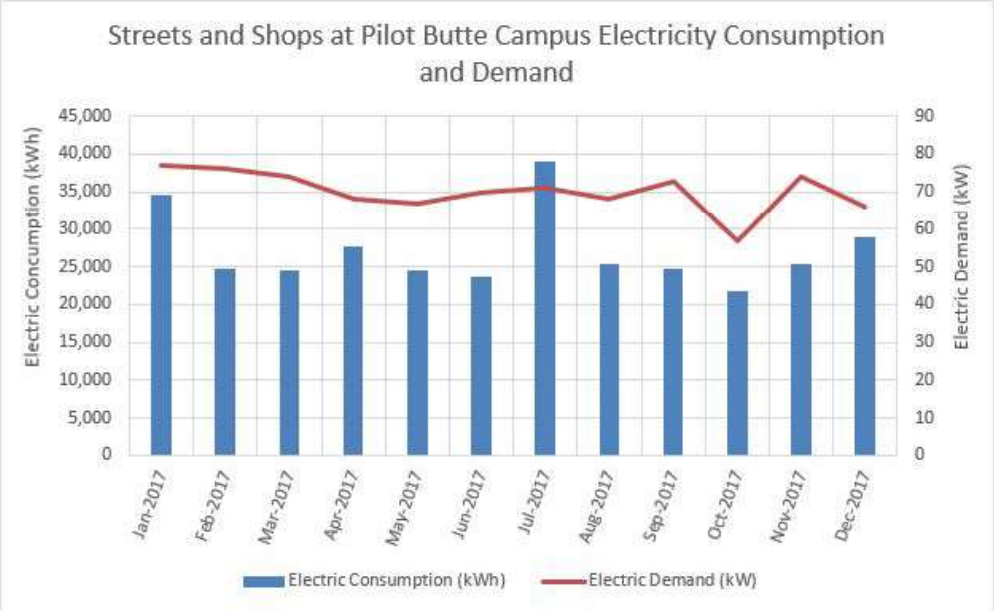
Bend Centennial Parking Plaza

Electricity Use (kWh and kW)



Streets and Shops

Electricity Use (kWh and kW)

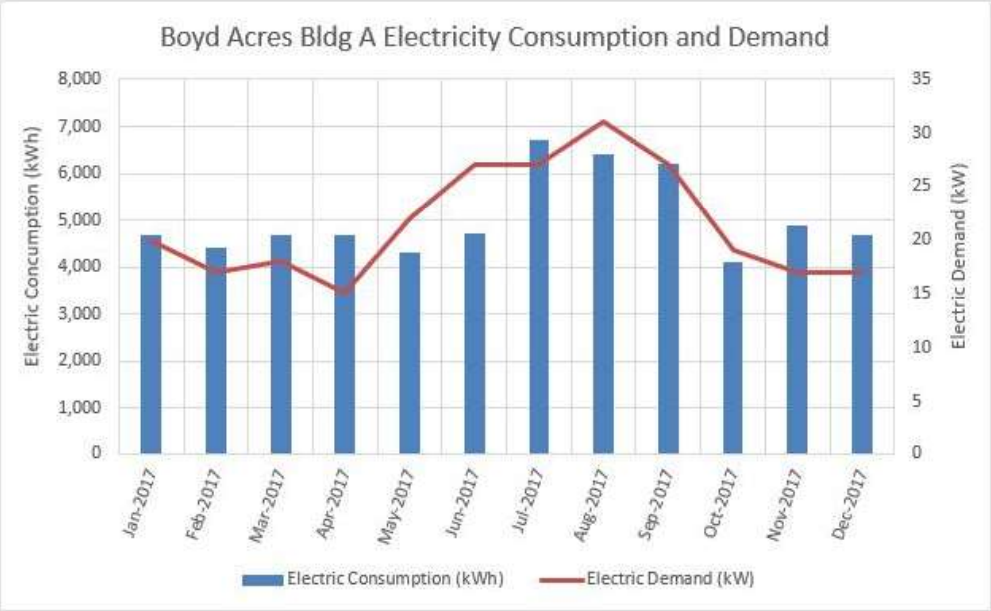


Natural Gas Use

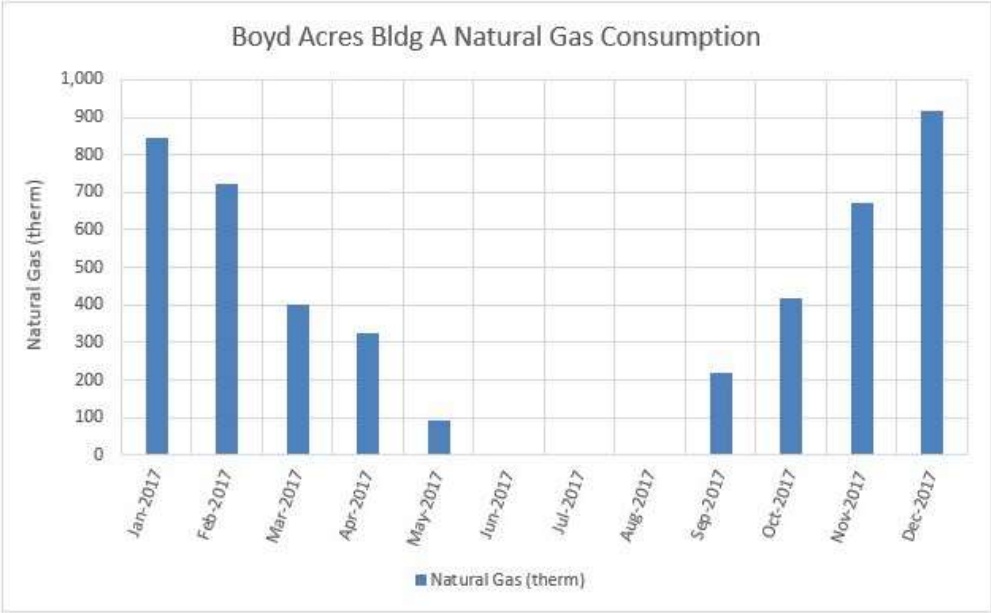


Boyd A

Electricity Use (kWh and kW)

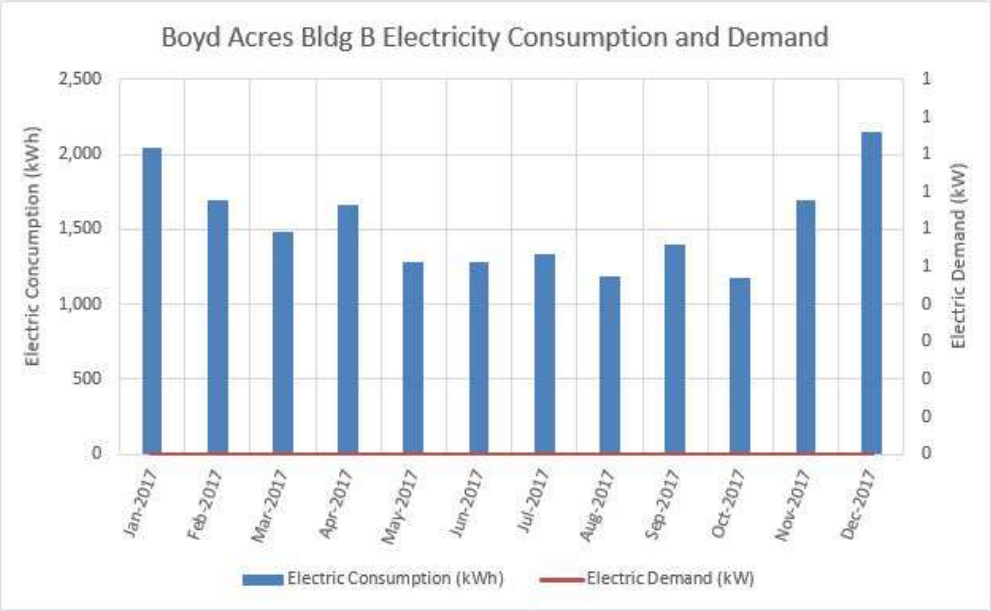


Natural Gas Use

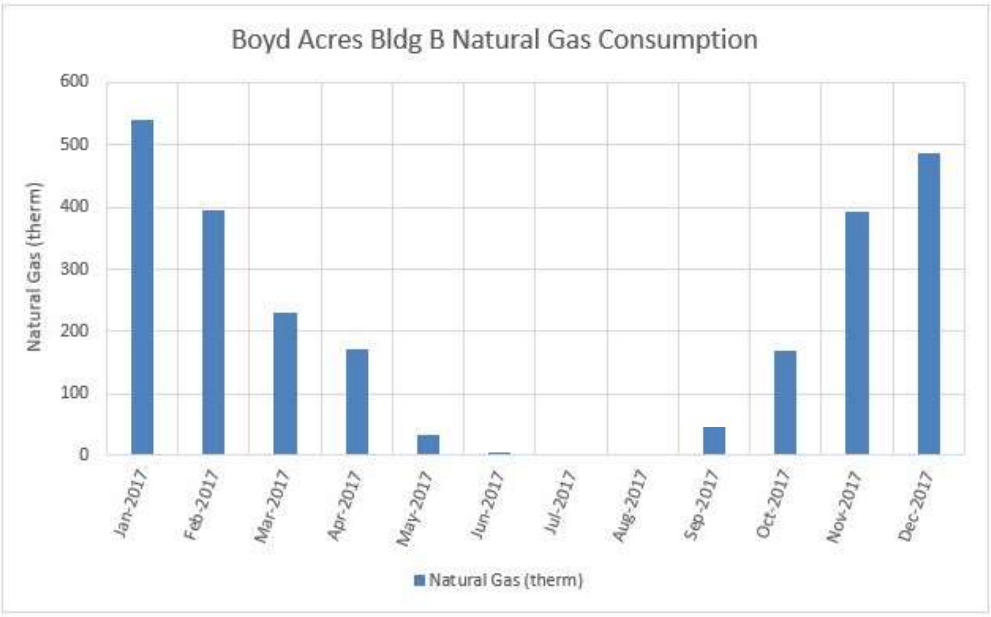


Boyd B

Electricity Use (kWh and kW)



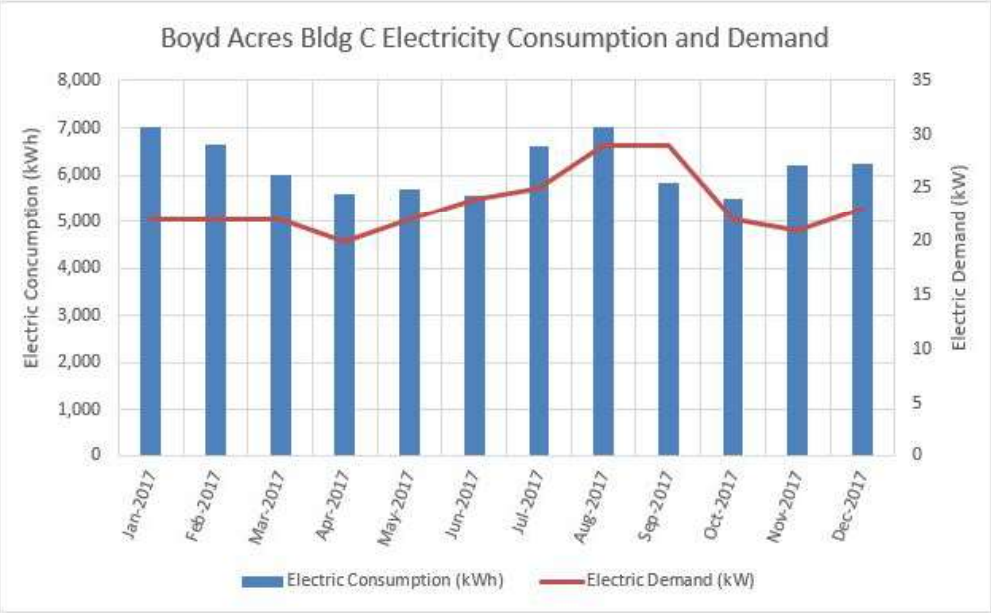
Natural Gas Use



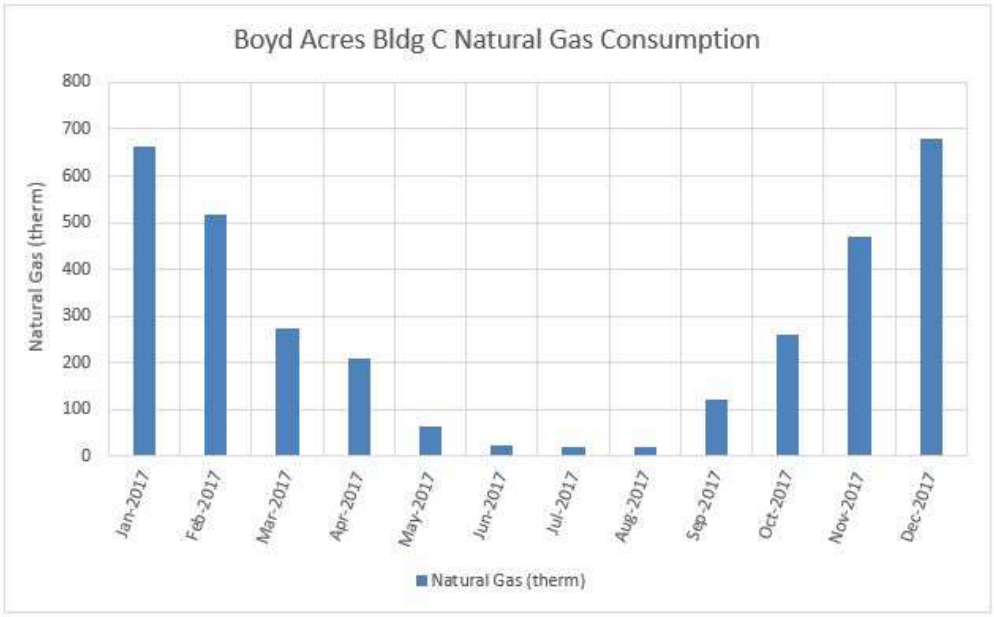
"Page content is subject to Confidentiality Restrictions"

Boyd C

Electricity Use (kWh and kW)

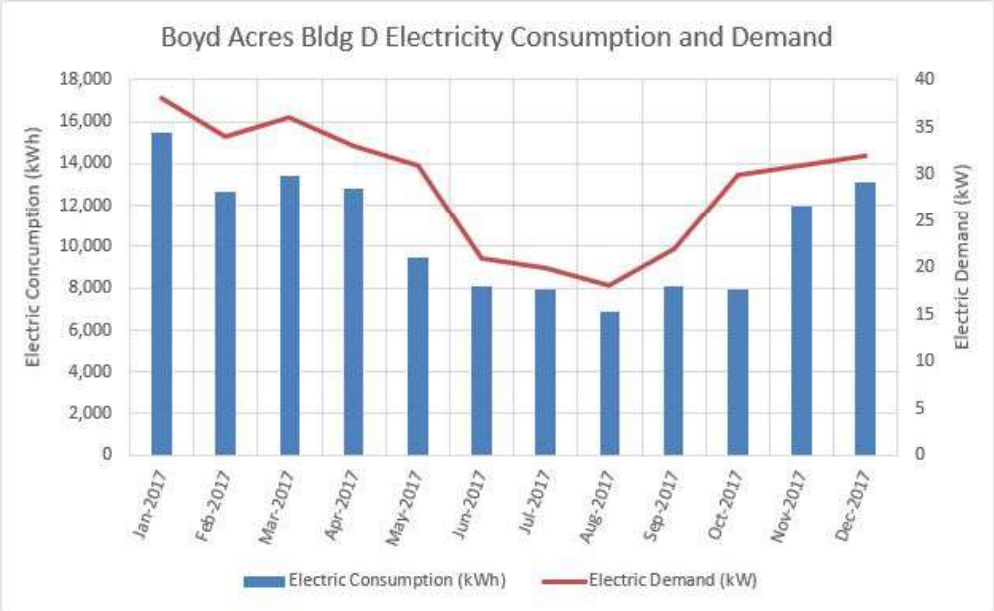


Natural Gas Use

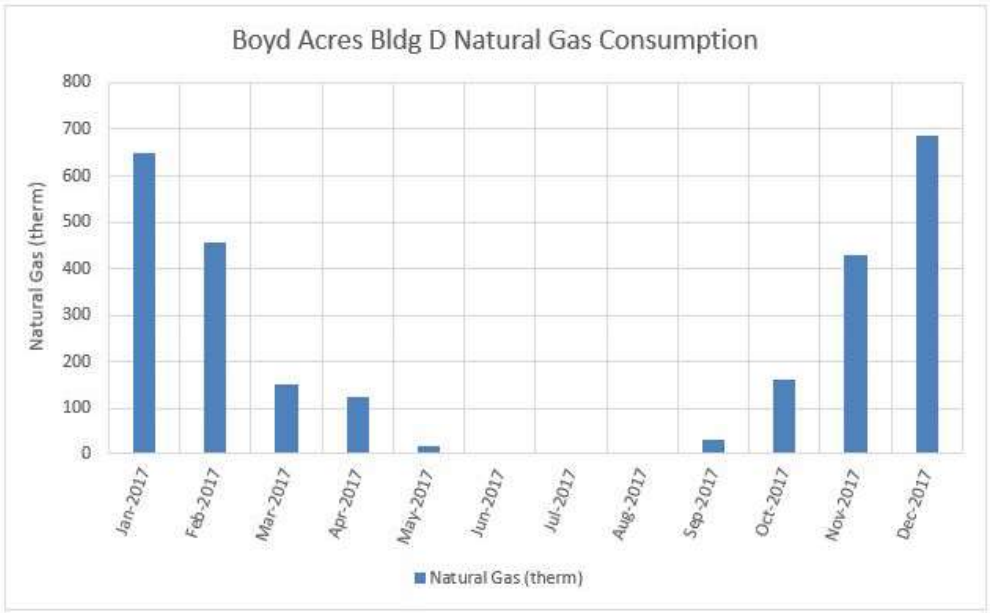


Boyd D

Electricity Use (kWh and kW)



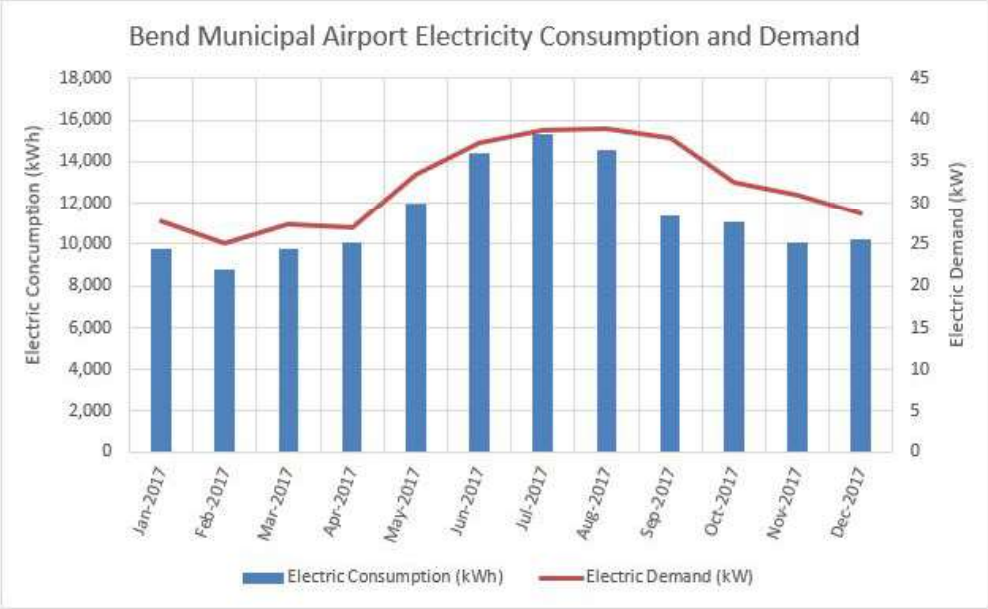
Natural Gas Use



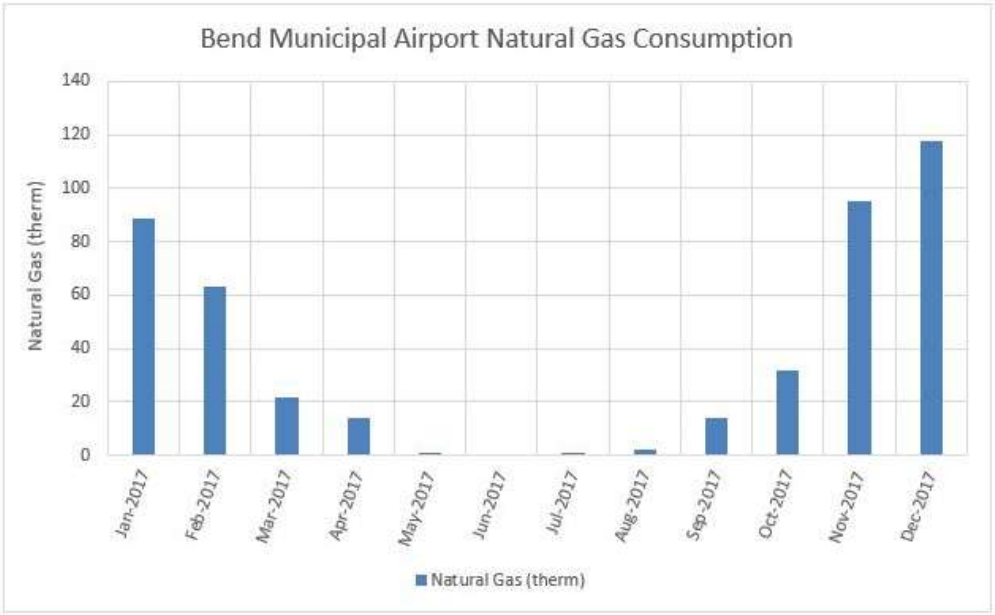
"Page content is subject to Confidentiality Restrictions"

Bend Municipal Airport

Electricity Use (kWh and kW)



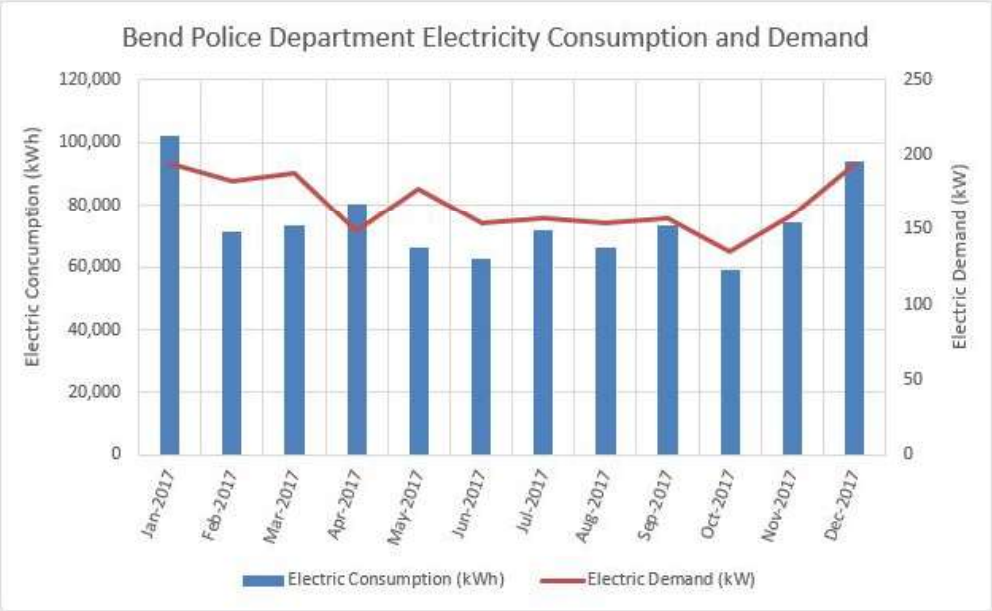
Natural Gas Use



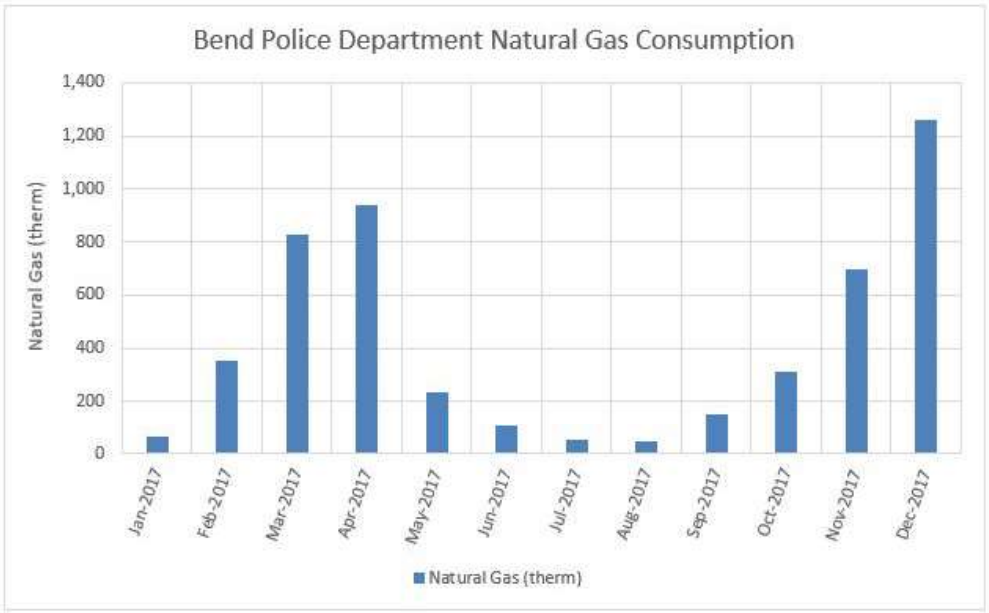
"Page content is subject to Confidentiality Restrictions"

Bend Police Department

Electricity Use (kWh and kW)



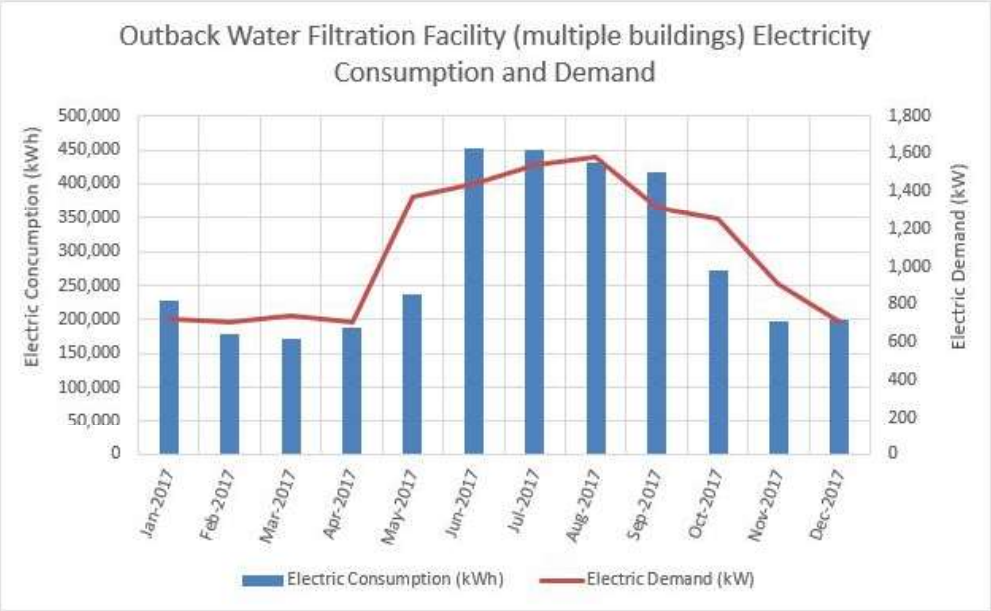
Natural Gas Use



"Page content is subject to Confidentiality Restrictions"

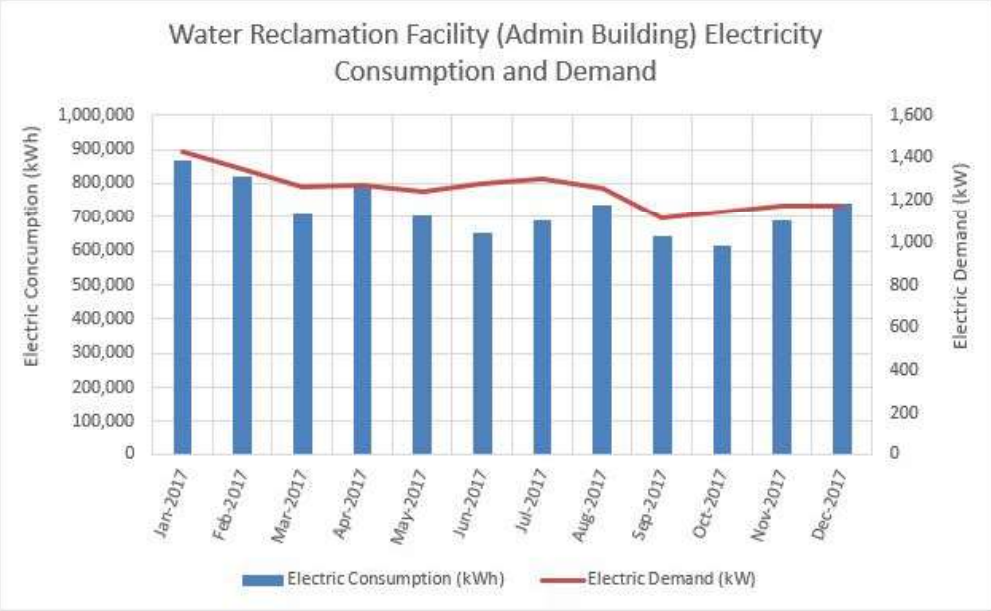
Outback Water Filtration Facility

Electricity Use (kWh and kW)



Water Reclamation Facility

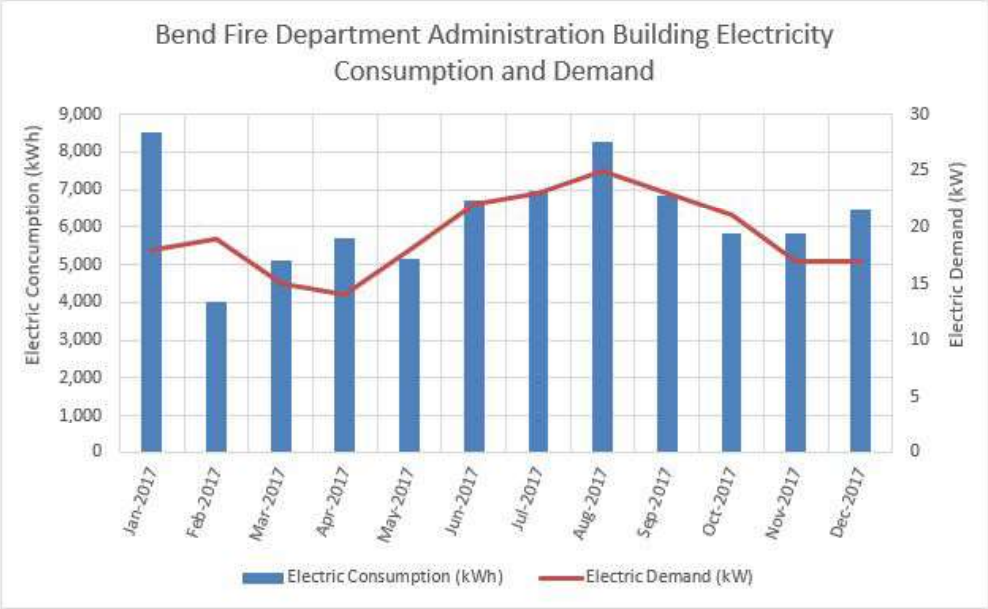
Electricity Use (kWh and kW)



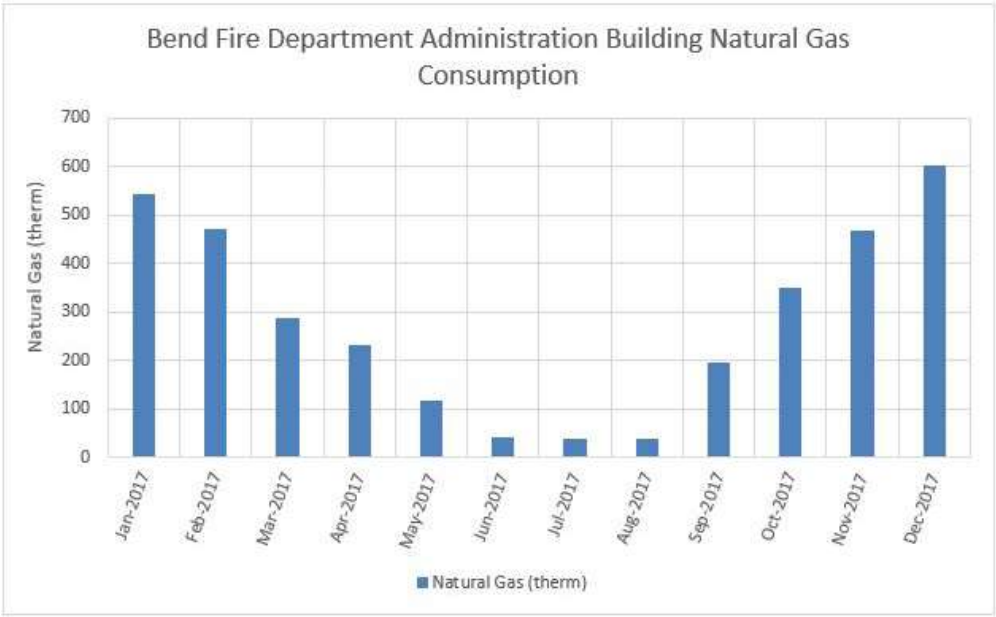
"Page content is subject to Confidentiality Restrictions"

Bend Fire Administration

Electricity Use (kWh and kW)



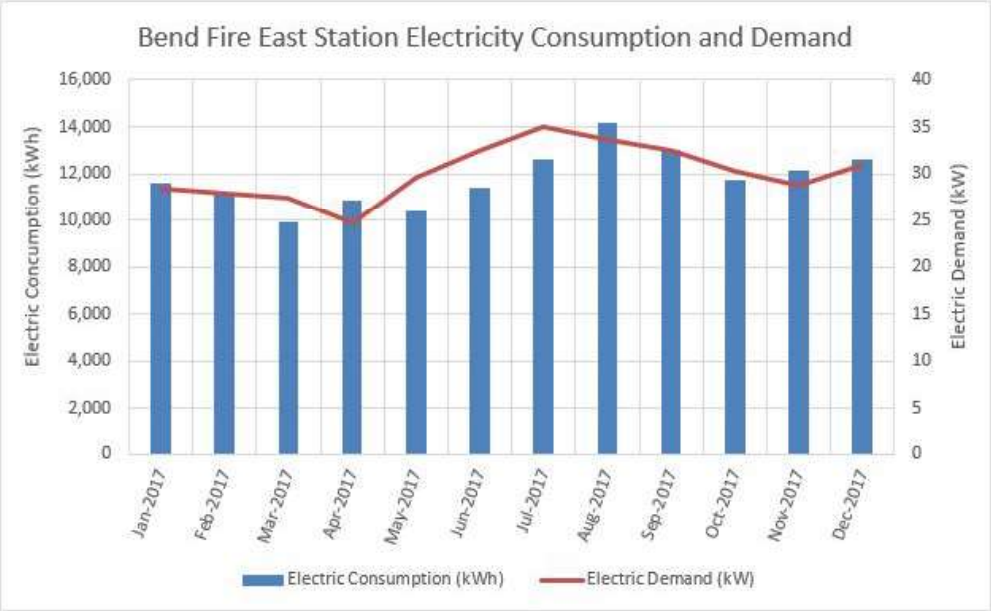
Natural Gas Use



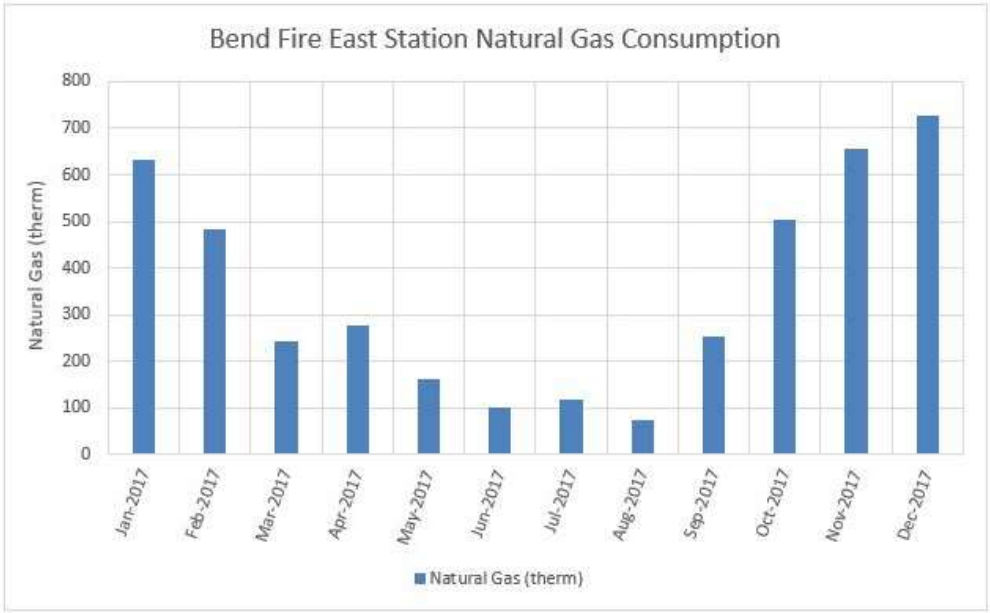
"Page content is subject to Confidentiality Restrictions"

Bend Fire East

Electricity Use (kWh and kW)



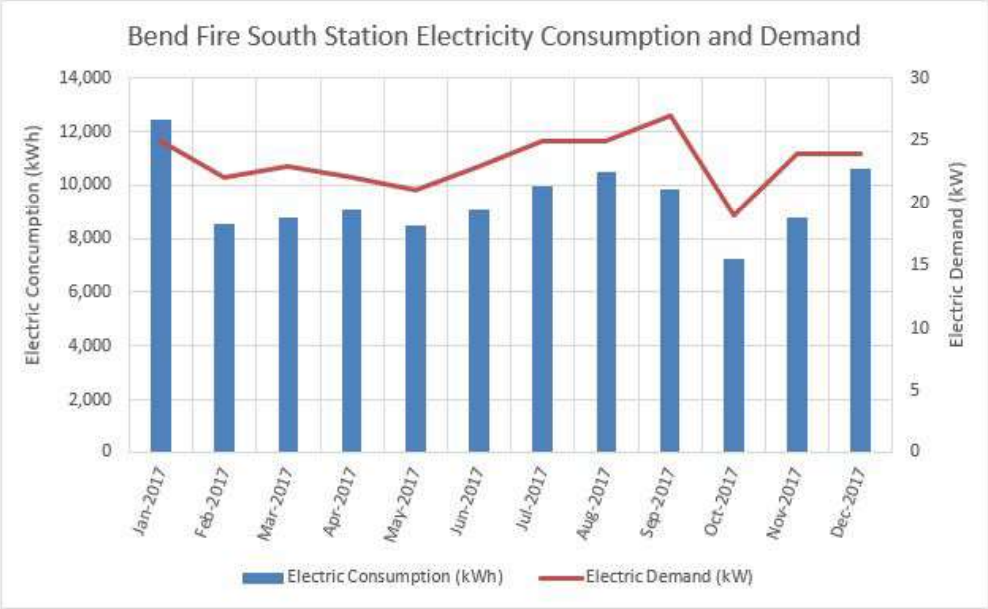
Natural Gas Use



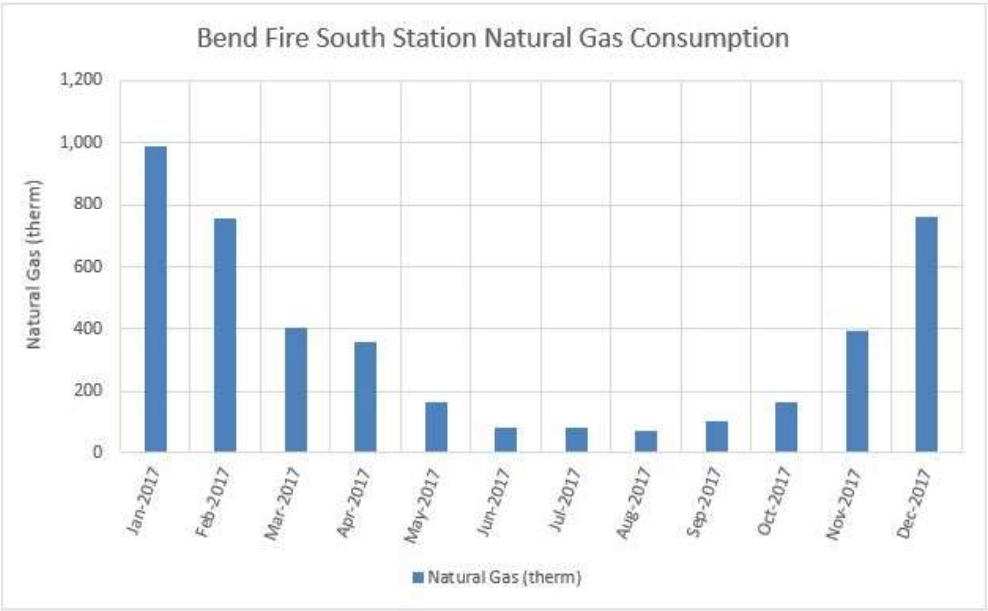
"Page content is subject to Confidentiality Restrictions"

Bend Fire South

Electricity Use (kWh and kW)

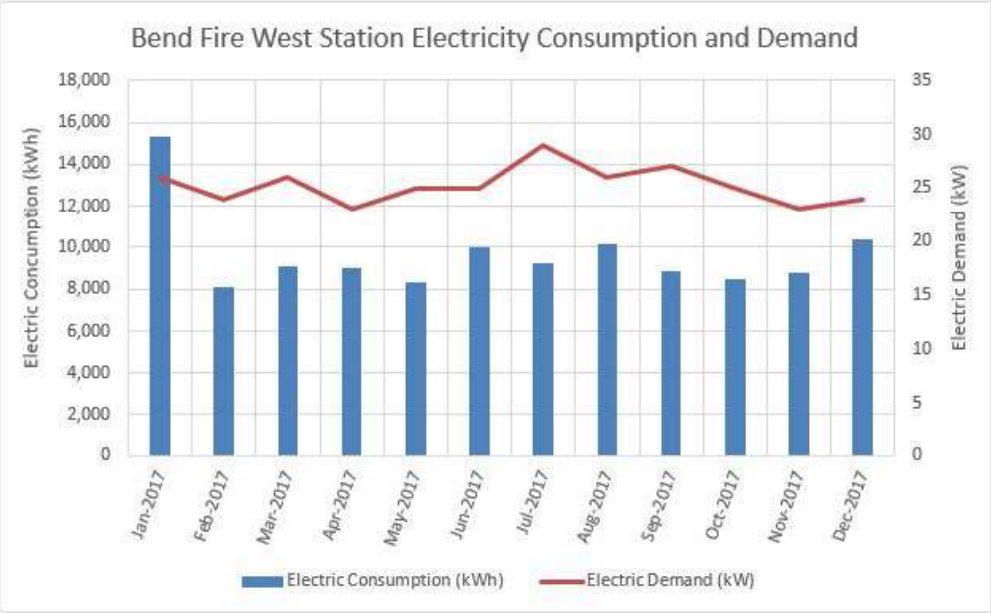


Natural Gas Use

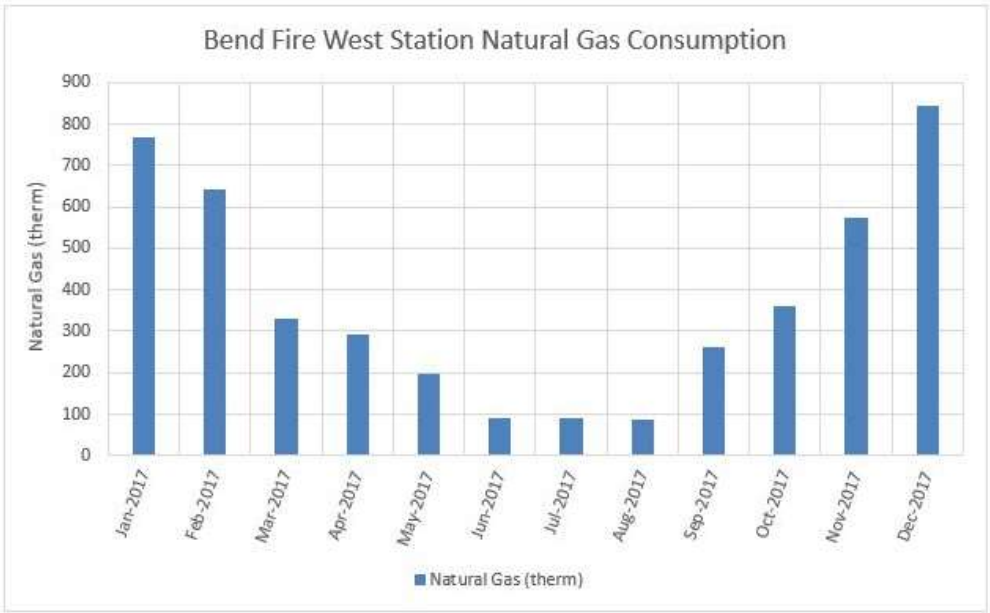


Bend Fire West

Electricity Use (kWh and kW)



Natural Gas Use



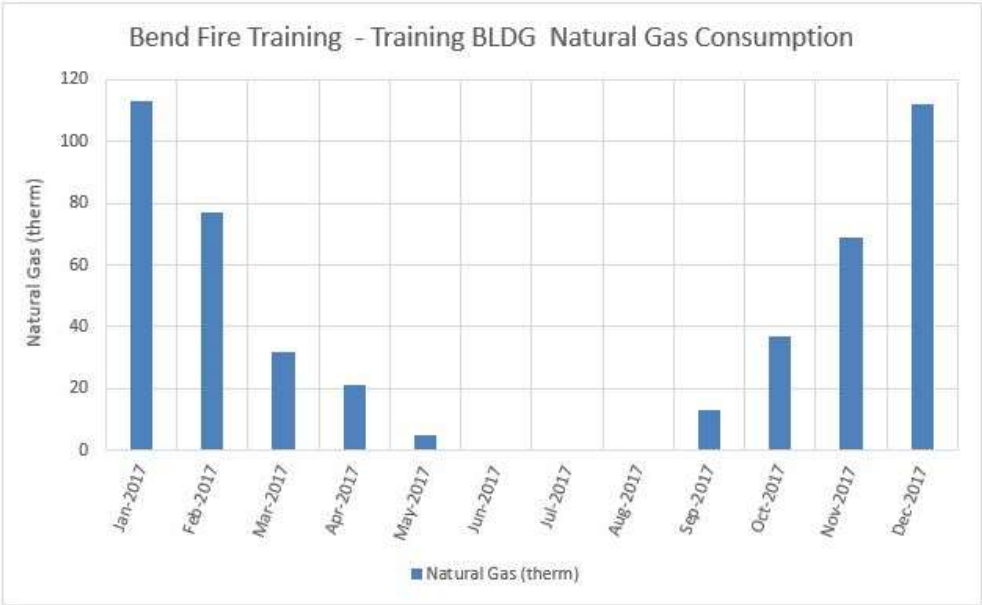
"Page content is subject to Confidentiality Restrictions"

Bend Fire Training

Electricity Use (kWh and kW)



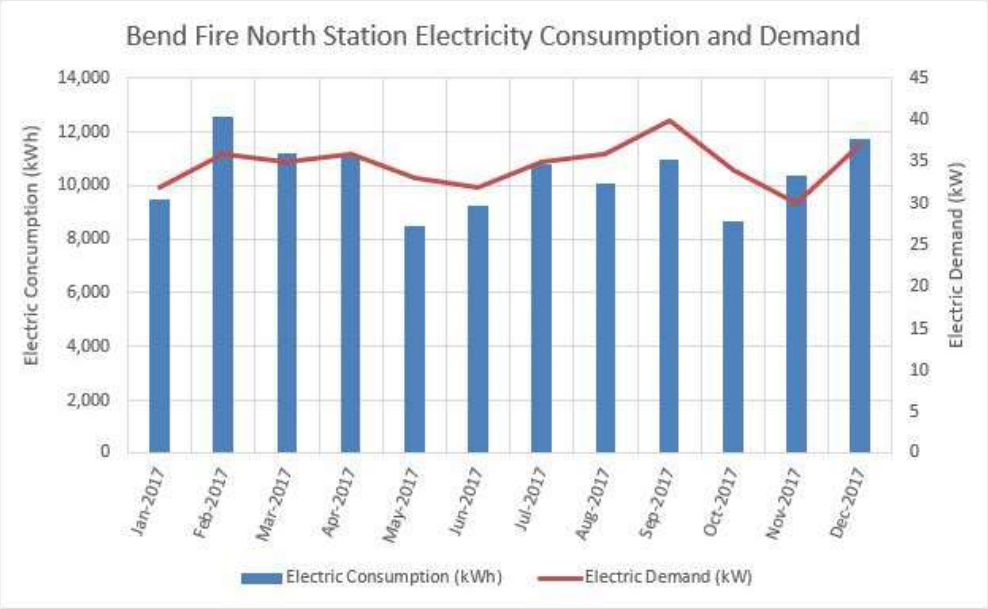
Natural Gas Use



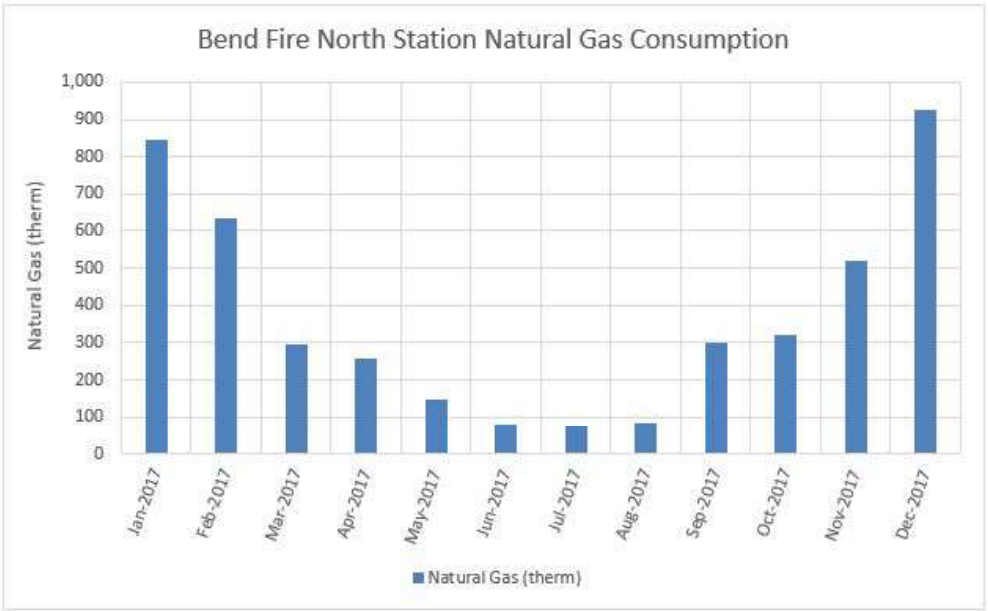
"Page content is subject to Confidentiality Restrictions"

Bend Fire North

Electricity Use (kWh and kW)



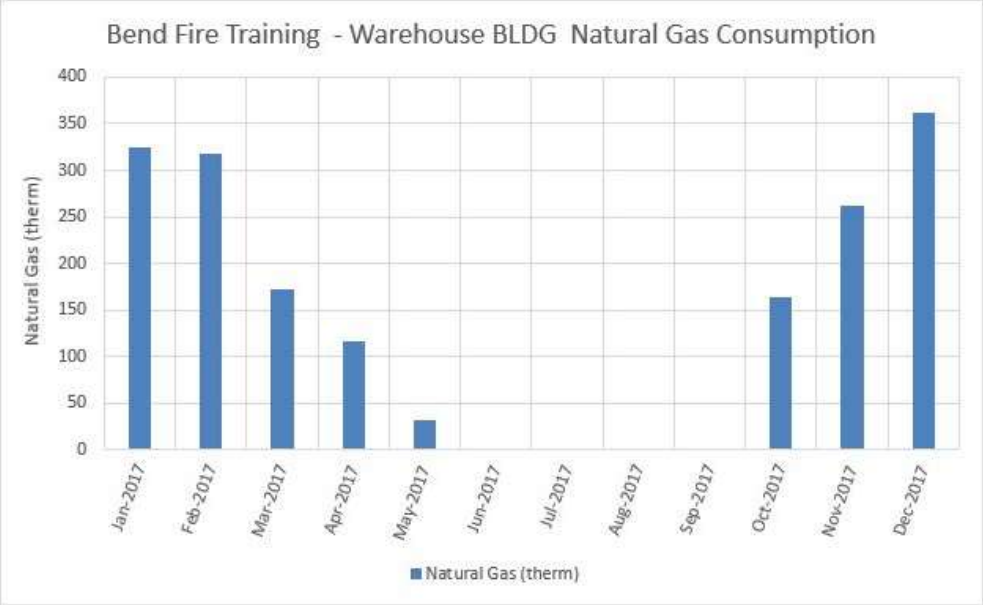
Natural Gas Use



"Page content is subject to Confidentiality Restrictions"

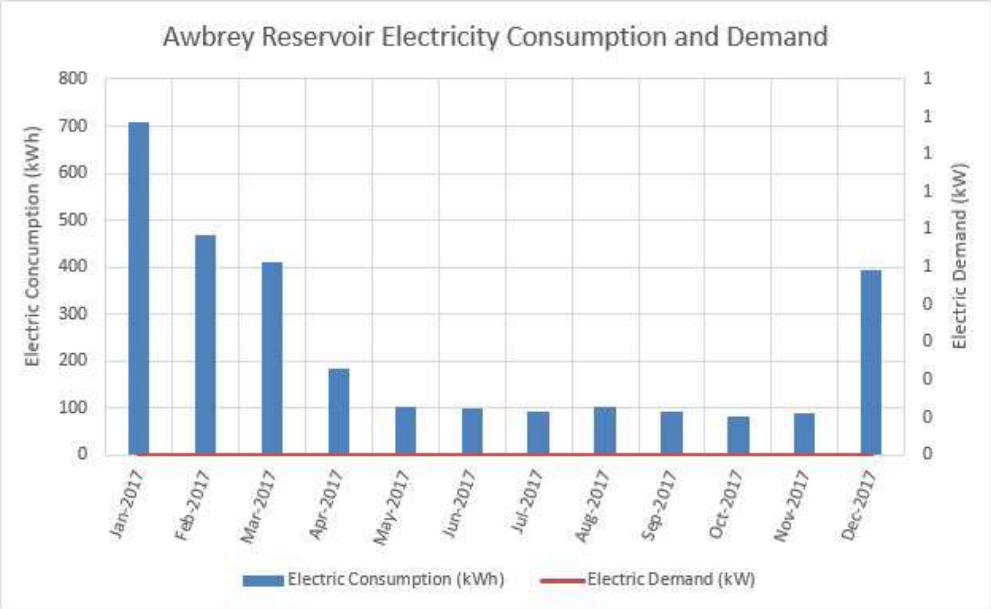
Bend Fire Training Warehouse

Natural Gas Use



Awbrey Reservoir

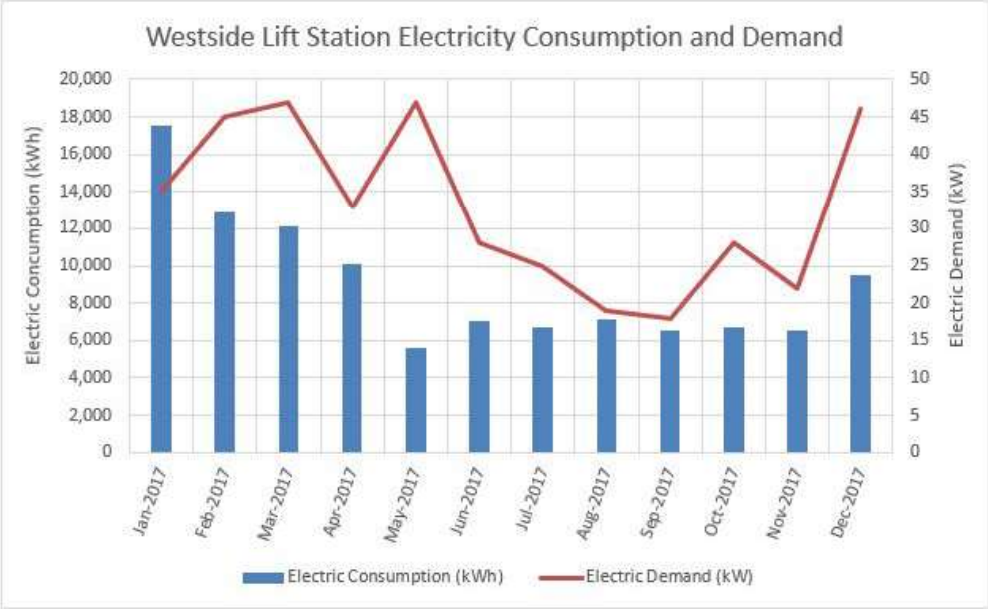
Electricity Use (kWh and kW)



"Page content is subject to Confidentiality Restrictions"

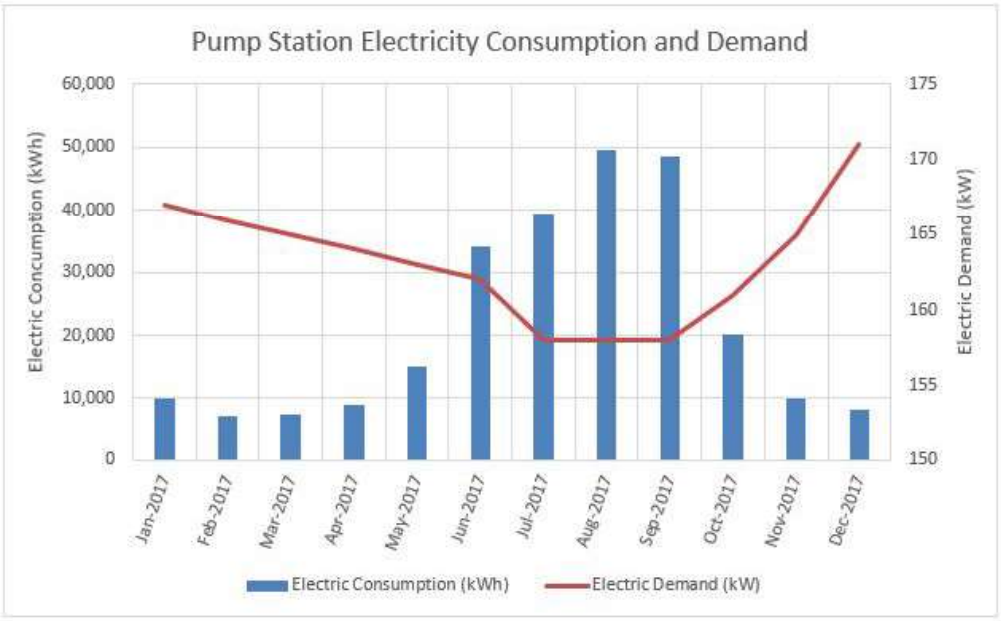
Westside Lift Station

Electricity Use (kWh and kW)



Pump Station

Electricity Use (kWh and kW)



"Page content is subject to Confidentiality Restrictions"

5. Methodology

Mechanical Systems

The mechanical audit focused on building controls and heating systems.

Ameresco performed extensive metering to determine a baseline for each facility. All energy calculations were then based on this metering. Metering methods used included the use of Onset amperage data loggers to determine equipment current draw, Onset temperature loggers to determine zone and equipment temperature profiles, and Onset lighting loggers to track lighting burn hours. This data was collected at 1 to 5 minute intervals for at least two weeks.

Based on this extensive metering, Ameresco performed engineering calculations using typical weather data to match the metered data to average weather conditions. These results were then compared to utility records to verify accuracy. This accurate baseline was then used for the proposed system. The data and engineering calculations for baseline and proposed systems appear in Appendix A. Table 5 lists the equipment used to collect data for this audit.

Lighting Systems

The lighting systems at each facility were reviewed and itemized. Lighting loggers were also used to determine operating hours and occupancy levels. Spreadsheets were then prepared to summarize the existing lighting fixtures and operating hours. Proposed systems were also itemized in the spreadsheet to be compared directly with the existing systems analyzed in the baseline.

Lighting Audits for baseline and proposed systems appear in Appendix B.

Water Systems

The water using systems at each facility were quantified and cataloged. Occupancy info was used to determine frequency of use. Spreadsheets were then prepared to summarize the existing fixtures and usage. Proposed systems were also itemized in the spreadsheet to be compared directly with the existing systems analyzed in the baseline.

Water Audits for baseline and proposed systems appear in Appendix C.

"Page content is subject to Confidentiality Restrictions"

Table 5: Data Logging Equipment Used

Logger Type	Manufacturer	Serial Number	
HOBO UX100-001 Temperature logger	Onset Corp.	Multiple	
HOBO Pendant Temp	Onset Corp.	Multiple	
HOBO MicroStation and S-TMB-M006 sensors	Onset Corp.	Multiple	
HOBO UX90-006 Occupancy/Light logger	Onset Corp.	Multiple	
HOBO UX90-004 motor on/off logger	Onset	Multiple	

5. Scope of Work

List of All Measures Studied

Table 6: All Measures Studied

		Baseline								Proposed												
ECM #	Conservation Measure	Current Annual Use - Electrical		Current Gas Use (Therms)	Current Water Use (CCF)	Current Electric Cost ($)	Current Gas Cost ($)	Current Water Cost ($)	Current Total Cost ($)	Future Total Annual Use - Electric		Future Gas Use (Therms)	Future Water Use (CCF)	Future Electric Cost ($)	Future Gas Cost ($)	Future Water Cost ($)	Future Total Cost ($)	Annual Savings Electric		Annual Gas Savings (Therms)	Annual Water Savings (CCF)	Annual Resource Savings ($)
		Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)			
	City of Bend, OR																					
CH-L1	City Hall: Lighting and lighting controls upgrade	53,109	217			$ 5,441	$ -	$ -	$ 5,441	26,246	100	202		$ 2,639	$ 126	$ -	$ 2,765	26,862	118	(202)	-	$ 2,675
CH-G1	City Hall: Building envelope improvements	12		420		$ 1	$ 262	$ -	$ 263					$ -	$ -	$ -	$ -	12	-	420	-	$ 263
CH-G2	City Hall: Roof surface replacement	-	-			$ -	$ -	$ -	$ -	-	-			$ -	$ -	$ -	$ -	-	-	-	-	$ -
CH-P1	City Hall: Domestic Water Conservation			202	181	$ -	$ 126	$ 1,029	$ 1,155			133	97	$ -	$ 83	$ 549	$ 632	-	-	69	85	$ 523
CH-M1	City Hall: HVAC Controls	32,258	262	6,065		$ 4,153	$ 3,789	$ -	$ 7,941	29,412	262	4,922		$ 3,941	$ 3,075	$ -	$ 7,015	2,846	(1)	1,143	-	$ 926
CH-M2	City Hall: HVAC Equipment Upgrade - NOT NEEDED					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
FA-L1	Franklin Annex: Lighting and lighting controls upgrade	21,998	90			$ 2,435	$ -	$ -	$ 2,435	19,080	79	22		$ 2,112	$ 14	$ -	$ 2,126	2,917	11	(22)	-	$ 309
FA-G1	Franklin Annex: Building envelope improvements	254		580		$ 28	$ 362	$ -	$ 390					$ -	$ -	$ -	$ -	254	-	580	-	$ 390
FA-P1	Franklin Annex: Domestic Water Conservation	564			36	$ 62	$ -	$ 206	$ 268	210			21	$ 23	$ -	$ 121	$ 144	354	-	-	15	$ 124
FA-M1	Franklin Annex: HVAC Controls	3,526	48	1,134		$ 390	$ 708	$ -	$ 1,099	3,430	48	1,022		$ 380	$ 638	$ -	$ 1,018	95	(0)	112	-	$ 81
FA-M2	Franklin Annex: HVAC Equipment Upgrade	1,381	15	513		$ 153	$ 320	$ -	$ 473	1,208	10	432		$ 134	$ 270	$ -	$ 403	173	4	81	-	$ 70
SS-L1	South Sister: Lighting and lighting controls upgrade	13,134	55			$ 1,454	$ -	$ -	$ 1,454	12,675	55	1		$ 1,403	$ 0	$ -	$ 1,403	459	-	(1)	-	$ 50
SS-G1	South Sister: Building envelope improvements	3		110		$ 0	$ 69	$ -	$ 69					$ -	$ -	$ -	$ -	3	-	110	-	$ 69
SS-G2	South Sister: Roof surface replacement					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
SS-P1	South Sister: Domestic Water Conservation	-		28	24	$ -	$ 17	$ 136	$ 153	-		8	13	$ -	$ 5	$ 73	$ 78	-	-	20	11	$ 75
SS-M1	South Sister: HVAC Controls	3,628	43	1,513		$ 402	$ 945	$ -	$ 1,347	3,571	44	1,220		$ 395	$ 762	$ -	$ 1,157	57	(1)	293	-	$ 189
MS-L1	Middle Sister: Lighting and lighting controls upgrade - NO SCOPE, JUST REMODELED					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
MS-G1	Middle Sister: Building envelope improvements	174		88		$ 19	$ 55	$ -	$ 74					$ -	$ -	$ -	$ -	174	-	88	-	$ 74
MS-P1	Middle Sister: Domestic Water Conservation			8	9	$ -	$ 5	$ 48	$ 54			3	5	$ -	$ 2	$ 28	$ 30	-	-	5	4	$ 24
MS-M1	Middle Sister: HVAC Controls	3,608	-	822		$ 399	$ 513	$ -	$ 913	3,418	-	702		$ 378	$ 438	$ -	$ 817	191	-	120	-	$ 96
NS-G1	North Sister: Building envelope improvements	2		80		$ 0	$ 50	$ -	$ 50					$ -	$ -	$ -	$ -	2	-	80	-	$ 50
WSA-L1	Wall Street Annex: Lighting and lighting controls upgrade	94,631	364			$ 10,475	$ -	$ -	$ 10,475	43,391	132	-		$ 4,803	$ -	$ -	$ 4,803	51,240	232	-	-	$ 5,672
WSA-G1	Wall Street Annex: Building envelope improvements	3		130		$ 0	$ 81	$ -	$ 82					$ -	$ -	$ -	$ -	3	-	130	-	$ 82
WSA-P1	Wall Street Annex: Domestic Water Conservation			34	7	$ -	$ 21	$ 42	$ 63			23	5	$ -	$ 14	$ 28	$ 43	-	-	11	2	$ 20
WSA-M1	Wall Street Annex: HVAC Controls	56,715	658	316		$ 6,278	$ 198	$ -	$ 6,476	49,429	631	251		$ 5,472	$ 157	$ -	$ 5,629	7,286	26	65	-	$ 847
WSA-M2	Wall Street Annex: HVAC Equipment Upgrade	38,954	503	-		$ 4,312	$ -	$ -	$ 4,312	28,391	401	-		$ 3,143	$ -	$ -	$ 3,143	10,563	102	-	-	$ 1,169
CPP-L1	Centennial Parking Plaza: Lighting and lighting controls upgrade	158,940	211			$ 17,594	$ -	$ -	$ 17,594	65,011	125	2		$ 7,197	$ 1	$ -	$ 7,198	93,929	87	(2)	-	$ 10,396
CFC-L1	Crows Feed Commons: Rademacher House Lighting and lighting controls upgrade	16,872	17			$ 1,868	$ -	$ -	$ 1,868	7,288	11	12		$ 807	$ 7	$ -	$ 814	9,583	6	(12)	-	$ 1,054
CFC-G2	Crows Feed Commons: Rademacher House Roof surface replacement	-				$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
S&O-L1	Streets and Ops: Lighting and lighting controls upgrade	144,829	523			$ 14,378	$ -	$ -	$ 14,378	55,787	269	669		$ 5,981	$ 418	$ -	$ 6,399	89,041	254	(669)	-	$ 7,980
S&O-G1	Streets and Ops: Building envelope improvements	314		8,870		$ 24	$ 5,541	$ -	$ 5,564					$ -	$ -	$ -	$ -	314	-	8,870	-	$ 5,564
S&O-G2	Streets and Ops: Roof surface replacement					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
S&O-P1	Streets and Ops: Domestic Water Conservation	7,455		23	172	$ 564	$ 15	$ 974	$ 1,552	4,455		12	78	$ 337	$ 7	$ 442	$ 786	2,999	-	11	94	$ 766
S&O-M1	Streets and Ops: HVAC Controls	20,958	194	7,220		$ 2,857	$ 4,510	$ -	$ 7,366	15,582	197	4,204		$ 2,465	$ 2,626	$ -	$ 5,091	5,376	(2)	3,015	-	$ 2,275
S&O-M2	Streets and Ops: HVAC Equipment Upgrade	6,726	91	1,936		$ 1,104	$ 1,209	$ -	$ 2,313	5,535	63	1,630		$ 831	$ 1,018	$ -	$ 1,849	1,191	28	306	-	$ 464

"Page content is subject to Confidentiality Restrictions"

Table 6: All Measures Studied (Continued)

		Baseline								Proposed								Annual Savings				
ECM #	Conservation Measure	Current Annual Use - Electrical		Current Gas Use (Therms)	Current Water Use (CCF)	Current Electric Cost ($)	Current Gas Cost ($)	Current Water Cost ($)	Current Total Cost ($)	Future Total Annual Use - Electric		Future Gas Use (Therms)	Future Water Use (CCF)	Future Electric Cost ($)	Future Gas Cost ($)	Future Water Cost ($)	Future Total Cost ($)	Electric		Annual Gas Savings (Therms)	Annual Water Savings (CCF)	Annual Resource Savings ($)
		Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)			
S&O-S1	Streets and Ops: Solar - 175 kW Rooftop Ballasted	-				$ -	$ -	$ -	$ -	(250,088)				$ (18,917)	$ -	$ -	$ (18,917)	250,088	-	-	-	$ 18,917
BAA-L1	Boyd Acres Building A: Lighting and lighting controls upgrade	29,027	108			$ 3,213	$ -	$ -	$ 3,213	11,217	44	134		$ 1,242	$ 84	$ -	$ 1,325	17,810	64	(134)	-	$ 1,888
BAA-G1	Boyd Acres Building A: Building envelope improvements	6		210		$ 1	$ 131	$ -	$ 132					$ -	$ -	$ -	$ -	6	-	210	-	$ 132
BAA-P1	Boyd Acres Building A: Domestic Water Conservation	1,625			53	$ 180	$ -	$ 300	$ 480	993			27	$ 110	$ -	$ 156	$ 266	632	-	-	25	$ 214
BAA-M1	Boyd Acres Building A: HVAC Controls	16,128	154	4,006		$ 1,785	$ 2,503	$ -	$ 4,288	11,043	157	2,245		$ 1,222	$ 1,402	$ -	$ 2,625	5,086	(2)	1,762	-	$ 1,663
BAA-M2	Boyd Acres Building A: HVAC Equipment Upgrade	10,712	154	2,291		$ 1,186	$ 1,431	$ -	$ 2,617	8,238	97	1,929		$ 912	$ 1,205	$ -	$ 2,117	2,474	57	362	-	$ 500
BAA-S1	Boyd Acres Building A: Solar - 77 kW Rooftop Standing Seam Metal	-				$ -	$ -	$ -	$ -	(102,408)				$ (11,336)	$ -	$ -	$ (11,336)	102,408	-	-	-	$ 11,336
BAB-L1	Boyd Acres Building B: Lighting and lighting controls upgrade	19,512	59			$ 2,160	$ -	$ -	$ 2,160	7,905	30	62		$ 875	$ 39	$ -	$ 914	11,607	29	(62)	-	$ 1,246
BAB-G1	Boyd Acres Building B: Building envelope improvements	24		800		$ 3	$ 500	$ -	$ 502					$ -	$ -	$ -	$ -	24	-	800	-	$ 502
BAB-P1	Boyd Acres Building B: Domestic Water Conservation	1,029			18	$ 114	$ -	$ 104	$ 218	316			8	$ 35	$ -	$ 48	$ 83	713	-	-	10	$ 135
BAB-M1	Boyd Acres Building B: HVAC Controls					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BAC-L1	Boyd Acres Building C: Lighting and lighting controls upgrade	28,224	87			$ 3,124	$ -	$ -	$ 3,124	10,822	36	90		$ 1,198	$ 56	$ -	$ 1,254	17,402	51	(90)	-	$ 1,870
BAC-G1	Boyd Acres Building C: Building envelope improvements	9		300		$ 1	$ 187	$ -	$ 188					$ -	$ -	$ -	$ -	9	-	300	-	$ 188
BAC-G2	Boyd Acres Building C: Roof surface replacement					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BAC-P1	Boyd Acres Building C: Domestic Water Conservation			2,049	523	$ -	$ 1,280	$ 2,964	$ 4,244			1,228	319	$ -	$ 767	$ 1,807	$ 2,574	-	-	822	204	$ 1,670
BAC-P2	Boyd Acres Building C: Domestic water heater replacement(s) - NOT NEEDED					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BAC-M1	Boyd Acres Building C: HVAC Controls	9,046	88	2,342		$ 1,001	$ 1,463	$ -	$ 2,464	7,578	90	1,808		$ 839	$ 1,129	$ -	$ 1,968	1,468	(2)	534	-	$ 496
BAD-L1	Boyd Acres Building D: Lighting and lighting controls upgrade	20,569	69			$ 2,010	$ -	$ -	$ 2,010	13,269	42	55		$ 1,281	$ 34	$ -	$ 1,315	7,300	27	(55)	-	$ 695
BAD-G1	Boyd Acres Building D: Building envelope improvements	125		4,280		$ 9	$ 2,673	$ -	$ 2,683					$ -	$ -	$ -	$ -	125	-	4,280	-	$ 2,683
BAD-G2	Boyd Acres Building D: Roof Repair					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BAD-P1	Boyd Acres Building D: Domestic Water Conservation			48	24	$ -	$ 30	$ 135	$ 165			16	11	$ -	$ 10	$ 65	$ 75	-	-	32	12	$ 90
BAD-M1	Boyd Acres Building D: HVAC Controls					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BAD-M2	Boyd Acres Building D: HVAC Equipment Upgrade - 2 Gas Furnaces to high efficiency. Potential for Infra-red in Vacuum Truck bay not included (would be comfort and control only, no savings)			2,000		$ -	$ 1,249	$ -	$ 1,249			1,500		$ -	$ 937	$ -	$ 937	-	-	500	-	$ 312
BAD-S1	Boyd Acres Building D: Solar - 73.4 kW Rooftop Standing Seam	-				$ -	$ -	$ -	$ -	(102,001)				$ (7,716)	$ -	$ -	$ (7,716)	102,001	-	-	-	$ 7,716
BPD-L1	Bend Police Department: Lighting and lighting controls upgrade	311,146	66			$ 23,968	$ -	$ -	$ 23,968	115,965	202	1,409		$ 10,093	$ 880	$ -	$ 10,973	195,181	(136)	(1,409)	-	$ 12,995
BPD-G1	Bend Police Department: Building envelope improvements	36		1,690		$ 3	$ 1,056	$ -	$ 1,058					$ -	$ -	$ -	$ -	36	-	1,690	-	$ 1,058
BPD-P1	Bend Police Department: Domestic Water Conservation	82,278			1,144	$ 6,224	$ -	$ 6,484	$ 12,708	47,090			692	$ 3,562	$ -	$ 3,923	$ 7,485	35,188	-	-	452	$ 5,222
BPD-P2	Bend Police Department: Domestic water heater replacement(s)	10,690				$ 809	$ -	$ -	$ 809			384		$ -	$ 240	$ -	$ 240	10,690	-	(384)	-	$ 569
BPD-M3	Bend Police Department: HVAC system retrocommissioning	163,433	723	9,759		$ 17,097	$ 6,096	$ -	$ 23,193	161,454	723	9,536		$ 16,947	$ 5,957	$ -	$ 22,904	1,979	-	223	-	$ 289
SL-L1	Street Lighting: Upgrade street lighting from HID to LED City-wide	1,818,654				$ 107,622	$ -	$ -	$ 107,622	835,629				$ -	$ -	$ -	$ -	983,025	-	-	-	$ 107,622
BMA-L1	Bend Municipal Airport: Lighting and lighting controls upgrade	82,945	181			$ 5,856	$ -	$ -	$ 5,856	30,633	78	370		$ 2,225	$ 231	$ -	$ 2,456	52,312	103	(370)	-	$ 3,400
BMA-G1	Bend Municipal Airport: Building envelope improvements	9		300		$ 1	$ 187	$ -	$ 188					$ -	$ -	$ -	$ -	9	-	300	-	$ 188
BMA-P1	Bend Municipal Airport: Domestic Water Conservation			172	83	$ -	$ 107	$ 242	$ 349			69	46	$ -	$ 43	$ 133	$ 176	-	-	103	37	$ 173
BFA-L1	Bend Fire Admin: Lighting and lighting controls upgrade	26,333	74			$ 2,915	$ -	$ -	$ 2,915	14,236	46	62		$ 1,576	$ 39	$ -	$ 1,614	12,098	29	(62)	-	$ 1,301
BFA-G1	Bend Fire Admin: Building envelope improvements	9		320		$ 1	$ 200	$ -	$ 201					$ -	$ -	$ -	$ -	9	-	320	-	$ 201
BFA-G2	Bend Fire Admin: Roof Replacement					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -

Table 6: All Measures Studied (Continued)

ECM #	Conservation Measure	Baseline								Proposed								Annual Savings				
		Current Annual Use - Electrical		Current Gas Use	Current Water Use	Current Electric Cost	Current Gas Cost	Current Water Cost	Current Total Cost	Future Total Annual Use - Electric		Future Gas Use	Future Water Use	Future Electric Cost	Future Gas Cost	Future Water Cost	Future Total Cost	Annual Savings Electric		Annual Gas Savings	Annual Water Savings	Annual Resource Savings
		Consume (kWh)	Demand (kW)	(Therms)	(CCF)	($)	($)	($)	($)	Consume (kWh)	Demand (kW)	(Therms)	(CCF)	($)	($)	($)	($)	Consume (kWh)	Demand (kW)	Savings (Therms)	(CCF)	($)
BFA-P1	Bend Fire Admin: Domestic Water Conservation			1,160	324	$ -	$ 725	$ 1,835	$ 2,560			681	180	$ -	$ 425	$ 1,021	$ 1,446	-	-	479	144	$ 1,113
BFA-M1	Bend Fire Admin: HVAC Controls	26,166	186	3,330		$ 2,896	$ 2,080	$ -	$ 4,976	18,633	184	2,040		$ 2,063	$ 1,274	$ -	$ 3,337	7,533	1	1,290	-	$ 1,640
BFA-S1	Bend Fire Admin: Solar - 25.2 kW Rooftop Direct Mount	-				$ -	$ -	$ -	$ -	(39,345)				$ (4,355)	$ -	$ -	$ (4,355)	39,345	-	-	-	$ 4,355
BFE-L1	Bend Fire East: Lighting and lighting controls upgrade	64,581	97			$ 4,314	$ -	$ -	$ 4,314	23,779	46	176		$ 1,644	$ 110	$ -	$ 1,754	40,802	51	(176)	-	$ 2,560
BFE-G1	Bend Fire East: Building envelope improvements	7		300		$ 0	$ 187	$ -	$ 188					$ -	$ -	$ -	$ -	7	-	300	-	$ 188
BFE-P1	Bend Fire East: Domestic Water Conservation			1,261	302	$ -	$ 788	$ 1,713	$ 2,500			737	177	$ -	$ 461	$ 1,003	$ 1,464	-	-	523	125	$ 1,036
BFE-P2	Bend Fire East: Domestic water heater replacement(s)			445		$ -	$ 278	$ -	$ 278			384		$ -	$ 240	$ -	$ 240	-	-	61	-	$ 38
BFE-M1	Bend Fire East: HVAC Controls	25,561	204	3,914		$ 2,633	$ 2,445	$ -	$ 5,078	24,558	199	3,993		$ 2,545	$ 2,494	$ -	$ 5,039	1,003	5	(79)	-	$ 39
BFS-L1	Bend Fire South: Lighting and lighting controls upgrade	50,500	97			$ 5,590	$ -	$ -	$ 5,590	17,894	39	187		$ 1,981	$ 117	$ -	$ 2,098	32,606	58	(187)	-	$ 3,492
BFS-G1	Bend Fire South: Building envelope improvements	11		480		$ 1	$ 300	$ -	$ 301					$ -	$ -	$ -	$ -	11	-	480	-	$ 301
BFS-P1	Bend Fire South: Domestic Water Conservation			1,155	278	$ -	$ 721	$ 1,577	$ 2,298			718	169	$ -	$ 449	$ 959	$ 1,408	-	-	437	109	$ 890
BFS-P2	Bend Fire South: Domestic water heater replacement(s)			445		$ -	$ 278	$ -	$ 278			384		$ -	$ 240	$ -	$ 240	-	-	61	-	$ 38
BFS-M1	Bend Fire South: HVAC Controls	31,832	207	3,785		$ 3,524	$ 2,365	$ -	$ 5,888	29,244	203	3,716		$ 3,237	$ 2,321	$ -	$ 5,558	2,588	4	69	-	$ 330
BFW-L1	Bend Fire West: Lighting and lighting controls upgrade	31,342	79			$ 3,469	$ -	$ -	$ 3,469	17,206	51	76		$ 1,905	$ 47	$ -	$ 1,952	14,136	28	(76)	-	$ 1,517
BFW-G1	Bend Fire West: Building envelope improvements	16		730		$ 2	$ 456	$ -	$ 458					$ -	$ -	$ -	$ -	16	-	730	-	$ 458
BFW-G2	Bend Fire West: Roof Replacement					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BFW-P1	Bend Fire West: Domestic Water Conservation			1,261	302	$ -	$ 788	$ 1,713	$ 2,500			737	177	$ -	$ 461	$ 1,003	$ 1,464	-	-	523	125	$ 1,036
BFW-P2	Bend Fire West: Domestic water heater replacement(s)			445		$ -	$ 278	$ -	$ 278			384		$ -	$ 240	$ -	$ 240	-	-	61	-	$ 38
BFW-M1	Bend Fire West: HVAC Controls	35,077	204	4,113		$ 3,883	$ 2,569	$ -	$ 6,452	24,686	202	2,139		$ 2,733	$ 1,336	$ -	$ 4,069	10,390	2	1,973	-	$ 2,383
BFW-S1	Bend Fire West: Solar - 41.8kW Rooftop Direct Mount	-				$ -	$ -	$ -	$ -	(45,620)				$ (5,050)	$ -	$ -	$ (5,050)	45,620	-	-	-	$ 5,050
BFN-L1	Bend Fire North: Lighting and lighting controls upgrade	53,822	151			$ 5,958	$ -	$ -	$ 5,958	20,410	64	221		$ 2,259	$ 138	$ -	$ 2,397	33,412	87	(221)	-	$ 3,561
BFN-G1	Bend Fire North: Building envelope improvements	13		590		$ 1	$ 369	$ -	$ 370					$ -	$ -	$ -	$ -	13	-	590	-	$ 370
BFN-G2	Bend Fire North: Roof Replacements					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
BFN-P1	Bend Fire North: Domestic Water Conservation	1,193		1,156	301	$ 132	$ 722	$ 1,708	$ 2,562	358		709	176	$ 40	$ 443	$ 998	$ 1,480	835	-	447	125	$ 1,081
BFN-P2	Bend Fire North: Domestic water heater replacement(s)			445		$ -	$ 278	$ -	$ 278			384		$ -	$ 240	$ -	$ 240	-	-	61	-	$ 38
BFN-M1	Bend Fire North: HVAC Controls	33,500	204	3,997		$ 3,708	$ 2,497	$ -	$ 6,205	32,236	206	3,509		$ 3,568	$ 2,192	$ -	$ 5,761	1,264	(2)	487	-	$ 444
BFT-L1	Bend Fire Training and Warehouse: Lighting and lighting controls upgrade	22,850	66			$ 2,161	$ -	$ -	$ 2,161	9,601	34			$ 948	$ -	$ -	$ 948	13,249	32	-	-	$ 1,213
BFT-G1	Bend Fire Training and Warehouse: Building envelope improvements	2		80		$ 0	$ 50	$ -	$ 50					$ -	$ -	$ -	$ -	2	-	80	-	$ 50
BFT-M1	Bend Fire Training: HVAC Controls	6,492	31	470		$ 693	$ 294	$ -	$ 987	4,222	33	288		$ 537	$ 180	$ -	$ 717	2,270	(2)	182	-	$ 270
BFH-G1	Bend Fire Warehouse: Building envelope improvements	2		80		$ 0	$ 50	$ -	$ 50					$ -	$ -	$ -	$ -	2	-	80	-	$ 50
BFH-M1	Bend Fire Warehouse: HVAC Controls	7,190				$ 544	$ -	$ -	$ 544	5,421				$ 410	$ -	$ -	$ 410	1,769	-	-	-	$ 134
WRF-L1	Water Reclamation Facility: Lighting and lighting controls upgrade	211,981	488			$ 9,886	$ -	$ -	$ 9,886	90,504	190			$ 4,136	$ -	$ -	$ 4,136	121,477	298	-	-	$ 5,750
WRF-M1	Water Reclamation Facility: Headworks fan VFD	136,591				$ 4,917	$ -	$ -	$ 4,917	87,340				$ 3,144	$ -	$ -	$ 3,144	49,251	-	-	-	$ 1,773
WRF-M2	Water Reclamation Facility: Out-building efficiency upgrades - NOT INCLUDED IN PHASE 1					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
WRF-M3	Water Reclamation Facility: Biogas Upgrading and Pipeline Injection	-	-	-		$ -	$ -	$ -	$ 14,890	1,338,656	5,299	(366,360)		$ 72,665	$ (1,165,690)	$ -	$ (1,093,026)	(1,338,656)	(5,299)	366,360	-	$ 1,107,916
WRF-M4	Water Reclamation Facility: Septage and Fog Receiving					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
WT-L1	Outback Water Filtration Facility: Lighting and lighting controls upgrade	90,122	275			$ 4,517	$ -	$ -	$ 4,517	51,923	153			$ 2,575	$ -	$ -	$ 2,575	38,198	123	-	-	$ 1,942

"Page content is subject to Confidentiality Restrictions"

Table 6: All Measures Studied (Continued)

ECM #	Conservation Measure	Baseline								Proposed								Annual Savings				
		Current Annual Use - Electrical		Current Gas Use (Therms)	Current Water Use (CCF)	Current Electric Cost ($)	Current Gas Cost ($)	Current Water Cost ($)	Current Total Cost ($)	Future Total Annual Use - Electric		Future Gas Use (Therms)	Future Water Use (CCF)	Future Electric Cost ($)	Future Gas Cost ($)	Future Water Cost ($)	Future Total Cost ($)	Electric		Annual Gas Savings (Therms)	Annual Water Savings (CCF)	Annual Resource Savings ($)
		Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)							Consume (kWh)	Demand (kW)			
WT-L2	Westside Lift Station: Lighting and lighting controls upgrade	3,032	37			$ 471	$ -	$ -	$ 471	1,056	13	-		$ 167	$ -	$ -	$ 167	1,976	24	-	-	$ 304
WT-M1a	Awbrey Butte PRV Hydro Generation - 80 kW Pump Turbine	-	-			$ -	$ -	$ -	$ -	(335,000)	-			$ (13,310)	$ -	$ -	$ (13,310)	335,000	-	-	-	$ 13,310
WT-M1b	Awbrey Butte PRV Hydro Generation - 140 kW In Line Turbine	-	-			$ -	$ -	$ -	$ -	(767,000)	-			$ (30,475)	$ -	$ -	$ (30,475)	767,000	-	-	-	$ 30,475
WT-M2a	Awbrey Butte Pump Station - Variable Speed Drive on existing infrastructure	240,400	1,920			$ 30,750	$ -	$ -	$ 30,750	115,813	1,620			$ 19,363	$ -	$ -	$ 19,363	124,588	300	-	-	$ 11,388
WT-M2b	Awbrey Butte Pump Station - Variable Speed Drives and upgrade electrical infrastructure	240,400	1,920			$ 30,750	$ -	$ -	$ 30,750	115,813	1,620			$ 19,363	$ -	$ -	$ 19,363	124,588	300	-	-	$ 11,388
WT-S1	Awbrey Butte Reservoir Solar - 77.8 kW Ground Mount Fixed Tilt	-				$ -	$ -	$ -	$ -	(119,387)				$ (9,031)	$ -	$ -	$ (9,031)	119,387	-	-	-	$ 9,031
WT-M4	Well Building Heat Pumps - NOT ENOUGH DATA TO RECOMMEND					$ -	$ -	$ -	$ -					$ -	$ -	$ -	$ -	-	-	-	-	$ -
WT-S2	Pilot Butte Solar - 258.5 kW Ground Mount Fixed Tilt	-				$ -	$ -	$ -	$ -	(399,639)				$ (24,435)	$ -	$ -	$ (24,435)	399,639	-	-	-	$ 24,435
WFF-M1	Outback Water Filtration Facility: Membrane Feed Pump - Hydraulic Water Powered Pump	768,941	3,623			$ 79,270	$ -	$ -	$ 79,270	250,973	896			$ 23,323	$ -	$ -	$ 23,323	517,969	2,727	-	-	$ 55,947
WFF-M2	Outback Water Filtration Facility: Electric Resistance Heat to Heat Pump	605,200				$ 37,004	$ -	$ -	$ 37,004	201,733				$ 12,335	$ -	$ -	$ 12,335	403,467	-	-	-	$ 24,669
WFF-S3	Outback Water Filtration Facility: Solar - 110.2 kW, Standing Seam Rooftop	-				$ -	$ -	$ -	$ -	(141,892)				$ (8,676)	$ -	$ -	$ (8,676)	141,892	-	-	-	$ 8,676
WFF-S4	Outback Water Filtration Facility: Solar - 129.6 kW, Ground Mount Fixed Tilt along North Fence Line	-				$ -	$ -	$ -	$ -	(196,679)				$ (12,026)	$ -	$ -	$ (12,026)	196,679	-	-	-	$ 12,026

List of Recommended and/or Selected Measures

Table 7: Recommended and/or Selected Measures

ECM #	Conservation Measure	Baseline								Proposed									Annual Savings Electric				
		Current Annual Use - Electrical		Current Gas	Current Water	Current Electric	Current Gas	Current Water	Current Total	Future Total Annual Use - Electric		Future Gas	Future Propane	Future Water	Future Electric	Future Gas	Future Water	Future Total			Annual Gas	Annual Water	Annual Resource
		Consume	Demand	Use	Use	Cost	Cost	Cost	Cost	Consume	Demand	Use	Use	Use	Cost	Cost	Cost	Cost	Consume	Demand	Savings	Savings	Savings
		kWh	kW	(Therms)	(CCF)	$	$	$	$	kWh	kW	(Therms)	(Gal)	(CCF)	$	$	$	$	kWh	kW	(Therms)	(CCF)	$
	City of Bend, OR																						
CPP-L1	Centennial Parking Plaza: Lighting and lighting controls upgrade	158,940	211			17,594			$17,594	65,011	125	2			$7,197	$1		$7,198	93,929	87	-2		$10,396
BPD-L1	Bend Police Department: Lighting and lighting controls upgrade	311,146	66			23,868			$23,968	115,965	202	1,409			$10,093	$880		$10,973	195,181	-136	-1,409		$12,395
BPD-G1	Bend Police Department: Building envelope improvements	36		1,690		3	1,056		$1,058										36		1,690		$1,058
BPD-P1	Bend Police Department: Domestic Water Conservation	82,278			1,144	6,224		6,484	$12,708	47,090				692	$3,562		$3,923	$7,485	35,188			452	$5,222
BPD-M3	Bend Police Department: HVAC system retrocommissioning	163,433	723	9,759		17,097	6,096		$23,193	161,454	723	9,536			$16,947	$5,957		$22,904	1,979		223		$289
SL-L1	Street Lighting: Upgrade street lighting from HID to LED City-wide	1,818,654				107,622			$107,622	835,629									983,025				$107,622
BFA-L1	Bend Fire Admin: Lighting and lighting controls upgrade	26,333	74			2,915			$2,915	14,236	46	62			$1,576	$39		$1,614	12,098	29	-62		$1,301
BFA-G1	Bend Fire Admin: Building envelope improvements	9		320		1	200		$201										9		320		$201
BFA-P1	Bend Fire Admin: Domestic Water Conservation			1,160	324		725	1,835	$2,560			681		180		$425	$1,021	$1,446			479	144	$1,113
BFA-M1	Bend Fire Admin: HVAC Controls	26,166	186	3,330		2,896	2,080		$4,976	18,633	184	2,040			$2,063	$1,274		$3,337	7,533	1	1,290		$1,640
BFE-L1	Bend Fire East: Lighting and lighting controls upgrade	64,581	97			4,314			$4,314	23,779	46	176			$1,644	$110		$1,754	40,802	51	-176		$2,560
BFE-G1	Bend Fire East: Building envelope improvements	7		300		0	187		$188										7		300		$188
BFE-P1	Bend Fire East: Domestic Water Conservation			1,261	302		788	1,713	$2,500			737		177		$461	$1,003	$1,464			523	125	$1,036
BFE-M1	Bend Fire East: HVAC Controls	25,561	204	3,314		2,633	2,445		$5,078	24,558	199	3,393			$2,545	$2,494		$5,039	1,003	5	-79		$39
BFS-L1	Bend Fire South: Lighting and lighting controls upgrade	50,500	97			5,590			$5,590	17,894	39	187			$1,981	$117		$2,098	32,606	58	-187		$3,432
BFS-G1	Bend Fire South: Building envelope improvements	11		480		1	300		$301										11		480		$301
BFS-P1	Bend Fire South: Domestic Water Conservation			1,155	278		721	1,577	$2,298			718		169		$449	$959	$1,408			437	109	$890
BFS-M1	Bend Fire South: HVAC Controls	31,832	207	3,785		3,524	2,365		$5,888	29,244	203	3,716			$3,237	$2,321		$5,558	2,588	4	69		$330
BFW-L1	Bend Fire West: Lighting and lighting controls upgrade	31,342	79			3,469			$3,469	17,206	51	76			$1,905	$47		$1,952	14,136	28	-76		$1,517
BFW-G1	Bend Fire West: Building envelope improvements	16		730		2	456		$458										16		730		$458
BFW-P1	Bend Fire West: Domestic Water Conservation			1,261	302		788	1,713	$2,500			737		177		$461	$1,003	$1,464			523	125	$1,036
BFW-M1	Bend Fire West: HVAC Controls	35,077	204	4,113		3,883	2,569		$6,452	24,686	202	2,139			$2,733	$1,336		$4,069	10,390	2	1,973		$2,383
BFN-L1	Bend Fire North: Lighting and lighting controls upgrade	53,822	151			5,958			$5,958	20,410	64	221			$2,259	$138		$2,397	33,412	87	-221		$3,561
BFN-G1	Bend Fire North: Building envelope improvements	13		590		1	369		$370										13		590		$370
BFN-P1	Bend Fire North: Domestic Water Conservation	1,193		1,156	301	132	722	1,708	$2,562	358		709		176	$40	$443	$938	$1,480	835		447	125	$1,081
BFN-M1	Bend Fire North: HVAC Controls	33,500	204	3,997		3,708	2,497		$6,205	32,236	206	3,503			$3,568	$2,192		$5,761	1,264	-2	487		$444
BFT-L1	Bend Fire Training and Warehouse: Lighting and lighting controls upgrade	22,850	66			2,161			$2,161	9,601	34				$948			$948	13,249	32			$1,213
BFT-G1	Bend Fire Training and Warehouse: Building envelope improvements	2		80		0	50		$50										2		80		$50
BFT-M1	Bend Fire Training: HVAC Controls	6,492	31	470		693	294		$987	4,222	33	288			$537	$180		$717	2,270	-2	182		$270
BFH-G1	Bend Fire Warehouse: Building envelope improvements	2		80		0	50		$50										2		80		$50
BFH-M1	Bend Fire Warehouse: HVAC Controls	7,190				544			$544	5,421					$410			$410	1,769				$134
WFF-M2	Outback Water Filtration Facility: Electric Resistance Heat to Heat Pump	605,200				37,004			$37,004	201,733					$12,335			$12,335	403,467				$24,669
WFF-S3	Outback Water Filtration Facility: Solar - 110.2 kW, Standing Seam Rooftop mount									-141,892					-$8,676			-$8,676	141,892				$8,676
WFF-S4	Outback Water Filtration Facility: Solar - 129.6 kW, Ground Mount Fixed Tilt along North Fence Line									-196,679					-$12,026			-$12,026	196,679				$12,026
	Totals:	3,556,184	2,600	39,629	2,651	$ 251,933	$ 24,754	$ 15,028	$ 291,722	1,330,795	2,356	30,936	-	1,571	$ 54,878	$ 19,324	$ 8,909	$ 83,110	2,225,389	243	8,693	1,079	$ 208,611
Total	**Mechanical**	**934,451**	**1,759**	**29,447**	**-**	**$ 71,983**	**$ 18,394**	**$ -**	**$ 90,377**	**163,615**	**1,751**	**25,221**	**-**	**-**	**$ 23,674**	**$ 15,754**	**$ -**	**$ 39,428**	**770,835**	**8**	**4,226**	**-**	**$ 50,949**
Total	**Water**	**83,471**	**-**	**5,992**	**2,651**	**$ 6,356**	**$ 3,743**	**$ 15,028**	**$ 25,127**	**47,448**	**-**	**3,583**	**-**	**1,571**	**$ 3,602**	**$ 2,238**	**$ 8,909**	**$ 14,749**	**36,023**	**-**	**2,409**	**1,079**	**$ 10,379**
Total	**Lighting**	**2,538,168**	**841**	**-**	**-**	**$ 173,592**	**$ -**	**$ -**	**$ 173,592**	**1,119,731**	**605**	**2,132**	**-**	**-**	**$ 27,602**	**$ 1,332**	**$ -**	**$ 28,934**	**1,418,437**	**236**	**(2,132)**	**-**	**$ 144,657**
Total	**General**	**94**	**-**	**4,190**	**-**	**$ 9**	**$ 2,617**	**$ -**	**$ 2,626**	**-**	**-**	**-**	**-**	**-**	**$ -**	**$ -**	**$ -**	**$ -**	**94**	**-**	**4,190**	**-**	**$ 2,626**

Detailed Scopes of Work

Detailed scopes of work will be determined in the Project Development Plan (PDP). See Section 7 for descriptions of ECMs proposed based on this audit.

Preliminary Project Schedule

The following information lists several preliminary milestone dates for the project. Ameresco will develop a detailed schedule outlining the various design, pre-construction, construction, and closeout tasks associated with the project once a design and construction contract is executed.

These dates are preliminary and are not to be interpreted as final.

	Start	Finish
PDP review and approval process	November 2018	December 2018
Award design and construction contract	January 2019	
Project design and pre-construction	February 2019	April 2019
Construction	April 2019	December 2019
Close out	December 2019	

"Page content is subject to Confidentiality Restrictions"

6. Energy Conservation Measure Descriptions

The following section will outline each Energy Conservation Measure (ECM) studied. Calculations, formulas, assumptions and key data are detailed in the energy calculation back up sheets located in Appendix A. General M&V methodology for the ECMs studied is located at the end of this section. A detailed M&V Plan summary that describes how each ECM will be measured and verified will be provided in the PDP.

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - L1

General Description

Lighting and lighting controls upgrade for all facilities studied.

Baseline Condition

Facilities are using inefficient fluorescent and incandescent lighting with limited automatic lighting controls. See Appendix for detailed line-by-line fixture audit and recommendations.

Proposed Condition

This measure will retrofit or replace interior lighting with LED lighting and appropriate lighting controls.

Benefits Summary

Energy Savings	kWh	kW	Dollars ($)
Baseline Energy Consumption	1,546,464	3,375	
Proposed Energy Consumption	664,843	1,824	
Estimated energy savings	881,621	1,551	$71,567
Estimated Incentives/Grants	$94,889		
Labor and Material Cost	$974,766		
Incented SPB (Years)	12.3		
Non-Energy Benefits	Increased lamp lifetime and reduced maintenance costs. Standardized inventory with other facilities.		

Energy Calculation Methodology

Existing lighting hours were estimated based on the current occupancy schedule then applied to the existing and proposed fixtures' wattage to determine a potential electricity demand and consumption reduction when upgrading to lower wattage fixtures. The heating penalty for using lighting with less waste heat output is 3,748 therms.

See Appendix A for calculation details.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Lighting Wattage	Varies. See Appendix B for lighting audit details.	Varies. See Appendix B for lighting audit details.

Multiple Facilities - G1

General Description
Building Envelope improvements for all facilities studied.

Baseline Condition
Multiple opportunities for building envelope improvement were discovered during the survey for the City of Bend's facilities. The facilities were found to have varying levels of infiltration, mostly due to age construction issues.

Proposed Condition
Most entrance doors needed one of the following: weather stripping and sweeps. Many of the door seals are original; however, some have been replaced. Often the replacement seals are of poor quality and are degraded by UV rays. Over time they lose their flexibility and ability to function reliably. Sealant is recommended around the perimeter of several windows as well as with numerous penetrations that were observed during the audit.

Benefits Summary

Energy Savings	kWh	therms	Dollars ($)
Estimated energy savings	1,031	20,438	$12,863
Estimated Incentives/Grants	$49,736		
Labor and Material Cost	$110,786		
Incented SPB (Years)	4.8		
Non-Energy Benefits	Improved occupant comfort and decreased infiltration of unwanted materials from the outside.		

Energy Calculation Methodology
Energy savings derived from this measure are a result of the heating and cooling systems not having to work as hard to achieve the desired environmental conditions. The amount of savings is dependent on the existing building conditions the amount of air leakage under the current operation conditions. Energy Savings are based on the ASHRAE crack method calculations which bases leak rates on factors such as: Linear feet of cracks, square feet of openings, average wind speed, heating or cooling set points, and average seasonal temperatures.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Infiltration rate	Large envelope gaps >.25"	Negligible gaps in envelope

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - G2

General Description

Roof surface replacement or upgrade.

Baseline Condition

Multiple Facilities have aging roofs, some being beyond their original life resulting in issues with weather infiltration and energy loss.

Proposed Condition

Replace aging roofs with appropriate replacements ranging from metal to membrane sealed roofs in multiple facilities owned by the City of Bend.

Benefits Summary

Measure Life	20 years
Labor and Material Cost	$1,058,826
Incented SPB (Years)	None calculated
Non-Energy Benefits	Improved occupant comfort. Extended life of facility by limiting ingress of water.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Roof Insulation	Minimum/poor condition	Upgraded as practical

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - P1

General Description

Domestic Water Conservation

Baseline Condition

Facilities have aging domestic water fixtures with standard flow rates.

Proposed Condition

This measure will install water conservation devices (aerators on sinks, flush valves on urinals and toilets, or new fixtures) to save water and energy for water heating.

Benefits Summary

Energy Savings	kWh	therms	CCF	Dollars ($)
Baseline Energy Consumption	94,144	8,557	3,780	$33,827
Proposed Energy Consumption	53,422	5,075	2,202	$19,635
Estimated energy savings	40,721	3,481	1,579	$14,191
Rate Escalation Projected	3%			
Age of Existing System	Varies			
Measure Life	15 years			
Estimated Incentives/Grants	$19,834			
Labor and Material Cost	$101,484			
Incented SPB (Years)	5.8			
Non-Energy Benefits				

Energy Calculation Methodology

Comprehensive audit was conducted of existing fixtures and compiled with estimated use according to each facilities end use.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Water Flow	Standard	Low flow

Multiple Facilities - P2

General Description
Domestic Water Heating

Baseline Condition
Several facilities are utilizing inefficient electric water heaters for domestic hot water.

Proposed Condition
This measure will replace the existing standard efficiency domestic water heaters with new high efficiency (90%+) gas-fired domestic water heaters.

Benefits Summary

Energy Savings	kWh	therms	CCF	Dollars ($)
Baseline Energy Consumption	10,690	1,780		$1,920
Proposed Energy Consumption	0	1,920		$1,200
Estimated energy savings	10,690	(141)		$720
Rate Escalation Projected	3%			
Age of Existing System	Various			
Measure Life	15 years			
Estimated Incentives/Grants	$1,132			
Labor and Material Cost	$98,580			
Incented SPB (Years)	135			
Non-Energy Benefits				

Energy Calculation Methodology
Facilities were appliances were audited and efficiency of the units were determined by manufactures data and depreciation and then compared to new high efficiency units.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Efficiency	Standard/low efficiency	High efficiency

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - Sx

General Description

Solar Photovoltaic (PV) installations

Baseline Condition

Many City owned buildings have underutilized locations for renewable photovoltaic solar systems.

Proposed Condition

Evaluated sites will have new behind the meter solar PV systems installed. The sites have been chosen due to the best opportunities based on electricity prices, age of roof, and shading and orientation of the site.

Benefits Summary

Energy Savings	kWh	Dollars ($)
Estimated energy savings	1,397,059	$101,542
Rate Escalation Projected	3%	
Age of Existing System	N/A	
Measure Life	20 years	
Estimated Incentives/Grants	TBD	
Labor and Material Cost	$1,757,962	
Incented SPB (Years)	17.3	
Non-Energy Benefits	Carbon offset benefits	

Energy Calculation Methodology

On sites that passed preliminary screening, shading evaluations were performed. Based on shading, annual production was estimated based on inclination, orientation, and PVSyst simulations.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Power Generation	None	As built estimated production confirmed with instantaneous measurement

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - M1

General Description

HVAC Controls

Baseline Condition

City owned buildings rely on manually set thermostats with varying degrees of occupant and maintenance access.

Proposed Condition

This measure installs new DDC energy management systems or networked thermostats for optimized control of HVAC equipment that will save the City maintenance time on responding to calls for comfort settings.

Benefits Summary

Energy Savings	kWh	kW	therms	Dollars ($)
Baseline Energy Consumption	311,682	2,482	43,026	$62,024
Proposed Energy Consumption	262,462	2,457	32,059	$50,210
Estimated energy savings	49,220	25	10,968	$11,813
Rate Escalation Projected	3%			
Measure Life	15 years			
Estimated Incentives/Grants	$31,175			
Labor and Material Cost	$118,404			
Incented SPB (Years)	7.4			
Non-Energy Benefits	Increased tenant comfort			

Energy Calculation Methodology

Data loggers were deployed in all facilities to determine operating conditions and energy use of HVAC equipment. Data was used to estimate energy savings by adjusting schedules heating and cooling setpoints.

Bin calculation organized on a degree-hour basis with heating and cooling balance points were used to determine heating intensity relative to outside air temperature. The therm/degree-hr rate is obtained by recasting the bill data over the TMY3 data from the Bend Airport weather station. The calculation determines the heating and cooling energy required for each occupied and unoccupied hour of the year. The proposed calculation includes less occupied hours and therefore less energy

"Page content is subject to Confidentiality Restrictions"

consumption from fans and compressors of the heat pumps. The proposed calculation also includes energy savings by turning ventilation off during unoccupied times. See Appendix A for calculation details.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
HVAC run times	Unregulated/sporadic	Well defined and easily controlled

"Page content is subject to Confidentiality Restrictions"

Multiple Facilities - M2

General Description
HVAC Equipment Upgrade

Baseline Condition
Several buildings are conditioned by aging HVAC equipment that is inefficient and is beyond its useful life.

Proposed Condition
This measure proposes the installation of new high efficiency roof top units.

Benefits Summary

Energy Savings	kWh	kW	therms	Dollars ($)
Baseline Energy Consumption	57,773	762	6,740	$10,965
Proposed Energy Consumption	43,372	571	5,492	$8,449
Estimated energy savings	14,401	191	1,248	$2,515
Rate Escalation Projected	3%			
Age of Existing System	18 years			
Measure Life	20 years			
Labor and Material Cost	$215,568			
Incented SPB (Years)	86			
Non-Energy Benefits	Decreased maintenance costs in the near term			

Energy Calculation Methodology
Data loggers were deployed in all facilities to determine operating conditions and energy use of HVAC equipment. Data was used to estimate energy savings by installing new high efficiency equipment.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Power consumption	Standard/low efficiency	High efficiency

"Page content is subject to Confidentiality Restrictions"

SL - L1

General Description

Upgrade street lighting from HID to LED City-wide

Baseline Condition

Street lighting throughout the City of Bend is typically high pressure sodium (HPS) except where already upgraded to LED. Street lighting is either City owned, owned by Pacific Power, or owned by Central Electric Co-Op.

Proposed Condition

This measure proposes upgrading the City owned and utility owned street lighting to LED fixtures.

Benefits Summary

Energy Savings	kWh	Dollars ($)
Baseline Energy Consumption	1,818,654	
Proposed Energy Consumption	835,629	
Estimated energy savings	983,025	$107,622
Rate Escalation Projected	3%	
Measure Life	20 years	
Estimated Incentives/Grants	$88,193	
Labor and Material Cost	$1,166,211	
Incented SPB (Years)	10	
Non-Energy Benefits	Increased lamp lifetime and reduced maintenance. Better light quality.	

Energy Calculation Methodology

Existing lighting hours were estimated based on the operating schedule of the street lights then applied to the existing and proposed fixtures' wattage to determine a potential electricity demand and consumption reduction when upgrading to lower wattage fixtures. For flat-rate fixtures, the base and proposed fixture costs were determined using current utility rate tables.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Lighting Wattage	Varies. See Appendix E for lighting audit details.	Varies. See Appendix E for lighting audit details.

"Page content is subject to Confidentiality Restrictions"

WRF - Mx

General Description

Outbuilding heating efficiency upgrades, Biogas upgrade and pipeline injection, Septage and fog receiving

Baseline Condition

All measures at WRF were preliminarily audited, but were put on hold pending winter weather, finishing construction, and master planning of the facility.

"Page content is subject to Confidentiality Restrictions"

WT-M1b

General Description
Hydro generation 140 kW pump turbine

Baseline Condition
Awbrey Butte reservoir currently has a pressure reducing valve to modulate flow from Outback Reservoir to maintain water levels.

Proposed Condition
Install inline hydro generation system to operate in parallel with the existing PRV to generate renewable energy.

Benefits Summary

Energy Savings	kWh	Dollars ($)
Estimated Energy Generation	768,941	$30,475
Rate Escalation Projected	3%	
Age of Existing System	n/a	
Measure Life	25 years	
Estimated Incentives/Grants	$114,000	
Labor and Material Cost	$394,320	
Incented SPB (Years)	10	
Non-Energy Benefits	Decreases carbon footprint with renewable energy production	

Energy Calculation Methodology
Energy production was based on 12 months of historical flow rates and measured pressure vs. flow curve.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Power	None	Power output at full and minimum flow to meet calculated values

"Page content is subject to Confidentiality Restrictions"

WT-M2a

General Description

Awbrey Butte Pump Station Variable speed drives

Baseline Condition

The existing pumps operate in an on/off cycle to maintain reservoir levels at Tower Rock.

Proposed Condition

This measure will install variable speed drives that will save energy, reduce demand charges, and reduce maintenance costs on the pumps and the motors. It will switch existing valves for pump suction to pull from the high pressure side of the Awbrey Reservoir PRV.

Benefits Summary

Energy Savings	kWh	kW	Dollars ($)
Baseline Energy Consumption	240,400	1,920	$30,750
Proposed Energy Consumption	115,813	1,620	$19,363
Estimated energy savings	124,588	300	$11,388
Rate Escalation Projected	3%		
Age of Existing System	70 years		
Measure Life	20 years		
Estimated Incentives/Grants	$37,146		
Labor and Material Cost	$65,826		
Incented SPB (Years)	3.26		
Non-Energy Benefits	VFD will provide soft start functionality to reduce wear on motors and pumps. Variable speed control will provide flexibility to control flow through Outback supply pipe.		

Energy Calculation Methodology

Twelve months of historical water flow interval data was used to calculate baseline and proposed pump energy consumption.

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
Pump Speed	On/Off	Variable Speed Control

"Page content is subject to Confidentiality Restrictions"

WT-M4

General Description
Well building heat pumps

This measure has not been fully audited and there is not enough data to recommend it.

WFF-M1

General Description
Replace electric resistance heaters with heat pumps in well buildings.

Baseline Condition
Well buildings are heated by electric resistance unit heaters.

Proposed Condition
This measure would analyze replacing the existing heaters with ductless split heat pumps to reduce heating electricity consumption.

"Page content is subject to Confidentiality Restrictions"

WFF-M2

General Description
Electric resistance heat to heat pump

Baseline Condition
The WFF building was built to the industrial building energy code, which allows electric resistance heat for the mechanical bays and offices. The offices are served by a VAV air handler with reheat boxes and no heat recovery for ventilation air. The mechanical bay is heated with wall mounted electric unit heaters which are on whenever the outside air temperature is less than 65°F.

Cooling for the building is provided by circulating raw process water directly through chilled water coils.

Proposed Condition
This measure proposes the installation of a water-to-water heat pump to absorb heat from the process water to then produce warm water to circulate through the existing chilled water coils. It requires the addition of a new heating coil as well as dampers to the AHU servicing the mechanical bays. Controls would be amended to convert chilled water loop to a two pipe change over system to provide heating throughout the winter. The existing electric heat should remain in place for back-up.

Benefits Summary

Energy Savings	kWh	Dollars ($)
Estimated energy savings	403,467	$24,669
Rate Escalation Projected	3%	
Age of Existing System	5 years	
Measure Life	20 years	
Estimated Incentives/Grants	$92,876	
Labor and Material Cost	$336,114	
Incented SPB (Years)	13.6	
Non-Energy Benefits	Will isolate cooling system from process water to increase component life and decrease contamination risk.	

Key Performance Indicators

Item	Baseline Condition	Proposed Condition
COP	100%	300%

"Page content is subject to Confidentiality Restrictions"

Table 8: General M&V Methodology (All ECMs)

ECM	Conservation Measure	IPMVP Option	Work to be Performed
CH-L1	City Hall: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
CH-G1	City Hall: Building envelope improvements	N/A	Verify installation as proposed
CH-G2	City Hall: Roof surface replacement	N/A	Verify installation as proposed
CH-P1	City Hall: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
CH-M1	City Hall: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
FA-L1	Franklin Annex: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
FA-G1	Franklin Annex: Building envelope improvements	N/A	Verify installation as proposed
FA-P1	Franklin Annex: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
FA-M1	Franklin Annex: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
FA-M2	Franklin Annex: HVAC Equipment Upgrade	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
SS-L1	South Sister: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
SS-G1	South Sister: Building envelope improvements	N/A	Verify installation as proposed
SS-G2	South Sister: Roof surface replacement	N/A	Verify installation as proposed
SS-P1	South Sister: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
SS-M1	South Sister: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
MS-G1	Middle Sister: Building envelope improvements	N/A	Verify installation as proposed
MS-P1	Middle Sister: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
MS-M1	Middle Sister: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
NS-G1	North Sister: Building envelope improvements	N/A	Verify installation as proposed
WSA-L1	Wall Street Annex: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
WSA-G1	Wall Street Annex: Building envelope improvements	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
WSA-P1	Wall Street Annex: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
WSA-M1	Wall Street Annex: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
WSA-M2	Wall Street Annex: HVAC Equipment Upgrade	A	Samples of air handling system temperatures and/or outside air damper position will be used with assumed or spot measured airflow to verify reduced cooling load.
CPP-L1	Centennial Parking Plaza: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
CPP-P1	Centennial Parking Plaza: Domestic Water Conservation - NOT USED	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
CFC-L1	Crows Feed Commons: Rademacher House Lighting and lighting controls upgrade	N/A	Verify installation as proposed
CFC-G2	Crows Feed Commons: Rademacher House Roof surface replacement	N/A	Verify installation as proposed
S&O-L1	Streets and Ops: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
S&O-G1	Streets and Ops: Building envelope improvements	N/A	Verify installation as proposed
S&O-G2	Streets and Ops: Roof surface replacement	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
S&O-P1	Streets and Ops: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
S&O-M1	Streets and Ops: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
S&O-M2	Streets and Ops: HVAC Equipment Upgrade	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
S&O-S1	Streets and Ops: Solar - 175 kW Rooftop Ballasted	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
BAA-L1	Boyd Acres Building A: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BAA-G1	Boyd Acres Building A: Building envelope improvements	N/A	Verify installation as proposed
BAA-P1	Boyd Acres Building A: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BAA-M1	Boyd Acres Building A: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BAA-M2	Boyd Acres Building A: HVAC Equipment Upgrade	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BAA-S1	Boyd Acres Building A: Solar - 77 kW Rooftop Standing Seam Metal	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
BAB-L1	Boyd Acres Building B: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BAB-G1	Boyd Acres Building B: Building envelope improvements	N/A	Verify installation as proposed
BAB-P1	Boyd Acres Building B: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BAB-M1	Boyd Acres Building B: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BAC-L1	Boyd Acres Building C: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BAC-G1	Boyd Acres Building C: Building envelope improvements	N/A	Verify installation as proposed
BAC-G2	Boyd Acres Building C: Roof surface replacement	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BAC-P1	Boyd Acres Building C: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BAC-M1	Boyd Acres Building C: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BAD-L1	Boyd Acres Building D: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BAD-G1	Boyd Acres Building D: Building envelope improvements	N/A	Verify installation as proposed
BAD-G2	Boyd Acres Building D: Roof Repair	N/A	Verify installation as proposed
BAD-P1	Boyd Acres Building D: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BAD-M1	Boyd Acres Building D: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BAD-M2	Boyd Acres Building D: HVAC Equipment Upgrade - 2 Gas Furnaces to high efficiency. Potential for Infra-red in Vacuum Truck bay not included (would be comfort and control only, no savings)	A	Samples of air handling system temperatures and/or outside air damper position will be used with assumed or spot measured airflow to verify reduced cooling load.

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BAD-S1	Boyd Acres Building D: Solar - 73.4 kW Rooftop Standing Seam	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
BPD-L1	Bend Police Department: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BPD-G1	Bend Police Department: Building envelope improvements	N/A	Verify installation as proposed
BPD-P1	Bend Police Department: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BPD-P2	Bend Police Department: Domestic water heater replacement(s)	N/A	Verify installation as proposed
BPD-M3	Bend Police Department: HVAC system retrocommissioning	A	Trends of occupancy, system runtime, zone temperature, and setpoint in use (when available) will be used to verify that the systems go into standby mode when spaces become unoccupied during scheduled
SL-L1	Street Lighting: Upgrade street lighting from HID to LED City-wide	N/A	Verify installation as proposed
BMA-L1	Bend Municipal Airport: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BMA-G1	Bend Municipal Airport: Building envelope improvements	N/A	Verify installation as proposed
BMA-P1	Bend Municipal Airport: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BFA-L1	Bend Fire Admin: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFA-G1	Bend Fire Admin: Building envelope improvements	N/A	Verify installation as proposed
BFA-G2	Bend Fire Admin: Roof Replacement	N/A	Verify installation as proposed
BFA-P1	Bend Fire Admin: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFA-M1	Bend Fire Admin: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFA-S1	Bend Fire Admin: Solar - 25.2 kW Rooftop Direct Mount	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
BFE-L1	Bend Fire East: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFE-G1	Bend Fire East: Building envelope improvements	N/A	Verify installation as proposed
BFE-P1	Bend Fire East: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFE-P2	Bend Fire East: Domestic water heater replacement(s)	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BFE-M1	Bend Fire East: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFS-L1	Bend Fire South: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFS-G1	Bend Fire South: Building envelope improvements	N/A	Verify installation as proposed
BFS-P1	Bend Fire South: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFS-P2	Bend Fire South: Domestic water heater replacement(s)	N/A	Verify installation as proposed
BFS-M1	Bend Fire South: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFW-L1	Bend Fire West: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFW-G1	Bend Fire West: Building envelope improvements	N/A	Verify installation as proposed
BFW-G2	Bend Fire West: Roof Replacement	N/A	Verify installation as proposed
BFW-P1	Bend Fire West: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFW-P2	Bend Fire West: Domestic water heater replacement(s)	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BFW-M1	Bend Fire West: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFW-S1	Bend Fire West: Solar - 41.8kW Rooftop Direct Mount	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
BFN-L1	Bend Fire North: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFN-G1	Bend Fire North: Building envelope improvements	N/A	Verify installation as proposed
BFN-G2	Bend Fire North: Roof Replacements	N/A	Verify installation as proposed
BFN-P1	Bend Fire North: Domestic Water Conservation	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFN-P2	Bend Fire North: Domestic water heater replacement(s)	N/A	Verify installation as proposed
BFN-M1	Bend Fire North: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFT-L1	Bend Fire Training and Warehouse: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
BFT-G1	Bend Fire Training and Warehouse: Building envelope improvements	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
BFT-P1	Bend Fire Training and Warehouse: Domestic Water Conservation - NOT INCLUDED	N/A	Use manufacturer ratings to confirm that the new water conservation fixtures installed meet or have lower flow rates than those originally proposed.
BFT-M1	Bend Fire Training: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
BFH-L1	Bend Fire Warehouse: Lighting and lighting controls upgrade - INCLUDED WITH TRAINING BUILDING	N/A	Verify installation as proposed
BFH-G1	Bend Fire Warehouse: Building envelope improvements	N/A	Verify installation as proposed
BFH-M1	Bend Fire Warehouse: HVAC Controls	A	Samples of zone or return temperatures will be used to verify the system is allowing the spaces to move to unoccupied setpoints during unoccupied times.
WRF-L1	Water Reclamation Facility: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
WRF-M1	Water Reclamation Facility: Headworks fan VFD	A	Samples of motor speed or fluid flow will be used to verify the system is turning down pump speed.
WRF-M3	Water Reclamation Facility: Biogas Upgrading and Pipeline Injection	TBD	TBD
WRF-M4	Water Reclamation Facility: Septage and Fog Receiving	TBD	TBD
WT-L1	Outback Water Filtration Facility: Lighting and lighting controls upgrade	N/A	Verify installation as proposed
WT-L2	Westside Lift Station: Lighting and lighting controls upgrade	N/A	Verify installation as proposed

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
WT-M1a	Awbrey Butte PRV Hydro Generation - 80 kW Pump Turbine	A	Measure power output at minimum and full flow
WT-M1b	Awbrey Butte PRV Hydro Generation - 140 kW In Line Turbine	A	Measure power output at minimum and full flow
WT-M2a	Awbrey Butte Pump Station - Variable Speed Drive on existing infrastructure	A	Samples of motor speed or fluid flow will be used to verify the system is turning down pump speed.
WT-M2b	Awbrey Butte Pump Station - Variable Speed Drives and upgrade electrical infrastructure	A	Samples of motor speed or fluid flow will be used to verify the system is turning down pump speed.
WT-S1	Awbrey Butte Reservoir Solar - 77.8 kW Ground Mount Fixed Tilt	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
WT-S2	Pilot Butte Solar - 258.5 kW Ground Mount Fixed Tilt	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
WFF-M1	Outback Water Filtration Facility: Membrane Feed Pump - Hydraulic Water Powered Pump	A	Verifying flow and system demand at normal operating conditions.
WFF-M2	Outback Water Filtration Facility: Electric Resistance Heat to Heat Pump	A	Spot measurements of power and heat output. before and after upgrade will be used to verify increased energy efficiency.

"Page content is subject to Confidentiality Restrictions"

ECM	Conservation Measure	IPMVP Option	Work to be Performed
WFF-S3	Outback Water Filtration Facility: Solar - 110.2 kW, Standing Seam Rooftop mount	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.
WFF-S4	Outback Water Filtration Facility: Solar - 129.6 kW, Ground Mount Fixed Tilt along North Fence Line	A	Array DC power, AC power, plane of array irradiance, and back of module temperature will be measured. Measured PV system power will then be corrected to standard test conditions (1000 W/m2, 25°C ambient temp), reduced by the annual degradation factor (identified by the module manufacturer, usually 1%), and compared to rated values.

7. Financials

Energy Savings Performance Contracts are structured to minimize the risks associated with construction projects. Energy Savings Performance Contracts have a guaranteed maximum construction cost with open book pricing. The open book pricing structure is applied to the labor and material costs of the project. This means that subcontracted portions of the direct construction cost are reconciled against final invoices. The client is only responsible to pay for the work performed. Since Ameresco uses guaranteed maximum project costs, our clients are protected from increases in construction costs and benefits from construction cost savings.

The following table outlines the compensation summary for the recommended Energy Conservation Measures that are being developed for the City of Bend.

Table 9: Recommended Project Financials

PROJECT COSTS	Mech, Water, General	Lighting	Total Project Costs
Engineering Audit and Asset Sustainability Professional Services	$ 114,611	$ 51,675	$ 166,286
Guaranteed Maximum Price for Construction Work			
Cost of Work	$ 991,600	$ 1,615,975	$ 2,607,575
Bonding @ 2.0% of Cost of Work	$ 19,832	$ 32,320	$ 52,152
Construction Contingency @ 5.0% of Cost of Work	$ 49,580	$ 80,799	$ 130,379
Guaranteed Maximum Price for Construction Work (GMP):			**$ 2,790,106**
Fixed Project Fees			
M,W,G Design @ 9.0% of Cost of Work	$ 89,244		$ 89,244
Lighting Design @ 9.0% of Cost of Work		$ 145,438	$ 145,438
Construction Mgt @ 6.0% of Cost of Work	$ 59,496	$ 96,959	$ 156,455
ESCO Overhead and Profit @ 18.0% of Cost of Work	$ 178,488	$ 290,876	$ 469,364
System Start-Up and Commissioning Fee @ 1.0% of Cost of Work	$ 9,916	$ 16,160	$ 26,076
Training of Owner's O&M Personnel Fee @ 0.2% of Cost of Work	$ 1,983	$ 3,232	$ 5,215
1st Year of Ameresco M&V			$ 9,421
Energy Savings Guarantee Contract Fee			$ -
Fixed Fees Subtotal:			**$ 901,213**
Project Cost Summary			
Contract Price			**$ 3,857,605**
Client Initial Cash Payment			$ 8,500
Estimated Utility Incentive and/or Grant	$ 134,144	$ 121,322	$ 255,467
Client Bond Counsel Fee Estimate (for reference only)			$ 46,189

"Page content is subject to Confidentiality Restrictions"

The cost categories include:

Engineering Audit – This is Ameresco's compensation for the energy engineering and project development services to put together the Technical Energy Audit and Project Development Plan.

Cost of Work – This is the estimated costs of the construction work for the measures selected to be implemented.

Bonding – This is the fee associated with providing a required performance bond on the project.

Construction Contingency – This is a contingency for unforeseen issues. If it is not used the amount reverts to the owner. If mutually agreed upon, these funds can be used for fund owner directed change orders.

Mechanical Water and General Design – This is the fee for designing the installed measures to be installed, excluding lighting.

Lighting Design – This is the fee for designing the lighting measures to be installed.

Construction Management – This is the fee for the construction administration and site supervision of the installed measures.

ESCO Overhead and Profit – This is Ameresco's Overhead and Profit for the project.

System Start up and Commissioning Fee – This is the fee for start-up of equipment and commissioning of all installed work.

Training of Owner's Operations & Maintenance Personnel Fee – This is the fee to provide proper training on the operations and maintenance of newly installed equipment.

Energy Savings Guarantee Contract Fee – This is the fee to cover the ESCO's risk to guarantee the energy savings of a project. Ameresco does not typically charge a fee for this.

1st Year of Ameresco Measurement and Verification – This is the fee for administering the Energy Savings Guarantee and determining the energy savings with the installed measures

Contract Price – This is the project cost before any reductions, such as utility incentives.

Client Cash Payment – This is for any capital contribution that the client may make to the project.

Utility Incentives – These are estimated utility incentives that are associated with the recommended ECMs.

"Page content is subject to Confidentiality Restrictions"

Other / Client Bond Counsel Fee Estimate (for reference only) – This is an estimate of the fee the District's bond council may charge for their services. This amount is not part of the ESCO contract but should be budgeted for and included in the financing as applicable.

Project Cost

Please refer to Table 9: Recommended Project Financials for a financial analysis based on the recommended measures. The total project cost, or Contract Price, is estimated to be $3,857,605. After incentives/grants in the amount of $255,467 the final project cost would be $3,639,827.

Cash Flow

Please refer to Table 10: Project Cash Flow for Selected Measures for Selected Projects, and Figure 16: Cumulative (Estimated) Cash Flow and Figure 17: Annual (Estimated) Cash Flow for a detailed account of the savings. The net savings would be: $209,346 per year to offset financed debt service.

Incentives

Ameresco has estimated a total incentive amount of $255,467 based on the program guidelines as of the publishing of this report. While we feel these values are accurate, we cannot guarantee the actual amount reimbursed for these measures.

"Page content is subject to Confidentiality Restrictions"

Table 10: Project Cash Flow for Selected Measures

PROJECT SAVINGS BASED ON GUARANTEED ENERGY SAVINGS (90)%

Year ending	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Mechanical, General, and Water savings	$ -	$ 57,559	$ 59,285	$ 61,064	$ 62,896	$ 64,783	$ 66,726	$ 68,728	$ 70,790	$ 72,913	$ 75,101	$ 77,354	$ 79,674	$ 82,065	$ 84,527	$ 87,062	$ 89,674	$ 92,365	$ 95,135	$ 97,990
Lighting Savings:	$ -	$ 130,192	$ 134,097	$ 138,120	$ 142,264	$ 146,532	$ 150,928	$ 155,456	$ 160,119	$ 164,923	$ 169,871	$ 174,967	$ 180,216	$ 185,622	$ 191,191	$ 196,927	$ 202,834	$ 208,920	$ 215,187	$ 221,643
Lighting Maintenance Savings	$ -	$ 16,608	$ 12,987	$ 10,388	$ 9,627	$ 9,173	$ 8,985	$ 8,811	$ 8,640	$ 8,609	$ 8,609	$ 8,609	$ 8,609	$ 8,609	$ 8,609	$ 8,562	$ 8,562	$ 8,562	$ 8,562	$ 8,562
Other Annual Savings	$ -	$ (0)	$ (0)	$ 0	$ (0)	$ 0	$ 0	$ (0)	$ 0	$ (0)	$ (0)	$ (0)	$ (0)	$ (0)	$ (0)	$ 0	$ 0	$ 0	$ 0	$ 0
Greehouse Gas Requisitions and Offsets	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,695	$ 3,600	$ 3,497	$ 3,383	$ 3,260	$ 3,127	$ 2,982	$ 2,826	$ 2,658
Total Savings:	$ -	$ 204,358	$ 206,370	$ 209,572	$ 214,787	$ 220,488	$ 226,639	$ 232,995	$ 239,549	$ 246,445	$ 253,580	$ 264,625	$ 272,100	$ 279,793	$ 287,710	$ 295,811	$ 304,198	$ 312,828	$ 321,711	$ 330,853
Cumulative Savings:	$ -	$ 204,358	$ 410,728	$ 620,300	$ 835,087	$ 1,055,575	$ 1,282,214	$ 1,515,208	$ 1,754,757	$ 2,001,203	$ 2,254,783	$ 2,519,408	$ 2,791,507	$ 3,071,300	$ 3,359,010	$ 3,654,822	$ 3,959,019	$ 4,271,848	$ 4,593,559	$ 4,924,411

ANNUAL PROJECT COSTS

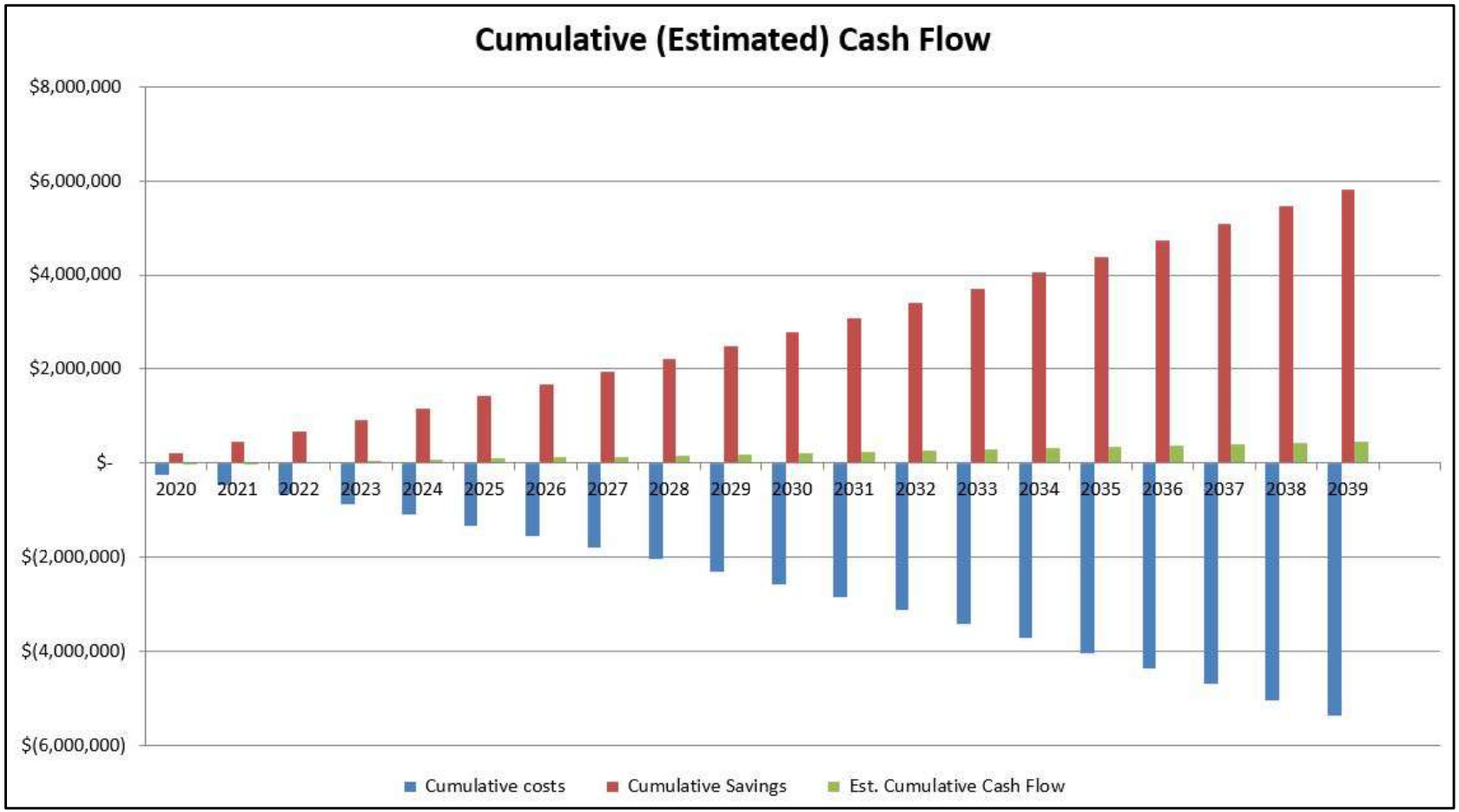
Principal Balance	$3,639,796	$ 3,566,969	$3,488,956	$ 3,404,366	$ 3,310,937	$ 3,207,852	$ 3,094,305	$ 2,969,701	$ 2,833,435	$ 2,684,734	$ 2,522,900	$ 2,343,541	$ 2,149,589	$ 1,940,289	$ 1,714,853	$ 1,472,508	$ 1,212,347	$ 933,474	$ 634,955	$ 315,811
Initial Cash Payment:	$ 54,689																			

Year ending	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Annual Principal Payment		$ 72,827	$ 78,013	$ 84,590	$ 93,429	$ 103,084	$ 113,548	$ 124,603	$ 136,266	$ 148,701	$ 161,834	$ 179,359	$ 193,952	$ 209,300	$ 225,435	$ 242,346	$ 260,161	$ 278,872	$ 298,520	$ 319,144
Annual Interest Payment		$ 127,393	$ 124,844	$ 122,113	$ 119,153	$ 115,883	$ 112,275	$ 108,301	$ 103,940	$ 99,170	$ 93,966	$ 88,301	$ 82,024	$ 75,236	$ 67,910	$ 60,020	$ 51,538	$ 42,432	$ 32,672	$ 22,223
Ameresco Measurement and Verification	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs to Client	**$ 54,689**	**$ 200,219**	**$ 202,857**	**$ 206,704**	**$ 212,582**	**$ 218,967**	**$ 225,823**	**$ 232,904**	**$ 240,206**	**$ 247,872**	**$ 255,800**	**$ 267,660**	**$ 275,976**	**$ 284,536**	**$ 293,345**	**$ 302,366**	**$ 311,699**	**$ 321,304**	**$ 331,191**	**$ 341,367**

NET ANNUAL CASH FLOW WHEN FINANCING PROJECT:

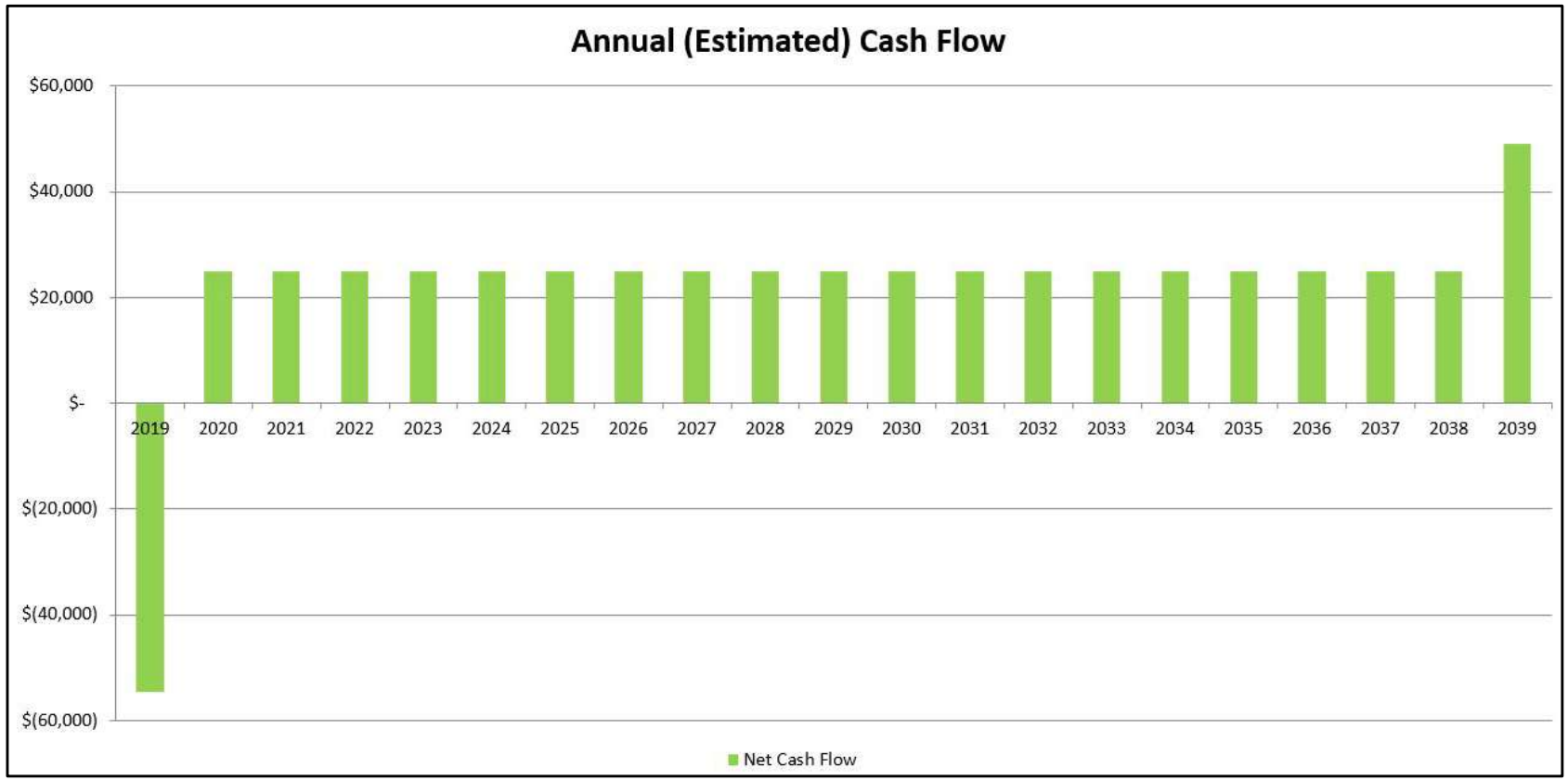
Year ending	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Cash Flow from Estimated Energy Savings (with inflation)	$ (54,689)	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Cumulative	$ (54,689)	$ (29,689)	$ (4,689)	$ 20,311	$ 45,311	$ 70,311	$ 95,311	$ 120,311	$ 145,311	$ 170,311	$ 195,311	$ 220,311	$ 245,311	$ 270,311	$ 295,311	$ 320,311	$ 345,311	$ 370,311	$ 395,311	$ 420,311
Cash Flow from Guaranteed Energy Savings (with inflation)	$ (54,689)	$ 4,139	$ 3,513	$ 2,868	$ 2,204	$ 1,521	$ 816	$ 91	$ (657)	$ (1,426)	$ (2,219)	$ (3,036)	$ (3,877)	$ (4,743)	$ (5,635)	$ (6,554)	$ (7,501)	$ (8,476)	$ (9,480)	$ (10,515)
Cumulative	$ (54,689)	$ (50,550)	$ (47,037)	$ (44,169)	$ (41,964)	$ (40,443)	$ (39,627)	$ (39,537)	$ (40,193)	$ (41,619)	$ (43,838)	$ (46,874)	$ (50,751)	$ (55,494)	$ (61,129)	$ (67,683)	$ (75,184)	$ (83,660)	$ (93,141)	$ (103,655)

Figure 16: Cumulative (Estimated) Cash Flow



"Page content is subject to Confidentiality Restrictions"

Figure 17: Annual (Estimated) Cash Flow



"Page content is subject to Confidentiality Restrictions"

8. Conclusion

This offers insights into many potential energy conservation measures throughout the facilities and systems within the City of Bend. Many of these improvements are cost effective, paying for themselves well within their respective useful lifetimes. We at Ameresco are eager to work with the City of Bend to implement the selected conservation measures.

"Page content is subject to Confidentiality Restrictions"

Appendices

A – ECM Data and Calculations

B – Lighting Studies

C – Plumbing

D – Building Envelope

E – Street Lighting Detailed Audit

F – Solar PV Audits

"Page content is subject to Confidentiality Restrictions"

Appendix A – ECM Data and Calculations

Appendix A: Calculations

CONTENTS

BPD-M3 3
AHU 1 3
AHU 2 6
AHU 3 10
AHU 4 14
AHU 5 18

BFA-M1 22
AHU 1 22
AHU 2 25
AHU 3 28
AHU 4 31
AHU 5 34
AHU 6 37

BFE-M1 40
AHU 1 40
AHU 2 43
AHU 3 46
AHU 4 49
AHU 5 52
AHU 6 55

BFS-M1 58
AHU 1 58

"Page content is subject to Confidentiality Restrictions"

AHU 2 61
AHU 3 64
AHU 4 67
AHU 5 70
AHU 6 73

BFW-M1 76

AHU 1 76
AHU 2 79
AHU 3 82
AHU 4 85
AHU 5 88
AHU 6 91

BFN-M1 94

AHU 1 94
AHU 2 97
AHU 3 100
AHU 4 103
AHU 5 106
AHU 6 109

BFT-M1 112

AHU 1 112
AHU 2 115

BFH-M1 118

AHU 1 118

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

BPD-M3

AHU 1

Project:	City of Bend
Measure:	BPD M3
Unit Data: (Graphs Title)	Police AHU-1
Weather Basis:	Medford, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

62.7%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
83.6%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	80%	80%	(for supplemental heat if using HP)
Max Heating Capacity	692,000 Btu/h	692,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	227%	227%	
Peak Cooling Capacity	659,000 Btuh	659,000 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☑	☑	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	29.83 kW	29.83 kW	
(equivalent HP)	40.00 HP	40.00 HP	
Exhst/Return Fan Power	7.46 kW	7.46 kW	
(equivalent HP)	10.00 HP	10.00 HP	
Total	**37.29 kW**	**37.29 kW**	
Airflow data			
Total Supply Airflow	14,575 cfm	14,575 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	2,915 cfm	2,915 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	20.0%	20.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	95,096	232.7	
Heating Energy	-	-	5,059.1
Cooling Energy	14,284	152.7	
Total	109,380	385.4	
Proposed:			
Fan Energy	95,096	232.7	
Heating Energy	-	-	5,059.1
Cooling Energy	14,284	152.7	
Total	109,380	385.4	
Savings:			
Total (%)	0.0%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	57	57	1,093	3,205
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	69	74	74

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	2,915	2,915
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	5,242	4,150	1,093
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	5,109	1,904	3,205
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,850	3,850
Cooling	1,249	1,249

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From: 6
To: 18

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

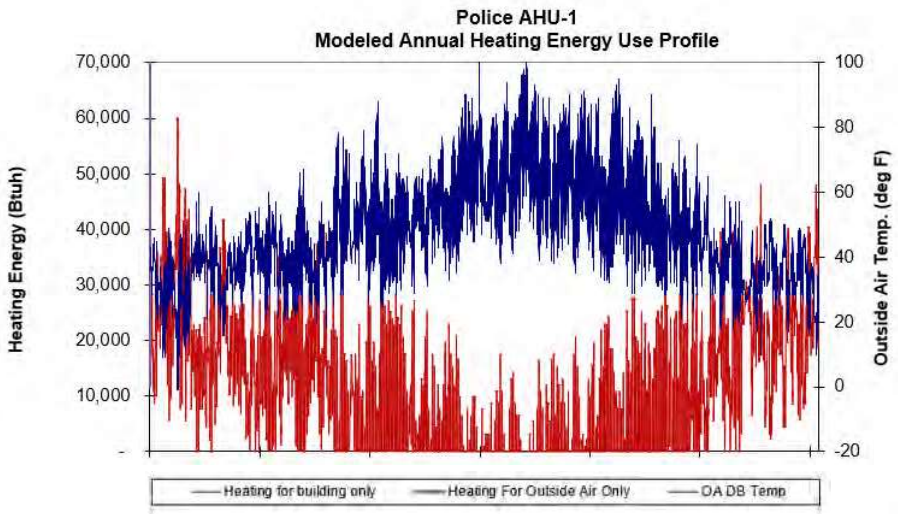
From: 6
To: 18

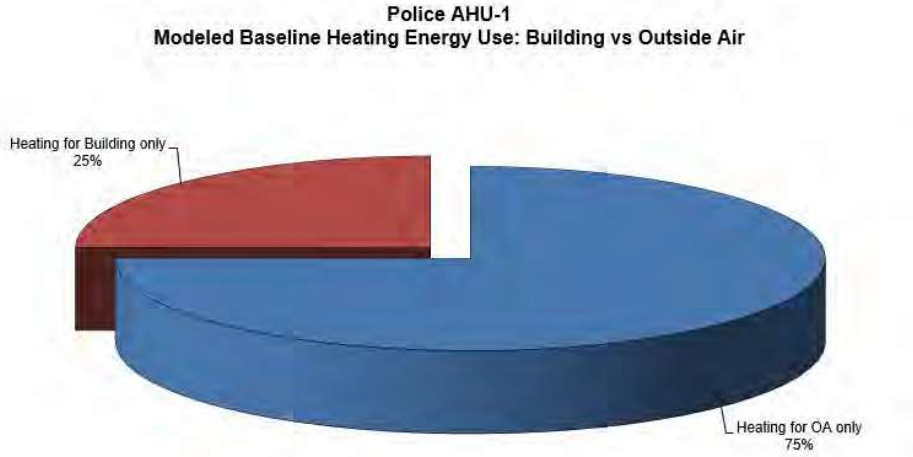
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Police AHU-1
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Police AHU-1
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for Building only
25%
Heating for OA only
75%

AHU 2

Project:	City of Bend
Measure:	BPD - M3
Unit Data: (Graphs Title)	Police AHU 2 - 2nd/3rd floor offices
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

16.5%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
102.3%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	80%	80%	(for supplemental heat if using HP)
Max Heating Capacity	104,000 Btu/h	104,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	59,500 Btu/h	59,500 Btu/h	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	964 cfm	964 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	145 cfm	145 cfm	Min Outside Air Calc Tab (if checked)
OA %	15.2%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Base line:			
Fan Energy	3,538	6.7	
Heating Energy	-	-	1,265.4
Cooling Energy	2,319	22.1	
Total	5,857	28.8	
Proposed:			
Fan Energy	3,538	6.7	
Heating Energy	-	-	1,265.4
Cooling Energy	2,319	22.1	
Total	5,857	28.8	
Savings:			
Total (%)	0.0%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed
Occupied		☑
Occupied Standby	☐	☐
Unoccupied Setback	☑	☑
Unit Off	☐	☐
Baseline Malfunction	☐	

Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
occ	54	54	57	57	1,389	740
stby						
un	52	52	60	60	335	No Data
off						
mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	74	74

Fixed Mixed Air Temp System ☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	145	145
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,654	N/A	1,389
stby	Not Calc'd	N/A	
un	335	N/A	335
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	856	N/A	740
stby	Not Calc'd	N/A	
un	89	N/A	86
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Operating DD	Total	Occ
Heating	3,660	2,196
Cooling	1,236	1,225

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	119	(occupied, occupied setback)
Unoccupied	49	(unoccupied setback, off, random)
Total	168	

From: 6
To: 23

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	119	(occupied, occupied setback)
Unoccupied	49	(unoccupied setback, off, random)
Total	168	

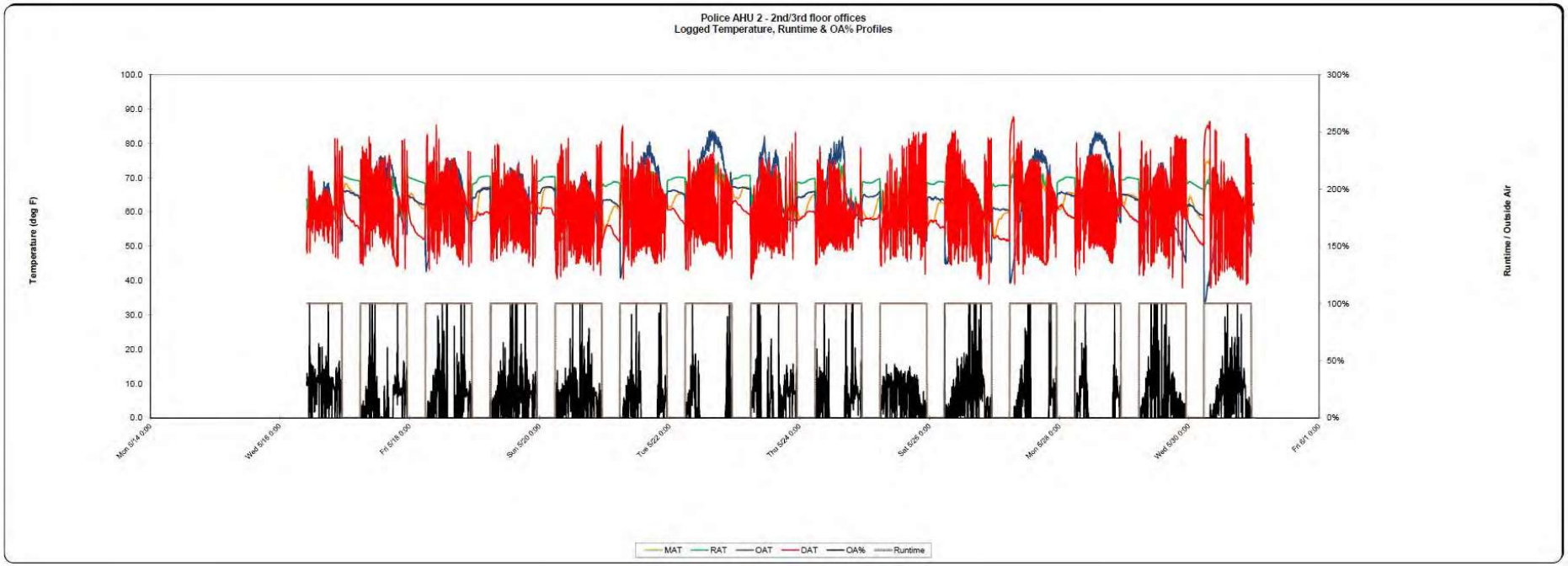
From:
To:

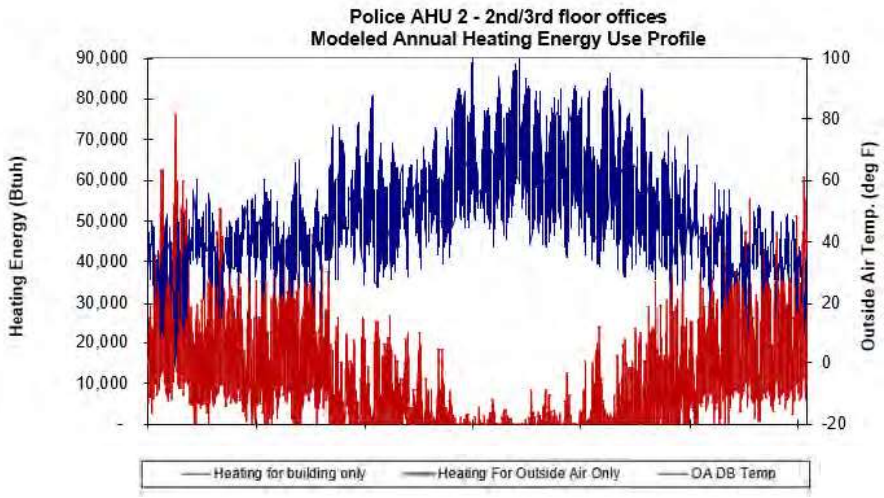
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un

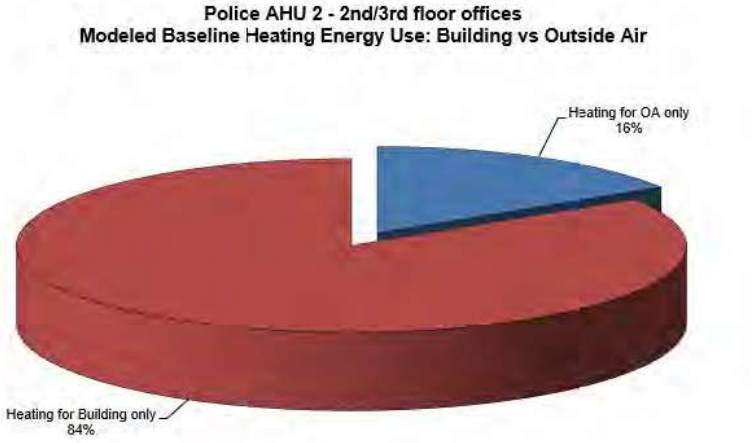
Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Police AHU 2 - 2nd/3rd floor offices
Logged Temperature, Runtime & OA% Profiles
Temperature (deg F)
Runtime / Outside Air
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
300%
250%
200%
150%
100%
50%
0%
Mon 5/14 0:00
Wed 5/16 0:00
Fri 5/18 0:00
Sun 5/20 0:00
Tue 5/22 0:00
Thu 5/24 0:00
Sat 5/26 0:00
Mon 5/28 0:00
Wed 5/30 0:00
Fri 6/1 0:00
MAT
RAT
OAT
DAT
OA%
Runtime


Police AHU 2 - 2nd/3rd floor offices
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Police AHU 2 - 2nd/3rd floor offices
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
16%
Heating for Building only
84%

AHU 3

Project:	City of Bend
Measure:	BPD M3
Unit Data: (Graphs Title)	Police AHU 3 -
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

12.9%	1. **Baseline** calc'd OA htg usage as a % of annualized **Source Data**
112.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. % of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,107	18.6	
Heating Energy	-	-	419.9
Cooling Energy	3,557	51.8	
Total	6,664	70.4	
Proposed:			
Fan Energy	2,657	18.6	
Heating Energy	-	-	318.8
Cooling Energy	3,223	51.8	
Total	5,880	70.4	
Savings:			
Total (%)	11.8%	0.0%	24.1%

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	80%	80%	(for supplemental heat if using HP)
Max Heating Capacity	162,000 Btu/h	162,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	270%	270%	
Peak Cooling Capacity	87,000 Btu/h	87,000 Btu/h	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☑	☑	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	2.24 kW	2.24 kW	
(equivalent HP)	3.00 HP	3.00 HP	
Exhst/Return Fan Power	0.75 kW	0.75 kW	
(equivalent HP)	1.00 HP	1.00 HP	
Total	**2.99 kW**	**2.99 kW**	
Airflow data			
Total Supply Airflow	1,950 cfm	1,950 cfm	
Occupied			Show/Hide Tab ---> ☐
OA MIN flow rate	137 cfm	137 cfm	Min Outside Air Calc Tab (if checked)
OA %	7.0%	7.0%	No Exhaust Requirement
OA % (override)	7.0%	7.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	57	57	1,254	1,750
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	0	0
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	74	74

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	137	137
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,265	N/A	1,254
stby	Not Calc'd	N/A	
un	0	N/A	0
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	2,675	N/A	1,750
stby	Not Calc'd	N/A	
un	0	N/A	0
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Operating DD	Total	Occ
Heating	3,503	988
Cooling	1,127	767

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	60	(occupied, occupied setback)
Unoccupied	108	(unoccupied setback, off, random)
Total	168	

From: 6
To: 18

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

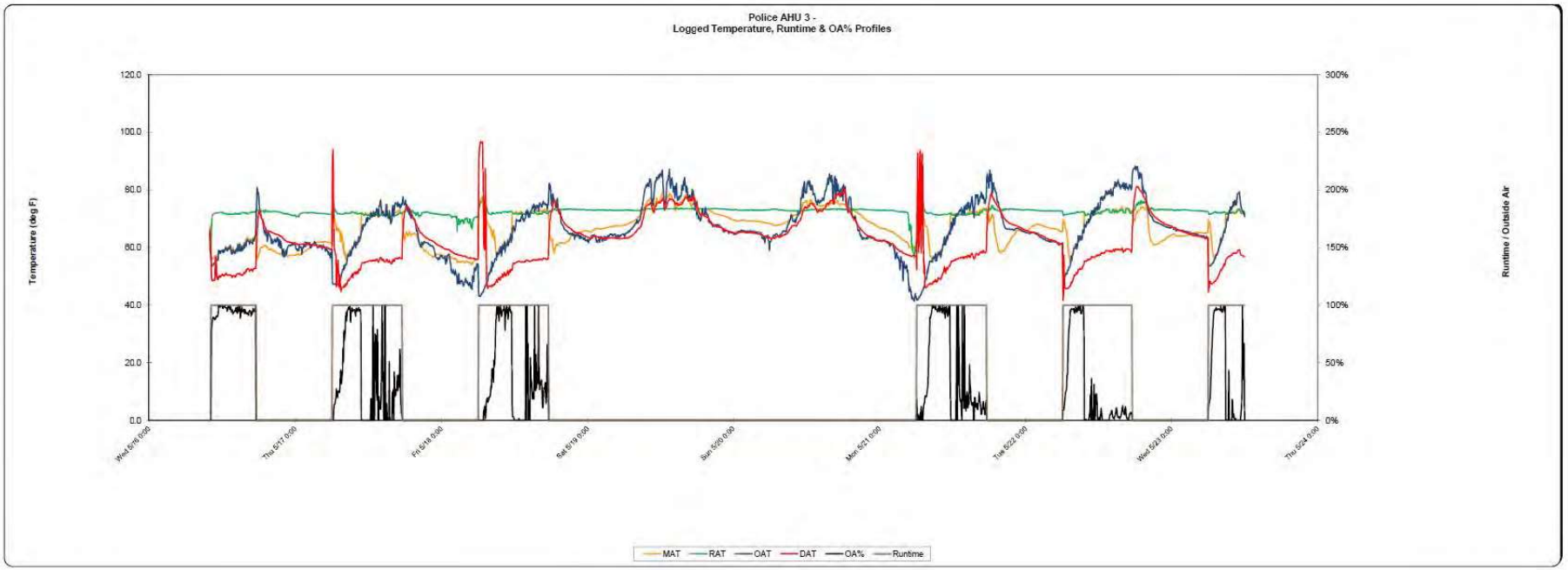
Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

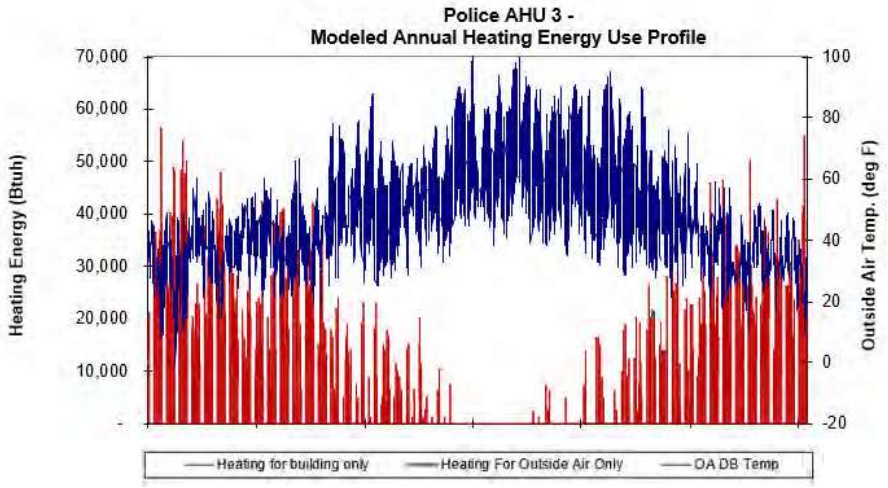
From: 7
To: 17

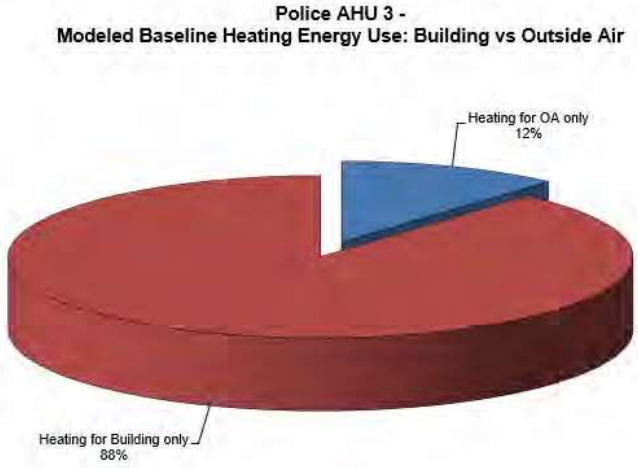
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Police AHU 3 -
Logged Temperature, Runtime & OA% Profiles
Temperature (deg F)
Runtime / Outside Air
120.0
100.0
80.0
60.0
40.0
20.0
0.0
300%
250%
200%
150%
100%
50%
0%
Wed 8/16 0:00
Thu 8/17 0:00
Fri 8/18 0:00
Sat 8/19 0:00
Sun 8/20 0:00
Mon 8/21 0:00
Tue 8/22 0:00
Wed 8/23 0:00
Thu 8/24 0:00
MAT
RAT
OAT
DAT
OA%
Runtime


Police AHU 3 -
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
100
80
60
40
20
0
-20
Outside Air Temp. (deg F)
Heating for building only
Heating For Outside Air Only
OA DB Temp


Police AHU 3 -
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
12%
Heating for Building only
88%

AHU 4

Project:	City of Bend
Measure:	BPD M3
Unit Data: (Graphs Title)	Police AHU 4
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

2.8%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
36.5%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.2%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.2%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged
Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	81%	81%	(for supplemental heat if using HP)
Max Heating Capacity	162,000 Btu/h	162,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	244%	244%	
Peak Cooling Capacity	114,000 Btuh	114,000 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	2.24 kW	2.24 kW	
(equivalent HP)	3.00 HP	3.00 HP	
Exhst/Return Fan Power	1.49 kW	1.49 kW	
(equivalent HP)	2.00 HP	2.00 HP	
Total	**3.73 kW**	**3.73 kW**	
Airflow data			
Total Supply Airflow	3,320 cfm	3,320 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	166 cfm	166 cfm	Min Outside Air Calc Tab (if checked)
OA %	5.0%	5.0%	No Exhaust Requirement
OA % (override)	5.0%	5.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		
OA % (override)	0.0%		

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	10,752	44.8	
Heating Energy	-	-	1,196.6
Cooling Energy	2,651	39.7	
Total	13,403	84.5	
Proposed:			
Fan Energy	9,780	44.8	
Heating Energy	-	-	1,074.9
Cooling Energy	2,429	39.7	
Total	12,209	84.5	
Savings:			
Total (%)	8.9%	0.0%	10.2%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	57	57	4,393	1,171
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	30	No Data
Unit Off	☐	☐	off						
Baseline Mafunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☑	4,393	1,171	Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	74	74

Fixed Mixed Air Temp System ☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	166	166
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	13,180	N/A	12,752
stby	Not Calc'd	N/A	
un	30	N/A	30
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,171	N/A	1,114
stby	Not Calc'd	N/A	
un	9	N/A	8
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Operating DD	Total	Occ
Heating	3,486	834
Cooling	1,123	759

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	55	(occupied, occupied setback)
Unoccupied	113	(unoccupied setback, off, random)
Total	168	

From: 7
To: 18

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																						
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Proposed

Weekly Hours Summary

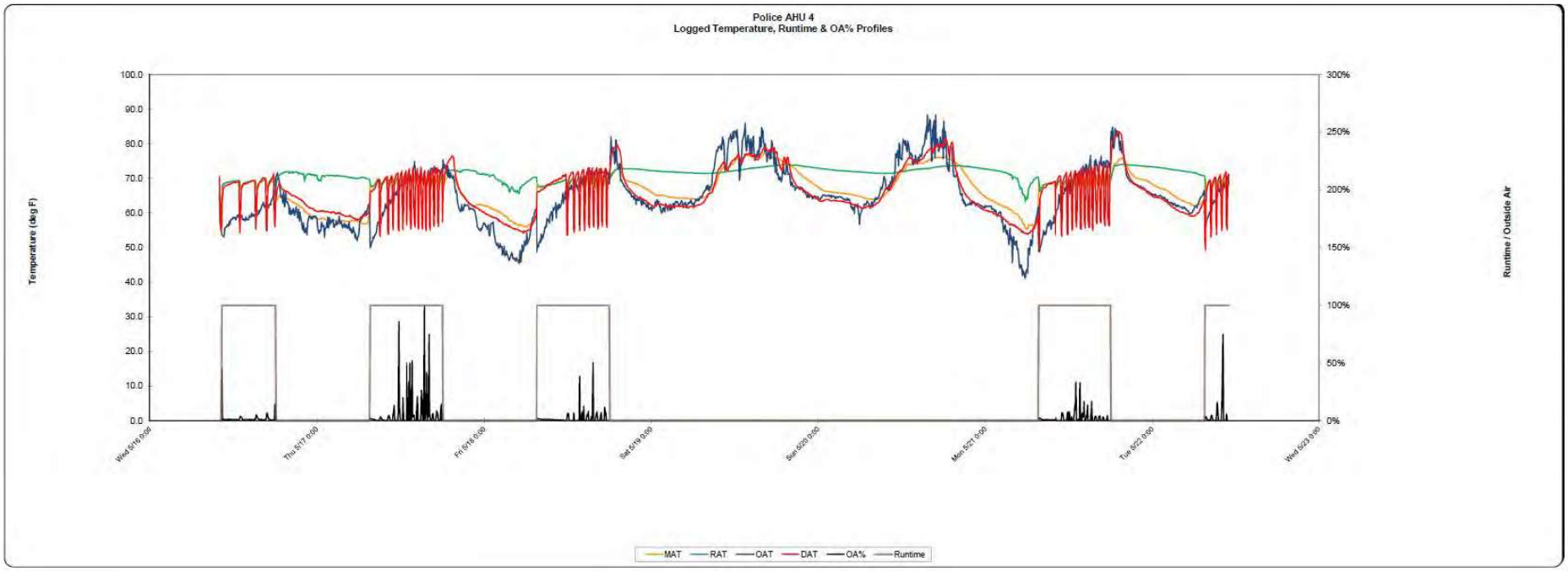
Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

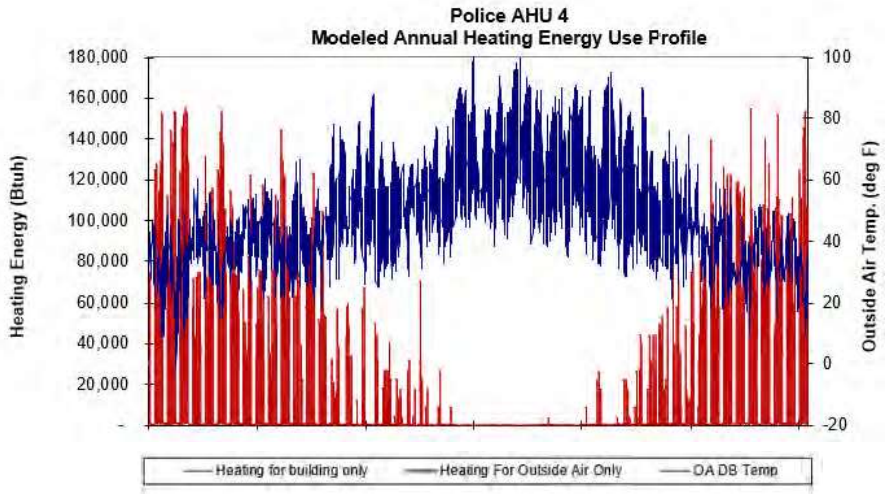
From: 7
To: 17

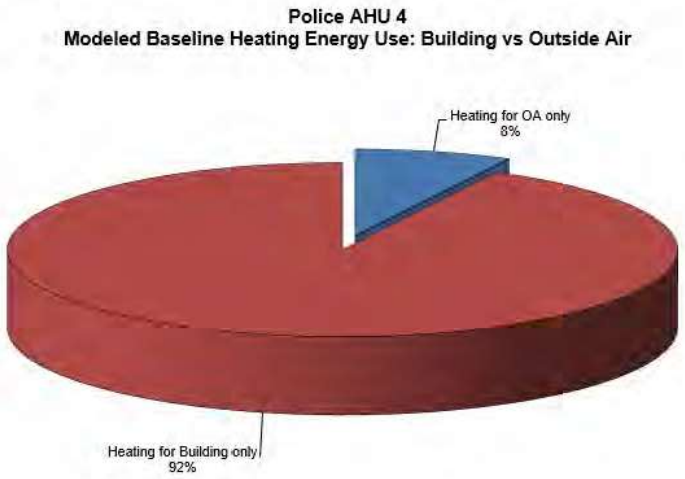
Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																						
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un


Police AHU 4
Logged Temperature, Runtime & OA% Profiles
Temperature (deg F)
Runtime / Outside Air
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
300%
250%
200%
150%
100%
50%
0%
Wed 5/16 0:00
Thu 5/17 0:00
Fri 5/18 0:00
Sat 5/19 0:00
Sun 5/20 0:00
Mon 5/21 0:00
Tue 5/22 0:00
Wed 5/23 0:00
MAT
RAT
OAT
DAT
OA%
Runtime


Police AHU 4
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Police AHU 4
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
8%
Heating for Building only
92%

AHU 5

Project:	City of Bend
Measure:	BPD M3
Unit Data: (Graphs Title)	Police AHU 5
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

11.6%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
47.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	81%	81%	(for supplemental heat if using HP)
Max Heating Capacity	284,000 Btu/h	284,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	258%	258%	
Peak Cooling Capacity	176,000 Btu/h	176,000 Btu/h	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☑	☑	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	3.73 kW	3.73 kW	
(equivalent HP)	5.00 HP	5.00 HP	
Exhst/Return Fan Power	2.24 kW	2.24 kW	
(equivalent HP)	3.00 HP	3.00 HP	
Total	5.97 kW	5.97 kW	
Airflow data			
Total Supply Airflow	2,325 cfm	2,325 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	349 cfm	349 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	0.0%	0.0%	
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	15,225	37.3	
Heating Energy	-	-	1,817.5
Cooling Energy	12,904	117.0	
Total	28,128	154.3	
Proposed:			
Fan Energy	15,225	37.3	
Heating Energy	-	-	1,817.5
Cooling Energy	12,904	117.0	
Total	28,128	154.3	
Savings:			
Total (%)	0.0%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	57	57	1,200	3,730
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☑	1,200	3,730	Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	74	74

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	349	349
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	3,387	N/A	3,387
stby	Not Calc'd	N/A	
un	Not Calc'd	N/A	
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	4,326	N/A	3,730
stby	Not Calc'd	N/A	
un	Not Calc'd	N/A	
off	Not Calc'd	N/A	
mal	Not Calc'd	N/A	

	Total	Occ
Operating DD		
Heating	3,850	3,850
Cooling	1,249	1,249

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From:
To:

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

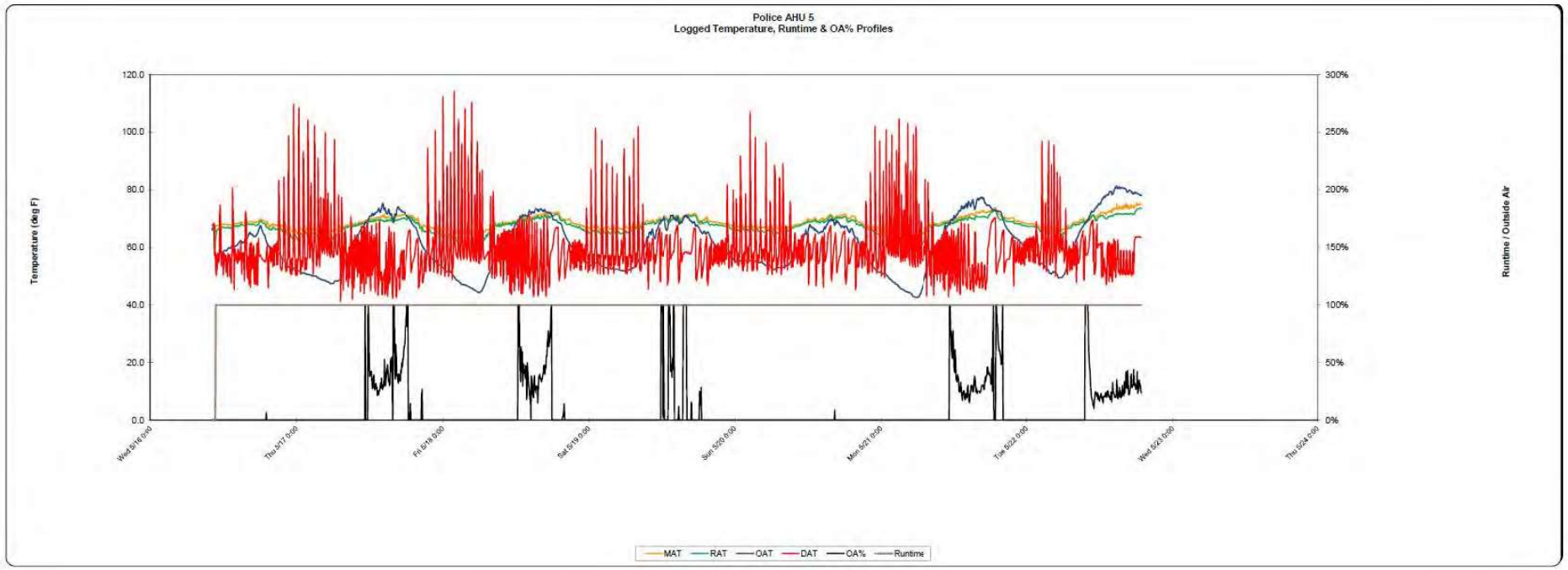
Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

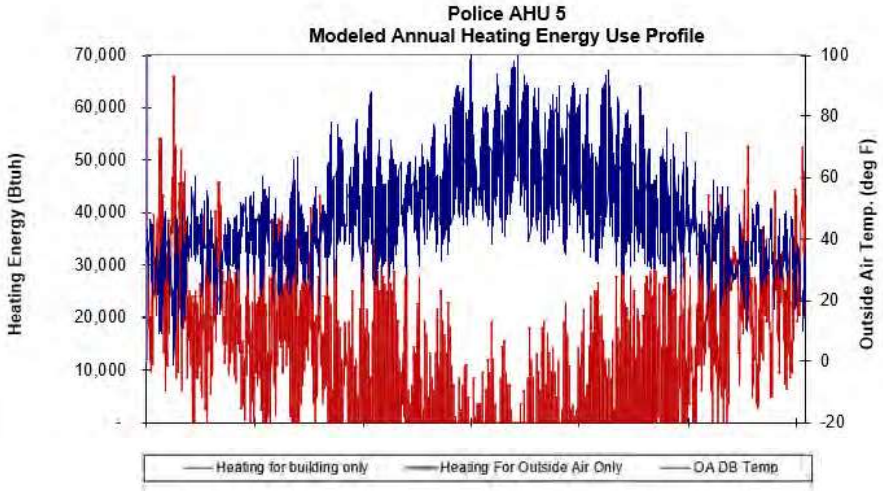
From: 6
To: 23

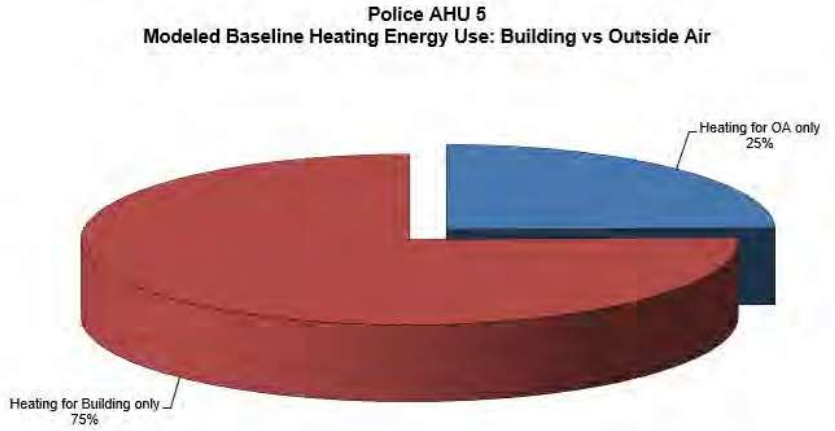
		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Police AHU 5
Logged Temperature, Runtime & OA% Profiles
Temperature (deg F)
Runtime / Outside Air
120.0
100.0
80.0
60.0
40.0
20.0
0.0
300%
250%
200%
150%
100%
50%
0%
Wed 5/16 0:00
Thu 5/17 0:00
Fri 5/18 0:00
Sat 5/19 0:00
Sun 5/20 0:00
Mon 5/21 0:00
Tue 5/22 0:00
Wed 5/23 0:00
Thu 5/24 0:00
MAT
RAT
OAT
DAT
OA%
Runtime


Police AHU 5
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Police AHU 5
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
25%
Heating for Building only
75%

BFA-M1

AHU 1

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin 1st Floor North Offices
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
100.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	84%	84%	(for supplemental heat if using HP)
Max Heating Capacity	92,000 Btu/h	92,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	285%	285%	
Peak Cooling Capacity	40,500 Btuh	40,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.37 kW	0.37 kW	
(equivalent HP)	0.50 HP	0.50 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.37 kW**	**0.37 kW**	
Airflow data			
Total Supply Airflow	1,440 cfm	1,440 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,505	4.4	
Heating Energy	-	-	435.2
Cooling Energy	2,367	24.8	
Total	3,872	29.2	
Proposed:			
Fan Energy	966	4.4	
Heating Energy	-	-	256.8
Cooling Energy	1,559	24.6	
Total	2,525	29.0	
Savings:			
Total (%)	34.8%	0.6%	41.0%

4. System Conditions

Operating Modes	Baseline	Proposed
Occupied		☑
Occupied Standby	☐	☐
Unoccupied Setback	☑	☑
Unit Off	☐	☐
Baseline Malfunction	☐	

Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
occ	55	54	57	57	1,203	942
stby						
un	53	52	54	60	No Data	No Data
off						
mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	68	74	74

Fixed Mixed Air Temp System	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,203	0	1,203
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	942	0	942
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

	Total	Occ
Operating DD		
Heating	3,730	1,267
Cooling	1,340	1,055

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	78	(occupied, occupied setback)
Unoccupied	90	(unoccupied setback, off, random)
Total	168	

From: 7
To: 19

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

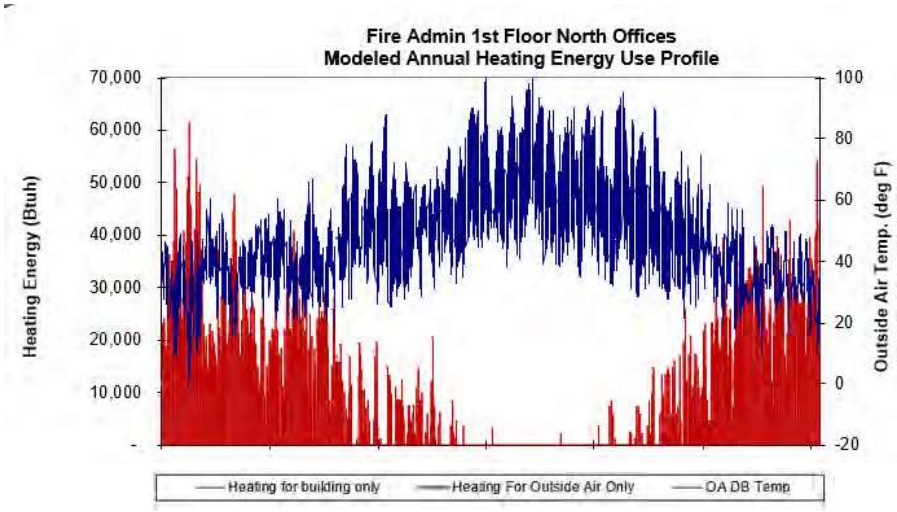
Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

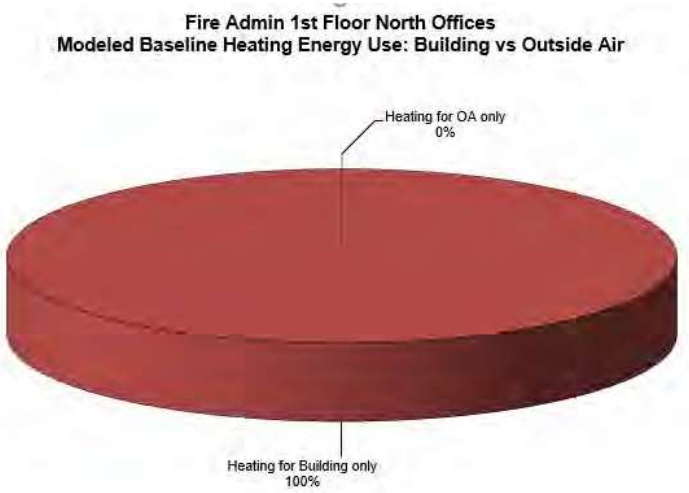
From: 7
To: 17

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire Admin 1st Floor North Offices
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin 1st Floor North Offices
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin - 1st Floor South Offices Admin
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

40.3%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
114.2%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	84%	84%	(for supplemental heat if using HP)
Max Heating Capacity	92,000 Btu/h	92,000 Btu/h	(output capacity, for supplemental if using HP)
Cooling			
Efficiency (output/input)	295%	295%	
Peak Cooling Capacity	40,500 Btuh	40,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.37 kW	0.37 kW	
(equivalent HP)	0.50 HP	0.50 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.37 kW**	**0.37 kW**	
Airflow data			
Total Supply Airflow	1,405 cfm	1,405 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	211 cfm	211 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,679	4.4	
Heating Energy	-	-	626.7
Cooling Energy	2,204	24.0	
Total	3,883	28.4	
Proposed:			
Fan Energy	966	4.4	
Heating Energy	-	-	317.5
Cooling Energy	1,415	23.8	
Total	2,380	28.2	
Savings:			
Total (%)	38.7%	0.7%	49.3%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	58	56	57	57	870	804
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	72	68	74	74

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	211	211
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,176	307	870
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	942	138	804
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,775	1,633
Cooling	1,193	1,087

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	87	(occupied, occupied setback)
Unoccupied	81	(unoccupied setback, off, random)
Total	168	

From: 6
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

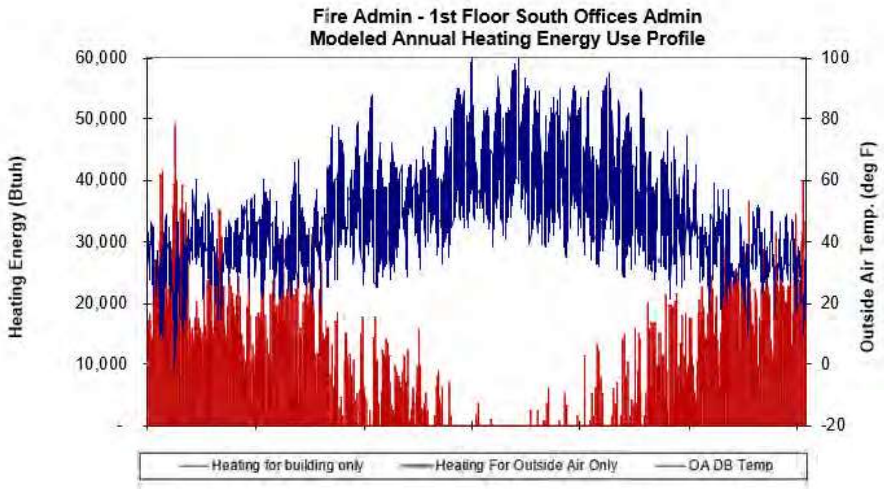
From: 7
To: 17

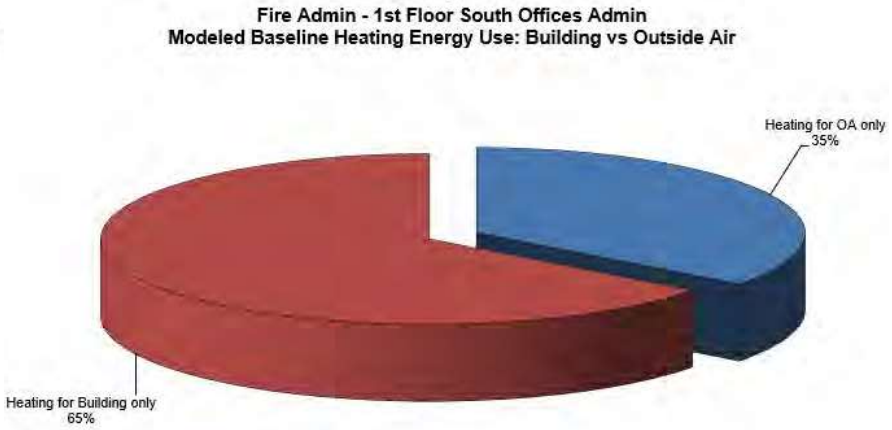
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Admin - 1st Floor South Offices Admin
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin - 1st Floor South Offices Admin
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
35%
Heating for Building only
65%

AHU 3

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin - Lobby
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

41.1%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
114.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.4%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	84%	84%	(for supplemental heat if using HP)
Max Heating Capacity	70,000 Btu/h	70,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	309%	309%	
Peak Cooling Capacity	35,800 Btuh	35,800 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.37 kW	0.37 kW	
(equivalent HP)	0.50 HP	0.50 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.37 kW**	**0.37 kW**	
Airflow data			
Total Supply Airflow	1,150 cfm	1,150 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	173 cfm	173 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)	15.0%	15.0%	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,718	4.4	
Heating Energy	-	-	470.4
Cooling Energy	1,894	20.2	
Total	3,612	24.7	
Proposed:			
Fan Energy	966	4.4	
Heating Energy	-	-	235.3
Cooling Energy	1,202	20.1	
Total	2,168	24.5	
Savings:			
Total (%)	40.0%	0.7%	50.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	55	57	57	667	724
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override			Btu/Deg-Hr
Occupied Standby Override			Btu/Deg-Hr
Unoccupied Setback Override			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	68	75	75

Fixed Mixed Air Temp System	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	173	173
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	915	248	667
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	833	108	724
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,677	1,579
Cooling	1,197	1,099

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	89	(occupied, occupied setback)
Unoccupied	79	(unoccupied setback, off, random)
Total	168	

From:
To:

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

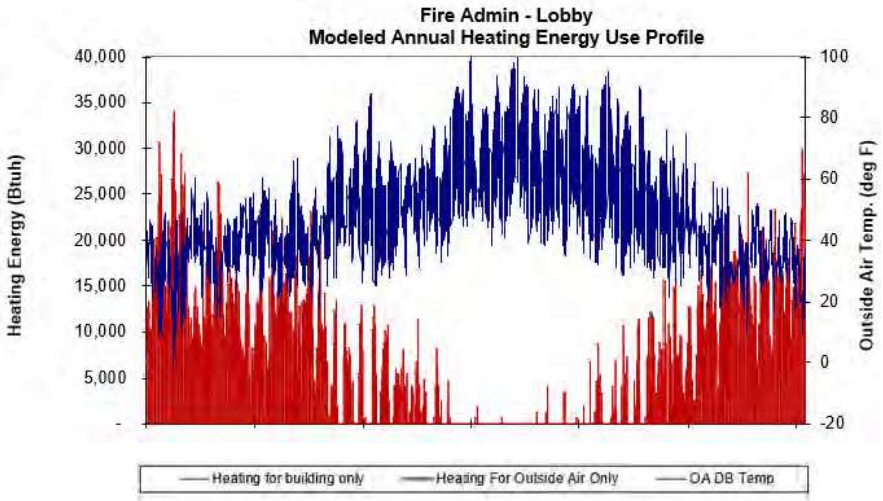
From: 7
To: 17

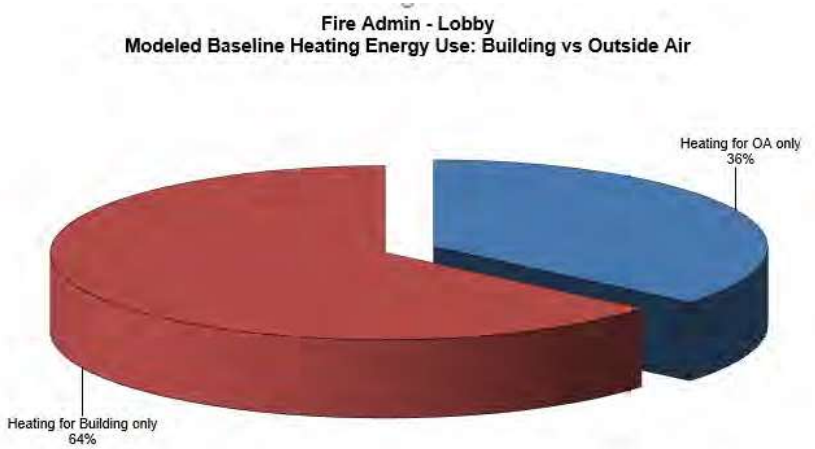
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Admin - Lobby
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin - Lobby
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
36%
Heating for Building only
64%

AMERESCO
Green • Clean • Sustainable

AHU 4

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin - Board Room
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

43.7%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
114.6%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,736	4.4	
Heating Energy	-	-	652.6
Cooling Energy	1,946	21.4	
Total	3,682	25.9	
Proposed:			
Fan Energy	966	4.4	
Heating Energy	-	-	311.3
Cooling Energy	1,274	21.2	
Total	2,239	25.7	
Savings:			
Total (%)	39.2%	0.7%	52.3%

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	
Peak Cooling Capacity	35,800 Btuh	35,800 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.37 kW	0.37 kW	
(equivalent HP)	0.50 HP	0.50 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.37 kW**	**0.37 kW**	
Airflow data			
Total Supply Airflow	1,635 cfm	1,635 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	245 cfm	245 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	55	56	56	863	645
Occupied Standby	☐	☐	stby					[illegible]	[illegible]
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off	[illegible]	[illegible]	[illegible]	[illegible]	-	-
Baseline Malfunction	☐		mal					[illegible]	[illegible]

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	68	72	72

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	245	245
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,216	353	863
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	814	169	645
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,688	1,658
Cooling	1,268	1,141

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	90	(occupied, occupied setback)
Unoccupied	78	(unoccupied setback, off, random)
Total	168	

From: 5
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

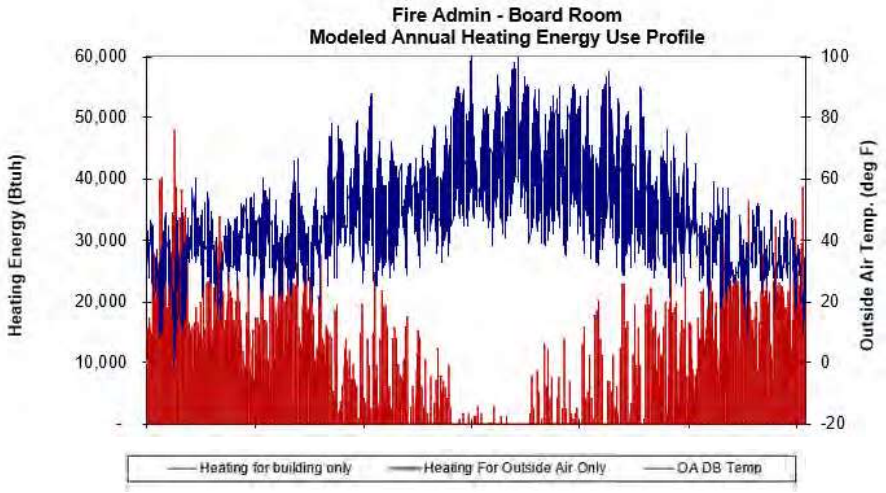
From: 7
To: 17

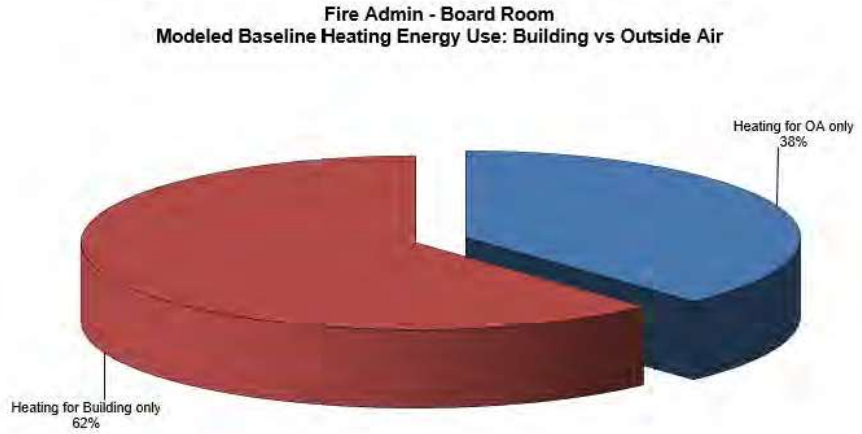
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Admin - Board Room
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin - Board Room
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
38%
Heating for Building only
62%

AHU 5

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin - 2nd Floor North Hall and Locker Rms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

47.5%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
116.8%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.9%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	
Peak Cooling Capacity	47,500 Btu/h	47,500 Btu/h	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,730 cfm	1,730 cfm	
Occupied			Show/Hide Tab <<< ☐
OA MIN flow rate	260 cfm	260 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,307	6.7	
Heating Energy	-	-	515.3
Cooling Energy	2,660	28.7	
Total	4,967	35.4	
Proposed:			
Fan Energy	1,462	6.7	
Heating Energy	-	-	299.7
Cooling Energy	1,738	28.4	
Total	3,200	35.2	
Savings:			
Total (%)	35.6%	0.6%	41.8%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occuped		☑	occ	55	54	56	56	842	901
Occuped Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occuped Override	☐		Btu/Deg-Hr
Occuped Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occuped Space Set point	70	68	72	72

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	260	260
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,216	374	842
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,080	178	901
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,629	1,286
Cooling	1,260	1,141

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	79	(occupied, occupied setback)
Unoccupied	89	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

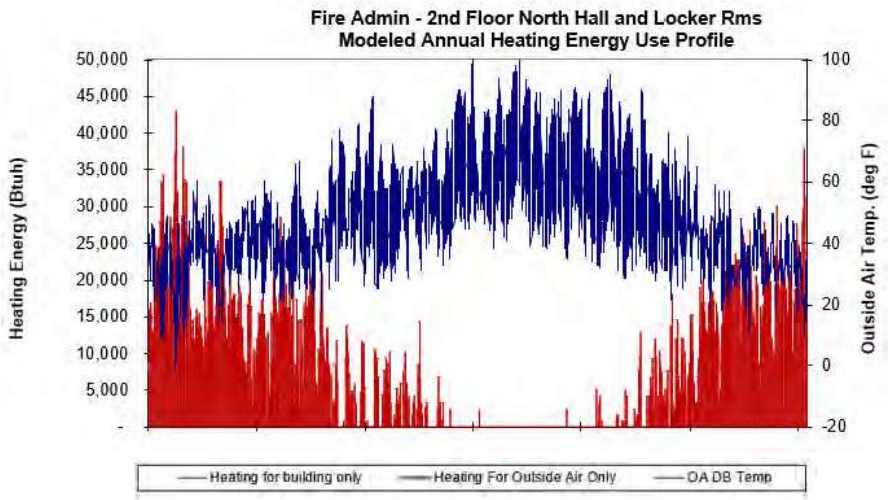
From: 7
To: 17

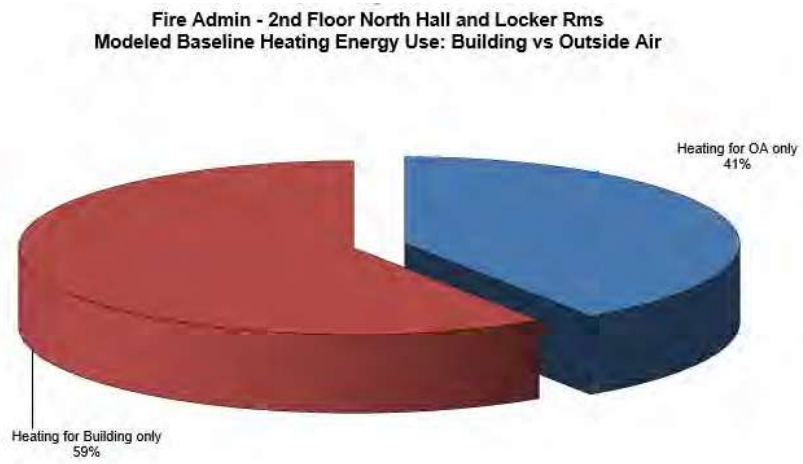
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Admin - 2nd Floor North Hall and Locker Rms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin - 2nd Floor North Hall and Locker Rms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
41%
Heating for Building only
59%

AMERESCO
Green • Clean • Sustainable

AHU 6

Project:	City of Bend
Measure:	BFA M1
Unit Data: (Graphs Title)	Fire Admin - 2nd Floor Offices and South hall
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

57.3%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
120.8%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity, for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently		☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	2,100 cfm	2,100 cfm	
Occupied			Show/Hide Tab ←-- ☐
OA MIN flow rate	315 cfm	315 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,629	6.7	
Heating Energy	-	-	629.4
Cooling Energy	3,521	35.4	
Total	6,149	42.1	
Proposed:			
Fan Energy	2,629	6.7	
Heating Energy	-	-	619.0
Cooling Energy	3,492	35.2	
Total	6,121	41.9	
Savings:			
Total (%)	0.5%	0.5%	1.7%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	55	55	787	1,036
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	53	53	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	69	68	71	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	315	315
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,243	456	787
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,256	219	1,036
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,710	1,487
Cooling	1,362	1,275

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	90	(occupied, occupied setback)
Unoccupied	78	(unoccupied setback, off, random)
Total	168	

From: 6
To: 18

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

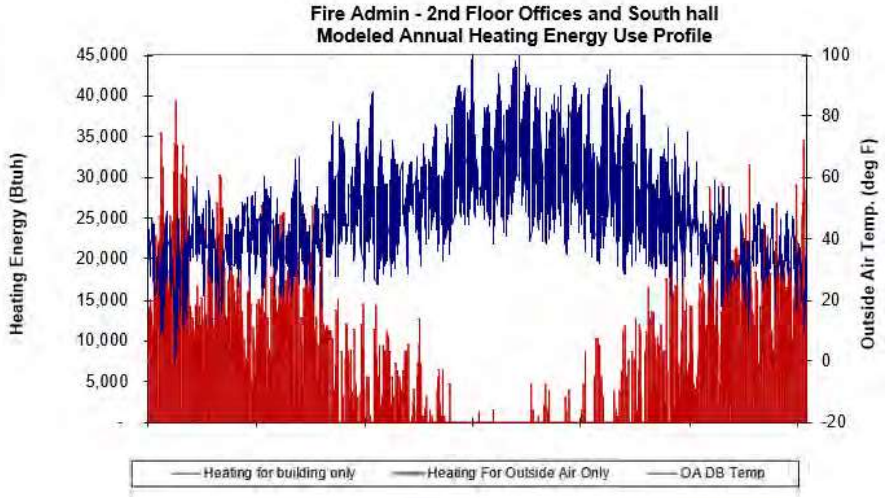
Occupied	90	(occupied, occupied setback)
Unoccupied	78	(unoccupied setback, off, random)
Total	168	

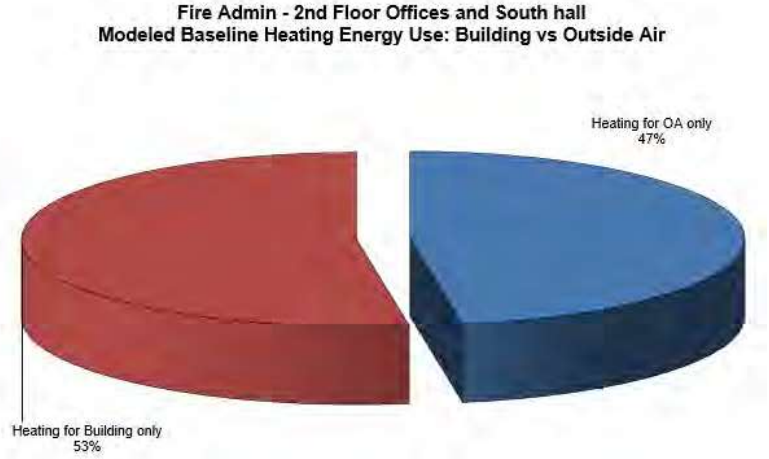
From:
To:

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire Admin - 2nd Floor Offices and South hall
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Admin - 2nd Floor Offices and South hall
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
47%
Heating for Building only
53%

BFE-M1

AHU 1

Project:	City of Bend Efficiency
Measure:	BFE M1
Unit Data: (Graphs Title)	Fire Station East - F-1 - Laundry/Storage
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key | Reference Block | Input Block | Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
99.9%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.2%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.1%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☐

2. Data Source

Logged ☐
Design ◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	47,000 Btu/h	47,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	Fill in HP efficiencies on HP tab
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.25 kW	0.25 kW	
(equivalent HP)	0.33 HP	0.33 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.25 kW**	**0.25 kW**	
Airflow data			
Total Supply Airflow	645 cfm	645 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,181	3.0	
Heating Energy	-	-	1,159.8
Cooling Energy	-	-	
Total	2,181	3.0	
Proposed:			
Fan Energy	1,272	3.0	
Heating Energy	-	-	500.7
Cooling Energy	-	-	
Total	1,272	3.0	
Savings:			
Total (%)	41.7%	0.0%	56.8%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	[illegible]	[illegible]	1,068	[illegible]
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50	[illegible]	[illegible]	0	[illegible]
Unit Off	☐	☐	off	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☑	0		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	[illegible]	[illegible]

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,068	0	1,068
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	0	0	0
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,850	3,850
[illegible]		

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From:
To:

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

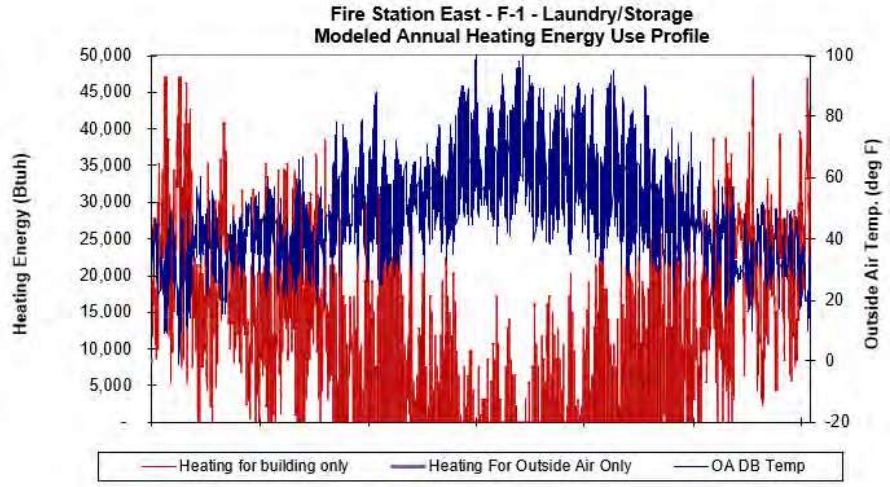
Occupied	98	(occupied, occupied setback)
Unoccupied	70	(unoccupied setback, off, random)
Total	168	

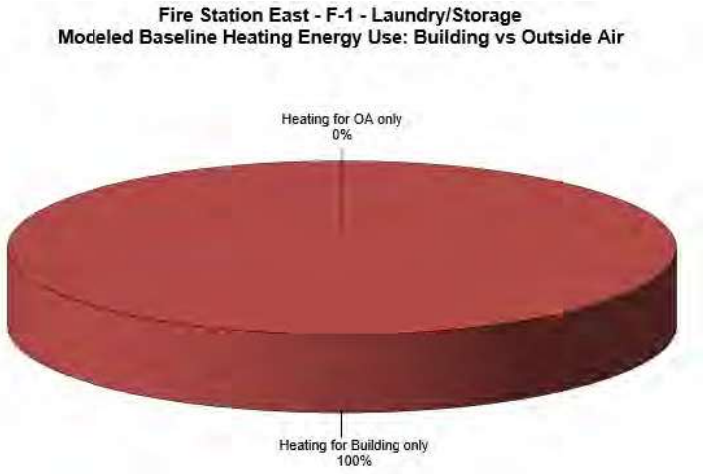
From: 6
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire Station East - F-1 - Laundry/Storage
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Station East - F-1 - Laundry/Storage
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend Efficiency
Measure:	BFE M1
Unit Data: (Graphs Title)	Fire Station East - F-2 - Meeting Room
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

19.4%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
106.5%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.3%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.3%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,905 cfm	1,905 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	286 cfm	286 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,023	6.7	
Heating Energy	-	-	421.7
Cooling Energy	1,888	35.3	
Total	2,912	42.0	
Proposed:			
Fan Energy	1,023	6.7	
Heating Energy	-	-	421.7
Cooling Energy	1,834	34.4	
Total	2,857	41.2	
Savings:			
Total (%)	1.9%	2.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	53	53	55	55	3,182	1,050
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	55	55	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	70	74

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	286	286
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	3,598	416	3,182
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,256	206	1,050
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,400	397
Cooling	1,458	667

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	35	(occupied, occupied setback)
Unoccupied	133	(unoccupied setback, off, random)
Total	168	

From: 10
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

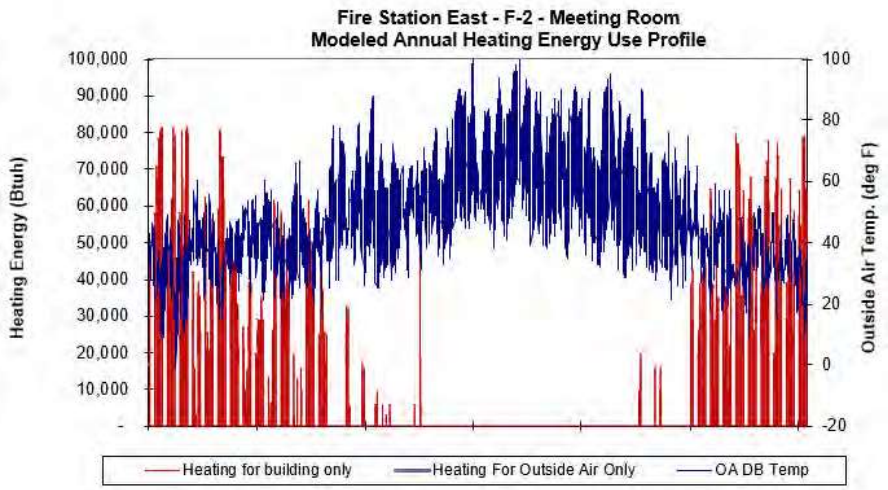
Occupied	35	(occupied, occupied setback)
Unoccupied	133	(unoccupied setback, off, random)
Total	168	

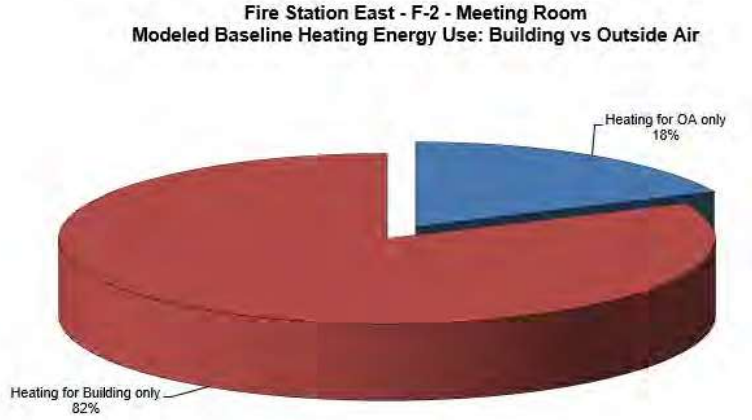
From: 10
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire Station East - F-2 - Meeting Room
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Station East - F-2 - Meeting Room
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
18%
Heating for Building only
82%

AHU 3

Project:	City of Bend Efficiency
Measure:	BFE M1
Unit Data: (Graphs Title)	Fire Station East - F-3 - Police/Lobby
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

29.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
110.9%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	86%	86%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,800 cfm	1,800 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	270 cfm	270 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]	[illegible]	[illegible]	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]	[illegible]		

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,199	6.7	
Heating Energy	-	-	374.3
Cooling Energy	1,929	35.3	
Total	3,128	42.1	
Proposed:			
Fan Energy	1,169	6.7	
Heating Energy	-	-	356.5
Cooling Energy	1,781	33.8	
Total	2,950	40.5	
Savings:			
Total (%)	5.7%	3.6%	4.7%

4. System Conditions

Operating Modes	Baseline	Proposed
Occupied		☑
Occupied Standby	☐	☐
Unoccupied Setback	☑	☑
Unit Off	☐	☐
Baseline Malfunction	☐	

Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
occ	54	54	56	56	1,729	1,061
stby						
un	52	50	53	60	No Data	No Data
off						
mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	70	72

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	270	270
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	2,114	384	1,729
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override
Clg (Btu/deg-Hr)	**Total**	**OA**	**Bldg Only**
occ	1,256	194	1,061
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,452	573
Cooling	1,601	683

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	41	(occupied, occupied setback)
Unoccupied	127	(unoccupied setback, off, random)
Total	168	

From: 8
To: 16

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	40	(occupied, occupied setback)
Unoccupied	128	(unoccupied setback, off, random)
Total	168	

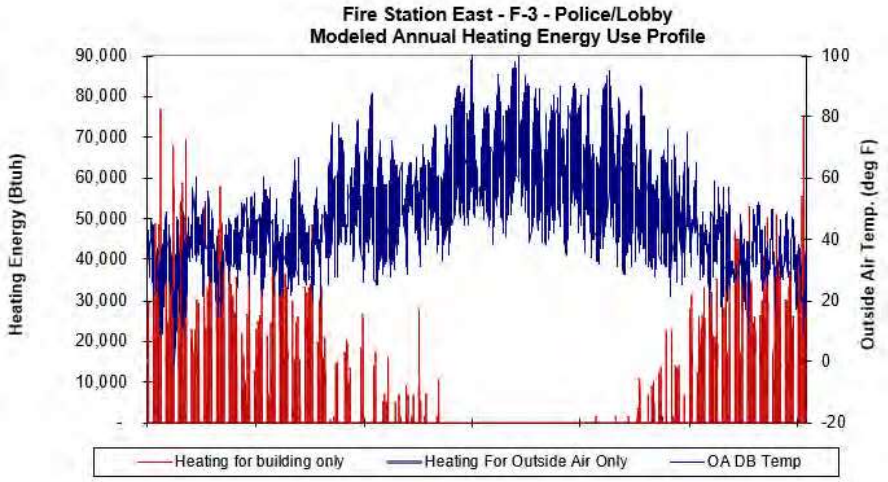
From: 8
To: 16

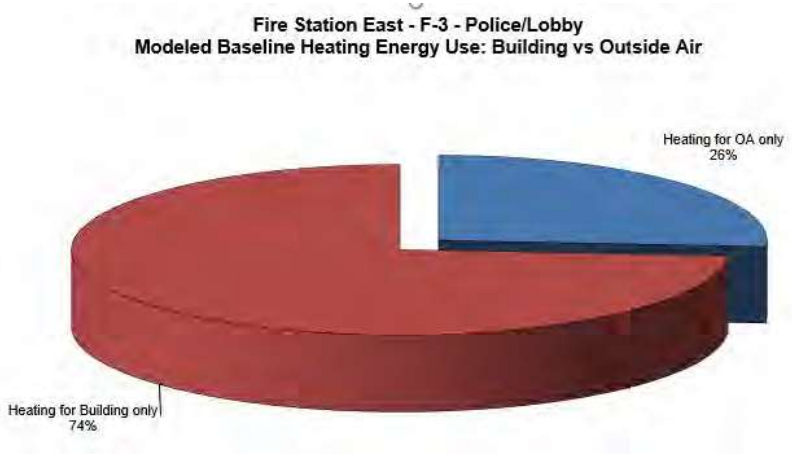
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Station East - F-3 - Police/Lobby
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
100
80
60
40
20
0
-20
Outside Air Temp. (deg F)
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Station East - F-3 - Police/Lobby
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
26%
Heating for Building only
74%

AMERESCO
Green • Clean • Sustainable

AHU 4

Project:	City of Bend Efficiency
Measure:	BFE - M1
Unit Data: (Graphs Title)	East Fire - F-4 - Dorms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
100.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,980 cfm	1,980 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,657	6.7	
Heating Energy	-	-	847.4
Cooling Energy	3,892	36.2	
Total	6,550	42.9	
Proposed:			
Fan Energy	2,657	6.7	
Heating Energy	-	-	847.4
Cooling Energy	3,892	36.2	
Total	6,550	42.9	
Savings:			
Total (%)	0.0%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	56	56	2,114	1,284
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	54	54	54	54	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	54	68	71	71

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	2,114	0	2,114
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	0	1,284
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,850	1,447
Cooling	1,394	1,233

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	91	(occupied, occupied setback)
Unoccupied	77	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	91	(occupied, occupied setback)
Unoccupied	77	(unoccupied setback, off, random)
Total	168	

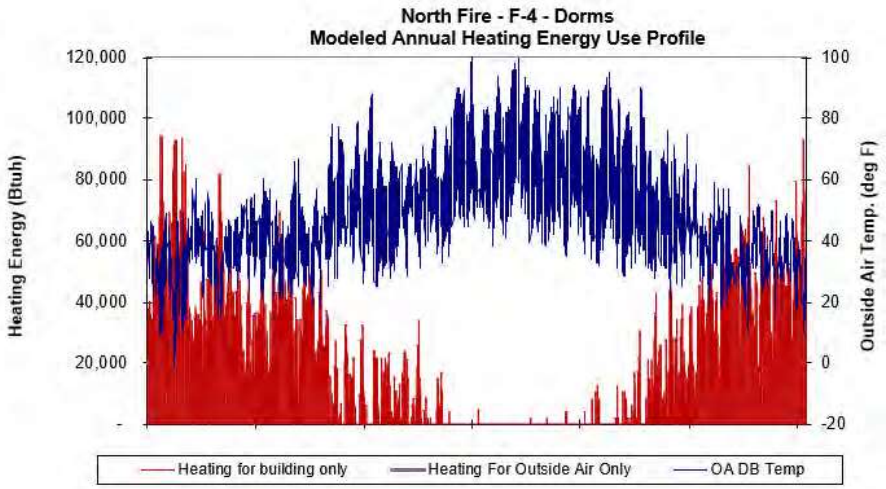
From:
To:

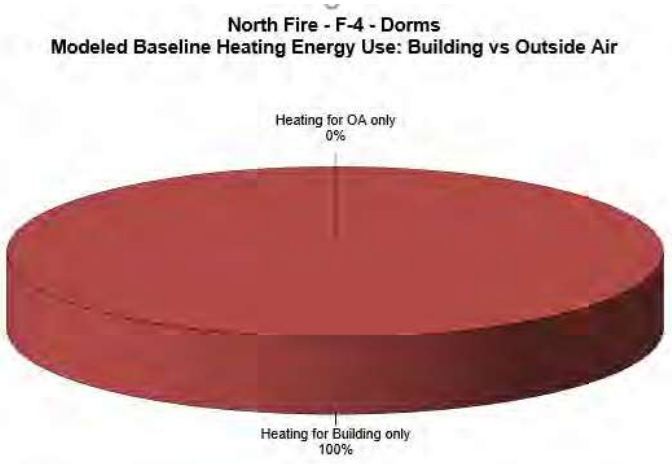
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


North Fire - F-4 - Dorms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
120,000
100,000
80,000
60,000
40,000
20,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-4 - Dorms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

AHU 5

Project:	City of Bend
Measure:	BFE M1
Unit Data: (Graphs Title)	East Fire - F-5 - Kitchen/Entertainment
Weather Basis:	Redmond, OR
Version	3.14

System Info Title Color Key | Reference Block | Input Block | Dynamic

Energy Calcs Program Warnings

24.7%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
108.5%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.1%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.1%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info /Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	0.56 kW	0.56 kW	
Airflow data			
Total Supply Airflow	1,605 cfm	1,605 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	241 cfm	241 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	1,137.9
Cooling Energy	2,610	27.5	
Total	5,676	34.2	
Propcsec:			
Fan Energy	2,862	6.7	
Heating Energy	-	-	1,025.8
Cooling Energy	2,574	27.5	
Total	5,435	34.2	
Savings:			
Total (%)	4.2%	0.0%	9.9%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	59	59	1,771	1,019
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	52	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	78	78

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	241	241
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	2,114	343	1,771
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,159	140	1,019
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,613	1,791
Cooling	1,056	1,033

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Proposed

Weekly Hours Summary

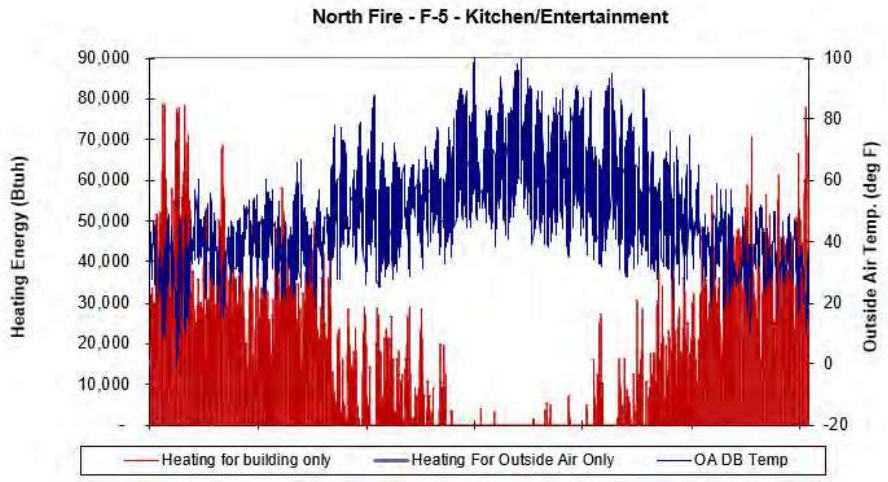
Occupied	98	(occupied, occupied setback)
Unoccupied	70	(unoccupied setback, off, random)
Total	168	

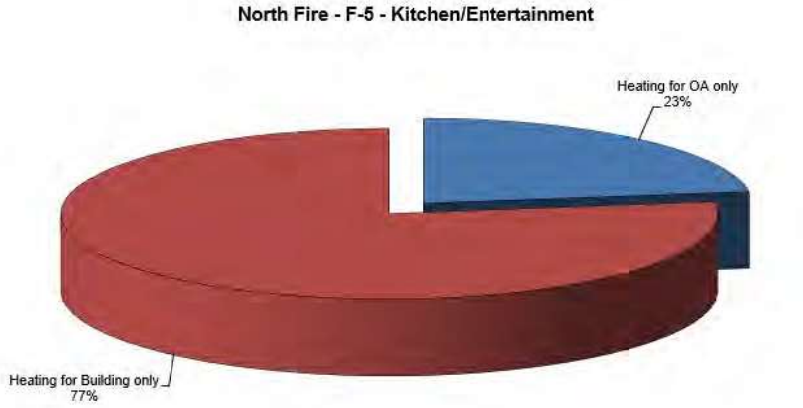
From: 7
To: 21

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un


North Fire - F-5 - Kitchen/Entertainment
Heating Energy (Btuh)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-5 - Kitchen/Entertainment
Heating for OA only
23%
Heating for Building only
77%

AMERESCO
Green • Clean • Sustainable

AHU 6

Project:	City of Bend
Measure:	BFE M1
Unit Data: (Graphs Title)	East Fire - F-6 - Gym/Lockers
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key | Reference Block | Input Block | Dynamic

Energy Calcs Program Warnings

26.9%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
109.2%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.1%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.2%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
38.7%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity, for supplemental if using HP)
Cooling			
Efficiency (output/input)	288%	288%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	0.56 kW	0.56 kW	
Airflow data			
Total Supply Airflow	1,840 cfm	1,840 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	276 cfm	276 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,212	6.7	
Heating Energy	-	-	1,132.5
Cooling Energy	4,084	36.1	
Total	7,296	42.8	
Propcsec:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	1,341.6
Cooling Energy	3,496	33.1	
Total	6,767	39.8	
Savings:			
Total (%)	7.3%	7.1%	-18.5%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	52	54	54	56	1,824	1,021
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	55	50	57	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	65	65	68	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	276	276
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	2,214	390	1,824
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,228	207	1,021
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,698	1,891
Cooling	1,536	1,492

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	110	(occupied, occupied setback)
Unoccupied	58	(unoccupied setback, off, random)
Total	168	

From: 6
To: 22

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Proposed

Weekly Hours Summary

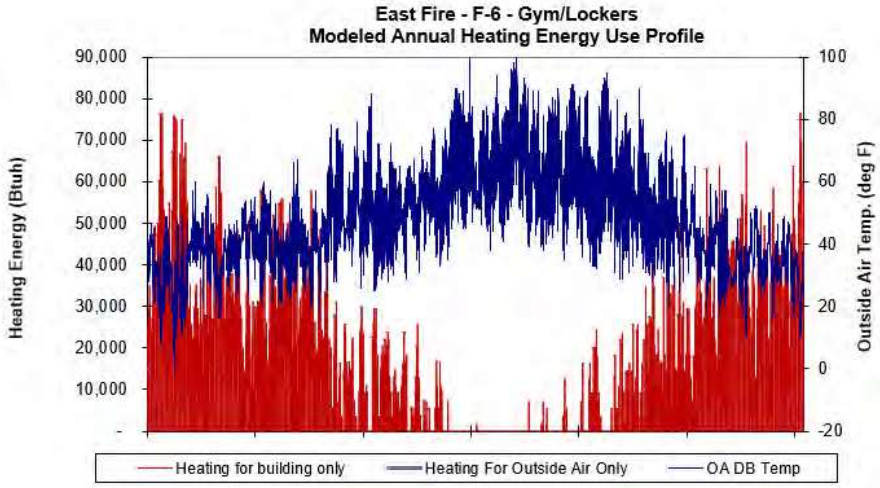
Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

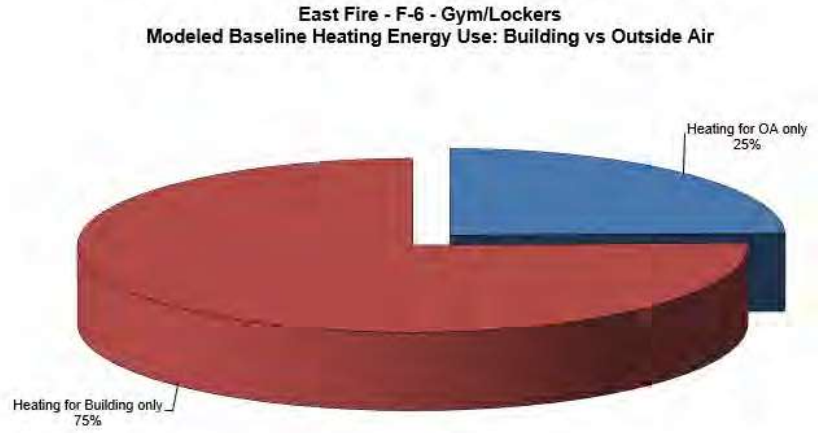
From: 6
To: 22

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

"Page content is subject to Confidentiality Restrictions"


East Fire - F-6 - Gym/Lockers
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
100
80
60
40
20
0
-20
Outside Air Temp. (deg F)
Heating for building only
Heating For Outside Air Only
OA DB Temp


East Fire - F-6 - Gym/Lockers
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
25%
Heating for Building only
75%

BFS-M1

AHU 1

Project:	City of Bend Efficiency
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-1 - Laundry/Storage
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

15.8%	1. Baseline calc'd OA htg usage as a % of annualized Source Data
100.8%	2. Baseline calc'd Total htg usage as a % of annualized Source Data
0.0%	3. % of annual hours BASELINE unit peak HEATING capacity exceeded
0.0%	4. % of annual hours PROPOSED unit peak HEATING capacity exceeded
38.8%	5. % of annual hours PROPOSED load exceeds BASELINE load
	6. % of Baseline load being satisfied by supplemental heat
	7. of Proposed load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,130	3.0	
Heating Energy	-	-	276.2
Cooling Energy	-	-	
Total	1,130	3.0	
Proposed:			
Fan Energy	1,454	3.0	
Heating Energy	-	-	460.4
Cooling Energy	-	-	
Total	1,454	3.0	
Savings:			
Total (%)	-28.7%	0.0%	-66.7%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☐

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	47,000 Btu/h	47,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	Fill in HP efficiencies on HP tab
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.25 kW	0.25 kW	
(equivalent HP)	0.33 HP	0.33 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.25 kW**	**0.25 kW**	
Airflow data			
Total Supply Airflow	645 cfm	645 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	97 cfm	97 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54			605	
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50			No Data	
Unit Off	☐	☐	off					0	0
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	55	69		

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	97	97
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	712	107	605
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	0	75	-75
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,284	1,363

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	87	(occupied, occupied setback)
Unoccupied	81	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

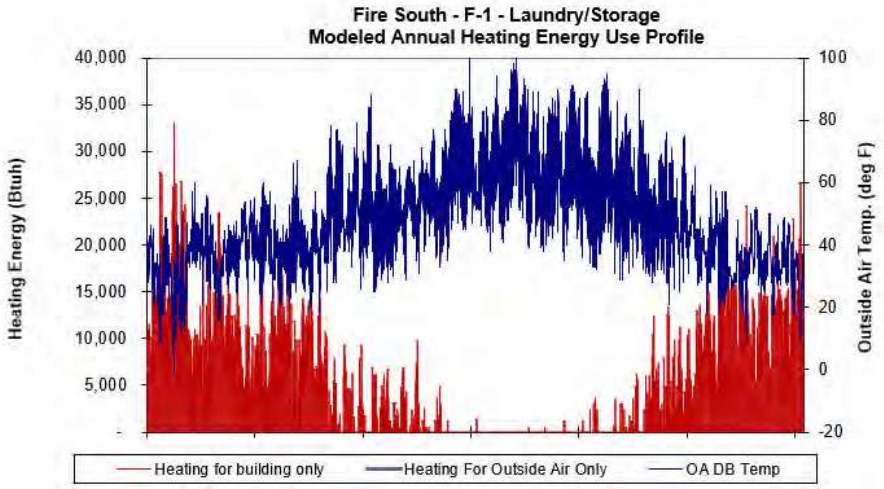
From: 6
To: 22

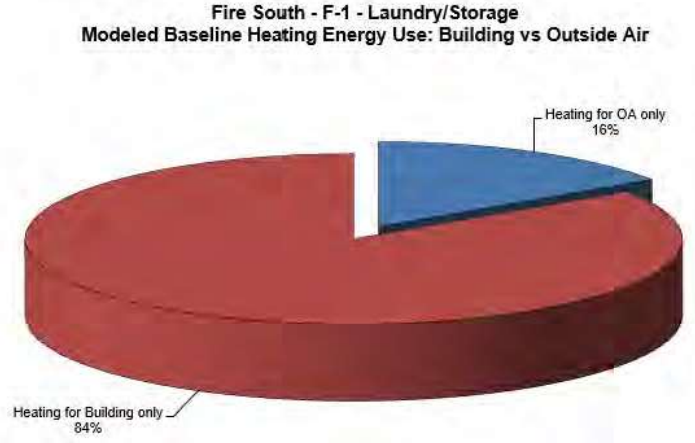
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire South - F-1 - Laundry/Storage
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-1 - Laundry/Storage
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
16%
Heating for Building only
84%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend Efficiency
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-2 - Meeting Room
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

42.8%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
113.9%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,905 cfm	1,905 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	286 cfm	286 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,898	6.7	
Heating Energy	-	-	448.8
Cooling Energy	2,928	35.0	
Total	4,826	41.7	
Proposed:			
Fan Energy	1,023	6.7	
Heating Energy	-	-	194.8
Cooling Energy	1,850	35.2	
Total	2,873	42.0	
Savings:			
Total (%)	40.5%	-0.7%	56.6%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	56	54	56	56	959	1,109
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	51	50	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides

	Heating	Cooling	
Occupied Override			Btu/Deg-Hr
Occupied Standby Override			Btu/Deg-Hr
Unoccupied Setback Override			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)

	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	75	72

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	286	286
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,348	389	959
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	175	1,109
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,480	1,055
Cooling	1,222	1,021

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	65	(occupied, occupied setback)
Unoccupied	103	(unoccupied setback, off, random)
Total	168	

From: 10
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	35	(occupied, occupied setback)
Unoccupied	133	(unoccupied setback, off, random)
Total	168	

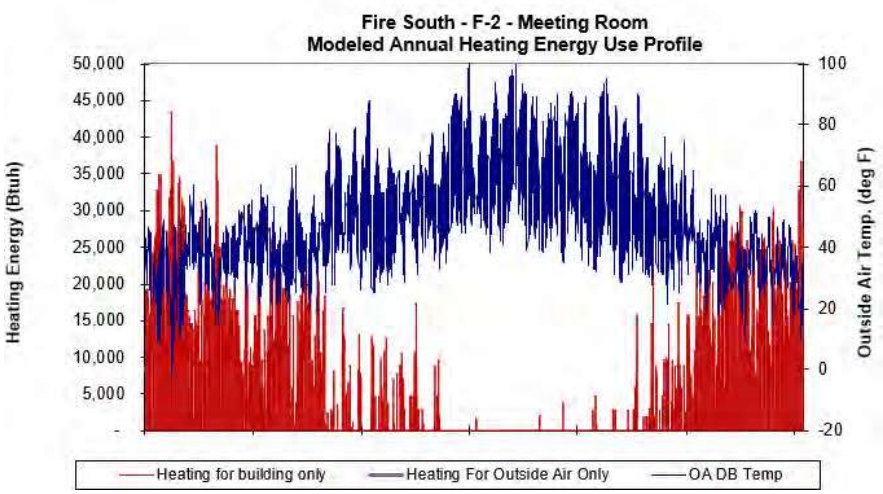
From: 10
To: 17

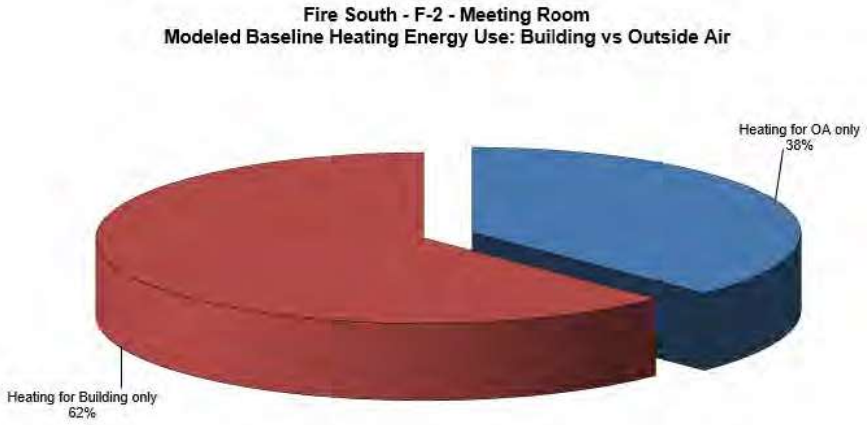
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire South - F-2 - Meeting Room
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-2 - Meeting Room
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
38%
Heating for Building only
62%

AHU 3

Project:	City of Bend Efficiency
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-3 - Police/Lobby
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

44.3%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
116.6%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,248	6.7	
Heating Energy	-	-	531.1
Cooling Energy	3,195	35.1	
Total	5,444	41.8	
Proposed:			
Fan Energy	2,248	6.7	
Heating Energy	-	-	523.9
Cooling Energy	3,195	35.1	
Total	5,444	41.8	
Savings:			
Total (%)	0.0%	0.0%	1.4%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	86%	86%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	0.56 kW	0.56 kW	
Airflow data			
Total Supply Airflow	1,800 cfm	1,800 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	270 cfm	270 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

4. System Condtions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	56	56	1,018	1,099
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	54	53	58	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	69	68	72	72

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	270	270
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,409	391	1,018
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	186	1,099
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,650	1,159
Cooling	1,296	1,106

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	77	(occupied, occupied setback)
Unoccupied	91	(unoccupied setback, off, random)
Total	168	

From: 7
To: 18

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

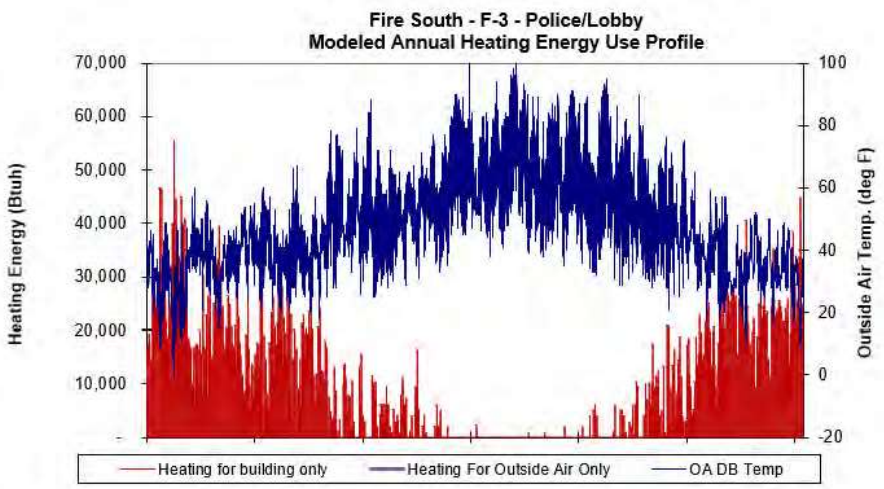
Occupied	77	(occupied, occupied setback)
Unoccupied	91	(unoccupied setback, off, random)
Total	168	

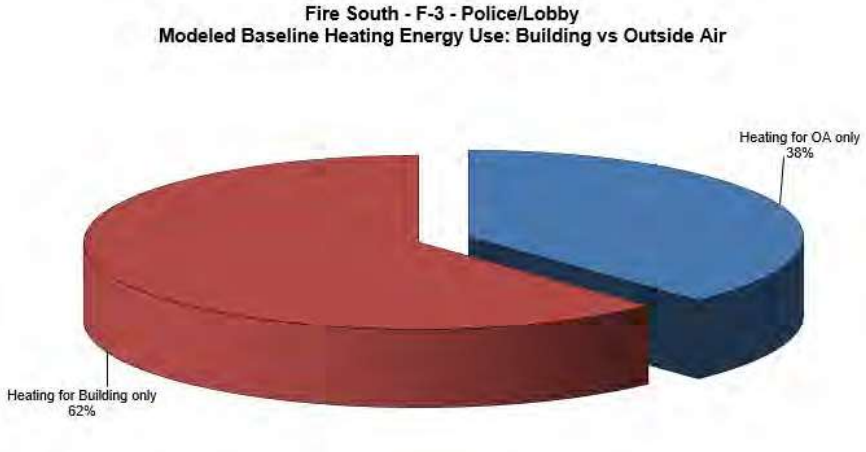
From: 8
To: 16

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire South - F-3 - Police/Lobby
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-3 - Police/Lobby
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
38%
Heating for Building only
62%

AMERESCO
Green • Clean • Sustainable

AHU 4

Project:	City of Bend Efficiency
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-4 - Dorms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

42.1%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
114.2%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
38.8%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	721.5
Cooling Energy	4,234	36.5	
Total	7,300	43.3	
Proposed:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	945.8
Cooling Energy	3,350	31.0	
Total	6,620	38.7	
Savings:			
Total (%)	9.3%	10.6%	-31.1%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,980 cfm	1,980 cfm	
			Show/Hide Tab ➡ ☐
Occupied			
OA MIN flow rate	297 cfm	297 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	52	54	53	56	1,064	970
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	50	52	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr ¹ (Balance Pt - OAT)

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	64	68	68	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	297	297
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,476	412	1,064
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,202	232	970
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,367	1,545
Cooling	1,711	1,589

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

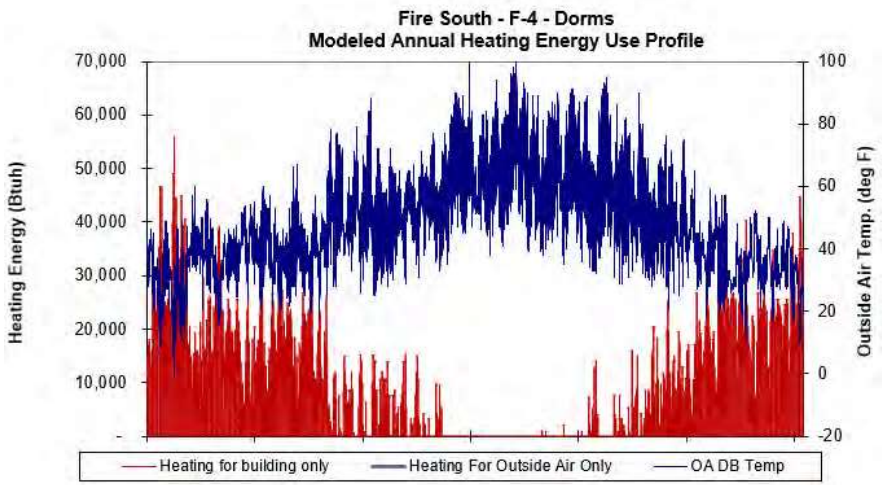
From: 6
To: 22

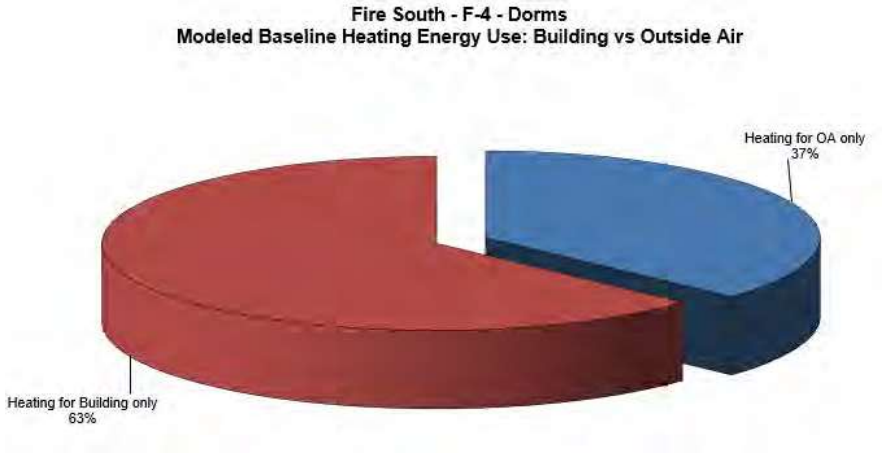
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire South - F-4 - Dorms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-4 - Dorms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
37%
Heating for Building only
63%

AHU 5

Project:	City of Bend
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-5 - Kitchen/Entertainment
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

37.4%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
112.3%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,605 cfm	1,605 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	241 cfm	241 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]	[illegible]	[illegible]	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]	[illegible]		

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,333	6.7	
Heating Energy	-	-	966.6
Cooling Energy	3,035	28.7	
Total	6,368	35.5	
Proposed:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	771.2
Cooling Energy	3,023	28.7	
Total	6,089	35.5	
Savings:			
Total (%)	4.4%	0.0%	20.2%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	54	56	56	1,031	914
Occupied Standby	☐	☐	stby					[illegible]	[illegible]
Unoccupied Setback	☑	☑	un	55	50	56	60	No Data	No Data
Unit Off	☐	☐	off	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Baseline Malfunction	☐		mal					[illegible]	[illegible]

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	68	72	72

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	241	241
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,378	347	1,031
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,080	165	914
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	4,101	2,254
Cooling	1,350	1,298

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	114	(occupied, occupied setback)
Unoccupied	54	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

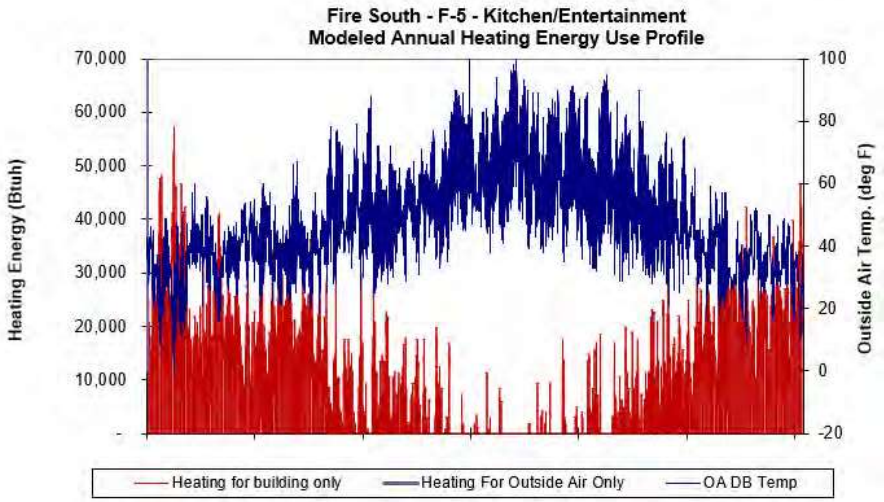
From: 7
To: 21

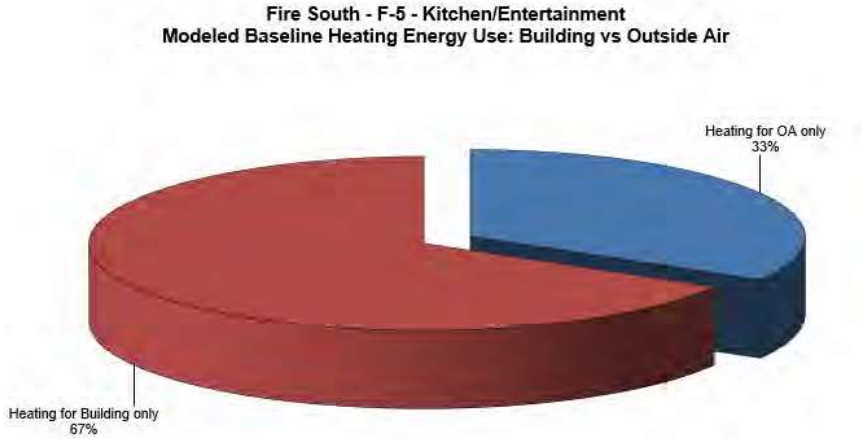
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire South - F-5 - Kitchen/Entertainment
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-5 - Kitchen/Entertainment
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
33%
Heating for Building only
67%

AMERESCO
Green • Clean • Sustainable

AHU 6

Project:	City of Bend
Measure:	BFS M1
Unit Data: (Graphs Title)	Fire South - F-6 - Gym/Lockers
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

43.6%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
114.7%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	841.3
Cooling Energy	3,698	35.1	
Total	6,764	41.8	
Proposed:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	819.9
Cooling Energy	3,698	35.1	
Total	6,764	41.8	
Savings:			
Total (%)	0.0%	0.0%	2.5%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity, for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,840 cfm	1,840 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	276 cfm	276 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	55	56	56	980	1,094
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	55	50	56	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	68	72	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	276	276
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,378	397	980
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	190	1,094
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	4,101	1,921
Cooling	1,050	1,293

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

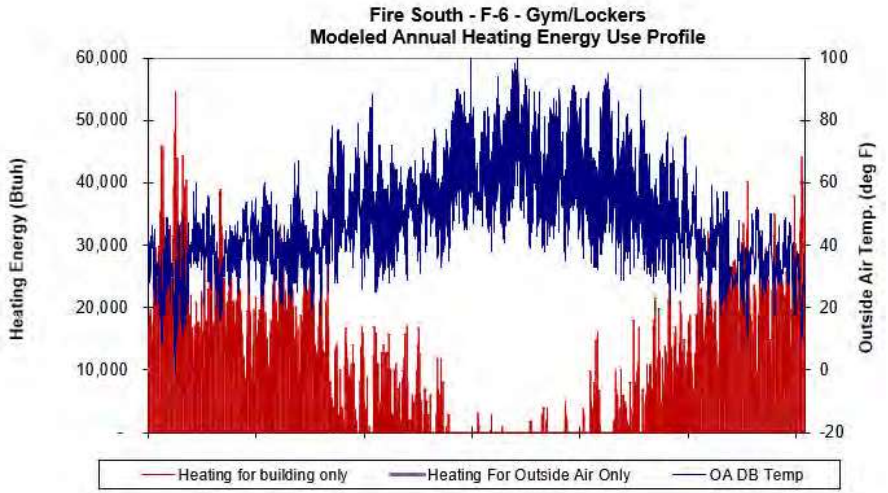
From: 7
To: 22

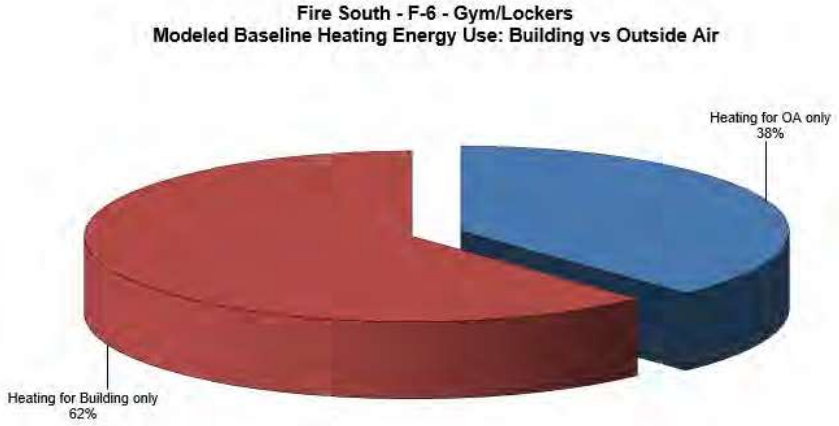
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire South - F-6 - Gym/Lockers
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire South - F-6 - Gym/Lockers
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
38%
Heating for Building only
62%

BFW-M1

AHU 1

Project:	City of Bend Efficiency
Measure:	BFW M1
Unit Data: (Graphs Title)	Fire West - F-1 - Laundry/Storage
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

41.1%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
113.9%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.4%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	1,259	3.0	
Heating Energy	-	-	235.4
Cooling Energy	-	-	
Total	1,259	3.0	
Proposed:			
Fan Energy	1,000	3.0	
Heating Energy	-	-	172.4
Cooling Energy	-	-	
Total	1,000	3.0	
Savings:			
Total (%)	20.6%	0.0%	26.8%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☐

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info /Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	47,000 Btu/h	47,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	Fill in HP efficiencies on HP tab
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.25 kW	0.25 kW	
(equivalent HP)	0.33 HP	0.33 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.25 kW**	**0.25 kW**	
Airflow data			
Total Supply Airflow	845 cfm	845 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	97 cfm	97 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	53	53			361	
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	53	53			0	
Unit Off	☐	☐	off						
Baseline Malfunction	☐		n/a						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☑	0		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	66	66		

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	97	97
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	497	136	361
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	0	75	-75
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,605	1,475

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	97	(occupied, occupied setback)
Unoccupied	71	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

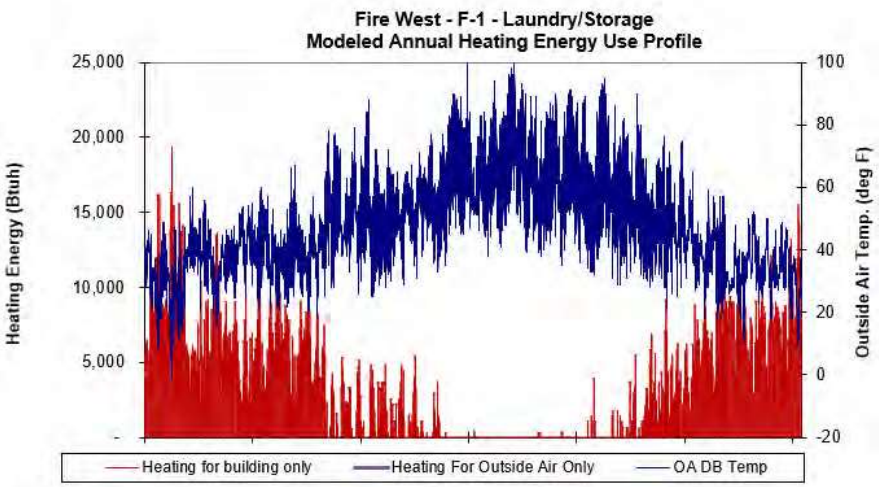
Occupied	77	(occupied, occupied setback)
Unoccupied	91	(unoccupied setback, off, random)
Total	168	

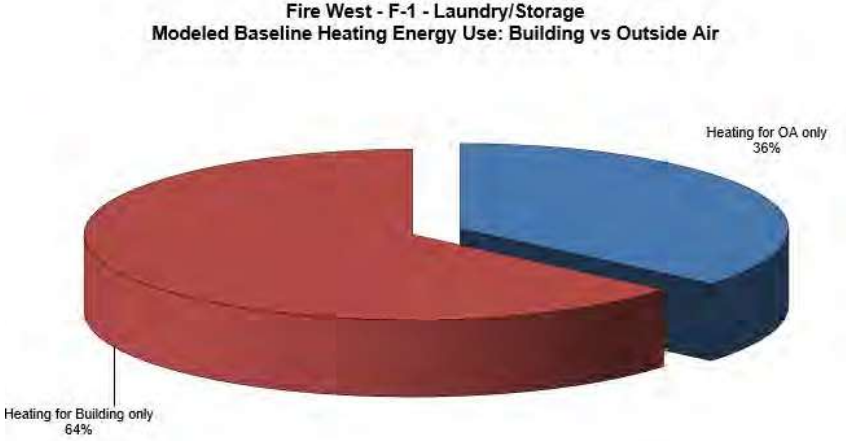
From: 7
To:

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire West - F-1 - Laundry/Storage
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-1 - Laundry/Storage
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
36%
Heating for Building only
64%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend Efficiency
Measure:	BFW M1
Unit Data: (Graphs Title)	Fire West - F-2 - Meeting Room
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

38.6%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
111.1%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,905 cfm	1,905 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	286 cfm	286 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement.
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,862	6.7	
Heating Energy	-	-	871.9
Cooling Energy	3,452	34.5	
Total	6,314	41.2	
Proposed:			
Fan Energy	1,462	6.7	
Heating Energy	-	-	388.7
Cooling Energy	2,173	34.2	
Total	3,635	41.0	
Savings:			
Total (%)	42.4%	0.7%	55.4%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	56	56	57	57	1,140	1,135
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50	58	58	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	75	75

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	286	286
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,529	389	1,140
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,314	179	1,135
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,686	1,852
Cooling	1,236	1,181

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	98	(occupied, occupied setback)
Unoccupied	70	(unoccupied setback, off, random)
Total	168	

From: 7
To: 21

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Proposed

Weekly Hours Summary

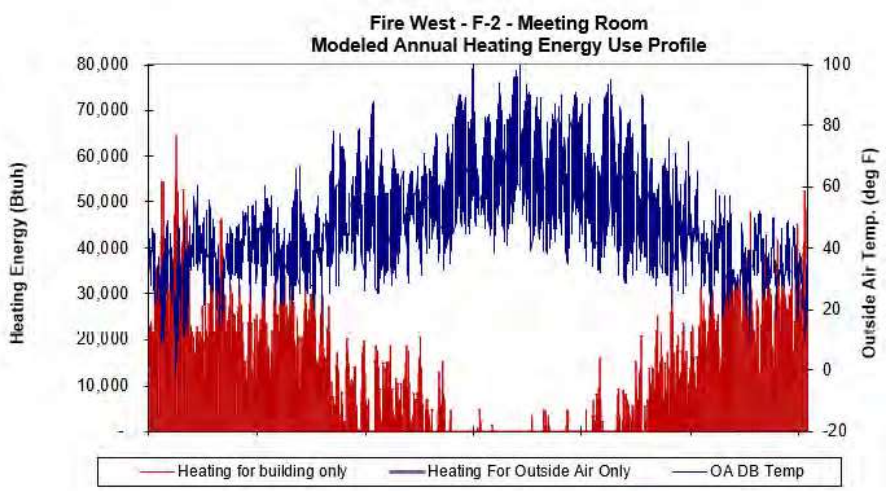
Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

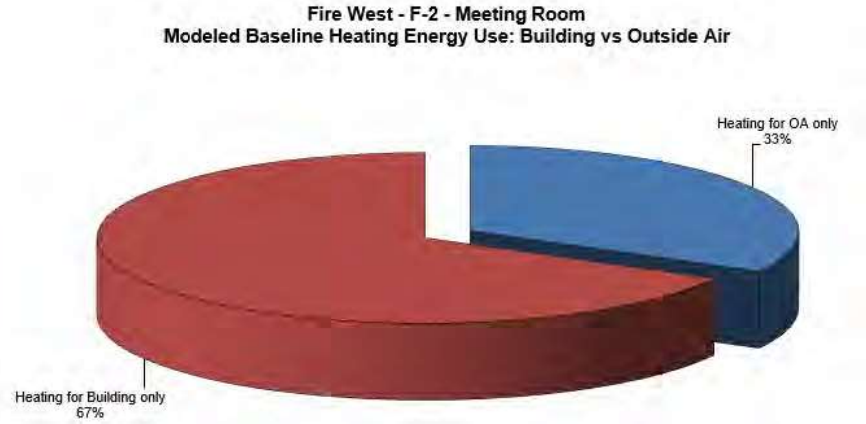
From: 8
To: 18

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un


Fire West - F-2 - Meeting Room
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-2 - Meeting Room
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
33%
Heating for Building only
67%

AHU 3

Project:	City of Bend Efficiency
Measure:	BFW M1
Unit Data: (Graphs Title)	Fire West - F-3 - Police/Lobby
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

84.1%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
122.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.9%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	88%	88%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,800 cfm	1,800 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	270 cfm	270 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]	[illegible]	[illegible]	
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]	[illegible]	[illegible]	

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,659	6.7	
Heating Energy	-	-	539.3
Cooling Energy	3,032	34.6	
Total	5,691	41.3	
Proposed:			
Fan Energy	1,169	6.7	
Heating Energy	-	-	183.1
Cooling Energy	1,751	34.1	
Total	2,921	40.9	
Savings			
Total (%)	48.7%	1.1%	66.1%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	55	57	57	544	1,138
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	55	55	57	57	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	71	68	74	75

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	270	270
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	939	395	544
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,314	176	1,138
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	4,101	1,686
Cooling	1,249	1,034

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	91	(occupied, occupied setback)
Unoccupied	77	(unoccupied setback, off, random)
Total	168	

From: 7
To: 23

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Proposed

Weekly Hours Summary

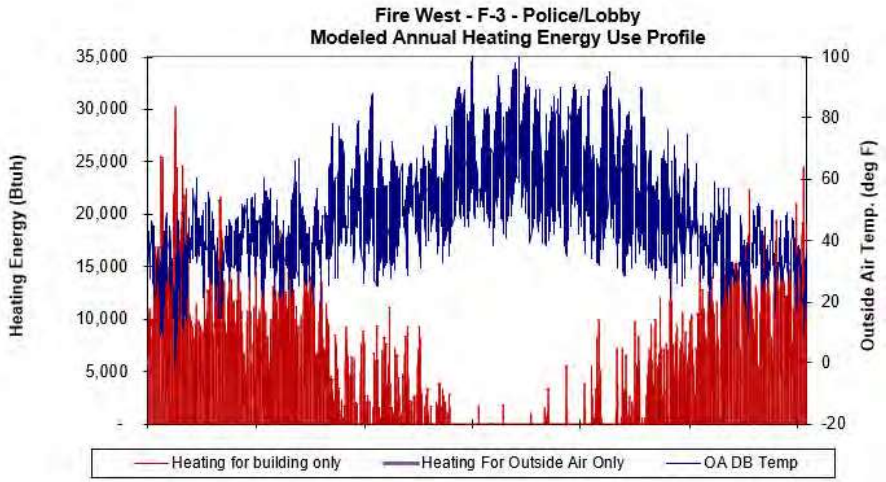
Occupied	40	(occupied, occupied setback)
Unoccupied	128	(unoccupied setback, off, random)
Total	168	

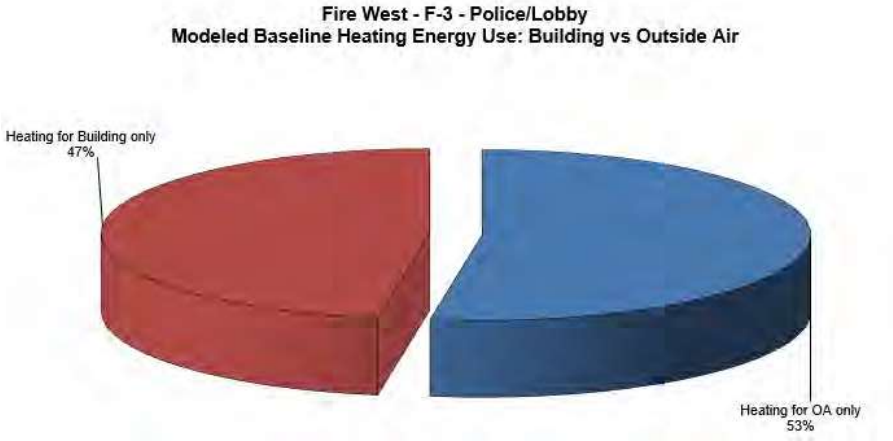
From: 8
To: 16

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un


Fire West - F-3 - Police/Lobby
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-3 - Police/Lobby
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for Building only
47%
Heating for OA only
53%

AMERESCO
Green • Clean • Sustainable

AHU 4

Project:	City of Bend Efficiency
Measure:	BFW M1
Unit Data: (Graphs Title)	Fire West - F-4 - Dorms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

52.9%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
115.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
24.4%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	4,906	6.7	
Heating Energy	-	-	980.7
Cooling Energy	3,822	35.0	
Total	8,728	41.7	
Proposed:			
Fan Energy	2,657	6.7	
Heating Energy	-	-	412.0
Cooling Energy	3,536	35.1	
Total	6,193	41.9	
Savings:			
Total (%)	29.0%	-0.4%	58.0%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,600 Btuh	56,600 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,980 cfm	1,980 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	297 cfm	297 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	50	50	56	56	656	1,080
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50	56	56	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	60	65	72	71

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	297	297
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,057	401	656
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	204	1,080
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	2,912	2,912
Cooling	1,350	1,350

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	91	(occupied, occupied setback)
Unoccupied	77	(unoccupied setback, off, random)
Total	168	

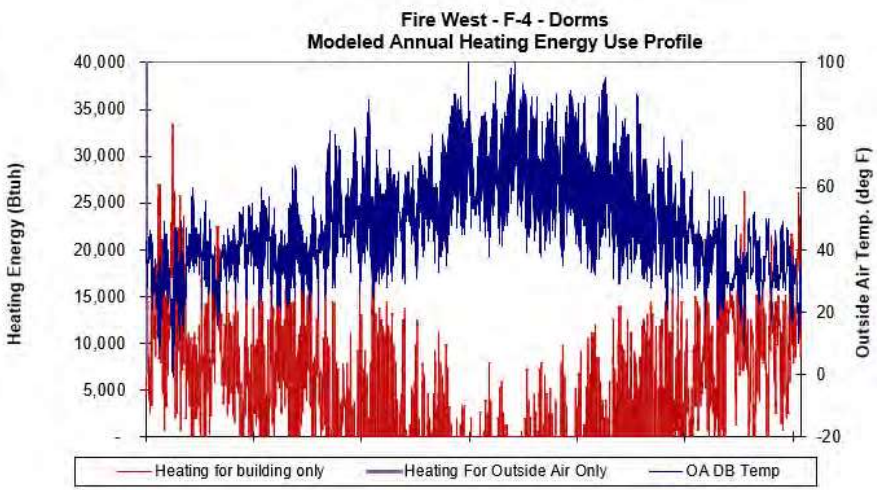
From:
To:

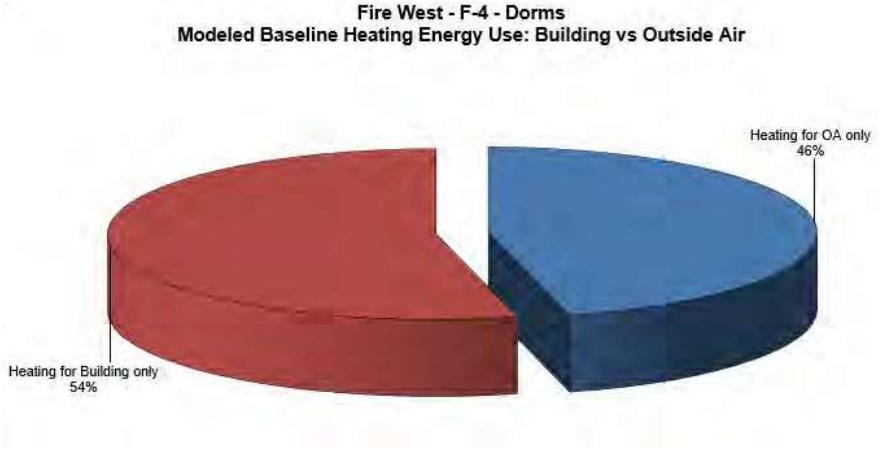
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire West - F-4 - Dorms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-4 - Dorms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
46%
Heating for Building only
54%

AHU 5

Project:	City of Bend
Measure:	BFWM1
Unit Data: (Graphs Title)	Fire West - F-5 - Kitchen/Entertainment
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

57.4%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
120.5%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93000 Btu/h	93,000 Btu/h	(output capacity for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,605 cfm	1,605 cfm	
Occupied			Show/Hide Tab ->> ☐
OA MIN flow rate	241 cfm	241 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,044	6.7	
Heating Energy	-	-	351.0
Cooling Energy	2,282	28.3	
Total	4,326	35.0	
Proposed:			
Fan Energy	2,044	6.7	
Heating Energy	-	-	351.0
Cooling Energy	2,282	28.3	
Total	4,326	35.0	
Savings:			
Total (%)	0.0%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	55	55	57	57	593	953
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	51	51	61	61	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	70	70	75	75

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	241	241
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	939	347	593
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,105	151	953
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,438	1,119
Cooling	1,138	947

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	70	(occupied, occupied setback)
Unoccupied	98	(unoccupied setback, off, random)
Total	168	

From: 7
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	70	(occupied, occupied setback)
Unoccupied	98	(unoccupied setback, off, random)
Total	168	

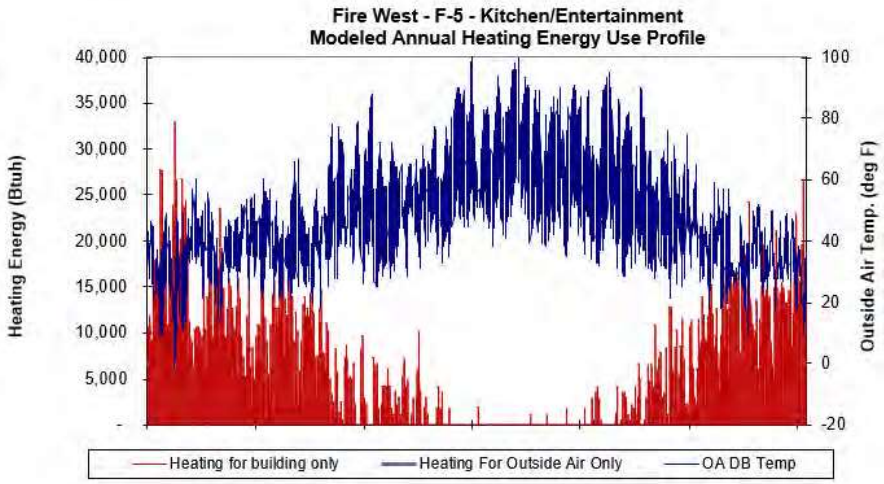
From: 7
To: 17

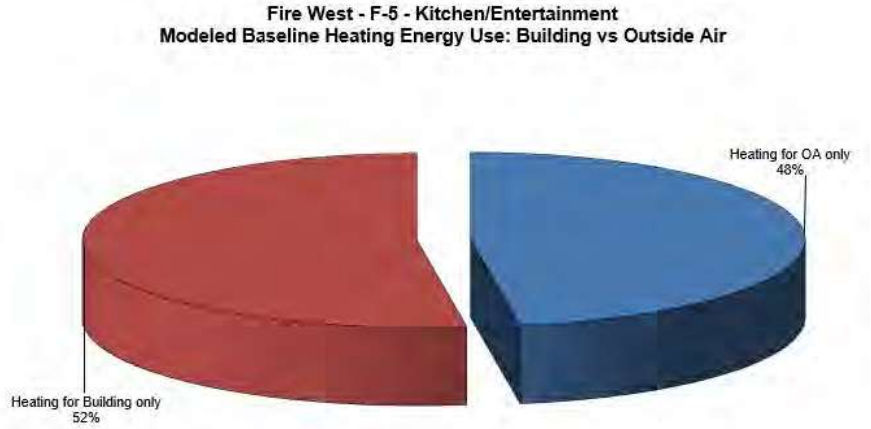
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire West - F-5 - Kitchen/Entertainment
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-5 - Kitchen/Entertainment
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
48%
Heating for Building only
52%

AMERESCO
Green • Clean • Sustainable

AHU 6

Project:	City of Bend
Measure:	BFW M1
Unit Data: (Graphs Title)	Fire West - F-6 - Gym/Lockers
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

41.5%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
108.2%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
35.9%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,840 cfm	1,840 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	276 cfm	276 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	4,906	6.7	
Heating Energy	-	-	1,134.2
Cooling Energy	3,853	35.1	
Total	8,759	41.8	
Proposed:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	632.0
Cooling Energy	3,546	33.8	
Total	6,612	40.6	
Savings:			
Total (%)	24.5%	2.9%	44.3%

4. System Conditions

Operating Modes	Baseline	Proposed
Occupied		☑
Occupied Standby	☐	☐
Unoccupied Setback	☑	☑
Unit Off	☐	☐
Baseline Malfunction	☐	

Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
occ	55	55	56	56	608	1,094
stby					[illegible]	[illegible]
un	55	55	56	56	No Data	No Data
off	[illegible]	[illegible]	[illegible]	[illegible]	0	0
mal					[illegible]	[illegible]

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	60	68	72	78

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	276	276
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	939	331	608
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,284	190	1,094
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	4,101	4,101
Cooling	1,350	1,350

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

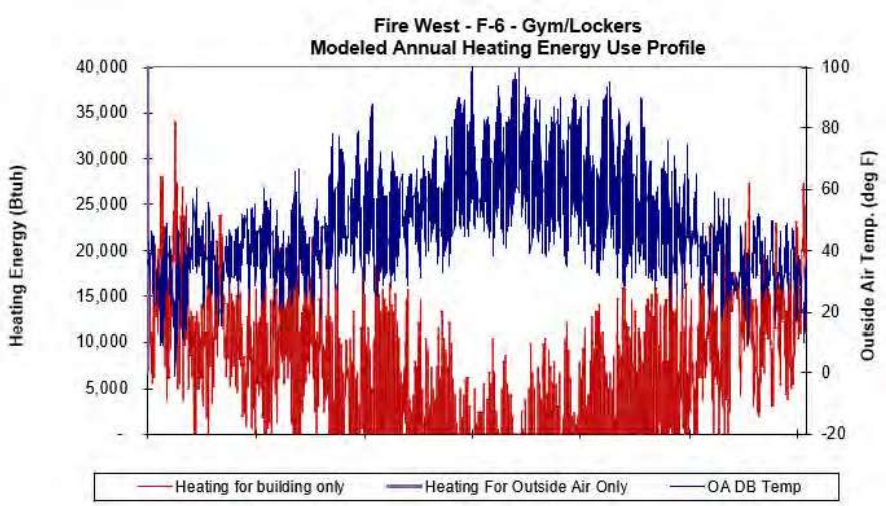
From: 6
To: 21

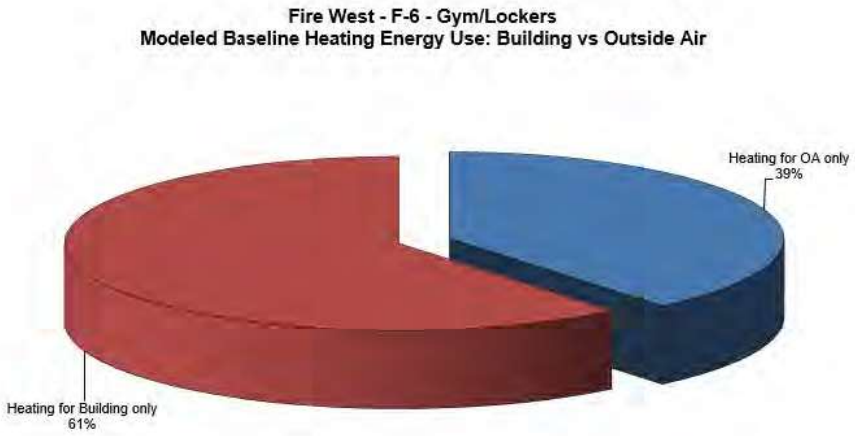
Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire West - F-6 - Gym/Lockers
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire West - F-6 - Gym/Lockers
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
39%
Heating for Building only
61%

BFN-M1

AHU 1

Project:	City of Bend Efficiency
Measure:	BFN M1
Unit Data: (Graphs Title)	North Fire - F-1 - Laundry/Storage
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
100.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☐

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	85%	85%	(for supplemental heat if using HP)
Max Heating Capacity	47,000 Btu/h	47,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	293%	293%	Fill in HP efficiencies on HP tab
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.25 kW	0.25 kW	
(equivalent HP)	0.33 HP	0.33 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.25 kW**	**0.25 kW**	
Airflow data			
Total Supply Airflow	645 cfm	645 cfm	
			Show/Hide Tab --> ☐
Occupied			
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,181	3.0	
Heating Energy	-	-	725.7
Cooling Energy	-	-	
Total	2,181	3.0	
Proposed:			
Fan Energy	1,454	3.0	
Heating Energy	-	-	378.0
Cooling Energy	-	-	
Total	1,454	3.0	
Savings:			
Total (%)	33.3%	0.0%	47.9%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	64	64	[illegible]	[illegible]	668	[illegible]
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50	[illegible]	[illegible]	0	[illegible]
Unit Off	☐	☐	off	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides

		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☑	0		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)

	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	[illegible]	[illegible]

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	668	0	668
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	0	0	0
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,850	3,850
[illegible]	[illegible]	[illegible]

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ	occ
un	un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	168	(occupied, occupied setback)
Unoccupied	0	(unoccupied setback, off, random)
Total	168	

From:
To:

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

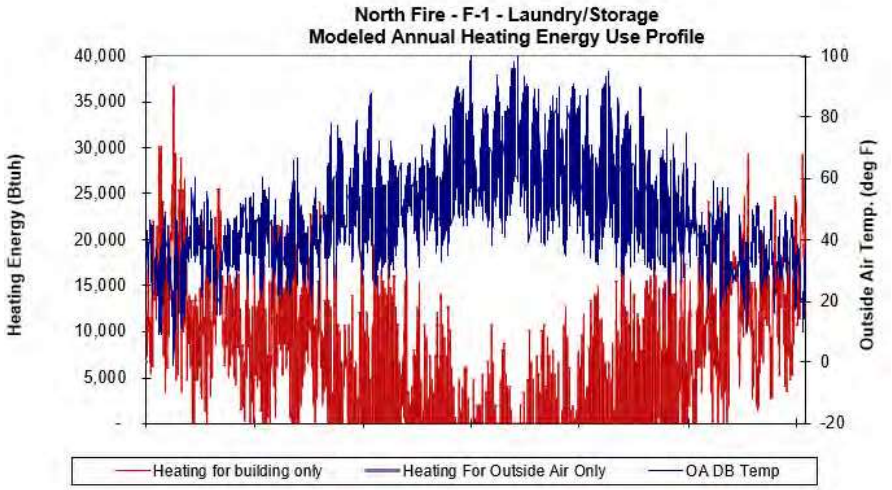
From: 6
To: 22

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


North Fire - F-1 - Laundry/Storage
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-1 - Laundry/Storage
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend Efficiency
Measure:	BFN M1
Unit Data: (Graphs Title)	North Fire - F-2 - Meeting Room
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

49.8%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
115.7%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
13.4%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☐
Cooling (Sensible Only)	☑

2. Data Source

Logged ☐ Design ◉

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently		☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	0.56 kW	0.56 kW	
Airflow data			
Total Supply Airflow	1,905 cfm	1,905 cfm	
			Show/Hide Tab ---> ☐
Occupied			
OA MIN flow rate	286 cfm	286 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate			
OA %			
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate			
OA %			
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,336	6.7	
Heating Energy	-	-	410.1
Cooling Energy	2,910	33.7	
Total	5,246	40.4	
Proposed:			
Fan Energy	1,315	6.7	
Heating Energy	-	-	240.5
Cooling Energy	2,215	36.6	
Total	3,530	43.3	
Savings:			
Total (%)	32.7%	-7.1%	41.4%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Point's (F) Baseline	Heating Balance Point's (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	53	54	59	56	751	1,167
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	54	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	64	68	72	72

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	286	286
stby	0	0
un	0	0
off	0	0
mal	0	

SourceData Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,138	388	751
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,378	211	1,167
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,160	1,123
Cooling	1,045	937

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	80	(occupied, occupied setback)
Unoccupied	88	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

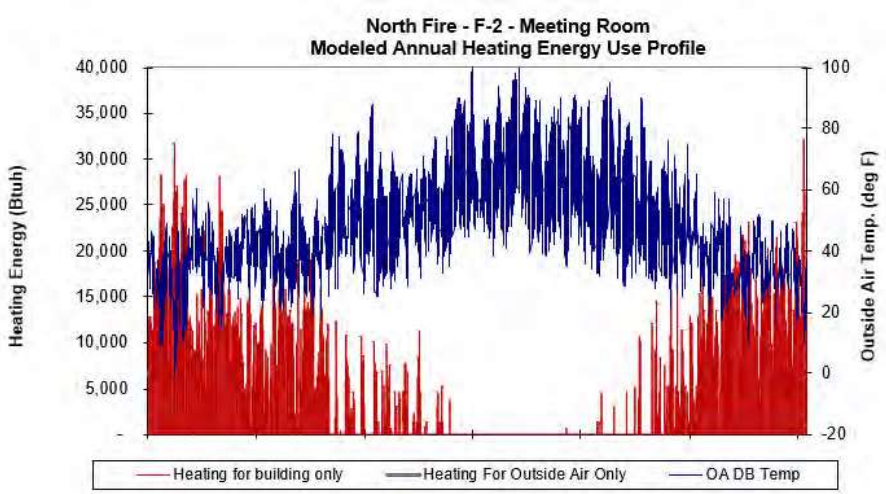
Occupied	45	(occupied, occupied setback)
Unoccupied	123	(unoccupied setback, off, random)
Total	168	

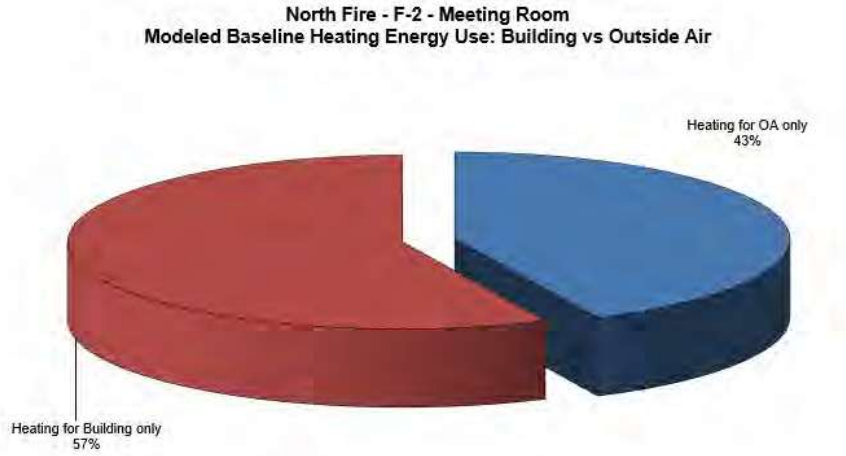
From: 8
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


North Fire - F-2 - Meeting Room
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
Outside Air Temp. (deg F)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-2 - Meeting Room
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
43%
Heating for Building only
57%

AHU 3

Project:	City of Bend Efficiency
Measure:	BEN M1
Unit Data: (Graphs Title)	North Fire - F-3 - Police/Lobby
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

49.5%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
115.5%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
35.4%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	86%	86%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,800 cfm	1,800 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	270 cfm	270 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm		
OA %	0.0%		
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,565	6.7	
Heating Energy	-	-	655.7
Cooling Energy	2,362	33.0	
Total	4,927	39.7	
Proposed:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	668.7
Cooling Energy	3,624	34.4	
Total	6,690	41.1	
Savings:			
Total (%)	-35.8%	-35.5%	-2.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	53	54	55	56	752	1,087
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	50	50	60	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	67	68	74	74

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	270	270
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,138	387	752
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,256	168	1,087
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,258	1,786
Cooling	1,257	848

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	88	(occupied, occupied setback)
Unoccupied	80	(unoccupied setback, off, random)
Total	168	

From: 6
To: 18

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	occ	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Thursday	5	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	occ	occ	occ	occ
Saturday	7	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Proposed

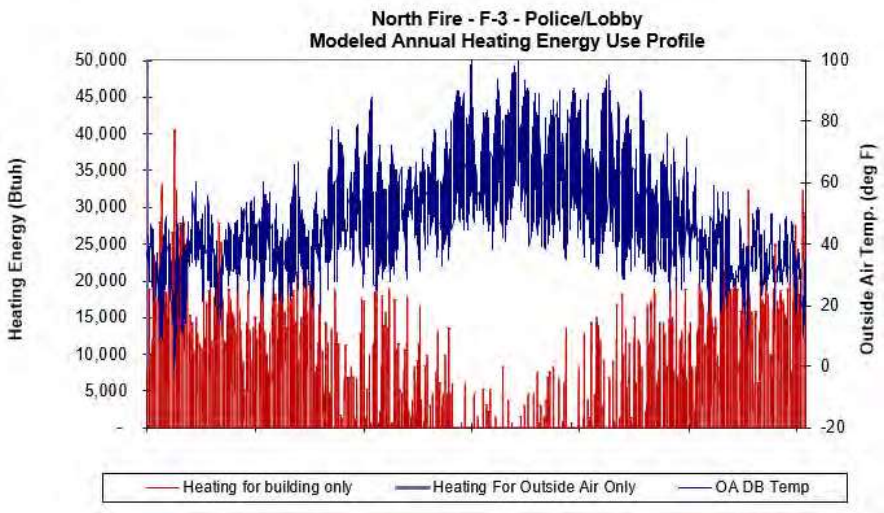
Weekly Hours Summary

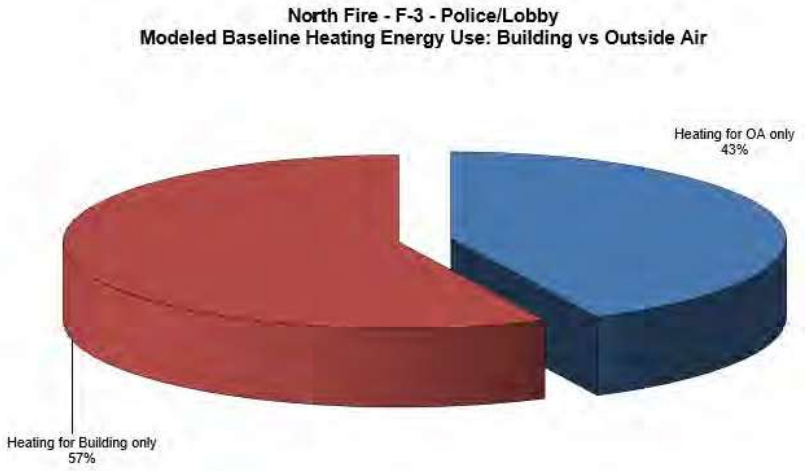
Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

From: 7
To: 22

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un


North Fire - F-3 - Police/Lobby
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-3 - Police/Lobby
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
43%
Heating for Building only
57%

AMERESCO
Green • Clean • Sustainable

AHU 4

Project:	City of Bend Efficiency
Measure:	BEN M1
Unit Data: (Graphs Title)	North Fire - F-4 - Dorms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block

Dynamic

Energy Calcs Program Warnings

53.3%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
116.8%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
38.8%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only) ☑
Cooling (Sensible Only) ☑

2. Data Source

Logged ○
Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,980 cfm	1,980 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	297 cfm	297 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,595	6.7	
Heating Energy	-	-	832.3
Cooling Energy	3,503	34.5	
Total	7,098	41.2	
Proposed:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	755.0
Cooling Energy	3,854	35.9	
Total	7,125	42.6	
Savings:			
Total (%)	-0.4%	-3.4%	9.3%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	53	54	57	56	721	1,127
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	53	53	65	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	66	66	75	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	297	297
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,138	418	721
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,314	186	1,127
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,605	2,262
Cooling	1,288	1,205

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	123	(occupied, occupied setback)
Unoccupied	45	(unoccupied setback, off, random)
Total	168	

From: 6
To: 21

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

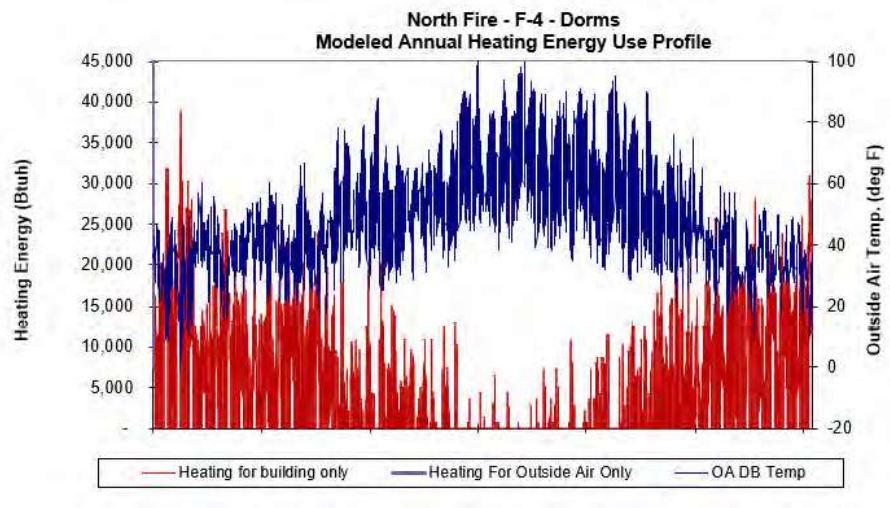
From: 6
To: 22

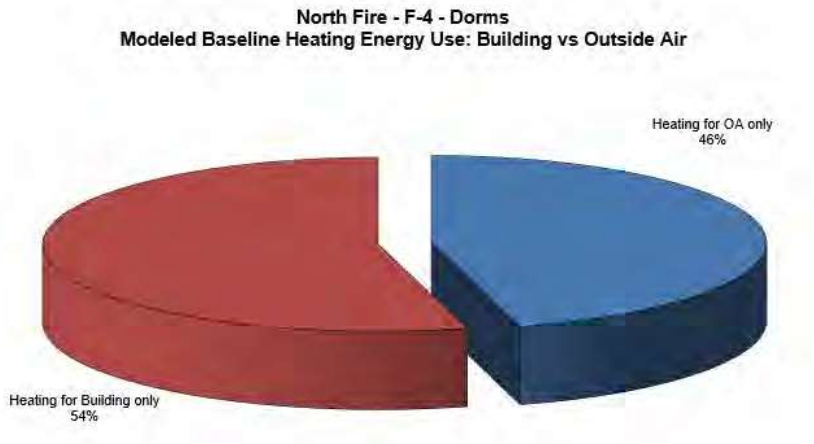
		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


North Fire - F-4 - Dorms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-4 - Dorms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
46%
Heating for Building only
54%

AHU 5

Project:	City of Bend
Measure:	BFN M1
Unit Data: (Graphs Title)	North Fire - F-5 - Kitchen/Entertainment
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

46.2%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
115.4%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
2.7%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	283%	283%	
Peak Cooling Capacity	47,500 Btuh	47,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,605 cfm	1,605 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	241 cfm	241 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
OA MIN flow rate			
OA %			
OA % (override)			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
OA MIN flow rate			
OA %			
OA % (override)			

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,328	6.7	
Heating Energy	-	-	751.1
Cooling Energy	3,454	29.9	
Total	6,783	36.6	
Proposed:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	715.2
Cooling Energy	2,902	27.5	
Total	6,173	34.2	
Savings:			
Total (%)	9.0%	6.6%	4.8%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	53	56	770	867
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	53	53	57	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	74	72

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	241	241
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,112	343	770
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,011	144	867
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,748	2,111
Cooling	1,640	1,590

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	114	(occupied, occupied setback)
Unoccupied	54	(unoccupied setback, off, random)
Total	168	

From: 6
To: 21

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Proposed

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

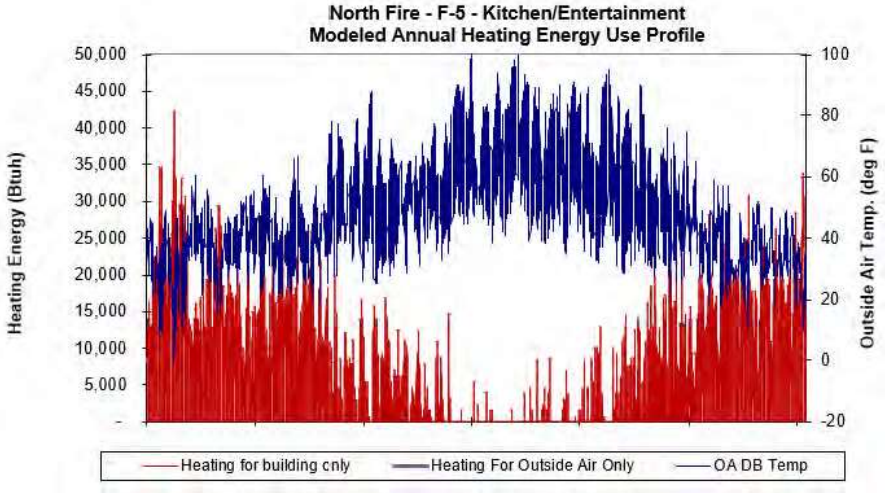
From: 6
To: 22

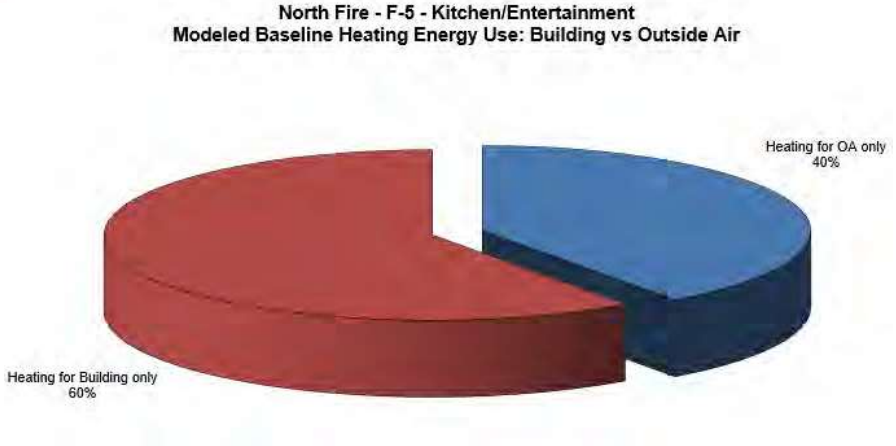
Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un

"Page content is subject to Confidentiality Restrictions"


North Fire - F-5 - Kitchen/Entertainment
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-5 - Kitchen/Entertainment
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
40%
Heating for Building only
60%

AMERESCO
Green • Clean • Sustainable

AHU 6

Project:	City of Bend
Measure:	BFN M1
Unit Data: (Graphs Title)	North Fire - F-6 - Gym/Lockers
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

42.1%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
110.4%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
38.8%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	93,000 Btu/h	93,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	286%	286%	
Peak Cooling Capacity	56,500 Btuh	56,500 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,840 cfm	1,840 cfm	
			Show/Hide Tab ==> ☐
Occupied			
OA MIN flow rate	276 cfm	276 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)	15.0%	15.0%	
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,066	6.7	
Heating Energy	-	-	621.7
Cooling Energy	4,034	36.1	
Total	7,100	42.8	
Proposed:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	752.0
Cooling Energy	3,994	35.3	
Total	7,265	42.0	
Savings:			
Total (%)	-2.3%	1.9%	-21.0%

4. System Conditions

Operating Modes	Baseline	Proposed
Occupied		☑
Occupied Standby	☐	☐
Unoccupied Setback	☑	☑
Unit Off	☐	☐
Baseline Malfunction	☐	

Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
occ	54	54	54	54	760	1,021
stby						
un	52	52	87	87	No Data	No Data
off						
mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	62	68	68	72

Fixed Mixed Air Temp System	☐	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
		Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	276	276
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,112	352	760
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,228	207	1,021
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,615	1,826
Cooling	1,529	1,472

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	105	(occupied, occupied setback)
Unoccupied	63	(unoccupied setback, off, random)
Total	168	

From: 6
To: 21

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un

Proposed

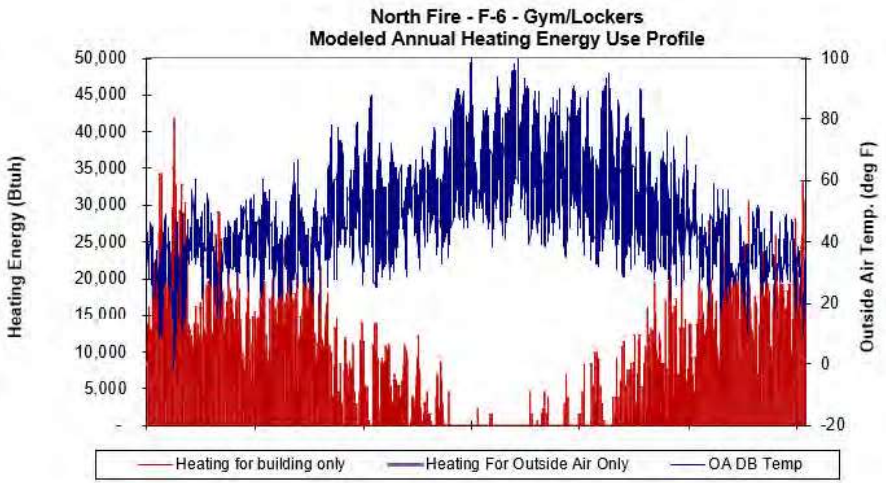
Weekly Hours Summary

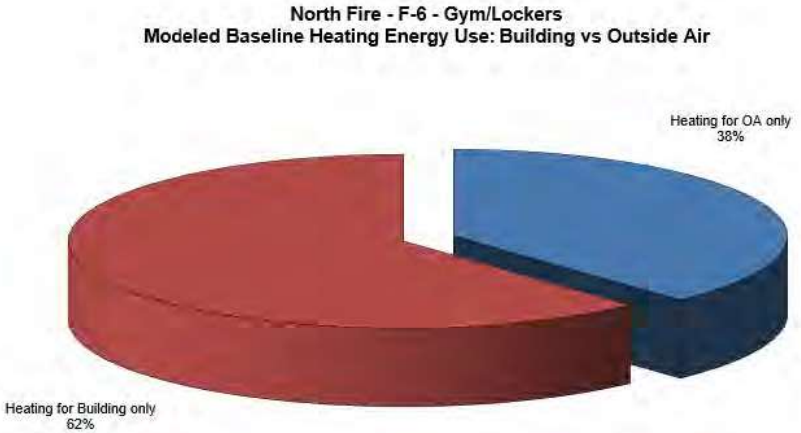
Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

From: 6
To: 21

Operating Months	
Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

		Hour																							
Weekday		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Tuesday	3	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Wednesday	4	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Thursday	5	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Friday	6	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Saturday	7	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un
Sunday	1	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un


North Fire - F-6 - Gym/Lockers
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


North Fire - F-6 - Gym/Lockers
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
38%
Heating for Building only
62%

BFT-M1

AHU 1

Project:	City of Bend
Measure:	BFT M1
Unit Data: (Graphs Title)	Fire Training Classrooms
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
100.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
15.6%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged ○ Design ●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	112,000 Btu/h	112,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	256%	256%	
Peak Cooling Capacity	48,000 Btuh	48,000 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	2,912 cfm	2,912 cfm	
Occupied			Show/Hide Tab =>> ☐
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,453	6.7	
Heating Energy	-	-	222.7
Cooling Energy	693	8.4	
Total	3,146	15.1	
Proposed:			
Fan Energy	1,462	6.7	
Heating Energy	-	-	147.3
Cooling Energy	689	10.6	
Total	2,151	17.3	
Savings:			
Total (%)	31.6%	-14.3%	33.9%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	52	54	62	56	711	337
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un	52	50	62	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides

	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)

	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	64	68	84	72

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	711	0	711
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	337	0	337
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,367	1,130
Cooling	822	747

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	84	(occupied, occupied setback)
Unoccupied	84	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

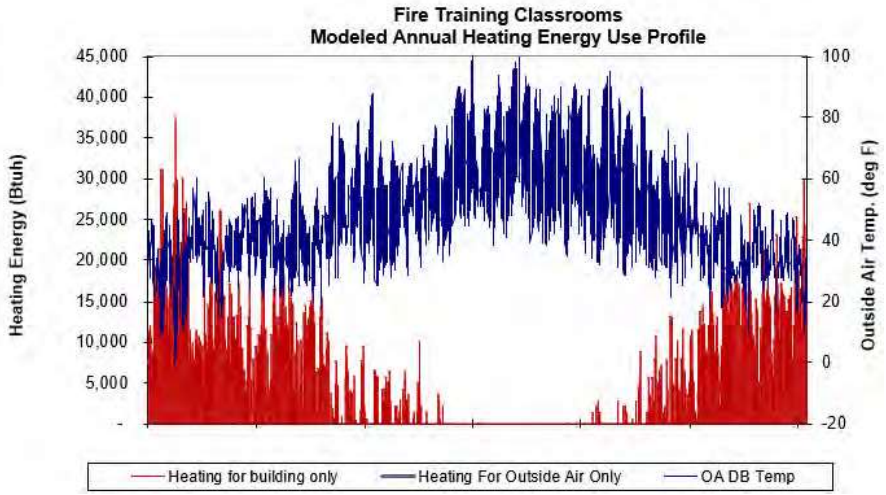
Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

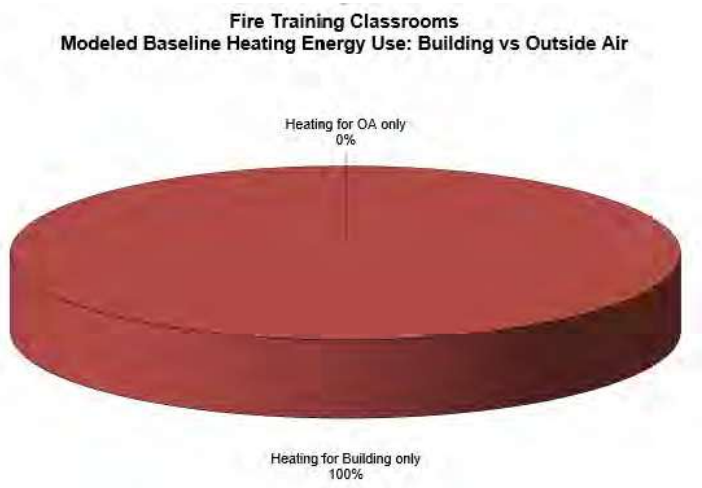
From: 7
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December


Fire Training Classrooms
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
Outside Air Temp. (deg F)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Training Classrooms
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

AMERESCO
Green • Clean • Sustainable

AHU 2

Project:	City of Bend
Measure:	BFT M1
Unit Data: (Graphs Title)	Fire Training Offices
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

0.0%	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
100.0%	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	2,453	6.7	
Heating Energy	-	-	247.6
Cooling Energy	892	9.1	
Total	3,346	15.8	
Proposed:			
Fan Energy	1,482	6.7	
Heating Energy	-	-	140.6
Cooling Energy	609	9.3	
Total	2,071	16.1	
Savings:			
Total (%)	38.1%	-1.7%	43.2%

1. Calculation Conditions

Heating (Sensible Only)	☑
Cooling (Sensible Only)	☑

2. Data Source

Logged	○
Design	●

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	112,000 Btu/h	112,000 Btu/h	output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	256%	256%	
Peak Cooling Capacity	48,000 Btuh	48,000 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	2,012 cfm	2,012 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
[illegible]			
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)
[illegible]			

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ	54	54	57	56	679	298
Occupied Standby	☐	☐	stby					No Data	No Data
Unoccupied Setback	☑	☑	un	53	50	59	60	No Data	No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides	Heating	Cooling	
Occupied Override	☐		Btu/Deg-Hr
Occupied Standby Override	☐		Btu/Deg-Hr
Unoccupied Setback Override	☐		Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point	68	68	70	72

		Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System	☐	Low			
		High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	679	0	679
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	298	0	298
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Heating	3,700	1,316
Cooling	1,209	1,089

"Page content is subject to Confidentiality Restrictions"

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	84	(occupied, occupied setback)
Unoccupied	84	(unoccupied setback, off, random)
Total	168	

From: 7
To: 20

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	50	(occupied, occupied setback)
Unoccupied	118	(unoccupied setback, off, random)
Total	168	

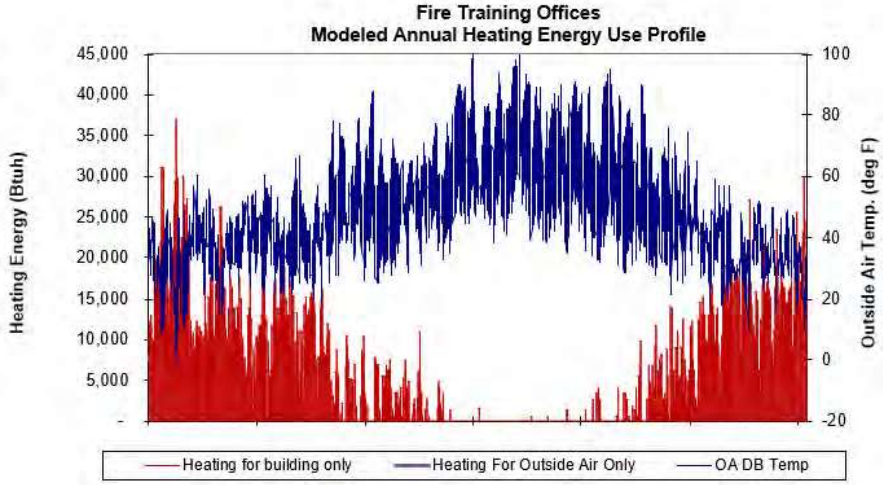
From: 7
To: 17

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"


Fire Training Offices
Modeled Annual Heating Energy Use Profile
Heating Energy (Btuh)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Outside Air Temp. (deg F)
100
80
60
40
20
0
-20
Heating for building only
Heating For Outside Air Only
OA DB Temp


Fire Training Offices
Modeled Baseline Heating Energy Use: Building vs Outside Air
Heating for OA only
0%
Heating for Building only
100%

BFH-M1

AHU 1

Project:	City of Bend
Measure:	BFH M1
Unit Data: (Graphs Title)	Fire Training Warehouse
Weather Basis:	Redmond, OR
Version	3.14

System Info. Title Color Key: Reference Block | Input Block — Dynamic

Energy Calcs Program Warnings

#DIV/0!	1. **Baseline** calc'd **OA** htg usage as a % of annualized **Source Data**
#DIV/0!	2. **Baseline** calc'd **Total** htg usage as a % of annualized **Source Data**
0.0%	3. % of annual hours **BASELINE** unit peak **HEATING** capacity exceeded
0.0%	4. % of annual hours **PROPOSED** unit peak **HEATING** capacity exceeded
0.0%	5. % of annual hours **PROPOSED** load exceeds **BASELINE** load
	6. % of **Baseline** load being satisfied by supplemental heat
	7. of **Proposed** load being satisfied by supplemental heat

1. Calculation Conditions

Heating (Sensible Only)	☐
Cooling (Sensible Only)	☑

2. Data Source

Logged / Design

3. System Data

System Characteristics	Baseline	Proposed	Additional Info./Comments
100% OA System?	☐	☐	
Heat Pump?	☐	☐	HP tab (if HP enabled for BL or PR)
Heating			
Fuel	Natural Gas	Natural Gas	Btu/gallon
Efficiency	87%	87%	(for supplemental heat if using HP)
Max Heating Capacity	112,000 Btu/h	112,000 Btu/h	(output capacity,for supplemental if using HP)
Cooling			
Efficiency (output/input)	256%	256%	
Peak Cooling Capacity	80,000 Btuh	80,000 Btuh	
Heat Recovery Device	☐	☐	
Heat Recovery Eff.			
Fan			
Fan VFD (SF and RF)	☐	☐	VFD tab (if VFD enabled for BL or PR)
Fan runs intermittently	☐	☐	
Supply Fan Power	0.56 kW	0.56 kW	
(equivalent HP)	0.75 HP	0.75 HP	
Exhst/Return Fan Power	0.00 kW	0.00 kW	
(equivalent HP)	0.00 HP	0.00 HP	
Total	**0.56 kW**	**0.56 kW**	
Airflow data			
Total Supply Airflow	1,750 cfm	1,750 cfm	
Occupied			Show/Hide Tab ==> ☐
OA MIN flow rate	0 cfm	0 cfm	Min Outside Air Calc Tab (if checked)
OA %	0.0%	0.0%	No Exhaust Requirement
OA % (override)			
Occupancy	0	0	
Occupancy (override)			(only used to calc ventilation rate below)
Ventilation Rate	0.0 cfm/pers.	0.0 cfm/pers.	(reference only, not used in calcs)
Occupied Standby			(Must select mode in System Conditions)
Unoccupied Setback			(Must select mode in System Conditions)
OA MIN flow rate	0 cfm	0 cfm	
OA %	0.0%	0.0%	
OA % (override)			
Baseline Malfunction			(Must select mode in System Conditions)

Results (Annual)

	kWh	kW	Therms
Baseline:			
Fan Energy	3,270	6.7	
Heating Energy	-	-	-
Cooling Energy	3,919	40.4	
Total	7,190	47.1	
Proposed:			
Fan Energy	2,044	6.7	
Heating Energy	-	-	-
Cooling Energy	3,377	40.4	
Total	5,421	47.1	
Savings:			
Total (%)	24.6%	0.0%	0.0%

4. System Conditions

Operating Modes	Baseline	Proposed	Schedule Key	Heating Balance Points (F) Baseline	Heating Balance Points (F) Proposed	Cooling Balance Points (F) Baseline	Cooling Balance Points (F) Proposed	Building Btu/Deg-Hr Heating	Building Btu/Deg-Hr Cooling
Occupied		☑	occ			60	60		1,500
Occupied Standby	☐	☐	stby						
Unoccupied Setback	☑	☑	un			59	59		No Data
Unit Off	☐	☐	off						
Baseline Malfunction	☐		mal						

*Note: Btu/h is calculated on the "Energy Calcs" tab as follows: Btu/h = Building Btu/Deg-Hr * (Balance Pt - OAT)*

Building Btu/Deg-Hr Overrides		Heating	Cooling	
Occupied Override	☐			Btu/Deg-Hr
Occupied Standby Override	☐			Btu/Deg-Hr
Unoccupied Setback Override	☐			Btu/Deg-Hr

Space Set Points (Htg/Clg the Outside Air)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed	Cooling Set Points (F) Baseline	Cooling Set Points (F) Proposed
Occupied Space Set point			80	80

	Reset Sched.	OAT (F)	Heating Set Points (F) Baseline	Heating Set Points (F) Proposed
Fixed Mixed Air Temp System ☐	Low			
	High			

5. System Operating Schedules

Proceed to Schedules tab

6. Weather Input

Proceed to Energy Calcs tab

Collected Outside Air Information

	Airflows (CFM) Baseline	Airflows (CFM) Proposed
occ	0	0
stby	0	0
un	0	0
off	0	0
mal	0	

Source Data Load Breakdown

Htg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	0	0	0
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Clg (Btu/deg-Hr)	Total	OA	Bldg Only
occ	1,500	0	1,500
stby	No Data	N/A	use override
un	No Data	N/A	use override
off	No Data	N/A	use override
mal	No Data	N/A	use override

Operating DD	Total	Occ
Cooling	984	949

"Page content is subject to Confidentiality Restrictions"

AMERESCO
Green • Clean • Sustainable

Selected Oper. Modes	
Baseline	Proposed
occ un	occ un

5. System Operating Schedules:

Baseline

Weekly Hours Summary

Occupied	112	(occupied, occupied setback)
Unoccupied	56	(unoccupied setback, off, random)
Total	168	

From: 8
To: 18

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

Proposed

Weekly Hours Summary

Occupied	70	(occupied, occupied setback)
Unoccupied	98	(unoccupied setback, off, random)
Total	168	

From: 6
To: 21

Weekday		Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	2	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Tuesday	3	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Wednesday	4	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Thursday	5	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Friday	6	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Saturday	7	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un
Sunday	1	un	un	un	un	un	un	un	un	occ	occ	occ	occ	occ	occ	occ	occ	occ	occ	un	un	un	un	un	un

Operating Months

Index	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

"Page content is subject to Confidentiality Restrictions"

Appendix B – Lighting Studies

AMERESCO
Green • Clean • Sustainable

Project Name	City of Bend OR - Part I
Date	July 19, 2018

Note to subcontractor: Remember to take power measurements on the existing and as-built lights according to the guidelines provided by Ameresco unless specifically instructed in writing not to.

Version 3.09

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (fm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
1	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 1 || Lower level open Warehouse	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	13				Upgrade Fixtures	Ave: 28.6 || 14, 25, 19; Between , 36,	0.75	2,738	2,064	7.54	$30	Noah: Difficult, add 50% because: A lot of pipe to maneuver around Lac.Color: Painted Ceil ht: 14 || lens dim: 6.5x4 ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	13				0.31	2,738	854	3	$5		1,210
2	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 1 || Lower level open Warehouse	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12				Upgrade Fixtures & Controls	Ave: 28.6 || 14, 25, 19; Between , 36,	0.70	2,738	1,906	7	$28	Noah: Difficult, add 50% because: A lot of pipe to maneuver around Lac.Color: Painted Ceil ht: 14 || lens dim: 6.5x4 ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	12		Fixture Mount PIR for 9-15' mounting	12	0.29	2,327	670	3	$4		1,235
3	Water Reclaim	Headworks Building || Fixture no: 2 || Lower level open	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	
4	Water Reclaim	Headworks Building || Fixture no: 3 || Lower level open	HALBUG	Existing Halogen BugEye	4				Upgrade Fixtures	none taken	0.12	355	43		$1	Noah: || || Auditor Suggests: Do Nothing	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
5	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 4 || Dumpster room 1 Warehouse	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	2,738	794	3	$12	Noah: Lac.Color: White Ceil ht: 12 || These are bracket mounted lens dim: 11.5x4" || Socket % damaged: 25 Fix	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	2,738	329	1	$2		465
6	Water Reclaim	Headworks Building || Fixture no: 5 || Dumpster room 1	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
7	Water Reclaim	Headworks Building || Fixture no: 6 || Dumpster room 1	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
8	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 7 || Dumpster room 2	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	2,738	794	3	$12	Noah: Lac.Color: White Ceil ht: 12 || lens dim: 11.5x4" || Socket % damaged: 25 Fix Color: White Conduit:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	2,738	329	1	$2		465
9	Water Reclaim	Headworks Building || Fixture no: 8 || Dumpster room 2	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
10	Water Reclaim	Headworks Building || Fixture no: 9 || Dumpster room 2	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
11	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 10 || Floor 1 RR Restroom	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	2,738	159	1	$2	Noah: Lac.Color: White || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,327	56	0	$0		103
12	Water Reclaim	Headworks Building Floor: 1 || Fixture no: 11 || Main entry Hallway	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	2,738	794	3	$12	Noah: Lac.Color: Painted Ceil ht: 12 || See mounting photos || Socket % damaged: 24 Fix Color: White Conduit:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	2,738	329	1	$2		465
13	Water Reclaim	Headworks Building Floor: 2 || Fixture no: 12 || Pre pump room IT/Mech/Elec	EH8HPS400	Existing High Bay Fixture High Pressure Sodium 400 watts	8				Upgrade Fixtures & Controls	Ave: 54.8 || 65, 54, 48, 42, 65	3.71	2,738	10,163	37	$32	Noah: Difficult, add 100% because: Tall fixtures no way to get lift in needs scaffolding Lac.Color: White Ceil ht: 35	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Cricn VTOD1 with integ sensor	8		Sensor comes integrated into each fixture	8	1.88	2,327	4,375	19			5,788
14	Water Reclaim	Headworks Building || Fixture no: 13 || Pre pump room	HALBUG	Existing Halogen BugEye	5				Upgrade Fixtures	none taken	0.15	355	53		$2	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	5				0.02	355	5				48
15	Water Reclaim	Headworks Building || Fixture no: 15 || Pre pump room	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
16	Water Reclaim	Headworks Building Floor: 2 || Fixture no: 14 || Control room Office (Private)	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	Ave: 43.6 || 45, 44, 47, 42, 40	0.23	2,738	635	2	$9	Noah: Lac.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,327	223	1	$1		412
17	Water Reclaim	Headworks Building || Fixture no: 16 || Exterior Exterior (Perimeter)	EWHPS70	Existing Wall Pack High Pressure Sodium 70 watt Lamp	10				Upgrade Fixtures	none taken	0.91	4,380	3,986		$60	Noah: Lac.Color: Painted || Bad photocell, Remote photocell, Eight fixtures not working || Fix Color:	NXTWLED30P	New Cooper Crosstour LED Wallpack, 25 watts, 2710lm + Photocell	10				0.26	4,380	1,139				2,847
18	Water Reclaim	22b Floor: 1 || Fixture no: 17 || Electrical	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	Ave: 39 || 33, 42, 40, 41, 39	0.23	2,738	635	2	$9	Noah: Lac.Color: White Ceil ht: 20 || || Socket % damaged: 0 Fix Color: White Conduit: Flex color: Silver/Galv. Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	2,738	263	1	$1		372
19	Water Reclaim	22b || Fixture no: 18 || Electrical	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
20	Water Reclaim	22b || Fixture no: 19 || Electrical	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
21	Water Reclaim	22b Floor: 1 || Fixture no: 20 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures	none taken	0.58	2,738	1,588	6	$23	Noah: Lac.Color: White Ceil ht: 20 || || Socket % damaged: 0 Fix Color: White Conduit: Flex color: Silver/Galv. Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10				0.24	2,738	657	2	$4		931
22	Water Reclaim	22b || Fixture no: 21 || Pump room	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
23	Water Reclaim	22b || Fixture no: 22 || Pump room	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
24	Water Reclaim	22a Floor: 1 || Fixture no: 23 || Electrical	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	2,738	635	2	$9	Noah: Lac.Color: White Ceil ht: 20 || || Socket % damaged: 0 Fix Color: White Conduit: Flex color: Silver/Galv. Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	2,738	263	1	$1		372
25	Water Reclaim	22a || Fixture no: 24 || Electrical	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
26	Water Reclaim	22a || Fixture no: 25 || Electrical	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
27	Water Reclaim	22a Floor: 1 || Fixture no: 26 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures	none taken	0.35	2,738	953	3	$14	Noah: Lac.Color: White Ceil ht: 20 || || Socket % damaged: 0 Fix Color: White Conduit: Flex color: Silver/Galv. Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	2,738	394	1	$2		559
28	Water Reclaim	22a || Fixture no: 27 || Pump room	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
29	Water Reclaim	22a || Fixture no: 28 || Pump room	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
30	Water Reclaim	Solids handling || Fixture no: 29 || Polymer Room Warehouse	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	Ave: 22.6 || 22, 24, 26, 21, 20	0.29	2,738	794	3	$12	Noah: Lac.Color: Painted Ceil ht: 10 || Replace 2 fixtures || Socket % damaged: 25 Fix Color: White Conduit:	NVT4-47	New Vapcrt Tight LED 1x4, 47w, 4686lm	5		(2) Wireless Wall PIR with 2 PowPaks	1	0.24	2,327	547	2			247
31	Water Reclaim	Solids handling || Fixture no: 30 || Polymer Room	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19

AMERESCO
Green • Clean • Sustainable

Site Information			Existing															Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
32	Water Reclaim	Solids handling ‖ Fixture no: 31 ‖ GBT BAY Storage (active)	EHBMH400	Existing High Bay Fixture Metal Halide 400 watts	13				Upgrade Fixtures & Controls	Ave: 34.8 ‖ 36, 32, 34, 34, 38 Closest to door	5.95	2,738	16,302	60	$52	Noah: Difficult, add 100% because: Will only be able to use lift on 5 Loc.Color: Painted Cell ht: 30 ‖ Will need	NHBLED110J	New LED 2x2 High Bay 16486 Lumens 110w - James ZYH2 with lens	13		Fixture Mount PIR for high mounting	13	1.30	2,327	3,025	13			13,277
33	Water Reclaim	Solids handling ‖ Fixture no: 32 ‖ GBT BAY	EFLHPS150	Existing Flood Fixture High Pressure Sodium 150 watt Lamp	3				Upgrade Fixtures	none taken	0.56	2,738	1,544	6	$12	Noah: Loc.Color: Painted ‖ ‖ Fix Color: Bronze Conduit: Flex color: Painted Length: 3 Size: 1 in Auditor	NFLED52	New LED Flood, Rab FFLED52 Flood, 54 watts	3				0.16	2,738	444	2			1,101
34	Water Reclaim	Solids handling ‖ Fixture no: 33 ‖ GBT BAY	HALBUG	Existing Halogen BugEye	5				Upgrade Fixtures	none taken	0.15	355	53		$2	Noah: ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	5				0.02	355	5				48
35	Water Reclaim	Solids handling ‖ Fixture no: 34 ‖ Electrical room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	Ave: 36.4 ‖ 38, 40, 36, 34, 34	0.23	2,327	540	2	$8	Noah: Loc.Color: Painted Cell ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,327	223	1	$1		317
36	Water Reclaim	Solids handling ‖ Fixture no: 35 ‖ Electrical room	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
37	Water Reclaim	Solids handling ‖ Fixture no: 36 ‖ Truck bay Warehouse	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.35	2,738	953	3	$14	Noah: Loc.Color: Painted Cell ht: 14 ‖ ‖ Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black Noah: Loc.Color: Painted ‖ ‖ Fix	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Fixture Mount PIR for 9-15' mounting	6	0.14	2,327	335	1	$2		618
38	Water Reclaim	Solids handling ‖ Fixture no: 37 ‖ Truck bay	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Color: Gray Conduit: EMT color: Silver/Galv. Length: 15 ea Size: 3/4	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
39	Water Reclaim	Solids handling ‖ Fixture no: 38 ‖ Exterior Exterior (Perimeter)	EWLED20	Existing Wallpack LED 20 watts	5				Remain As Is	none taken	0.10	4,380	438		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	5				0.10	4,380	438		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
40	Water Reclaim	Digester complex Floor: 1 ‖ Fixture no: 39 ‖ Digester 3 mech IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	42		Already Controlled	1	Upgrade Fixtures	Ave: 34 ‖ 38, 34, 33, 32, 33	2.44	2,327	5,669	24	$57	Noah: Difficult, add 100% because: A lot to get around Loc.Color: Painted Cell ht: 16 ‖ ‖ Socket % damaged: 25	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	42		Already Controlled	1	1.01	2,327	2,346	10	$15		3,323
41	Water Reclaim	Digester complex ‖ Fixture no: 40 ‖ Digester 3 mech	HALBUG	Existing Halogen BugEye	4				Upgrade Fixtures	none taken	0.12	355	43		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
42	Water Reclaim	Digester complex Floor: 1 ‖ Fixture no: 41 ‖ Digester 3 older mech	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	21		Already Controlled	1	Upgrade Fixtures	none taken	1.22	2,327	2,835	12	$43	Noah: Difficult, add 100% because: A lot to get around Loc.Color: Painted Cell ht: 16 ‖ ‖ Socket % damaged: 25	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	21		Already Controlled	1	0.50	2,327	1,173	5	$8		1,662
43	Water Reclaim	Digester complex ‖ Fixture no: 42 ‖ Digester 3 older mech	HALBUG	Existing Halogen BugEye	4				Upgrade Fixtures	none taken	0.12	355	43		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
44	Water Reclaim	Digester complex Floor: 1 ‖ Fixture no: 43 ‖ Digester 3 electrical IT/Mech/Elec	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	none taken	0.28	2,327	675	3	$10	Noah: Difficult, add 100% because: A lot to get around Loc.Color: Painted Cell ht: 16 ‖ ‖ Socket % damaged: 25	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.12	2,327	279	1	$2		396
45	Water Reclaim	Digester complex ‖ Fixture no: 44 ‖ Digester 3 electrical	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
46	Water Reclaim	Digester complex Floor: 1 ‖ Fixture no: 45 ‖ Digester 3 has room	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.46	2,738	1,270	5	$19	Noah: Difficult, add 100% because: A lot to get around Loc.Color: Painted Cell ht: 16 ‖ Covers on every tube	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		(2) Wireless Wall PIR with 2 PowPaks	1	0.19	2,327	447	2	$2		824
47	Water Reclaim	Digester complex ‖ Fixture no: 46 ‖ Digester 3 has room	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
48	Water Reclaim	Digester complex ‖ Fixture no: 47 ‖ Exterior Exterior (Perimeter)	EFHPS250	Existing Fixture High Pressure Sodium 250 watt Lamp	8				Upgrade Fixtures	none taken	2.36	4,380	10,337		$48	Noah: Loc.Color: Painted ‖ Poor light ‖ Fix Color: Gray Mounting: 4 in round pole length: dim: color: JST: order	NCHLED95	New AEL LED CobraHead 95 watts ATBM, 11,500 Lumen	8				0.76	4,380	3,329				7,008
49	Water Reclaim	Digester complex ‖ Fixture no: 48 ‖ Exterior	EFLHPS400	Existing Flood Fixture High Pressure Sodium 400 watt Lamp	6				Upgrade Fixtures	none taken	2.78	4,380	12,194		$36	Noah: Difficult, add 100% because: Top of building ‖ Three of these pictures are on 2 inch round metal poles	NFLED150	New LED Flood, Rab FXLED150, 155 watts	6				0.93	4,380	4,073				8,121
50	Water Reclaim	Digester complex ‖ Fixture no: 49 ‖ Exterior	EWLED20	Existing Wallpack LED 20 watts	3				Remain As Is	none taken	0.06	4,380	263		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	3				0.06	4,380	263		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
51	Water Reclaim	Filter/reuse building ‖ Fixture no: 50 ‖ Filter room Warehouse	EHBHPS250	Existing High Bay Fixture High Pressure Sodium 250 watts	25				Upgrade Fixtures & Controls	Ave: 31.4 ‖ 30, 30, 28, 25, 44	7.38	2,738	20,193	74	$101	Noah: Difficult, add 50% because: Tight areas Loc.Color: Cream/Beige ‖ ‖ Fix Color: White Conduit: WireMold color:	NHBLED110J	New LED 2x2 High Bay 16486 Lumens 110w - James ZYH2 with lens	25		Fixture Mount PIR for high mounting	25	2.50	2,327	5,818	25			14,375
52	Water Reclaim	Filter/reuse building ‖ Fixture no: 51 ‖ Filter room	EXLED	Existing LED Exit Sign	5				Remain As Is	none taken	0.03	8,760	263		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	5				0.03	8,760	263		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
53	Water Reclaim	Filter/reuse building ‖ Fixture no: 52 ‖ Filter room	HALBUG	Existing Halogen BugEye	5				Upgrade Fixtures	none taken	0.15	355	53		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	5				0.02	355	5				48
54	Water Reclaim	Filter/reuse building ‖ Fixture no: 53 ‖ Filter room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.17	2,738	476	2	$7	Noah: ‖ ‖ Fix Color: Painted Conduit: WireMold color: Black Length: 2 Size: 1/2 1 – Standard Toggle ‖ Ivory switch	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	2,327	168	1	$1		309
55	Water Reclaim	Filter/reuse building ‖ Fixture no: 54 ‖ Electrical room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures & Controls	none taken	0.58	2,738	1,588	6	$23	Noah: Loc.Color: White Cell ht: 12 ‖ One s ballasted ‖ Socket % damaged: 25 Fix Color: White Conduit: WireMold	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.24	2,327	559	2	$3		1,029
56	Water Reclaim	Filter/reuse building ‖ Fixture no: 55 ‖ Exterior Exterior (Perimeter)	ECFLP222	Existing Pin Based CFL Lamps 2L 22 watts	8				Upgrade Fixtures	none taken	0.40	4,380	1,752		$47	Noah: Loc.Color: Brick ‖ Photocell/motion sensor on fixture ‖ Fix Color: Bronze Auditor Suggests:	NXTWLED30P	New Cooper Crosstour LED Wallpack, 25 watts, 2710lm+ Photocell	8				0.21	4,380	911				841
57	Water Reclaim	Portable water pump station ‖ Fixture no: 56 ‖ Main IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.35	2,738	953	3	$14	Noah: Loc.Color: Painted Cell ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Existing control: None	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, DT, 1 pole	1	0.14	2,327	335	1	$2		618
58	Water Reclaim	Portable water pump station ‖ Fixture no: 57 ‖ Exterior	EWHPS70	Existing Wall Pack High Pressure Sodium 70 watt Lamp	1				Upgrade Fixtures	none taken	0.09	4,380	399		$6	Noah: Loc.Color: Brick ‖ ‖ Fix Color: Bronze Auditor Suggests: Replace	NXTWLED30P	New Cooper Crosstour LED Wallpack, 26 watts, 2710lm+ Photocell	1				0.03	4,380	114				285
59	Water Reclaim	Kerri building ‖ Fixture no: 58 ‖ Entry Hallway	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	Ave: 41 ‖ 40, 42, . .	0.09	2,738	233	1	$3	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.04	2,327	84	0	$0		149
60	Water Reclaim	Kerri building ‖ Fixture no: 59 ‖ Main hall Hallway	ECFLP18	Existing CFL Pin Based 18 watt Lamp(s)	5				Upgrade Fixtures & Controls	none taken	0.11	2,738	301	1	$16	Noah: Loc.Color: White Cell ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	RTS-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	5		Wall Switch Sensor, PIR, 1 pole	1	0.04	2,327	93	0			208
61	Water Reclaim	Kerri building ‖ Fixture no: 64 ‖ Main hall	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
62	Water Reclaim	Kerri building ‖ Fixture no: 60 ‖ Conference room Conference / Meeting	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12		Already Controlled	1	Upgrade Fixtures	none taken	1.02	2,327	2,374	10	$30	Noah: Loc.Color: White Cell ht: 10 ‖ Only two fixtures are emergency ballast did the rest or single ballast ‖ Socket	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	12		Already Controlled	1	0.43	2,327	1,005	4	$7		1,368
63	Water Reclaim	Kerri building ‖ Fixture no: 61 ‖ Conference room	ECFLP18	Existing CFL Pin Based 18 watt Lamp(s)	9				Upgrade Fixtures	none taken	0.20	2,738	542	2	$28	Noah: ‖ ‖ 1 – Dimming (Manual) ‖ Auditor Suggests: Retrofit	RTS-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	9				0.07	2,738	197	1			345
64	Water Reclaim	Kerri building ‖ Fixture no: 62 ‖ Conference room	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
65	Water Reclaim	Kerri building || Fixture no: 63 || Sprinkler riser room Storage (active)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	251	15	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	188	5	0	$0		10
66	Water Reclaim	Kerri building || Fixture no: 65 || JC Storage (inactive)	EDFLP18	Existing CFL Pin Based 18 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.02	251	6	0	$1	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	188	2	0			4
67	Water Reclaim	Kerri building || Fixture no: 66 || AC	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	2,738	115	0	$4	Noah: Loc.Color: Painted || || Socket % damaged: 25 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,327	56	0	$0		59
68	Water Reclaim	Kerri building || Fixture no: 67 || RRM Storage (inactive)	EDFLP18	Existing CFL Pin Based 18 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.02	251	6	0	$1	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	188	2	0			4
69	Water Reclaim	Kerri building || Fixture no: 69 || RRM	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	2,738	115	0	$4	Noah: Loc.Color: Painted || || Socket % damaged: 25 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 2 pole	1	0.02	2,327	56	0	$0		59
70	Water Reclaim	Kerri building || Fixture no: 68 || RRW Storage (inactive)	EDFLP18	Existing CFL Pin Based 18 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.02	251	6	0	$1	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	188	2	0			4
71	Water Reclaim	Kerri building || Fixture no: 70 || RRW	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	2,738	115	0	$4	Noah: Loc.Color: Painted || || Socket % damaged: 25 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,327	56	0	$0		59
72	Water Reclaim	Kerri building || Fixture no: 71 || Open office	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		Already Controlled	1	Upgrade Fixtures	none taken	0.68	2,327	1,583	7	$20	Noah: Loc.Color: White Ceil ht: 10 || Plenum 1 is e ballasted || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8		Already Controlled	1	0.29	2,327	670	3	$4		912
73	Water Reclaim	Kerri building || Fixture no: 73 || Open office	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
74	Water Reclaim	Kerri building || Fixture no: 74 || office 4	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,327	396	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,327	168	1	$1		228
75	Water Reclaim	Kerri building || Fixture no: 75 || office 3	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,327	396	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,327	168	1	$1		228
76	Water Reclaim	Kerri building || Fixture no: 78 || Exterior	EDFLP18	Existing CFL Pin Based 18 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.11	4,380	482		$24	Noah: Loc.Color: Brick || Please verify could not open have the wrong kind of tamperproof || Remote Photo cell	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	5				0.05	4,380	219		$1		263
77	Water Reclaim	Kerri building || Fixture no: 76 || office 2	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,327	396	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum 1 is e ballasted || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,327	168	1	$1		228
78	Water Reclaim	Kerri building || Fixture no: 77 || office 1	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,327	396	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,327	168	1	$1		228
79	Water Reclaim	Main office building || Fixture no: 79 || Entry Hallway	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	7				Upgrade Fixtures & Controls	Ave: 35,666666666 6667 || 38, 35,	0.22	2,738	613	2	$13	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 || Full of bugs || Socket % damaged:	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	7		(1) Wireless Ceiling PIR with 1 PowPak	1	0.08	2,327	195	1	$1		418
80	Water Reclaim	Main office building || Fixture no: 80 || Entry	ELEDLAMP9	Existing LED Lamp 9 watts	8				Remain As Is	none taken	0.07	2,738	197	1	$0	Noah: || || Fix Color: White 2 – Standard Toggle || Black switch w/ Silver plate.. Existing control: None	ELEDLAMP9	Existing LED Lamp 9 watts	8				0.07	2,738	197	1	$0	Noah: || || Fix Color: White 2 – Standard Toggle || Black switch w/ Silver plate.. Existing control: None	
81	Water Reclaim	Main office building || Fixture no: 81 || Main hall Hallway	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	Ave: 26.4 || 24, 25, 28, 30, 27	0.29	2,327	675	3	$10	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.12	2,327	279	1	$2		396
82	Water Reclaim	Main office building || Fixture no: 82 || Main hall	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	
83	Water Reclaim	Main office building || Fixture no: 100 || Main hall	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	2,738	318	1	$5	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: Black Auditor Suggests: Replace	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	2,738	131	0	$1		186
84	Water Reclaim	Main office building || Fixture no: 83 || Supply closet Storage (active)	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.06	251	16	1	$1	Noah: Loc.Color: White Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.02	188	5	0	$0		12
85	Water Reclaim	Main office building || Fixture no: 84 || Lab1	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	24		Already Controlled	1	Upgrade Fixtures	Ave: 48.8 || 44, 47, 46, 59, 48	1.39	2,327	3,240	14	$49	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	24		Already Controlled	1	0.58	2,327	1,341	6	$9		1,899
86	Water Reclaim	Main office building || Fixture no: 85 || Lab1	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	
87	Water Reclaim	Main office building || Fixture no: 86 || Chem storage Storage (active)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 36.5 || 35, 38, , ,	0.12	2,738	318	1	$5	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,327	112	0	$1		206
88	Water Reclaim	Main office building || Fixture no: 87 || Chem storage	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Exclude	
89	Water Reclaim	Main office building || Fixture no: 88 || Lab tech station Laboratory	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7		Already Controlled	1	Upgrade Fixtures	Ave: 35 || 30, 36, 39, 35, 35	0.41	2,327	945	4	$14	Noah: Loc.Color: White Ceil ht: 10 || Plenum only 2 are e ballasted || Fix Color: White 2 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	7		Already Controlled	1	0.17	2,327	391	2	$3		554
90	Water Reclaim	Main office building || Fixture no: 89 || Lab tech station Laboratory	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7		Already Controlled	1	Upgrade Fixtures	none taken	0.60	2,327	1,385	6	$17	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	7		Already Controlled	1	0.25	2,327	586	3	$4		798
91	Water Reclaim	Main office building || Fixture no: 90 || Lab tech station	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
92	Water Reclaim	Main office building || Fixture no: 91 || Lab tech station Laboratory	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,327	540	2	$8	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,327	223	1	$1		317
93	Water Reclaim	Main office building || Fixture no: 92 || Lab tech station mgr Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,327	540	2	$8	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,327	223	1	$1		317
94	Water Reclaim	Main office building || Fixture no: 93 || Lab hood room Laboratory	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	8				Upgrade Fixtures & Controls	Ave: 33.6 || 30, 32, 34, 33, 39: Directly	0.26	2,738	701	3	$15	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 || || Socket % damaged: 25 Fix	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	8		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,327	223	1	$1		478
95	Water Reclaim	Main office building || Fixture no: 94 || Lab hood room	ELEDLAMP9	Existing LED Lamp 9 watts	8				Remain As Is	none taken	0.07	2,738	197	1	$0	Noah: || || Fix Color: White 2 – Standard Toggle || Black switch w/ Silver plate.. Existing control: None	ELEDLAMP9	Existing LED Lamp 9 watts	8				0.07	2,738	197	1	$0	Noah: || || Fix Color: White 2 – Standard Toggle || Black switch w/ Silver plate.. Existing control: None	
96	Water Reclaim	Main office building || Fixture no: 95 || Sample wash room Laboratory	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,327	251	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,327	112	0	$1		140
97	Water Reclaim	Main office building || Fixture no: 96 || ICP-MS Lab Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,327	540	2	$8	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,327	223	1	$1		317

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
98	Water Reclaim	Main office building ‖ Fixture no: 97 ‖ JC 1 Storage (inactive)	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.10	251	25	1		Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Pull chain Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1				0.02	251	4	0	$0		21
99	Water Reclaim	Main office building ‖ Fixture no: 98 ‖ Womans shower Restroom	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	6		Already Controlled	1	Upgrade Fixtures	Ave: 29 ‖ 28, 30, 29, , : Directly	0.19	2,327	447	2	$10	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.07	2,327	168	1	$1		279
100	Water Reclaim	Main office building ‖ Fixture no: 99 ‖ Womans shower	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.46	2,738	1,270	5	$19	Noah: ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Black switch w/ Silver plate. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		(4) Wireless Ceiling PIR with 2 PowPaks	1	0.19	2,327	447	2	$2		824
101	Water Reclaim	Main office building ‖ Fixture no: 103 ‖ Womens shower	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	
102	Water Reclaim	Main office building ‖ Fixture no: 101 ‖ Mens shower Restroom	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	none taken	0.13	2,327	298	1	$7	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.05	2,327	112	0	$1		186
103	Water Reclaim	Main office building ‖ Fixture no: 102 ‖ Mens shower	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 24.2 ‖ 24, 23, 28, 20, 28	0.12	2,738	318	1	$5	Noah: ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White Black switch w/ Silver plate. Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.05	2,327	112	0	$1		206
104	Water Reclaim	Main office building ‖ Fixture no: 104 ‖ Room Restroom	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	none taken	0.13	2,327	298	1	$7	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.05	2,327	112	0	$1		186
105	Water Reclaim	Main office building ‖ Fixture no: 105 ‖ Room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,738	318	1	$5	Noah: ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White Black switch w/ Silver plate. Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,327	112	0	$1		206
106	Water Reclaim	Main office building ‖ Fixture no: 106 ‖ RRM Restroom	EDI4132N	Existing Direct/Indirect Fixture 4' 1L F32 T8 Lamp, NBF Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,327	149	1	$3	Noah: Difficult, add 25% because: All need cleaning Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.02	2,327	56	0	$0		93
107	Water Reclaim	Main office building ‖ Fixture no: 107 ‖ RRM	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,327	270	1	$4	Noah: ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall Switch Auditor	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,327	112	0	$1		158
108	Water Reclaim	Main office building ‖ Fixture no: 108 ‖ Electrical IT/Mech/Elec	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,738	635	2	$9	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Mounting: Chain length: 2 dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,327	223	1	$1		412
109	Water Reclaim	Main office building ‖ Fixture no: 109 ‖ Electrical	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	
110	Water Reclaim	Main office building ‖ Fixture no: 110 ‖ RRU Restroom	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.05	2,327	126	1	$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,327	56	0	$0		70
111	Water Reclaim	Main office building ‖ Fixture no: 111 ‖ RRU	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	
112	Water Reclaim	Main office building ‖ Fixture no: 112 ‖ JC/electrical IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,327	135	1	$2	Noah: Loc.Color: White Ceil ht: 8 ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 – ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,327	56	0	$0		79
113	Water Reclaim	Main office building ‖ Fixture no: 113 ‖ JC/electrical	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	2,738	120	0	$2	Noah: ‖ ‖ 1 – Standard Toggle ‖ White switch w/ Silver plate. Existing control: None Tie into other sensor	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Fixture Mount PIR for 9-15' mounting	1	0.02	2,327	56	0	$0		65
114	Water Reclaim	Main office building ‖ Fixture no: 114 ‖ Employee break room Breakroom / Lounge	EDI8232N	Existing Direct / Indirect 8' 2L F32 T8 Lamps, NBF Ballast	8		Already Controlled	1	Upgrade Fixtures	none taken	0.46	2,327	1,080	5	$49	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Already Controlled	1	0.19	2,327	447	2	$3		633
115	Water Reclaim	Main office building ‖ Fixture no: 115 ‖ Employee break room	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
116	Water Reclaim	Main office building ‖ Fixture no: 116 ‖ Main work office Laboratory	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		Already Controlled	1	Upgrade Fixtures	none taken	0.68	2,327	1,583	7	$20	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum: ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8		Already Controlled	1	0.29	2,327	670	3	$4		912
117	Water Reclaim	Main office building ‖ Fixture no: 117 ‖ Main work office	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
118	Water Reclaim	Main office building ‖ Fixture no: 118 ‖ Office 1 front Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	Ave: 47 ‖ 44, 45, 48, 49, 49	0.23	2,738	635	2	$9	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,327	223	1	$1		412
119	Water Reclaim	Maintenance area ‖ Fixture no: 119 ‖ Bay 4 Manufacturing (Task)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	18				Upgrade Fixtures & Controls	none taken	1.04	2,738	2,858	10	$42	Noah: Difficult, add 100% because: Things to get around Needs: 19' Scissor Lift Loc.Color: Painted Ceil ht:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	18		Fixture Mount PIR for high mounting	18	0.43	2,327	1,005	4	$6		1,853
120	Water Reclaim	Maintenance area ‖ Fixture no: 120 ‖ Bay 4	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: Loc.Color: Painted ‖ Yellowish Gray flexible plastic conduit ‖ Conduit: Flex color: Silver/Galv. Length:	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
121	Water Reclaim	Maintenance area ‖ Fixture no: 121 ‖ Bay 3/2	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	26				Upgrade Fixtures & Controls	none taken	1.51	2,738	4,129	15	$61	Noah: Difficult, add 100% because: Things to get around Needs: 19' Scissor Lift Loc.Color: Painted Ceil ht:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	26		Fixture Mount PIR for high mounting	26	0.62	2,327	1,452	6	$8		2,577
122	Water Reclaim	Maintenance area ‖ Fixture no: 122 ‖ Bay 3/2	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: Loc.Color: Painted ‖ ‖ Conduit: Flex color: Silver/Galv. Length: 2 Size: 3/4 Auditor Suggests:	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
123	Water Reclaim	Maintenance area ‖ Fixture no: 123 ‖ Bay 3/2	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,738	635	2	$9	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,327	223	1	$1		412
124	Water Reclaim	Maintenance area ‖ Fixture no: 124 ‖ Bay 1 Manufacturing (Task)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7		Already Controlled	1	Upgrade Fixtures	Ave: 33.4 ‖ 34, 32, 32, 35, 34	0.60	2,327	1,385	6	$17	Noah: Loc.Color: White Ceil ht: 12 ‖ Plenum: ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	7		Already Controlled	1	0.25	2,327	586	3	$4		798
125	Water Reclaim	Maintenance area ‖ Fixture no: 125 ‖ Bay 1	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Replace	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Replace	
126	Water Reclaim	Maintenance area ‖ Fixture no: 126 ‖ Bay 1	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: Loc.Color: Painted ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
127	Water Reclaim	Maintenance area ‖ Fixture no: 127 ‖ Bay 1 kitchen	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,738	465	2	$6	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.07	2,327	168	1	$1		298
128	Water Reclaim	Maintenance area ‖ Fixture no: 128 ‖ Bay 1 kitchen	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Replace	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Replace	
129	Water Reclaim	Maintenance area ‖ Fixture no: 129 ‖ Bay 1 kitchen	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: Loc.Color: Painted ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
130	Water Reclaim	Maintenance area ‖ Fixture no: 130 ‖ Office 1 Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10		Already Controlled	1	Upgrade Fixtures	none taken	0.85	2,327	1,978	9	$25	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	10		Already Controlled	1	0.36	2,327	838	4	$5		1,140

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
131	Water Reclaim	Maintenance area || Fixture no: 131 || Office 1	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Replace	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Replace	
132	Water Reclaim	Maintenance area || Fixture no: 132 || Office 1	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$0	Noah: Loc.Color: Painted || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
133	Water Reclaim	Maintenance area || Fixture no: 133 || Exterior Exterior (Perimeter)	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	4				Upgrade Fixtures	none taken	1.18	4,380	5,168		$24	Noah: Difficult, add 50% because: Roof Loc.Color: Gray/Silver || || Fix Color: Bronze Conduit: WireMold color:	NXTWLED102P	New Cooper CrossfourMaxx LED Wallpack, 102 watts, 12539+ Photocell	4				0.41	4,380	1,787				3,381
134	Water Reclaim	Maintenance area || Fixture no: 134 || Exterior	EWHPS250	Existing Wall Pack High Pressure Sodium 250 watt Lamp	1				Upgrade Fixtures	none taken	0.30	4,380	1,292		$6	Noah: || || Auditor Suggests: Replace	NXTWLED102P	New Cooper CrossfourMaxx LED Wallpack, 102 watts, 12539+ Photocell	1				0.10	4,380	447				845
135	Water Reclaim	Maintenance area || Fixture no: 135 || Equipment storage Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	251	15	1	$0	Noah: Loc.Color: Painted || || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5	0	$0		10
136	Water Reclaim	Open shed || Fixture no: 136 || Bays Parking Garage	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.34	4,380	1,472		$38	Noah: Loc.Color: Wood Dark Ceil ht: 16 || || Fix Color: White Mounting: Conduit length: 95 dim: color: 1 –	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3				0.14	4,380	631		$4		841
137	Water Reclaim	Open shed || Fixture no: 137 || Bays	EWHPS70	Existing Wall Pack High Pressure Sodium 70 watt Lamp	2				Upgrade Fixtures	none taken	0.18	2,738	466	2	$8	Noah: Ceil ht: 14 || || Auditor Suggests: Replace	NXTWLED30P	New Cooper Crossfour LED Wallpack, 25 watts, 2710lm+ Photocell	2				0.05	2,738	142	1			356
138	Water Reclaim	Maintenance single bay || Fixture no: 138 || Bay Warehouse	EI48432N	Existing Hood 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.22	2,327	521	2	$15	Noah: Loc.Color: Gray/Silver Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White Conduit: EMT color:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.10	2,327	223	1	$1		298
139	Water Reclaim	Walkway/ area lights || Fixture no: 139 || Campus walkway Exterior (Path)	EFMH250	Existing Fixture Metal Halide 250 watt Lamp	30				Upgrade Fixtures	none taken	8.85	4,380	38,763		$161	Noah: || || JST: order Type 5 optics silver with slipfitter	NCHLED95	New AEL LED CobraHead 95 watts ATBM, 11,600 Lumen	30				2.85	4,380	12,483				26,280
140	Water Reclaim	R || Fixture no: 140 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	none taken	0.29	2,738	794	3	$12	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Mounting: Cable length: 1dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.12	2,327	279	1	$2		515
141	Water Reclaim	R || Fixture no: 141 || Pump room	EIB8432N	Existing Highbay 4' 4L F32 T8 Lamps, NBF Ballast	10				Upgrade Fixtures & Controls	none taken	1.12	2,738	3,067	11	$54	Noah: Difficult, add 100% because: Scaffolding: Needs: Scaffolding Loc.Color: White Ceil ht: 20 || ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	10		Fixture Mount PIR for high mounting	10	0.48	2,327	1,117	5	$6		1,949
142	Water Reclaim	R || Fixture no: 142 || Exterior	EWLED20	Existing Wallpack LED 20 watts	2				Remain As Is	none taken	0.04	4,380	175		$0	Noah: || || Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	2				0.04	4,380	175		$0	Noah: || || Auditor Suggests: Exclude	
143	Water Reclaim	R || Fixture no: 143 || Exterior	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	2				Upgrade Fixtures	none taken	0.59	4,380	2,584		$12	Noah: || || Auditor Suggests: Replace	NXTWLED102P	New Cooper CrossfourMaxx LED Wallpack, 102 watts, 12539+ Photocell	2				0.20	4,380	894				1,691
144	Water Reclaim	B || Fixture no: 144 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures & Controls	none taken	0.58	2,738	1,588	6	$23	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Mounting: Cable length: 1dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.24	2,327	559	2	$3		1,029
145	Water Reclaim	B || Fixture no: 145 || Pump room	EIB8432N	Existing Highbay 4' 4L F32 T8 Lamps, NBF Ballast	30				Upgrade Fixtures & Controls	none taken	3.36	2,738	9,200	34	$161	Noah: Difficult, add 100% because: Scaffolding: Needs: Scaffolding Loc.Color: White Ceil ht: 20 || ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	30		Fixture Mount PIR for high mounting	30	1.44	2,327	3,351	14	$19		5,848
146	Water Reclaim	B || Fixture no: 146 || Exterior	EWLED20	Existing Wallpack LED 20 watts	2				Remain As Is	none taken	0.04	4,380	175		$0	Noah: || || Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	2				0.04	4,380	175		$0	Noah: || || Auditor Suggests: Exclude	
147	Water Reclaim	B || Fixture no: 147 || Exterior	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	2				Upgrade Fixtures	none taken	0.59	4,380	2,584		$12	Noah: || || Auditor Suggests: Replace	NXTWLED102P	New Cooper CrossfourMaxx LED Wallpack, 102 watts, 12539+ Photocell	2				0.20	4,380	894				1,691
148	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 1 || 116 Office 1 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 30.25 || 32, 30, 29, 30,	0.11	2,227	240	1	$4	Noah: Loc.Color: White Ceil ht: 12 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
149	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 2 || 117 Office 2	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,227	240	1	$4	Noah: Loc.Color: White Ceil ht: 12 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
150	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 3 || 118 RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
151	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 4 || 113 Interview	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,227	240	1	$4	Noah: Loc.Color: White Ceil ht: 12 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
152	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 5 || 112/115 Main	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	Ave: 28 || 28, 27, 27, 30, 28	0.22	2,227	481	2	$8	Noah: Loc.Color: White Ceil ht: 12 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,227	214	1	$2		267
153	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 7 || 112/115 Main	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.18	2,969	546	2	$17	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	2,969	154	1			392
154	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 8 || 114 Evidence	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,227	240	1	$4	Noah: Loc.Color: White Ceil ht: 12 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
155	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 9 || 101 entry/Lobby Hallway	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	Ave: 30.8 || 28, 32, 31, 31, 32	0.18	8,760	1,542		$49	Noah: Loc.Color: Wood Dark Ceil ht: 14 || || Fix Color: Painted Mounting: Rigid Pendant length: 3 dim: 1/2 color:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	8,760	841		$9		701
156	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 9 || 101 entry/Lobby	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	7				Upgrade Fixtures	none taken	0.32	2,969	956	3	$29	Noah: Loc.Color: Painted Ceil ht: 10 || || 4 recessed in wood 3 in drywall || Fix Color: Silver 1 – Standard	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	7				0.09	2,969	270	1			686
157	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 10 || 101 entry/Lobby	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
158	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 11 || 119 office Office (Private)	EPT_ED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	2				Upgrade Controls Only	Ave: 45.6 || 40, 43, 46, 49, 50	0.08	2,969	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Noah: Loc.Color: Painted || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Exclude Noah: Loc.Color: Painted || || Fix Color: White 0 – || Existing control: None Auditor Suggests: Exclude	EPTLED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.08	2,227	187	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Noah: Loc.Color: Painted || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Exclude Noah: Loc.Color: Painted || || Fix Color: White 0 – || Existing control: None Auditor Suggests: Exclude	62
159	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 12 || 120 JC Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Already Controlled	1	Remain As Is	none taken	0.03	188	5	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Exclude Noah: Loc.Color: Painted || || Fix Color: White 0 – || Existing control: None Auditor Suggests: Exclude	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	188	5	0	$0		
160	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 13 || Elevator Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Remain As Is	none taken	0.03	8,760	245		$0	Noah: Loc.Color: Wood Dark Ceil ht: 14 || || Fix Color: Painted Mounting: Rigid Pendant length: 3 dim: 1/2 color:	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				0.03	8,760	245		$0		
161	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 14 || 109 hall Hallway	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	none taken	0.18	8,760	1,542		$49	Noah: Loc.Color: Wood Dark Ceil ht: 14 || || Fix Color: Painted Mounting: Rigid Pendant length: 3 dim: 1/2 color:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	8,760	841		$9		701
162	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 15 || 109 hall	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	2,969	273	1	$8	Noah: Loc.Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			196
163	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 16 || 109 hall	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
164	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 17 || Conference Conference / Meeting	ELEDLAMP20	Existing LED Lamp 20 watts	6				Remain As Is	none taken	0.12	2,969	356	1	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP20	Existing LED Lamp 20 watts	6				0.12	2,969	356	1	$0	Noah: || || Auditor Suggests: Exclude	
165	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 18 || Conference	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	2,969	273	1	$8	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			196
166	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 19 || 105 RRM Restroom	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	Remain As Is	none taken	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
167	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 20 || 104 RRW Restroom	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	Remain As Is	none taken	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
168	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 21 || 102 office Office (Private)	EPT_ED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	3				Upgrade Controls Only	none taken	0.13	2,969	374	1	$1	Noah: Loc.Color: White Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	EPTLED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	3		Wall Switch Sensor, DT, 1 pole	1	0.13	2,227	281	1	$1	Noah: Loc.Color: White Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	94
169	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 22 || 111 Stairwell Restroom	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	8,760	736		$1	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	8,760	736		$1	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
170	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 23 || 108 office Office (Private)	EPT_ED4-2L14	Existing Parabolic Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	2,969	166	1	$0	Noah: Loc.Color: White Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	EPTLED4-2L14	Existing Parabolic Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	42
171	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 24 || 123 Apparatus room Parking Garage	EHLED8-6L14	Existing Hood LED 8' 6L 14 watt Lamps	22				Remain As Is	none taken	1.85	2,969	5,487	18	$8	Noah: Loc.Color: Painted Cell ht: 16 || || Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size: 1/2	EHLED8-6L14	Existing Hood LED 8' 6L 14 watt Lamps	22				1.85	2,969	5,487	18	$8	Noah: Loc.Color: Painted Cell ht: 16 || || Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size: 1/2	
172	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 25 || 123 Apparatus room	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3				Upgrade Controls Only	none taken	0.08	2,969	249	1	$0	Noah: Loc.Color: Painted Cell ht: 10 || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3		Wall Switch Sensor, PIR, 1 pole	1	0.08	2,227	187	1	$0	Noah: Loc.Color: Painted Cell ht: 10 || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	62
173	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 26 || 121 Electrical Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
174	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 27 || 122 equipment Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
175	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 28 || 131 equipment Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	3				Upgrade Controls Only	none taken	0.08	251	21	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	3		Wall Switch Sensor, DT, 1 pole	1	0.08	188	16	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	5
176	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 29 || 126 equipment Storage (inactive)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
177	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 30 || 127 equipment Storage (inactive)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
178	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 31 || 128 laundry Storage (inactive)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
179	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 32 || 125 Storage (inactive)	EVLED4-2L14	Existing Vaportight LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EVLED4-2L14	Existing Vaportight LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4
180	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 33 || 124 hose Storage (inactive)	BNC100	Existing Incandescent 100 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.20	251	50	2		Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	2		Wall Switch Sensor, DT, 1 pole	1	0.03	188	6	0	$0		44
181	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 34 || 130 Stairwell 2 Restroom	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	8,760	736		$1	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	8,760	736		$1	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
182	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 35 || Kitchen Kitchen (commercial)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	4				Upgrade Controls Only	none taken	0.11	2,969	333	1	$1	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	4		Wall Switch Sensor, DT, 1 pole	1	0.11	2,227	249	1	$1	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	83
183	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 36 || Kitchen	ES2217N	Existing Strip 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,969	98	0	$4	Noah: || Under cabinet || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,969	59	0	$0		39
184	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 37 || Kitchen	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.04	2,969	131	0	$2	Noah: || Under cabinet || Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1				0.02	2,969	71	0	$0		59
185	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 38 || Kitchen	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.17	2,969	517	2	$7	Noah: || Under cabinet || jet: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 2w - bypass ballast	3				0.07	2,969	214	1	$1		303
186	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 39 || Dining/living Conference / Meeting	ECFLS40	Existing Screw-in CFL Lamp 40 watts	8				Upgrade Fixtures	none taken	0.32	2,969	950	3	$7	Noah: Loc.Color: Wood Light Cell ht: 14 || || Fix Color: White Mounting: Rigid Pendant length: 44m: color: 2 –	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	8				0.13	2,969	380	1	$1		570
187	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 40 || Dining/living	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	2,969	273	1	$8	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			196
188	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 41 || Dining/living	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Fix Color: White Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Fix Color: White Auditor Suggests: Exclude	
189	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 42 || Dining/living	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.18	2,969	546	2	$17	Noah: Loc.Color: Painted Cell ht: 8 || || Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	2,969	154	1			392
190	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 43 || Storage 1 Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, DT, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	2
191	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 44 || Storage 2 Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, DT, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	2
192	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 45 || Storage 3 Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, DT, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	2
193	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 46 || Storage 4 Hallway	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	1				Upgrade Fixtures	none taken	0.09	251	22	1	$1	Noah: Loc.Color: Wood Dark Cell ht: 14 || || Fix Color: Painted Mounting: Rigid Pendant length: 3 dim: 1/2 color:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	1				0.05	251	12	0	$0		10
194	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 47 || Storage 4	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.05	1,420	65		$2	Noah: Loc.Color: Painted Cell ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1				0.01	1,420	18				47
195	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 48 || Storage 4	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
196	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 49 || Exercise room Storage (inactive)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	6				Remain As Is	none taken	0.17	251	42	2	$0	Noah: Loc.Color: Painted || || Fix Color: White 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	6				0.17	251	42	2	$0	Noah: Loc.Color: Painted || || Fix Color: White 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
197	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 50 || Exercise room Storage Storage (inactive)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	251	15	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	188	5	0	$0		10
198	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 51 || Living room storage	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	251	15	1	$0	Noah: Loc.Color: Painted || || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	188	5	0	$0		10
199	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 52 || Mens LOCKER ROOM	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
200	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 53 || Mens LOCKER ROOM	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	8				Remain As Is	none taken	0.22	2,969	665	2	$1	Noah: || || Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	8				0.22	2,969	665	2	$1	Noah: || || Auditor Suggests: Exclude	
201	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 54 || Mens LOCKER ROOM	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.22	2,969	665	2	$17	Noah: Loc.Color: Painted Ceil ht: 10 || Wet location || Fix Color: White 1 – Standard Toggle || Existing control:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	2,969	154	1			511
202	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 55 || Womans LOCKER ROOM	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	Remain As Is	none taken	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,227	62	0	$0	Noah: || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	
203	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 56 || Womans LOCKER ROOM	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	4				Remain As Is	none taken	0.11	2,969	333	1	$1	Noah: || || Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	4				0.11	2,969	333	1	$1	Noah: || || Auditor Suggests: Exclude	
204	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 57 || Womans LOCKER ROOM	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.11	2,969	333	1	$8	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Existing control: None Auditor	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			255
205	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 58 || Sleeping Room 8	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	3				Upgrade Fixtures & Controls	none taken	0.14	251	35	1	$2	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3		Wall Switch Sensor, DT, 1 pole	1	0.04	188	7	0			27
206	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 59 || Room 8	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.09	2,969	267	1	$13	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	3				0.02	2,969	53	0	$1		214
207	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 60 || Rooms storage Hallway	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	none taken	0.18	251	44	2	$3	Noah: Loc.Color: Wood Dark Ceil ht: 14 || || Fix Color: Painted Mounting: Rigid Pendant length: 3 dim: 1/2 color:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	251	24	1	$0		20
208	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 61 || Rooms storage	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.05	1,420	65		$2	Noah: Loc.Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1				0.01	1,420	18				47
209	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 63 || Sleeping Room 7	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.05	251	12	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	188	2	0			9
210	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 64 || Room 7	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,969	178	1	$8	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	2,969	36	0	$1		143
211	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 65 || Sleeping Room 6	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.05	251	12	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	188	2	0			9
212	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 66 || Room 6	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,969	178	1	$8	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	2,969	36	0	$1		143
213	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 67 || Sleeping Room 5	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.05	251	12	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	188	2	0			9
214	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 68 || Room 5	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	2,969	89	0	$4	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	2,969	18	0	$0		71
215	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 69 || Sleeping Room 4	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.05	251	12	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	188	2	0			9
216	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 70 || Room 4	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	2,969	89	0	$4	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	2,969	18	0	$0		71
217	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 71 || Sleeping Room 3	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.05	251	12	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	188	2	0			9
218	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 72 || Room 3	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,969	178	1	$8	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	2,969	36	0	$1		143
219	Fire D West	Police/Fire Station floor 1/2 Floor: 2 || Fixture no: 73 || Sleeping Room 2	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.09	251	23	1	$1	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Wall Switch Sensor, DT, 1 pole	1	0.03	188	5	0			18
220	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 74 || Room 2	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,969	178	1	$8	Noah: Loc.Color: White || || 3 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	2,969	36	0	$1		143
221	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 75 || Room 1 Office (Private)	EPT_ED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.08	2,969	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	EPTLED4-3L14	Existing Parabolic Troffer LED 4' 3L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.08	2,227	187	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	62
222	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 76 || Rooms hall Hallway	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.28	8,760	2,418		$68	Noah: Loc.Color: White Ceil ht: 8 || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	6				0.08	8,760	683				1,734
223	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 77 || Rooms hall	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	5				Upgrade Fixtures	none taken	0.11	2,969	327	1	$21	Noah: || || Auditor Suggests: Retrofit	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	5				0.03	2,969	89	0	$2		238
224	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 78 || Exterior Exterior (Perimeter)	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	24				Upgrade Fixtures	none taken	0.72	4,380	3,154		$114	Noah: || || Auditor Suggests: Retrofit	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	24				0.24	4,380	1,051		$7		2,102
225	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 79 || Exterior	EWHPS70	Existing Wall Pack High Pressure Sodium 70 watt Lamp	6				Upgrade Fixtures	none taken	0.55	4,380	2,391		$36	Noah: || This is a guess, unsure of technology needs to be verified, Did not have a ladder tall enough to reach ||	LEDR24	24 watt HIDtoLED Lamp- Light Efficient Design -bypass ballast	6				0.14	4,380	631				1,761
226	Fire D West	Police/Fire Station floor 1/2 || Fixture no: 80 || Exterior	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.06	4,380	245		$6	Noah: Loc.Color: Painted Ceil ht: 12 || || Fix Color: White Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1				0.01	4,380	57				188
227	Fire Department Admin	Administration building || Fixture no: 1 || Entry Lobby Hallway	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.05	2,969	137	0	$4	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1				0.01	2,969	39	0			98
228	Fire Department Admin	Administration building || Fixture no: 2 || Entry Lobby	ELEDLAMP8	Existing LED Lamp 8 watts	6				Remain As Is	none taken	0.05	2,969	160	1	$0	Noah: || || 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None Auditor	ELEDLAMP9	Existing LED Lamp 9 watts	6				0.05	2,969	160	1	$0	Noah: || || 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control: None Auditor	
229	Fire Department Admin	Administration building || Fixture no: 3 || Entry Lobby	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	Ave: 19.5 || 18, 19, 21, 20,	0.18	2,969	523	2	$18	Noah: Loc.Color: Wood Light Ceil ht: 16 || Gold || Fix Color: Painted Mounting: Rigid Pendant length: 4 dim:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	2,969	285	1	$3		238

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
230	Fire Department Admin	Administration building || Fixture no: 4 || Entry Lobby	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures	none taken	0.02	2,969	65	0	$4	Noah: || Under cabinet switched || 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Existing control: None	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	2,969	18	0	$0		48
231	Fire Department Admin	Administration building || Fixture no: 35 || Entry Lobby	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	3				Remain As Is	none taken	0.04	2,969	125	0	$0	Noah: || Under cabinet || Auditor Suggests: Exclude	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	3				0.04	2,969	125	0	$0	Noah: || Under cabinet || Auditor Suggests: Exclude	
232	Fire Department Admin	Administration building || Fixture no: 5 || Main hall Hallway	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8				Upgrade Fixtures	Ave: 29.4 || 28, 27, 30, 31, 31	0.37	2,969	1,093	4	$34	Noah: Loc.Color: White Cell ht: 10 || Same as lobby || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	8				0.10	2,969	309	1			784
233	Fire Department Admin	Administration building || Fixture no: 6 || Main hall	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	11				Remain As Is	Ave: 24.2 || 20, 23, 24, 28, 26	0.31	2,969	914	3	$1	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	11				0.31	2,969	914	3	$1	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	
234	Fire Department Admin	Administration building || Fixture no: 7 || Main hall	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	
235	Fire Department Admin	Administration building || Fixture no: 8 || Main hall	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: Loc.Color: Painted || Gold unsure of technology please verify did not have small enough tamperproof	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: Loc.Color: Painted || Gold unsure of technology please verify did not have small enough tamperproof	
236	Fire Department Admin	Administration building || Fixture no: 9 || 115 Front office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	Ave: 31.2 || 30, 31, 33, 31, 31	0.06	2,969	166	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	42
237	Fire Department Admin	Administration building || Fixture no: 10 || 116 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				Upgrade Controls Only	none taken	0.11	2,969	333	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Wall Switch Sensor, PIR, 1 pole	1	0.11	2,227	249	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	83
238	Fire Department Admin	Administration building || Fixture no: 11 || 117 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate..	
239	Fire Department Admin	Administration building || Fixture no: 12 || 118 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	
240	Fire Department Admin	Administration building || Fixture no: 13 || 119 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				Upgrade Controls Only	none taken	0.11	2,969	333	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Wall Switch Sensor, PIR, 1 pole	1	0.11	2,227	249	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	83
241	Fire Department Admin	Administration building || Fixture no: 14 || 119 office	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.09	2,227	205	1	$6	Noah: Loc.Color: Painted Cell ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	2,227	58	0			147
242	Fire Department Admin	Administration building || Fixture no: 15 || 120 office Conference / Meeting	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	2,969	166	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Plenum || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	42
243	Fire Department Admin	Administration building || Fixture no: 16 || 120 office	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	6		Already Controlled	1	Upgrade Fixtures	none taken	0.28	2,227	615	3	$19	Noah: Loc.Color: Painted Cell ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	6		Already Controlled	1	0.08	2,227	174	1			441
244	Fire Department Admin	Administration building || Fixture no: 17 || 120 office	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	2				Remain As Is	none taken	0.03	2,969	83	0	$0	Noah: Loc.Color: Wood Dark || Under cabinet || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	2				0.03	2,969	83	0	$0	Noah: Loc.Color: Wood Dark || Under cabinet || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch	
245	Fire Department Admin	Administration building || Fixture no: 18 || 125 storage Storage (active)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	8		Already Controlled	1	Remain As Is	Ave: 30.4 || 30, 26, 25, 36, 35	0.22	188	42	2	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 2– || Existing control: Wall Switch Auditor Suggests: Exclude	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	8		Already Controlled	1	0.22	188	42	2	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 2– || Existing control: Wall Switch Auditor Suggests: Exclude	
246	Fire Department Admin	Administration building || Fixture no: 19 || 122 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	2,227	187	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	2,227	187	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	
247	Fire Department Admin	Administration building || Fixture no: 20 || 123 storage Storage (active)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	Ave: 31.8 || 30, 32, 31, 31, 35	0.06	251	14	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, DT, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	4
248	Fire Department Admin	Administration building || Fixture no: 21 || 126B JC Storage (inactive)	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: Painted Cell ht: 8 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: Painted Cell ht: 8 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	2
249	Fire Department Admin	Administration building || Fixture no: 22 || RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	Ave: 29.333333333 3333 || 28, 29,	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Gold unsure of technology could not open tamper proof was too big. ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
250	Fire Department Admin	Administration building || Fixture no: 23 || RRW Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 1 – || Existing control: Wall Switch (not	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
251	Fire Department Admin	Administration building || Fixture no: 24 || 111 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	2,969	166	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	42
252	Fire Department Admin	Administration building || Fixture no: 25 || 110 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				Upgrade Controls Only	none taken	0.11	2,969	333	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Wall Switch Sensor, PIR, 1 pole	1	0.11	2,227	249	1	$1	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	83
253	Fire Department Admin	Administration building || Fixture no: 26 || 109 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	2,227	187	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	2,227	187	1	$0	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – || Silver/Metalic switch w/ Silver plate.. Existing control:	
254	Fire Department Admin	Administration building || Fixture no: 27 || Elevator Hallway	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	Ave: 33.5 || 35, 32,..	0.06	8,760	508		$6	Noah: Cell ht: 8 || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	8,760	210		$1		298
255	Fire Department Admin	Administration building || Fixture no: 28 || Stairwell 1 Hallway	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	5				Upgrade Fixtures	Ave: 25.6 || 10, 12, 28, 30, 48: By window	0.23	2,969	683	2	$21	Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: Painted Cell ht: 20 || Fix	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	5				0.07	2,969	193	1			490
256	Fire Department Admin	Administration building || Fixture no: 29 || RRU	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 1 – || Existing control: Wall Switch (not	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
257	Fire Department Admin	Administration building || Fixture no: 30 || Attic in big conference	BNC100	Existing Incandescent 100 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.20	251	50	2		Noah: Loc.Color: Wood Light Cell ht: 8 || Pull string || Fix Color: White Pull string x2 Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	2				0.03	251	8	0	$0		42
258	Fire Department Admin	Administration building Floor: 1 || Fixture no: 31 || Large conference	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.18	2,969	546	2	$17	Noah: Loc.Color: White Cell ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	4				0.05	2,969	154	1			392
259	Fire Department Admin	Administration building || Fixture no: 32 || Large conference	ELEDLAMP9	Existing LED Lamp 9 watts	14				Remain As Is	none taken	0.13	2,969	374	1	$1	Noah: || || 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Existing control: None Auditor	ELEDLAMP9	Existing LED Lamp 9 watts	14				0.13	2,969	374	1	$1	Noah: || || 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Existing control: None Auditor	
260	Fire Department Admin	Administration building || Fixture no: 33 || Large conference	ECFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	none taken	0.18	2,969	523	2	$18	Noah: Loc.Color: Wood Light Cell ht: 16 || Fix Color: Painted Mounting: Rigid Pendant length: 4 dim: 1/2 color:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	2,969	285	1	$3		238
261	Fire Department Admin	Administration building || Fixture no: 34 || Large conference	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3				Remain As Is	none taken	0.08	2,969	249	1	$0	Noah: || || Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3				0.08	2,969	249	1	$0	Noah: || || Auditor Suggests: Exclude	
262	Fire Department Admin	Administration building Floor: 1 || Fixture no: 36 || 201 upstairs hall	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8				Upgrade Fixtures	none taken	0.37	2,969	1,093	4	$34	Noah: Loc.Color: White Cell ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	8				0.10	2,969	309	1			784

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
263	Fire Department Admin	Administration building || Fixture no: 39 || 201 upstairs hall	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	5				Upgrade Fixtures	none taken	0.11	2,969	327	1	$21	Noah: || || 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Existing control: None Auditor	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	5				0.03	2,969	89	0	$2		238
264	Fire Department Admin	Administration building || Fixture no: 40 || 201 upstairs hall	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	3				Remain As Is	none taken	0.04	2,969	125	0	$0	Noah: || || Auditor Suggests: Exclude	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	3				0.04	2,969	125	0	$0	Noah: || || Auditor Suggests: Exclude	
265	Fire Department Admin	Administration building || Fixture no: 41 || 201 upstairs hall	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	
266	Fire Department Admin	Administration building || Fixture no: 42 || 201 upstairs hall	ET2317N	Existing Troffer 2' 3L F17 T8 Lamps, NBF Ballast	7				Upgrade Fixtures	Ave: 32.5 || 30, 32, 33, 35,	0.35	2,969	1,039	4	$35	Noah: Loc.Color: White Ceil ht: 10 || Plenum: || Socket % damaged: 25 Fix Color: White Auditor Suggests:	2TLED9-3	Retrofit 3L to 2' TLED type B - 9w - bypass ballast	7				0.19	2,969	561	2	$3		478
267	Fire Department Admin	Administration building || Fixture no: 43 || 201 upstairs hall	ETLED2-2L8	Existing Troffer LED 2' 2L 8 watt Lamps	8				Remain As Is	none taken	0.13	2,969	380	1	$1	Noah: || || Auditor Suggests: Exclude	ETLED2-2L8	Existing Troffer LED 2' 2L 8 watt Lamps	8				0.13	2,969	380	1	$1	Noah: || || Auditor Suggests: Exclude	
268	Fire Department Admin	Administration building || Fixture no: 44 || 201 upstairs hall	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	
269	Fire Department Admin	Administration building || Fixture no: 45 || 204 office	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	
270	Fire Department Admin	Administration building || Fixture no: 46 || 205 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	Remain As Is	none taken	0.11	2,227	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Plenum: || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	0.11	2,227	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Plenum: || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch	
271	Fire Department Admin	Administration building || Fixture no: 47 || 205 office closet	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	251	15	1	$0	Noah: || Closet exist with lights could not get in do not know technology || IST: ESTIMATE ONLY	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6	0	$0		9
272	Fire Department Admin	Administration building || Fixture no: 48 || 206 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	Remain As Is	none taken	0.11	2,227	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	0.11	2,227	249	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	
273	Fire Department Admin	Administration building || Fixture no: 49 || 206 office closet	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	251	15	1	$0	Noah: || Unknown tech in space no access closet ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6	0	$0		9
274	Fire Department Admin	Administration building || Fixture no: 50 || 207 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				Upgrade Controls Only	none taken	0.11	2,969	333	1	$1	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Wall Switch Sensor, PIR, 1 pole	1	0.11	2,227	249	1	$1	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	83
275	Fire Department Admin	Administration building || Fixture no: 51 || 207 office	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.09	2,227	205	1	$6	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	2,227	58	0			147
276	Fire Department Admin	Administration building || Fixture no: 52 || 208 office Conference / Meeting	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	2,969	166	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	42
277	Fire Department Admin	Administration building || Fixture no: 53 || 208 office	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8		Already Controlled	1	Upgrade Fixtures	none taken	0.37	2,227	819	4	$26	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	8		Already Controlled	1	0.10	2,227	232	1			588
278	Fire Department Admin	Administration building || Fixture no: 54 || 208 office	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	2				Remain As Is	none taken	0.03	2,969	83	0	$0	Noah: Loc.Color: Wood Dark || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: Painted Ceil ht: 20 || 2 e	ESLED4-1L14	Existing Strip LED 4' 1L 14 watt Lamp	2				0.03	2,969	83	0	$0	Noah: Loc.Color: Wood Dark || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: Painted Ceil ht: 20 || 2 e	
279	Fire Department Admin	Administration building || Fixture no: 55 || Stairwell 2	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				Remain As Is	none taken	0.11	2,969	333	1	$1	Over stairs Needs: Scaffolding Loc.Color: Painted Ceil ht: 20 || 2 e	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4				0.11	2,969	333	1	$1	Over stairs Needs: Scaffolding Loc.Color: Painted Ceil ht: 20 || 2 e	
280	Fire Department Admin	Administration building || Fixture no: 56 || RRM 215 Restroom	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8				Upgrade Fixtures	none taken	0.37	2,969	1,093	4	$34	Noah: Loc.Color: Painted Ceil ht: 10 || 4 are white and wet location fixtures || Fix Color: Silver Auditor Suggests:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	8				0.10	2,969	309	1			784
281	Fire Department Admin	Administration building || Fixture no: 57 || RRM 215	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	
282	Fire Department Admin	Administration building || Fixture no: 58 || RRM 215	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	
283	Fire Department Admin	Administration building || Fixture no: 59 || RRW 216 Restroom	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8				Upgrade Fixtures	none taken	0.37	2,969	1,093	4	$34	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	8				0.10	2,969	309	1			784
284	Fire Department Admin	Administration building || Fixture no: 60 || RRW 216	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	
285	Fire Department Admin	Administration building || Fixture no: 61 || RRW 216	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				Remain As Is	none taken	0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	EVANLED4-2L14	Existing Vanity LED 4' 2L 14 watt Lamps	2				0.06	2,969	166	1	$0	Noah: || || Auditor Suggests: Exclude	
286	Fire Department Admin	Administration building || Fixture no: 62 || 203 office Office (Private)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	2,227	187	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	2,227	187	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	
287	Fire Department Admin	Administration building || Fixture no: 63 || 203 office storage	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	2,969	172	1	$2	Noah: || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	2,969	71	0	$0		101
288	Fire Department Admin	Administration building || Fixture no: 64 || 202 office	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	
289	Fire Department Admin	Administration building || Fixture no: 65 || 209 office	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	Remain As Is	none taken	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,227	125	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	
290	Fire Department Admin	Administration building || Fixture no: 66 || Closet Storage (inactive)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate..	2
291	Fire Department Admin	Administration building || Fixture no: 67 || Closet	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.05	188	9	0	$0	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	188	2	0			6
292	Fire Department Admin	Administration building || Fixture no: 68 || 212 storage Storage (inactive)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	251	14	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	1	0.06	188	11	1	$0	Noah: Loc.Color: White Ceil ht: 10 || Fix Color: White 1 – Standard Toggle || White switch w/ Silver plate.. Existing	4
293	Fire Department Admin	Administration building || Fixture no: 69 || 214 JC	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1				Upgrade Controls Only	none taken	0.03	251	7	0	$0	Noah: Loc.Color: Painted Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	ESLED4-2L14	Existing Strip LED 4' 2L 14 watt Lamps	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	188	5	0	$0	Noah: Loc.Color: Painted Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Silver/Metalic switch w/ Silver	2
294	Fire Department Admin	Administration building || Fixture no: 70 || 210 Storage (active)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	188	20	1	$1	Noah: Loc.Color: White Ceil ht: 10 || Plenum: || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Noah: Loc.Color: Painted || Fix Color: Painted Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		11
295	Fire Department Admin	Administration building || Fixture no: 71 || Exterior Exterior (Perimeter)	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	8				Upgrade Fixtures	none taken	0.24	4,380	1,051		$38		LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	8				0.08	4,380	350		$2		701

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
296	Fire Department Admin	Administration building || Fixture no: 72 || Exterior	EGFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	2				Upgrade Fixtures	none taken	0.04	4,380	193		$12	Noah: || || Auditor Suggests: Replace	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	4,380	53		$1		140
297	Fire Department Admin	Administration building || Fixture no: 73 || Exterior	EGFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.06	4,380	245		$6	Noah: Loc.Color: Painted Cell ht: 12 || Wet location || Fix Color: White	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1				0.01	4,380	57				188
298	Fire Department Admin	Administration building || Fixture no: 74 || Exterior	EWHPS150	Existing Wall Pack High Pressure Sodium 150 watt Lamp	2				Upgrade Fixtures		0.38	4,380	1,647		$12	Noah: ||Unsure of technology could not reach, Needs verification || Auditor Suggests: Replace	NXTWLED60P	New Cooper CrosstourMaxx LED Wallpack, 58 watts, 6036 + Photocell	2				0.12	4,380	508				1,138
299	Fire Department Admin	Administration building || Fixture no: 75 || Exterior	ESBLED100	Existing Shoebox LED 100 watts	4				Remain As Is	none taken	0.40	4,380	1,752		$0	Noah: || || Fix Color: Bronze Auditor Suggests: Retrofit	ESBLED100	Existing Shoebox LED 100 watts	4				0.40	4,380	1,752		$0	Noah: || || Fix Color: Bronze Auditor Suggests: Retrofit	
300	Fire Department Admin	Administration building || Fixture no: 76 || Exterior	EGFLP26	Existing CFL Pin Based 26 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.15	4,380	657		$24	Noah: ||Unable to view technology my suspicion is a four pin 26 W CFL but needs verification did not have a tall	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	5				0.05	4,380	219		$1		438
301	Fire Department Admin	Administration building || Fixture no: 77 || Exterior	EHPS70	Existing Fixture High Pressure Sodium 70 watt Lamp	4				Upgrade Fixtures	none taken	0.36	4,380	1,594		$24	Noah: ||Unsure of technology could not get top off needed a right angle tool of which I do not have please verify	LEDR18	18 watt Mini HID to LED Lamp- Light Efficient Design -bypass ballast	4				0.07	4,380	315				1,278
302	Fire D North	Fire station North || Fixture no: 1 || Lobby/Entry Hallway	EGFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	2				Upgrade Fixtures	Ave: 21.2 || 20, 22, 23, 21, 20	0.18	4,380	771	2	$26	Noah: Loc.Color: Wood Dark Cell ht: 14 || Gold same as west station || Fix Color: Silver Mounting: Rigid Pendant	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	4,380	420	1	$5		350
303	Fire D North	Fire station North || Fixture no: 9 || Lobby/entry	EGFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	8				Upgrade Fixtures	none taken	0.37	4,380	1,612	4	$47	Noah: Loc.Color: Painted Cell ht: 10 || 4 are in wood 3 in drywall || Fix Color: Silver 2 – Standard Toggle ||	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	8				0.10	4,380	456	1			1,156
304	Fire D North	Fire station North || Fixture no: 38 || Lobby/entry	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	4,380	105	0	$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	4,380	105	0	$1	Noah: || || Auditor Suggests: Exclude	
305	Fire D North	Fire station North || Fixture no: 2 || 112 main office police Office (Open)	EGFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	4				Upgrade Fixtures	Ave: 28 || 30, 32, 29, 24, 25	0.18	2,969	546	2	$17	Noah: Loc.Color: White Cell ht: 10 || Fix Color: White 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	2,969	154	1			392
306	Fire D North	Fire station North || Fixture no: 3 || 112 main office police	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	Ave: 27.6 || 26, 28, 28, 27, 29	0.34	2,227	757	3	$9	Noah: Loc.Color: White Cell ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	2,227	321	1	$2		436
307	Fire D North	Fire station North || Fixture no: 4 || 116 police office 1 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 30.6 || 32, 30, 29, 31, 31	0.11	2,227	240	1	$4	Noah: Loc.Color: White Cell ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
308	Fire D North	Fire station North || Fixture no: 5 || 117 police office 1 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,227	240	1	$4	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
309	Fire D North	Fire station North || Fixture no: 6 || RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
310	Fire D North	Fire station North || Fixture no: 7 || 113 police interview Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,227	258	1	$4	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		151
311	Fire D North	Fire station North || Fixture no: 8 || 114 police interview Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,227	258	1	$4	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		151
312	Fire D North	Fire station North || Fixture no: 10 || 120 JC Storage (inactive)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11	1	$0	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5	0	$0		6
313	Fire D North	Fire station North || Fixture no: 11 || Elevator Hallway	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
314	Fire D North	Fire station North || Fixture no: 12 || 109 Hall Hallway	EGFLP8L9	Existing Pin Based CFL Lamps 8L 9 watts	8				Upgrade Fixtures	none taken	0.70	2,969	2,080	7	$73	Noah: Loc.Color: Wood Dark Cell ht: 14 || Fix Color: Silver Mounting: Rigid Pendant length: dim: 1/2 color: 1	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	8				0.38	2,969	1,140	4	$13		950
315	Fire D North	Fire station North || Fixture no: 13 || 109 Hall	EGFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	2,969	273	1	$8	Noah: Loc.Color: Painted Cell ht: 10 || Fix Color: Silver 2 – Standard Toggle || Silver/Metallic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			196
316	Fire D North	Fire station North || Fixture no: 14 || 108 office Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,227	240	1	$4	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,227	107	0	$1		134
317	Fire D North	Fire station North || Fixture no: 15 || Conference Conference / Meeting	EDFLS40	Existing Screw-in CFL Lamp 40 watts	6		Already Controlled	1	Upgrade Fixtures	Ave: 24.8 || 26, 20, 30, 19, 29	0.24	2,227	534	2	$4	Noah: Loc.Color: Wood Dark Cell ht: 10 || Fix Color: White 2 – Standard Toggle || Silver/Metallic switch w/ Silver	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	6		Already Controlled	1	0.10	2,227	214	1	$1		321
318	Fire D North	Fire station North || Fixture no: 16 || Conference	EGFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	2,969	273	1	$8	Noah: Loc.Color: Painted Cell ht: 8 || 2 – Standard Toggle || Silver/Metallic switch w/ Silver plate. Existing control:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			196
319	Fire D North	Fire station North || Fixture no: 17 || 105 RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
320	Fire D North	Fire station North || Fixture no: 18 || 104 RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
321	Fire D North	Fire station North || Fixture no: 19 || 119 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,227	378	2	$5	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,227	160	1	$1		218
322	Fire D North	Fire station North || Fixture no: 20 || 102 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,969	491	2	$7	Noah: Loc.Color: White Cell ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,227	160	1	$1		321
323	Fire D North	Fire station North || Fixture no: 21 || 110 stairwell Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,723	648	2	$9	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	3,723	268	1	$2		380
324	Fire D North	Fire station North || Fixture no: 22 || 111 storage Storage (inactive)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
325	Fire D North	Fire station North || Fixture no: 23 || 121 storage IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
326	Fire D North	Fire station North || Fixture no: 24 || 122 storage IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
327	Fire D North	Fire station North || Fixture no: 25 || 131 storage IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
328	Fire D North	Fire station North || Fixture no: 26 || 130 stairwell Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,723	648	2	$9	Noah: Loc.Color: Painted Cell ht: 8 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	3,723	268	1	$2		380

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
329	Fire D North	Fire station North || Fixture no: 27 || 134 storage IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
330	Fire D North	Fire station North || Fixture no: 28 || 133 storage IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
331	Fire D North	Fire station North || Fixture no: 29 || 132 storage IT/Mech/Elec	EW4432N	Existing Wrap 4' 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.11	251	28	1	$0	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		19
332	Fire D North	Fire station North || Fixture no: 30 || 129 storage IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,723	648	2	$9	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	3,723	268	1	$2		380
333	Fire D North	Fire station North || Fixture no: 31 || 126 storage IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	251	29	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		20
334	Fire D North	Fire station North || Fixture no: 32 || 127 storage IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	251	29	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		20
335	Fire D North	Fire station North || Fixture no: 33 || 126 storage IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	251	29	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		20
336	Fire D North	Fire station North || Fixture no: 34 || 125 storage IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	251	29	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		20
337	Fire D North	Fire station North || Fixture no: 35 || 124 storage IT/Mech/Elec	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.06	251	16	1	$0	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	3	0	$0		13
338	Fire D North	Fire station North || Fixture no: 36 || 123 Bay	EH8632H	Existing Hood 1x8 Fixture 8L F32 T8 32 watt Lamp(s), High Ballast Factor	20				Upgrade Fixtures & Controls	Ave: 45.8 || 45, 44, 48, 46, 46	4.44	4,380	19,447	44	$333	Noah: Loc.Color: Painted Ceil ht: 14 || Fix Color: White Conduit: Flex color: Silver/Galv, Length: 6 ea Size: 1/2 6 –	LBLED8-113	New Cooper Lenoxd High Bay 1x8, 113 watts, 17804 lm	20		(4) Wireless Ceiling PIR with 2 PowPaks	1	2.26	3,723	8,414	23			11,033
339	Fire D North	Fire station North || Fixture no: 37 || 123 Bay	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	4,380	105	0	$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	4,380	105	0	$1	Noah: || || Auditor Suggests: Exclude	
340	Fire D North	Fire station North || Fixture no: 38 || Kitchen Kitchen (commercial)	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	Ave: 31 || 28, 30, 31, 32, 34	0.23	4,380	1,016	2	$14	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	3,723	357	1	$2		659
341	Fire D North	Fire station North || Fixture no: 40 || Kitchen	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.04	4,380	193	0	$3	Noah: || Under counter || 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate., Existing control: None	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1				0.02	4,380	105	0	$1		88
342	Fire D North	Fire station North || Fixture no: 41 || Kitchen	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.13	4,380	561	1	$11	Noah: || Under cabinet || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.,	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	4				0.05	4,380	210	0	$1		350
343	Fire D North	Fire station North || Fixture no: 42 || Conference Conference / Meeting	ECFLS40	Existing Screw-in CFL Lamp 40 watts	8		Already Controlled	1	Upgrade Fixtures	none taken	0.32	3,723	1,191	3	$9	Noah: Loc.Color: Wood Dark Ceil ht: 10 || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	8		Already Controlled	1	0.13	3,723	477	1	$1		715
344	Fire D North	Fire station North || Fixture no: 43 || Conference	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	10				Upgrade Fixtures	none taken	0.46	4,380	2,015	5	$59	Noah: Loc.Color: Painted Ceil ht: 8 || || 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate., Existing control:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	10				0.13	4,380	569	1			1,445
345	Fire D North	Fire station North || Fixture no: 44 || Conference	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7				Upgrade Fixtures	none taken	0.41	4,380	1,778	4	$24	Noah: || || Lenses needed: 3dim: Standard || Socket % damaged: 25 Fix Color: White 3 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	7				0.17	4,380	736	2	$4		1,042
346	Fire D North	Fire station North || Fixture no: 45 || Conference	E35MR16	Existing Halogen 35 watt MR16 Style Lamp	2				Upgrade Fixtures	none taken	0.07	4,380	307	1		Noah: || || Auditor Suggests: Retrofit	6WLEDMR16	6 watt MR16 Style LED Lamp - Philips	2				0.01	4,380	53	0	$1		254
347	Fire D North	Fire station North Floor: 2 || Fixture no: 46 || Storage 1 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
348	Fire D North	Fire station North Floor: 2 || Fixture no: 47 || Storage 2 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
349	Fire D North	Fire station North Floor: 2 || Fixture no: 48 || Storage 3 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
350	Fire D North	Fire station North Floor: 2 || Fixture no: 49 || Storage 4 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9	0	$0		13
351	Fire D North	Fire station North Floor: 2 || Fixture no: 50 || Storage 5 Storage (active)	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.05	188	9	0	$0	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	188	2	0			6
352	Fire D North	Fire station North Floor: 2 || Fixture no: 51 || 222 exercise rm	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures	none taken	0.35	4,380	1,524	3	$20	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	4,380	631	1	$4		894
353	Fire D North	Fire station North Floor: 2 || Fixture no: 52 || Exercise storage Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11	1	$0	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5	0	$0		6
354	Fire D North	Fire station North Floor: 2 || Fixture no: 53 || 229Mens LOCKER ROOM	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures	none taken	0.46	4,380	2,032	5	$27	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8				0.19	4,380	841	2	$5		1,191
355	Fire D North	Fire station North || Fixture no: 54 || 229Mens LOCKER ROOM	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.12	4,380	508	1	$7	Noah: || || 1 – Standard Toggle || Existing control: None Propose: 1 Wall Switch DT Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	3,723	179	0	$1		329
356	Fire D North	Fire station North || Fixture no: 55 || 229Mens LOCKER ROOM	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.22	4,380	981	2	$24	Noah: || Wet location || 1 – Standard Toggle || Existing control: None Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	4,380	228	1			753
357	Fire D North	Fire station North Floor: 2 || Fixture no: 56 || 228 Womens LOCKER ROOM IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	4,380	1,016	2	$14	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	3,723	357	1	$2		659
358	Fire D North	Fire station North || Fixture no: 57 || 228 Womens LOCKER ROOM	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.06	4,380	254	1	$3	Noah: || || 1 – Standard Toggle || Existing control: None Propose 1 Wall Switch DT Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	3,723	89	0	$0		165
359	Fire D North	Fire station North || Fixture no: 58 || 228 Womens LOCKER ROOM	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.11	4,380	491	1	$12	Noah: || || 1 – Standard Toggle || Existing control: None Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	4,380	114	0			377
360	Fire D North	Fire station North || Fixture no: 59 || 2 nd floor RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,227	129	1	$2	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,227	53	0	$0		76
361	Fire D North	Fire station North || Fixture no: 60 || Rm 8 Office (Private)	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,969	178	1	$8	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	2,969	36	0	$1		143

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
362	Fire D North	Fire station North || Fixture no: 61 || Rm 8	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
363	Fire D North	Fire station North Floor: 2 || Fixture no: 62 || Rooms Storage Storage (active)	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.05	188	9	0	$0	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	188	2	0			6
364	Fire D North	Fire station North || Fixture no: 63 || Rm 7	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
365	Fire D North	Fire station North || Fixture no: 64 || Rm 7	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
366	Fire D North	Fire station North || Fixture no: 65 || Rm 6	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
367	Fire D North	Fire station North || Fixture no: 66 || Rm 6	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
368	Fire D North	Fire station North || Fixture no: 67 || Rm 5	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
369	Fire D North	Fire station North || Fixture no: 68 || Rm 5	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
370	Fire D North	Fire station North || Fixture no: 69 || Rm 4	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
371	Fire D North	Fire station North || Fixture no: 70 || Rm 4	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
372	Fire D North	Fire station North || Fixture no: 71 || Rm 3	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
373	Fire D North	Fire station North || Fixture no: 72 || Rm 3	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
374	Fire D North	Fire station North || Fixture no: 73 || Rm 2	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 2 – Standard Toggle || Silver/Metalic switch w/ Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3	0	$0		12
375	Fire D North	Fire station North || Fixture no: 74 || Rm 2	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.09	251	23	1	$1	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2				0.03	251	7	0			17
376	Fire D North	Fire station North Floor: 2 || Fixture no: 75 || Rm 1	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	251	41	2	$1	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	188	14	1	$0		27
377	Fire D North	Fire station North Floor: 2 || Fixture no: 76 || Rooms Storage Hallway	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	5		Already Controlled	1	Upgrade Fixtures	none taken	0.23	3,723	856	2	$25	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	5		Already Controlled	1	0.07	3,723	242	1			614
378	Fire D North	Fire station North || Fixture no: 77 || Rooms Storage	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.18	1,420	256		$14	Noah: Loc.Color: Painted || || Auditor Suggests: Retrofit	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	6				0.04	1,420	51		$1		204
379	Fire D North	Fire station North || Fixture no: 78 || Exterior Exterior (Perimeter)	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	24				Upgrade Fixtures	none taken	0.72	4,380	3,154		$114	Noah: || || Auditor Suggests: Retrofit	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	24				0.24	4,380	1,051		$7		2,102
380	Fire D North	Fire station North || Fixture no: 79 || Exterior	EWHPS70	Existing Wall Pack High Pressure Sodium 70 watt Lamp	6				Upgrade Fixtures	none taken	0.55	4,380	2,391		$36	Noah: || Unsure of technology need to verify I did not have a ladder that tall || jst: same as other FS - verify as it is an	LEDR24	24 watt HIDtoLED Lamp- Light Efficient Design -bypass ballast	6				0.14	4,380	631				1,761
381	Fire D North	Fire station North || Fixture no: 80 || Exterior	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.06	4,380	245		$6	Noah: Loc.Color: Painted Ceil ht: 12 || Wet location picture || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	1				0.01	4,380	57				188
382	Fire D North	Fire station North || Fixture no: 81 || Exterior	ESBLED100	Existing Shoebox LED 100 watts	2				Remain As Is	none taken	0.20	4,380	876		$0	Noah: || || Auditor Suggests: Exclude	ESBLED100	Existing Shoebox LED 100 watts	2				0.20	4,380	876		$0	Noah: || || Auditor Suggests: Exclude	
383	Training	Training building || Fixture no: 1 || 101/102 Entry/lobby Hallway	EDI5432N	Existing Direct/Indirect Fixture 8' 4L F32 T8 Lamps, NBF Ballast	4				Upgrade Fixtures & Controls	Ave: 36.4 || 34, 38, 36, 36, 38	0.45	2,614	1,171	4	$33	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: Liquid Tight color: White	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.19	2,222	427	2	$2		744
384	Training	Training building || Fixture no: 3 || 101/102 Entry/lobby	E~14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,614	606	2	$9	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 1 – Standard Toggle || Silver/Metalic switch	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	2	0.10	2,222	213	1	$1		393
385	Training	Training building || Fixture no: 4 || 101/102 Entry/lobby	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.11	2,614	293	1	$7	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: White Switched with other tech Auditor Suggests: Replace	LED4PH8-2	Retrofit 4 Pin LED -(2) lamp 8W G24q - Horizontal, Maxlite	2	384	Controlled by a device on another line		0.03	2,222	71	0	$1		222
386	Training	Training building || Fixture no: 5 || 101/102 Entry/lobby	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
387	Training	Training building || Fixture no: 2 || 103 Office	EVT2240BX	Existing 2X2 Volum. Troffer with (2) PLL CFL 40w Biax	4				Upgrade Fixtures & Controls	none taken	0.32	2,614	836	3	$15	Noah: Loc.Color: White Ceil ht: 10 || lens dim: 5.5x2 || Fix Color: White 1 – Standard Toggle || Ivory switch w/	22BX23-2	Retrofit 2L 22" PLL 2G11 to 23W type B	4		Wall Switch Sensor, PIR, 1 pole	1	0.16	2,222	409	2	$1		428
388	Training	Training building || Fixture no: 6 || 104 Office	EVT2240BX	Existing 2X2 Volum. Troffer with (2) PLL CFL 40w Biax	2				Upgrade Fixtures & Controls	none taken	0.16	2,614	418	2	$7	Noah: Loc.Color: White Ceil ht: 10 || lens dim: 5.5x2 || Fix Color: White 1 – Standard Toggle || Ivory switch w/	22BX23-2	Retrofit 2L 22" PLL 2G11 to 23W type B	2		Wall Switch Sensor, PIR, 1 pole	1	0.09	2,222	204	1	$1		214
389	Training	Training building || Fixture no: 7 || 105 Office	EVT2240BX	Existing 2X2 Volum. Troffer with (2) PLL CFL 40w Biax	4				Upgrade Fixtures & Controls	none taken	0.32	2,614	836	3	$15	Noah: Loc.Color: White Ceil ht: 10 || lens dim: 5.5x2 || Fix Color: White 1 – Standard Toggle || Ivory switch w/	22BX23-2	Retrofit 2L 22" PLL 2G11 to 23W type B	4		Wall Switch Sensor, PIR, 1 pole	1	0.18	2,222	409	2	$1		428
390	Training	Training building || Fixture no: 8 || RRW Restroom	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	Ave: 14 || 13, 14, 16, 12, 15	0.11	2,222	249	1	$6	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests:	LED4PH8-2	Retrofit 4 Pin LED -(2) lamp 8W G24q - Horizontal, Maxlite	2		Already Controlled	1	0.03	2,222	71	0	$1		178
391	Training	Training building || Fixture no: 9 || RRW Restroom	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,222	373	2	$10	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests:	LED4PH8-2	Retrofit 4 Pin LED -(2) lamp 8W G24q - Horizontal, Maxlite	3		Already Controlled	1	0.05	2,222	107	0	$1		267
392	Training	Training building || Fixture no: 10 || 110 class Hallway	ED12632N	Existing Direct/Indirect Fixture 12' 6L F32 T8 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	none taken	0.48	2,614	1,255	5	$33	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: Liquid Tight color: White	4TLED12-6	Retrofit 6L to 4' TLED type B - 12w - bypass ballast	3		(1) Wireless Wall PIR with 1 PowPak	1	0.22	2,222	480	2	$3		775
393	Training	Training building || Fixture no: 11 || 110 class	E~14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12				Upgrade Fixtures & Controls	none taken	0.70	2,614	1,819	7	$27	Noah: Loc.Color: Painted Ceil ht: 8 || || Socket % damaged: 25 1 – Standard Toggle || Silver/Metalic switch	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	12		Wall Switch Sensor, DT, 1 pole	2	0.29	2,222	640	3	$4		1,178
394	Training	Training building || Fixture no: 12 || 110 class	ECFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.17	2,614	439	2	$11	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: White jst: no qty given, estimate 3	LED4PH8-2	Retrofit 4 Pin LED -(2) lamp 8W G24q - Horizontal, Maxlite	3				0.05	2,614	125	0	$1		314

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
365	Training	Training building || Fixture no: 13 || 110 class	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
366	Training	Training building || Fixture no: 14 || 109 class Hallway	ED12632N	Existing Direct/indirect Fixture 12' 6L F32 T8 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	none taken	0.48	2,614	1,255	5	$33	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: Liquid Tight color: White	4TLED12-6	Retrofit 6L to 4' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.22	2,222	480	2	$3		775
367	Training	Training building || Fixture no: 17 || 109 class	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
368	Training	Training building || Fixture no: 16 || 111 storage Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
369	Training	Training building || Fixture no: 19 || 112 storage Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
400	Training	Training building || Fixture no: 20 || 113 storage Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
401	Training	Training building || Fixture no: 25 || Exterior Exterior (Perimeter)	EDFLP26	Existing CFL Pin Based 26 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.18	4,380	788		$29	Noah: Loc.Color: Painted || See photos of mounting there are strips needing to be cut if replaced not retrofitted || Fix	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	6				0.06	4,380	263		$2		526
402	Training	Warehouse || Fixture no: 21 || Main Warehouse	EH8432N	Existing Hood 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12				Upgrade Fixtures & Controls	Ave: 31.4 || 28, 30, 32, 34, 33	1.34	2,614	3,513	13	$100	Noah: Loc.Color: White Ceil ht: 18 || || Socket % damaged: 25 Fix Color: White Mounting: Chain length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	12		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.58	2,222	1,280	6	$7		2,233
403	Training	Warehouse || Fixture no: 22 || Main	ELEDLAMP9	Existing LED Lamp 9 watts	6				Remain As Is	none taken	0.05	2,614	141	1	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP9	Existing LED Lamp 9 watts	6				0.05	2,614	141	1	$0	Noah: || || Auditor Suggests: Exclude	
404	Training	Warehouse || Fixture no: 23 || Storage tower	EDFLP26	Existing CFL Pin Based 26 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	1,420	85		$4	Noah: Loc.Color: Wood Light || || Auditor Suggests: Retrofit	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	2				0.02	1,420	28		$0		57
405	Training	Warehouse || Fixture no: 24 || Exterior Exterior (Perimeter)	EAVMH70	Existing Wall Pack Metal Halide 70 watt Lamp	5				Upgrade Fixtures	none taken	0.45	4,380	1,971		$30	Noah: || ||	NXTWLED30P	New Cooper Crosstour LED Wallpack, 26 watts, 2710lm+ Photocell	5				0.13	4,380	569				1,402
406	Training	Tower shed || Fixture no: 26 || Exterior Exterior (Perimeter)	EAVMH70	Existing Wall Pack Metal Halide 70 watt Lamp	1				Upgrade Fixtures	none taken	0.09	4,380	394		$6	Noah: Loc.Color: Painted || || Fix Color: Bronze Existing control: Fixture MountedPic: Auditor Suggests: Replace	NXTWLED30P	New Cooper Crosstour LED Wallpack, 26 watts, 2710lm+ Photocell	1				0.03	4,380	114				280
407	Training	Tower shed || Fixture no: 27 || Bay Warehouse	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	2,614	606	2	$9	Noah: Loc.Color: White Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	2,614	251	1	$1		356
408	Training	Tower || Fixture no: 28 || Exterior Exterior (Perimeter)	E1HPS70	Existing Fixture High Pressure Sodium 70 watt Lamp	4				Upgrade Fixtures	none taken	0.36	4,380	1,594		$24	Noah: Loc.Color: Brick || || Fix Color: Black Auditor Suggests: Replace	LEDR30	30 watt HIDtoLED Lamp External Driver - Light Efficient Design -bypass ballast	4				0.12	4,380	526				1,068
409	Training	Tower || Fixture no: 29 || Garage Storage (active)	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: Wood Light Ceil ht: 20 || lens dim: Standard || Socket % damaged: 25 Fix Color: White Conduit:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	1,420	68		$0		97
410	Training	Tower || Fixture no: 30 || House simulation	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	2,614	758	3	$11	Noah: Ceil ht: 20 || || Lenses needed: 2dim: Standard || Socket % damaged: 25 Fix Color: White Conduit:	NVT4-47	New Vapcrt Tight LED 1x4, 47w, 4686lm	5				0.24	2,614	614	2			144
411	Training	Tower || Fixture no: 31 || Stairwell	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	17				Upgrade Fixtures	none taken	0.99	2,614	2,577	10	$38	Noah: Ceil ht: 20 || || Lenses needed: 4dim: Standard || Socket % damaged: 25 Fix Color: White Conduit:	NVT4-47	New Vapcrt Tight LED 1x4, 47w, 4686lm	17				0.80	2,614	2,089	8			489
412	Police Dept	Ground floor || Interior Fixture no: 175 || Elevator landing Hallway	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7				Upgrade Fixtures	none taken	0.38	8,760	3,311	4	$45	Noah: Loc.Color: White Ceil ht: 8 || Plenum || Socket % damaged: 25 Fix Color: White Auditor Suggests:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	7				0.17	8,760	1,472	2	$8		1,840
413	Police Dept	Ground floor || Interior Fixture no: 176 || Elevator landing	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || ||	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || ||	
414	Police Dept	Ground floor || Interior Fixture no: 177 || Holding area Office (Open)	ET4432N	Existing Prismatic Troffer 2x4 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.45	8,760	3,924	4	$37	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White On 240' Auditor Suggests:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4				0.19	8,760	1,682	2	$9		2,243
415	Police Dept	Ground floor Floor: G || Interior Fixture no: 178 || 126 storage Storage (inactive)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.03	251	8	0	$0	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ivory plate.. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	188	2	0	$0		6
416	Police Dept	Ground floor || Interior Fixture no: 179 || Holding area 2 Office (Open)	ET4432N	Existing Prismatic Troffer 2x4 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	25				Upgrade Fixtures	none taken	2.80	8,760	24,528	28	$228	Noah: Loc.Color: White Ceil ht: 10 || || 14 are Battery back up || Socket % damaged: 25 Fix Color: White Auditor	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	25				1.20	8,760	10,512	12	$58		14,016
417	Police Dept	Ground floor || Interior Fixture no: 180 || Holding area 2	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
418	Police Dept	Ground floor || Interior Fixture no: 181 || Holding area 2 Office (Open)	E**14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	16				Upgrade Fixtures	none taken	0.93	8,760	8,129	9	$102	Noah: Loc.Color: White Ceil ht: 10 || 6 are battery backup || Socket % damaged: 25 Fix Color: White 24 hr	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	16				0.38	8,760	3,364	4	$19		4,765
419	Police Dept	Ground floor || Interior Fixture no: 182 || Holding area 2	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
420	Police Dept	Ground floor Floor: G || Interior Fixture no: 183 || 112a storage Storage (inactive)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	251	29	1	$1	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White Mounting: Chain length: 9dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9	0	$0		20
421	Police Dept	Ground floor Floor: G || Interior Fixture no: 184 || 138 electrical Storage (inactive)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.10	251	24	1	$1	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ivory plate.. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.04	188	7	0	$0		17
422	Police Dept	Ground floor Floor: G || Interior Fixture no: 185 || 105 storage IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 8 || || Lenses needed: 1dim: || Fix Color: White 1 – Standard Toggle || Ivory	NVT4-47	New Vapcrt Tight LED 1x4, 47w, 4686lm	2		Wall Switch Sensor, PIR, 1 pole	1	0.09	1,420	133				31
423	Police Dept	Ground floor Floor: G || Interior Fixture no: 186 || 110 electrical IT/Mech/Elec	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.03	1,420	45		$1	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ivory plate.. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	17		$0		28
424	Police Dept	Ground floor || Interior Fixture no: 187 || Hall Hallway	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.18	8,760	1,577	2	$45	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: Silver Always on jst estimating egress	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	5				0.07	8,760	569	1			1,007
425	Police Dept	Ground floor Floor: G || Interior Fixture no: 188 || 146 electrical Storage (inactive)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.10	251	24	1	$1	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ivory plate.. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.04	188	7	0	$0		17
426	Police Dept	Ground floor || Interior Fixture no: 189 || 146 electrical	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.09	1,420	121		$2	Noah: Loc.Color: White Ceil ht: 8 || || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.04	1,420	51		$0		70
427	Police Dept	Ground floor Floor: G || Interior Fixture no: 190 || IT IT/Mech/Elec	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.17	8,760	1,524	2	$19	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White Mounting: Chain length: 9dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	6,570	473	1	$3		1,051

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
428	Police Dept	Ground floor ‖ Interior Fixture no: 191 ‖ 129 Mens locker room Locker	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	15				Upgrade Fixtures & Controls	Ave: 36.25 ‖ 35, 36, 36, 36, 38	1.28	8,760	11,169	13	$116	Noah: Loc.Color: White Cell ht: 10 ‖ 6 24 hour burns ‖ Lenses needed: 4dim: Standard ‖ Socket % damaged:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	15		(4) Wireless Ceiling PIR with 1 PowPak	1	0.54	6,570	3,548	5	$20		7,621
429	Police Dept	Ground floor ‖ Interior Fixture no: 192 ‖ 129 Mens locker room	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		none taken		Upgrade Fixtures & Controls	none taken	0.07	8,760	631	1	$18	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	2	428	Controlled by a device on another line		0.03	6,570	171	0			460
430	Police Dept	Ground floor ‖ Interior Fixture no: 193 ‖ 129 Mens locker room	EDFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	3		none taken		Upgrade Fixtures & Controls	none taken	0.17	8,760	1,472	2	$34	Noah: Loc.Color: Painted Cell ht: 10 ‖ Wet locations ‖ Fix Color: White Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	3	428	Controlled by a device on another line		0.04	6,570	256	0			1,215
431	Police Dept	Ground floor ‖ Interior Fixture no: 194 ‖ 129 Mens locker room	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	4		none taken		Upgrade Fixtures & Controls	none taken	0.17	8,760	1,472	2	$45	Noah: Loc.Color: Painted ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	4	428	Controlled by a device on another line		0.10	6,570	631	1	$4		841
432	Police Dept	Ground floor ‖ Interior Fixture no: 195 ‖ 129 Mens locker room	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		none taken		Upgrade Fixtures & Controls	none taken	0.17	8,760	1,524	2	$19	Noah: ‖ ‖ jst: no qty given, estimating 3	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3	428	Controlled by a device on another line		0.07	6,570	473	1	$3		1,051
433	Police Dept	Ground floor ‖ Interior Fixture no: 196 ‖ 133 Womens locker room Locker	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		none taken		Upgrade Fixtures & Controls	none taken	0.68	8,760	5,957	7	$92	Noah: Loc.Color: White Cell ht: 10 ‖ 3 24 hour burns ‖ Lenses needed: 4dim: Standard ‖ Socket % damaged:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8		(4) Wireless Ceiling PIR with 1 PowPak	1	0.29	6,570	1,892	3	$11		4,065
434	Police Dept	Ground floor ‖ Interior Fixture no: 197 ‖ 133 Womens locker room	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		none taken		Upgrade Fixtures & Controls	none taken	0.07	8,760	631	1	$18	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	2	433	Controlled by a device on another line		0.03	6,570	171	0			460
435	Police Dept	Ground floor ‖ Interior Fixture no: 198 ‖ 133 Womens locker room	EDFLP226	Existing CFL Pin Based with 2 - 26 watt Lamp(s)	3		none taken		Upgrade Fixtures & Controls	none taken	0.17	8,760	1,472	2	$34	Noah: Loc.Color: Painted Cell ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	3	433	Controlled by a device on another line		0.04	6,570	256	0			1,215
436	Police Dept	Ground floor ‖ Interior Fixture no: 199 ‖ 133 Womens locker room	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	4		none taken		Upgrade Fixtures & Controls	none taken	0.17	8,760	1,472	2	$45	Noah: Loc.Color: Painted ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	4	433	Controlled by a device on another line		0.10	6,570	631	1	$4		841
437	Police Dept	Ground floor ‖ Interior Fixture no: 200 ‖ 133 Womens locker room	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2		none taken		Upgrade Fixtures & Controls	none taken	0.12	8,760	1,016	1	$13	Noah: ‖ ‖ jst: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2	433	Controlled by a device on another line		0.05	6,570	315	0	$2		701
438	Police Dept	Ground floor ‖ Interior Fixture no: 201 ‖ Evidence Office (Open)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	Ave: 38 ‖ 36, 38, 38, 39, 39	0.25	3,310	834	3	$18	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Socket %: damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	4		Already Controlled	1	0.10	3,310	344	1	$2		490
439	Police Dept	Ground floor ‖ Interior Fixture no: 202 ‖ Evidence	ET4132N	Existing Prismatic Troffer 2x4 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.06	4,697	301	1	$6	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.02	4,667	113	0	$1		188
440	Police Dept	Ground floor ‖ Interior Fixture no: 203 ‖ 142Evidence Office (Open)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	none taken	0.25	3,310	834	3	$18	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Socket %: damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	4		Already Controlled	1	0.10	3,310	344	1	$2		490
441	Police Dept	Ground floor ‖ Interior Fixture no: 204 ‖ 142Evidence	ET4132N	Existing Prismatic Troffer 2x4 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.03	6,262	200	0	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1				0.01	6,262	75	0	$0		125
442	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 205 ‖ 134 B Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	31		none taken		Upgrade Fixtures & Controls	none taken	1.80	1,420	2,553		$46	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White Mounting: Chain length: 9dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	31		(6) Wireless Ceiling PIR with 1 PowPak	1	0.74	1,420	1,056		$6		1,497
443	Police Dept	Ground floor ‖ Interior Fixture no: 206 ‖ Evidence 1 Hallway	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	251	9	0	$1	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	251	3	0			6
444	Police Dept	Ground floor ‖ Interior Fixture no: 207 ‖ Evidence 2 Hallway	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	251	9	0	$1	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	251	3	0			6
445	Police Dept	Ground floor ‖ Interior Fixture no: 208 ‖ Evidence 3 Hallway	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	251	9	0	$1	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	251	3	0			6
446	Police Dept	Ground floor ‖ Interior Fixture no: 209 ‖ Evidence 4 Hallway	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	251	9	0	$1	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	251	3	0			6
447	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 210 ‖ Drug vault Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		none taken		Upgrade Fixtures & Controls	none taken	0.29	1,420	412		$7	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White Mounting: Chain length: 9dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, PIR, 1 pole	1	0.12	1,420	170		$1		241
448	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 211 ‖ 143 Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		none taken		Upgrade Fixtures & Controls	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White Mounting: Chain length: 9dim: color: 1 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	1,420	68		$0		97
449	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 212 ‖ 160 Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		none taken		Upgrade Fixtures & Controls	none taken	0.46	1,420	659		$12	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White Mounting: Chain length: 9dim: color: 2 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Wall Switch Sensor, PIR, 1 pole	2	0.19	1,420	273		$2		386
450	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 213 ‖ 166 IT/Mech/Elec	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		none taken		Upgrade Fixtures & Controls	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White Mounting: Chain length: 9dim: color: 2 – Standard	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	1,420	68		$0		97
451	Police Dept	Ground floor Floor: G ‖ Interior Fixture no: 214 ‖ Evidence garage Storage (inactive)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	23		none taken		Upgrade Fixtures & Controls	none taken	0.74	251	185	7	$6	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	23		(6) Wireless Ceiling PIR with 1 PowPak	1	0.28	188	52	3	$0		133
452	Police Dept	Main floor Floor: 1 ‖ Interior Fixture no: 77 ‖ Lobby Hallway	EDFLP26	Existing CFL Pin Based 26 watt Lamp(s)	13				Upgrade Fixtures	Ave: 31.4 ‖ 30, 32, 31, 30, 34	0.38	8,760	3,416	4	$118	Noah: Loc.Color: White Cell ht: 10 ‖ Same as 3rd floor ‖ Fix Color: Silver 0 – Breakers ‖ jst: estimating egress	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	13				0.17	8,760	1,480	2			1,936
453	Police Dept	Main floor ‖ Interior Fixture no: 78 ‖ Lobby	ESFOTLED10	Existing Spot LED 10 watts	3				Remain As Is	none taken	0.03	6,262	188	0	$0	Noah: Cell ht: 24 ‖ ‖ Fix Color: Silver Auditor Suggests: Exclude	ESPOTLED10	Existing Spot LED 10 watts	3				0.03	6,262	188	0	$0	Noah: Cell ht: 24 ‖ ‖ Fix Color: Silver Auditor Suggests: Exclude	
454	Police Dept	Main floor ‖ Interior Fixture no: 79 ‖ Lobby	EVAN6172NT8	Existing Vanity 6' 1L F72 T8 Lamp, NBF Ballast	2				Upgrade Fixtures	none taken	0.17	6,262	1,065	2	$26	Noah: Loc.Color: Painted ‖ See photos ‖ Socket %: damaged: 25 Fix Color: Silver Mounting: Rigid Pendant length:	6TLED31-1	Retrofit 1L to 7' TLED type B - 31w - bypass ballast, change sockets to R17d	2				0.06	6,262	388	1			676
455	Police Dept	Main floor ‖ Interior Fixture no: 80 ‖ Lobby	ELEDLAMP100	Existing LED Lamp 100 watts	4				Remain As Is	none taken	0.40	6,262	2,505	4	$0	Noah: Loc.Color: Wood Light Cell ht: 35 ‖ ‖ Fix Color: Silver Mounting: Rigid Pendant length: 4 dim: 1/2 color:	ELEDLAMP100	Existing LED Lamp 100 watts	4				0.40	6,262	2,505	4	$0	Noah: Loc.Color: Wood Light Cell ht: 35 ‖ ‖ Fix Color: Silver Mounting: Rigid Pendant length: 4 dim: 1/2 color:	
456	Police Dept	Main floor ‖ Interior Fixture no: 81 ‖ Lobby	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		none taken		Upgrade Fixtures	none taken	0.35	6,262	2,179	3	$28	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket %: damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	6,262	902	1	$5		1,277
457	Police Dept	Main floor ‖ Interior Fixture no: 82 ‖ Lobby	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
458	Police Dept	Main floor ‖ Interior Fixture no: 83 ‖ 208 Elivator equipment Storage (inactive)	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	251	15	1	$0	Noah: Loc.Color: Painted Cell ht: 8 ‖ lens dirt: Missing ‖ Socket %: damaged: 25 Fix Color: White Auditor	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6	0	$0		9
459	Police Dept	Main floor ‖ Interior Fixture no: 84 ‖ 238 Office (Private)	EYT4254H	Existing Volum, Troffer 4' 2L F54 T5 Lamps, HBF Ballast	3				Upgrade Fixtures & Controls	Ave: 35.5 ‖ 36, 34, 37, 35,	0.36	4,138	1,490	4	$17	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket %: damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TSLED25-2	Retrofit 2L to 4' TLED T5HO type B - 25w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.15	3,310	497	2	$1		993
460	Police Dept	Main floor ‖ Interior Fixture no: 85 ‖ 241 Office (Private)	EYT4254H	Existing Volum, Troffer 4' 2L F54 T5 Lamps, HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	4,138	993	2	$11	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket %: damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TSLED25-2	Retrofit 2L to 4' TLED T5HO type B - 25w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.10	3,310	331	1	$1		662

AMERESCO
Green • Clean • Sustainable

Site Information			Existing															Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
461	Police Dept	Main floor ‖ Interior Fixture no: 86 ‖ 242 JC Storage (active)	EDFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	9		$0		23
462	Police Dept	Main floor ‖ Interior Fixture no: 87 ‖ 243 Briefing Office (Open)	EYT4254H	Existing Vellum, Troffer 4' 2L F54 T5 Lamps, HBF Ballast	15				Upgrade Fixtures & Controls	Ave: 45.4 ‖ 44, 45, 46, 44, 48	1.80	4,138	7,448	18	$84	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 4 – Standard Toggle ‖ Ivory	4TSLED25-2	Retrofit 2L to 4' TLED TSHO type B - 25w - bypass ballast	15		(1) Ceiling Mount PIR, 2 Power Packs	1	0.75	3,310	2,483	8	$7		4,966
463	Police Dept	Main floor ‖ Interior Fixture no: 88 ‖ 244 closet 1 Storage (active)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.03	1,420	45		$1	Noah: Loc.Color: White Cell ht: 8 ‖ Switched outside of door moved to inside of door. ‖ Fix Color: White 1 –	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	17		$0		28
464	Police Dept	Main floor ‖ Interior Fixture no: 89 ‖ 244 closet 2 Storage (active)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.06	1,420	91		$2	Noah: Loc.Color: White Cell ht: 8 ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.02	1,420	34		$0		57
465	Police Dept	Main floor ‖ Interior Fixture no: 90 ‖ RRM Restroom	EVAN2117N	Existing Vanity 2' 1L F17 T8 Lamps, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	4,697	80	0	$5	Noah: Loc.Color: Painted Cell ht: 10 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Wall Switch. Auditor Suggests:	2TLED9-1	Retrofit 1L to 2' TLED type B - 9w - bypass ballast	1		Already Controlled	1	0.01	4,667	47	0	$0		33
466	Police Dept	Main floor ‖ Interior Fixture no: 91 ‖ RRM	EQRCFC12T9	Existing Circline Lamp FC12T9 (verify wattage)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	4,697	94	0	$5	Noah: ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	NWCLED17	New White Contemporary 13" Round, 17w LED, Maxlite, 1100lm	1		Already Controlled	1	0.02	4,667	80	0			14
467	Police Dept	Main floor ‖ Interior Fixture no: 92 ‖ RRW Restroom	EVAN2117N	Existing Vanity 2' 1L F17 T8 Lamps, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	4,697	80	0	$5	Noah: Loc.Color: Painted Cell ht: 10 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Wall Switch. Auditor Suggests:	2TLED9-1	Retrofit 1L to 2' TLED type B - 9w - bypass ballast	1		Already Controlled	1	0.01	4,667	47	0	$0		33
468	Police Dept	Main floor ‖ Interior Fixture no: 93 ‖ RRW	EQRCFC12T9	Existing Circline Lamp FC12T9 (verify wattage)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	4,697	94	0	$5	Noah: ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	NWCLED17	New White Contemporary 13" Round, 17w LED, Maxlite, 1100lm	1		Already Controlled	1	0.02	4,667	80	0			14
469	Police Dept	Main floor ‖ Interior Fixture no: 94 ‖ 243 Briefing Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9				Upgrade Fixtures & Controls	none taken	0.77	4,138	3,166	8	$35	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 4 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	9		(1) Ceiling Mount PIR, 4 Power Packs	1	0.32	3,310	1,073	3	$6		2,093
470	Police Dept	Main floor ‖ Interior Fixture no: 95 ‖ 265sergeant Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7				Upgrade Fixtures & Controls	none taken	0.60	4,138	2,462	6	$27	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 4 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	7		(1) Ceiling Mount PIR, 4 Power Packs	1	0.25	3,310	834	3	$5		1,628
471	Police Dept	Main floor ‖ Interior Fixture no: 96 ‖ 267 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 36.8 ‖ 38, 38, 36, 35, 37	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
472	Police Dept	Main floor ‖ Interior Fixture no: 97 ‖ 268 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
473	Police Dept	Main floor ‖ Interior Fixture no: 98 ‖ 266 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
474	Police Dept	Main floor ‖ Interior Fixture no: 99 ‖ 269 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
475	Police Dept	Main floor ‖ Interior Fixture no: 100 ‖ 270 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
476	Police Dept	Main floor ‖ Interior Fixture no: 101 ‖ 271 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
477	Police Dept	Main floor ‖ Interior Fixture no: 102 ‖ 272 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
478	Police Dept	Main floor ‖ Interior Fixture no: 103 ‖ 273 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
479	Police Dept	Main floor ‖ Interior Fixture no: 104 ‖ 274 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
480	Police Dept	Main floor ‖ Interior Fixture no: 105 ‖ 275 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
481	Police Dept	Main floor ‖ Interior Fixture no: 106 ‖ 276 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
482	Police Dept	Main floor ‖ Interior Fixture no: 107 ‖ 277 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
483	Police Dept	Main floor ‖ Interior Fixture no: 108 ‖ Stairwell Hallway	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.11	8,760	946	1	$13	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	8,760	420	0	$2		526
484	Police Dept	Main floor ‖ Interior Fixture no: 109 ‖ Stairwell	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	6,262	726	1	$9	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	6,262	301	0	$2		426
485	Police Dept	Main floor ‖ Interior Fixture no: 110 ‖ Exercise hall Hallway	EDI8232N	Existing Direct / Indirect 8' 2L F32 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.06	8,760	508	1	$20	Noah: Loc.Color: Painted Cell ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 0 – ‖ Auditor Suggests:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	8,760	210	0	$1		298
486	Police Dept	Main floor ‖ Interior Fixture no: 111 ‖ 257 exercise Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12		Already Controlled	1	Upgrade Fixtures	none taken	1.02	3,310	3,377	10	$40	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	12		Already Controlled	1	0.43	3,310	1,430	4	$10		1,947
487	Police Dept	Main floor ‖ Interior Fixture no: 112 ‖ 257 exercise	ET2317N	Existing Troffer 2' 3L F17 T8 Lamps, NBF Ballast	2				Upgrade Fixtures	none taken	0.10	6,262	626	1	$19	Noah: ‖ ‖ Socket % damaged: 25 Auditor Suggests: Retrofit	2TLED9-3	Retrofit 3L to 2' TLED type B - 9w - bypass ballast	2				0.05	6,262	338	1	$2		288
488	Police Dept	Main floor ‖ Interior Fixture no: 113 ‖ 253 vault Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Fix Color: White 2 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	1,420	68		$0		97
489	Police Dept	Main floor ‖ Interior Fixture no: 114 ‖ 257 exercise Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		Already Controlled	1	Upgrade Fixtures	none taken	0.68	3,310	2,251	7	$27	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 3 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8		Already Controlled	1	0.29	3,310	953	3	$7		1,298
490	Police Dept	Main floor ‖ Interior Fixture no: 115 ‖ 257 exercise	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	9		Already Controlled	1	Upgrade Fixtures	none taken	0.32	4,697	1,522	3	$46	Noah: Cell ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: Silver 1 – Standard Toggle ‖ Ivory switch w/ Ivory	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	9		Already Controlled	1	0.12	4,667	549	1			972
491	Police Dept	Main floor ‖ Interior Fixture no: 116 ‖ 257 exercise	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.06	4,697	301	1	$6	Noah: ‖ Under cabinet ‖ jst: estimating egress	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.02	4,667	113	0	$1		188
492	Police Dept	Main floor ‖ Interior Fixture no: 117 ‖ 257 exercise	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
493	Police Dept	Main floor ‖ Interior Fixture no: 118 ‖ 220 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
484	Police Dept	Main floor ||Interior Fixture no: 119 || 228 RRM Restroom	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.13	4,697	592	1	$19	Noah: Loc,Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – || Existing control: Ceiling Auditor Suggests:	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	4,667	338	1	$3		254
485	Police Dept	Main floor ||Interior Fixture no: 120 || 228 RRM	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	4		Already Controlled	1	Upgrade Fixtures	none taken	0.14	4,697	676	1	$20	Noah: || || Fix Color: Silver jst: estimating egress	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4		Already Controlled	1	0.05	4,667	244	1			432
486	Police Dept	Main floor ||Interior Fixture no: 121 || 227 RRW Restroom	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.13	4,697	592	1	$19	Noah: Loc,Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – || Existing control: Ceiling Auditor Suggests:	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	4,667	338	1	$3		254
487	Police Dept	Main floor ||Interior Fixture no: 122 || 227 RRW	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	4		Already Controlled	1	Upgrade Fixtures	none taken	0.14	4,697	676	1	$20	Noah: || || Fix Color: Silver jst: estimating egress	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4		Already Controlled	1	0.05	4,667	244	1			432
488	Police Dept	Main floor ||Interior Fixture no: 123 || Mail room Office (Open)	E^14132N	Existing Prismatic Troffer 1x4 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	none taken	0.16	8,760	1,402	2	$25	Noah: Loc,Color: White Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.06	6,570	394	1	$2		1,007
489	Police Dept	Main floor ||Interior Fixture no: 124 || 229 copy room Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	3,310	281	1	$3	Noah: Loc,Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White 1 – || Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	3,310	119	0	$1		162
500	Police Dept	Main floor ||Interior Fixture no: 125 || Records Storage (active)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.46	1,420	659		$12	Noah: Loc,Color: White Ceil ht: 8 || || Fix Color: White 2 – Standard Toggle || Ivory switch w/ Ivory plate,. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Wall Switch Sensor, PIR, 2 pole	1	0.19	1,420	273		$2		386
501	Police Dept	Main floor ||Interior Fixture no: 126 || 267 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.26	4,138	1,055	3	$12	Noah: Loc,Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.11	3,310	358	1	$2		698
502	Police Dept	Main floor ||Interior Fixture no: 127 || Lobby RRW Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	4,697	1,080	2	$15	Noah: Loc,Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – || Existing control: Ceiling jst: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	4,667	451	1	$3		639
503	Police Dept	Main floor ||Interior Fixture no: 128 || Lobby RRW	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3		Already Controlled	1	Upgrade Fixtures	none taken	0.11	4,697	507	1	$15	Noah: || || Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3		Already Controlled	1	0.04	4,667	183	0			324
504	Police Dept	Main floor ||Interior Fixture no: 129 || Lobby RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	4,697	1,080	2	$15	Noah: Loc,Color: Painted Ceil ht: 10 || || Fix Color: Silver 1 – || Existing control: Ceiling jst: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	4,667	451	1	$3		639
505	Police Dept	Main floor ||Interior Fixture no: 130 || Lobby RRM	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3		Already Controlled	1	Upgrade Fixtures	none taken	0.11	4,697	507	1	$15	Noah: || || Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3		Already Controlled	1	0.04	4,667	183	0			324
506	Police Dept	Main floor ||Interior Fixture no: 131 || 235 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	Ave: 25.6 || 28, 26, 25, 27, 24	0.09	4,138	352	1	$4	Noah: Loc,Color: White Ceil ht: 8 || Bilevel inboard outboard || Socket %: damaged: 25 Fix Color: White 2 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.04	3,310	119	0	$1		233
507	Police Dept	Main floor ||Interior Fixture no: 134 || 240 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	none taken	0.43	3,310	1,407	4	$17	Noah: Loc,Color: White Ceil ht: 10 || One fixture is 24 hour for burn || Socket %: damaged: 25 Fix Color:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.18	3,310	596	2	$4		811
508	Police Dept	Main floor ||Interior Fixture no: 135 || 226 equipment Storage (inactive)	ET2317N	Existing Troffer 2' 3L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.05	251	13	1	$1	Noah: Loc,Color: White Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate,. Existing	2TLED9-3	Retrofit 3L to 2' TLED type B - 9w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	188	5	0	$0		7
509	Police Dept	Main floor ||Interior Fixture no: 136 || 251 lactation room Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	4,138	240	1	$3	Noah: Loc,Color: White Ceil ht: 8 || lens dim: Standard || Socket %: damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	3,310	79	0	$0		161
510	Police Dept	Main floor ||Interior Fixture no: 137 || 256 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	4,138	703	2	$8	Noah: Loc,Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.07	3,310	238	1	$1		465
511	Police Dept	Main floor ||Interior Fixture no: 138 || 245 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc,Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White 1 – || Ivory switch w/ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
512	Police Dept	Main floor ||Interior Fixture no: 139 || Main hall Hallway	EYT4332N	Existing 2x4 Volum. Troffer, 3 lamp F32T8, NBF	33				Upgrade Fixtures & Controls	Ave: 31.6 || 34, 22, 28, 40, 36	2.81	8,760	24,572	28	$444	Noah: Loc,Color: White Ceil ht: 10 || Lenses needed: 12dim: || Socket %: damaged: 25 Fix Color: White Sensor	BLT24-48	New 2x4 BLT Troffer, 4880lm, 36w	33		(10) Wireless Wall PIR with 5 PowPaks	1	1.19	6,570	7,805	12			16,767
513	Police Dept	Main floor ||Interior Fixture no: 140 || Main hall	EDI6232N	Existing Direct / Indirect 8' 2L F32 T8 Lamps, NBF Ballast	16				Upgrade Fixtures & Controls	none taken	0.93	8,760	8,129	9	$328	Noah: Loc,Color: Painted Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	16	512	Controlled by a device on another line		0.38	6,570	2,523	4	$14		5,606
514	Police Dept	Main floor ||Interior Fixture no: 141 || Main hall	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	4				Upgrade Fixtures & Controls	none taken	0.14	8,760	1,261	1	$36	Noah: || || jst: estimating egress	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4	512	Controlled by a device on another line		0.05	6,570	342	1			920
515	Police Dept	Main floor ||Interior Fixture no: 142 || Main hall	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	6				Upgrade Fixtures & Controls	none taken	0.18	8,760	1,577	2	$68	Noah: || || Auditor Suggests: Retrofit	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	6	512	Controlled by a device on another line		0.04	6,570	237	0	$5		1,340
516	Police Dept	Main floor ||Interior Fixture no: 143 || Main hall	EXLED	Existing LED Exit Sign	7				Remain As Is	none taken	0.04	8,760	368		$2	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	7				0.04	8,760	368		$2	Noah: || || Auditor Suggests: Exclude	
517	Police Dept	Main floor ||Interior Fixture no: 144 || Main hall	EINC2L-10	Existing Notifier Sign Incandescent 2L 10 watt Lamps	3				Upgrade Fixtures	none taken	0.06	6,262	376	1	$9	Noah: ||In use sinage || Auditor Suggests: Retrofit	2-4WLEDB10CB	(2) 3.5 watt B10C Candle Base, Bullet Dimmable LED lamp - Sylvania	3				0.02	6,262	132	0	$2		244
518	Police Dept	Main floor ||Interior Fixture no: 145 || Courtroom: Classroom	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	38				Upgrade Fixtures	none taken	1.37	6,262	8,566	14	$247	Noah: Loc,Color: White Ceil ht: 18 || || Fix Color: Silver jst: estimating egress	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	38				0.49	6,262	3,093	5			5,473
519	Police Dept	Main floor ||Interior Fixture no: 146 || Courtroom	EDFLP26	Existing CFL Pin Based 26 watt Lamp(s)	36				Upgrade Fixtures	none taken	1.08	6,262	6,763	11	$234	Noah: Loc,Color: Wood Light Ceil ht: 24 || Unsure of technology needs to be verified || Fix Color: White jst:	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	36				0.36	6,262	2,254	4	$15		4,509
520	Police Dept	Main floor ||Interior Fixture no: 147 || Courtroom	ECFLP840	Existing Pin Based CFL Lamps 8L 40 watts	6				Upgrade Fixtures	none taken	1.92	6,262	12,023	19	$105	Noah: Loc,Color: Wood Light Ceil ht: 24 || || Fix Color: White Conduit: WireMold color: White Length: 4 Size:	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	6				0.29	6,262	1,803	3	$20		10,220
521	Police Dept	Main floor ||Interior Fixture no: 148 || Courtroom	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	
522	Police Dept	Main floor ||Interior Fixture no: 149 || 286 storage Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	1,420	494		$9	Noah: Loc,Color: White Ceil ht: 8 || lens dim: Standard || Socket %: damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	1,420	204		$1		290
523	Police Dept	Main floor ||Interior Fixture no: 150 || 297 storage Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc,Color: White Ceil ht: 8 || lens dim: Standard || Socket %: damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
524	Police Dept	Main floor ||Interior Fixture no: 151 || 284 Kitchen Kitchenette	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3		Already Controlled	1	Upgrade Fixtures	none taken	0.11	4,697	507	1	$15	Noah: Loc,Color: White Ceil ht: 8 || || Fix Color: Silver 1 – || Existing control: Wall Switch Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3		Already Controlled	1	0.04	4,667	183	0			324
525	Police Dept	Main floor ||Interior Fixture no: 152 || 182 hall Hallway	EYT4254H	Existing Volum, Troffer 4' 2L F54 T5 Lamps, HBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.12	6,262	751	1	$8	Noah: Loc,Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED25-2	Retrofit 2L to 4' TLED T5HO type B - 25w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.05	4,667	225	1	$1		517
526	Police Dept	Main floor ||Interior Fixture no: 153 || 266 court conference Conference / Meeting	EYT4254H	Existing Volum, Troffer 4' 2L F54 T5 Lamps, HBF Ballast	6				Upgrade Fixtures & Controls	none taken	0.72	4,138	2,979	7	$34	Noah: Loc,Color: White Ceil ht: 10 || 2 are 24 hour burn || Socket %: damaged: 25 Fix Color: White 2 –	4TLED25-2	Retrofit 3L to 4' TLED T5HO type B - 25w - bypass ballast	6		Wall Switch Sensor, PIR, 2 pole	1	0.30	3,310	993	3	$3		1,986

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
527	Police Dept	Main floor ‖Interior Fixture no: 154 ‖ 286 court conference	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.11	4,138	447	1	$14	Noah: Loc.Color: White ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3				0.04	4,138	161	0			286
528	Police Dept	Main floor ‖Interior Fixture no: 155 ‖ 286 court conference Conference / Meeting	EYT4254H	Existing Volum. Troffer 4' 2L F54 T5 Lamps, HBF Ballast	4				Upgrade Fixtures & Controls	none taken	0.48	4,138	1,986	5	$22	Noah: Loc.Color: White Ceil ht: 10 ‖ 1 is 24 hour burn ‖ Socket % damaged: 25 Fix Color: White 2 – Standard	4TSLED25-2	Retrofit 2L to 4' TLED TSHO type B - 25w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.20	3,310	662	2	$2		1,324
529	Police Dept	Main floor ‖Interior Fixture no: 156 ‖ 286 court conference	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.22	4,138	894	2	$27	Noah: Loc.Color: White ‖ ‖	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	6				0.08	4,138	323	1			571
530	Police Dept	Main floor ‖Interior Fixture no: 157 ‖ 286 court office Conference / Meeting	EYT4254H	Existing Volum. Troffer 4' 2L F54 T5 Lamps, HBF Ballast	4				Upgrade Fixtures & Controls	none taken	0.48	4,138	1,986	5	$22	Noah: Loc.Color: White Ceil ht: 10 ‖ 1 is 24 hour burn ‖ Socket % damaged: 25 Fix Color: White 2 – Standard	4TSLED25-2	Retrofit 2L to 4' TLED TSHO type B - 25w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.20	3,310	662	2	$2		1,324
531	Police Dept	Main floor ‖Interior Fixture no: 158 ‖ 286 court office	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.14	4,138	596	1	$18	Noah: Loc.Color: White ‖ ‖	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4				0.05	4,138	215	1			381
532	Police Dept	Main floor ‖Interior Fixture no: 159 ‖ Court offices Office (Open)	E~14132N	Existing Prismatic Troffer 1x4 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.26	4,138	1,059	3	$20	Noah: Loc.Color: White Ceil ht: 8 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	8		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	3,310	318	1	$2		742
533	Police Dept	Main floor ‖Interior Fixture no: 160 ‖ Court offices	ET2317N	Existing Troffer 2' 3L F17 T8 Lamps, NBF Ballast	3				Upgrade Fixtures	none taken	0.15	4,138	621	2	$20	Noah: ‖ ‖ Socket % damaged: 25 Auditor Suggests: Retrofit	2TLED9-3	Retrofit 3L to 2' TLED type B -9w - bypass ballast	3				0.08	4,138	335	1	$2		286
534	Police Dept	Main floor ‖Interior Fixture no: 161 ‖ 289 storage Storage (active)	EWN4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	1,420	82		$1	Noah: Loc.Color: White Ceil ht: 8 ‖ lens dirn: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	1,420	34		$0		48
535	Police Dept	Main floor ‖Interior Fixture no: 162 ‖ 290 IT Storage (inactive)	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	188	7	0	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Wall Switch Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	188	2	0			4
536	Police Dept	Main floor ‖Interior Fixture no: 163 ‖ Court RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	4,697	272	1	$4	Noah: Loc.Color: Painted Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Ceiling jst: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	4,667	113	0	$1		160
537	Police Dept	Main floor ‖Interior Fixture no: 164 ‖ Court RRM	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.18	6,262	1,127	2	$32	Noah: ‖ ‖ Fix Color: Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	5				0.07	6,262	407	1			720
538	Police Dept	Main floor ‖Interior Fixture no: 165 ‖ Court RRW Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	4,697	545	1	$7	Noah: Loc.Color: Painted Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Ceiling jst: estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	4,667	225	0	$2		319
539	Police Dept	Main floor ‖Interior Fixture no: 166 ‖ Court RRW	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.18	6,262	1,127	2	$32	Noah: ‖ ‖ Fix Color: Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	5				0.07	6,262	407	1			720
540	Police Dept	Main floor ‖Interior Fixture no: 167 ‖ Court hall Hallway	EYT4332N	Existing 2x4 Volum. Troffer, 3 lamp F32T8, NBF	6				Upgrade Fixtures	none taken	0.51	6,262	3,194	5	$58	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Lenses needed: 12dim: ‖ Socket % damaged: 25 Fix Color: White jst:	BLT24-48	New 2x4 BLT Troffer, 4880lm, 35w	6				0.22	6,262	1,353	2			1,841
541	Police Dept	Main floor ‖Interior Fixture no: 168 ‖ Court hall	ED8232N	Existing Direct / Indirect 8' 2L F32 T8 Lamps, NBF Ballast	28				Upgrade Fixtures	none taken	1.62	6,262	10,169	16	$410	Noah: Loc.Color: Painted Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White jst: no qty given, estimate 3	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	28				0.67	6,262	4,208	7	$23		5,961
542	Police Dept	Main floor ‖Interior Fixture no: 169 ‖ Court hall	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.22	6,262	1,353	2	$39	Noah: ‖ ‖ jst: no qty given, estimate 3	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	6				0.08	6,262	498	1			864
543	Police Dept	Main floor ‖Interior Fixture no: 170 ‖ Court hall	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	6				Upgrade Fixtures	none taken	0.18	6,262	1,127	2	$48	Noah: ‖ ‖ jst: no qty given - estimate 6	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	6				0.04	6,262	225	0	$5		902
544	Police Dept	Main floor ‖Interior Fixture no: 171 ‖ Court hall	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
545	Police Dept	Main floor ‖Interior Fixture no: 172 ‖ Court hall	ENC2L10	Existing Notifier Sign Incandescent 2L 10 watt Lamps	2				Upgrade Fixtures	none taken	0.04	6,262	250	0	$6	Noah: ‖ ‖ Auditor Suggests: Retrofit	2-4WLEDB10CB	(2) 3.5 watt B10C Candle Base, Bullet Dimmable LED lamp - Sylvania	2				0.01	6,262	88	0	$1		163
546	Police Dept	Main floor ‖Interior Fixture no: 173 ‖ Court entry Hallway	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.07	4,697	338	1	$10	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Wall Switch Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	4,667	122	0			216
547	Police Dept	Main floor ‖Interior Fixture no: 174 ‖ Police entry Hallway	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.07	4,697	338	1	$10	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Silver 1 – ‖ Existing control: Wall Switch Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	4,667	122	0			216
548	Police Dept	Upper floor Floor: 3 ‖Interior Fixture no: 1 ‖ Lobby /stairwell Hallway	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	4				Upgrade Fixtures & Controls	Ave: 20 ‖ 16, 20, 21, 22, 21	0.12	6,262	751	1	$26	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: Silver 0 – Breakers ‖ Propose 2 Wall Switch	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	4		Wall Switch Sensor, DT, 1 pole	1	0.05	4,667	244	1			507
549	Police Dept	Upper floor ‖Interior Fixture no: 2 ‖ Lobby /stairwell	ESPOTLED10	Existing Spot LED 10 watts	2				Remain As Is	none taken	0.02	6,262	125	0	$0	Noah: ‖ ‖	ESPOTLED10	Existing Spot LED 10 watts	2				0.02	6,262	125	0	$0	Noah: ‖ ‖	
550	Police Dept	Upper floor ‖Interior Fixture no: 3 ‖ Lobby /stairwell	EWLED20	Existing Wallpack LED 20 watts	2				Remain As Is	none taken	0.04	6,262	250	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	2				0.04	6,262	250	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
551	Police Dept	Upper floor ‖Interior Fixture no: 4 ‖ Lobby /stairwell	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.18	6,262	1,127	2	$32	Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: Brick ‖ ‖ Fix Color: Gray	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	5				0.05	6,262	313	1	$2		814
552	Police Dept	Upper floor ‖Interior Fixture no: 5 ‖ Lobby /stairwell	EWW35CMH	Existing Wall Wash, 35w Ceramic e-MH	4				Remain As Is	none taken	0.16	6,262	1,002	2	$62	Noah: Difficult, add 100% because: Height over stairs Needs: Scaffolding Loc.Color: White ‖ 26-35 see photos ‖	EWW35CMH	Existing Wall Wash, 35w Ceramic e-MH	4				0.16	6,262	1,002	2	$62	Noah: Difficult, add 100% because: Height over stairs Needs: Scaffolding Loc.Color: White ‖ 26-35 see photos ‖	
553	Police Dept	Upper floor ‖Interior Fixture no: 6 ‖ 304 JC Storage (active)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.03	1,420	45		$1	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	17		$0		28
554	Police Dept	Upper floor ‖Interior Fixture no: 7 ‖ 343 Archives Storage (active)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	1,420	179		$5	Noah: Loc.Color: White Ceil ht: 8 ‖ Could not find Ballasts ‖ Socket % damaged: 25 Fix Color: White 2 –	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	1,420	74		$0		105
555	Police Dept	Upper floor ‖Interior Fixture no: 8 ‖ 342 System tech Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	3,310	1,152	3	$17	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	3,310	477	1	$3		675
556	Police Dept	Upper floor ‖Interior Fixture no: 9 ‖ 339 Storage (active)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2				Upgrade Controls Only	none taken	0.06	1,420	80		$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	2		Wall Switch Sensor, PIR, 1 pole	2	0.06	1,420	80		$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	
557	Police Dept	Upper floor ‖Interior Fixture no: 10 ‖ 338 Training Office (Open)	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	Remain As Is	none taken	0.11	3,310	371	1	$1	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	ETLED4-2L14	Existing Troffer LED 4' 2L 14 watt Lamps	4		Already Controlled	1	0.11	3,310	371	1	$1	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	
558	Police Dept	Upper floor ‖Interior Fixture no: 11 ‖ 391 conference Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	3,310	1,152	3	$17	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	3,310	477	1	$3		675
559																															

AMERESCO
Green • Clean • Sustainable

Site Information			Existing															Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
560																													
561	Police Dept	Upper floor ‖Interior Fixture no: 14 ‖ RRM Restroom	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	Ave: 21 ‖ 20, 21, 22, ,	0.04	4,697	169	0	$5	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 0 – ‖ Existing control: Ceiling Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	4,667	61	0			108
562	Police Dept	Upper floor ‖Interior Fixture no: 15 ‖ RRM	EVAN2117N	Existing Vanity 2' 1L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.02	6,262	106	0	$6	Noah: ‖ Could not open without breaking ‖ Auditor Suggests: Replace	2TLED9-1	Retrofit 1L to 2' TLED type B -9w - bypass ballast	1				0.01	6,262	63	0	$0		44
563	Police Dept	Upper floor ‖Interior Fixture no: 16 ‖ RRW Restroom	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	4,697	169	0	$5	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 0 – ‖ Existing control: Ceiling Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	1		Already Controlled	1	0.01	4,667	61	0			108
564	Police Dept	Upper floor ‖Interior Fixture no: 17 ‖ RRW	EVAN2117N	Existing Vanity 2' 1L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.02	6,262	106	0	$6	Noah: ‖ ‖ Auditor Suggests: Replace	2TLED9-1	Retrofit 1L to 2' TLED type B -9w - bypass ballast	1				0.01	6,262	63	0	$0		44
565	Police Dept	Upper floor ‖Interior Fixture no: 18 ‖ 387 Admin LT Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
566	Police Dept	Upper floor ‖Interior Fixture no: 19 ‖ 382 support Div Command Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
567	Police Dept	Upper floor ‖Interior Fixture no: 20 ‖ 384 chief assistant Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
568	Police Dept	Upper floor ‖Interior Fixture no: 21 ‖ 383 Chief Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
569	Police Dept	Upper floor ‖Interior Fixture no: 22 ‖ 381 training Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
570	Police Dept	Upper floor ‖Interior Fixture no: 23 ‖ 381-1 Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
571	Police Dept	Upper floor ‖Interior Fixture no: 24 ‖ 379 conference Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9		Already Controlled	1	Upgrade Fixtures	none taken	0.52	3,310	1,728	5	$25	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9		Already Controlled	1	0.22	3,310	715	2	$5		1,013
572	Police Dept	Upper floor ‖Interior Fixture no: 25 ‖ Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
573	Police Dept	Upper floor Floor: 3 ‖ Interior Fixture no: 26 ‖ Lobby /stairwell Hallway	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	6,262	676	1	$9	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Plenum ‖ Socket %damaged: 25 Fix Color: Silver 0 – Breakers ‖ Propose 2	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	4,667	225	0	$1		451
574	Police Dept	Upper floor ‖Interior Fixture no: 28 ‖ Lobby /stairwell	EWLED20	Existing Wallpack LED 20 watts	2				Upgrade Fixtures	none taken	0.04	6,262	250	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	2				0.04	6,262	250	0	$0		
575	Police Dept	Upper floor ‖Interior Fixture no: 29 ‖ Lobby /stairwell	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5				Upgrade Fixtures	none taken	0.18	6,262	1,127	2	$32	Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: Brick ‖ ‖ Fix Color: Gray	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	5				0.05	6,262	313	1	$2		814
576	Police Dept	Upper floor ‖Interior Fixture no: 30 ‖ Lobby /stairwell	EWW35CMH	Existing Wall Wash, 35w Ceramic e-MH	4				Upgrade Fixtures	none taken	0.16	6,262	1,002	2	$62	Noah: Difficult, add 100% because: Height over stairs Needs: Scaffolding Loc.Color: White ‖ ‖ Fix Color: White	EWW35CMH	Existing Wall Wash, 35w Ceramic e-MH	4				0.16	6,262	1,002	2	$58		
577	Police Dept	Upper floor ‖Interior Fixture no: 31 ‖ Office Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	3,310	281	1	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	3,310	119	0	$1		162
578	Police Dept	Upper floor ‖Interior Fixture no: 32 ‖ 327 interview Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	3,310	281	1	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	3,310	119	0	$1		162
579	Police Dept	Upper floor ‖Interior Fixture no: 33 ‖ 326 interview Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	3,310	281	1	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	3,310	119	0	$1		162
580	Police Dept	Upper floor ‖Interior Fixture no: 34 ‖ 325 sgt Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
581	Police Dept	Upper floor ‖Interior Fixture no: 35 ‖ 370 LT Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
582	Police Dept	Upper floor ‖Interior Fixture no: 36 ‖ 386 LT Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.34	3,310	1,126	3	$13	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.14	3,310	477	1	$3		649
583	Police Dept	Upper floor ‖Interior Fixture no: 37 ‖ 368 interview Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
584	Police Dept	Upper floor ‖Interior Fixture no: 38 ‖ 367 polygraph Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
585	Police Dept	Upper floor ‖Interior Fixture no: 39 ‖ 366 polygraph Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
586	Police Dept	Upper floor ‖Interior Fixture no: 40 ‖ 364 polygraph Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
587	Police Dept	Upper floor ‖Interior Fixture no: 41 ‖ 363 detective Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
588	Police Dept	Upper floor ‖Interior Fixture no: 42 ‖ 362 detective Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
589	Police Dept	Upper floor ‖Interior Fixture no: 43 ‖ 323 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
590	Police Dept	Upper floor ‖Interior Fixture no: 44 ‖ 322 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
591	Police Dept	Upper floor ‖Interior Fixture no: 45 ‖ RRW Restroom	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.07	4,697	338	1	$10	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 0 – ‖ Existing control: Ceiling Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	4,667	122	0			216
592	Police Dept	Upper floor ‖Interior Fixture no: 46 ‖ RRW	EVAN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	none taken	0.13	6,262	789	1	$24	Noah: ‖ ‖ Auditor Suggests: Replace	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.07	4,667	338	1	$2		451

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
583	Police Dept	Upper floor ‖Interior Fixture no: 47 ‖ Closet Storage (active)	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory plate.. Existing	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	9		$0		23
584	Police Dept	Upper floor ‖Interior Fixture no: 48 ‖ Closet 2 Storage (active)	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory plate.. Existing	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	9		$0		23
585	Police Dept	Upper floor ‖Interior Fixture no: 49 ‖ RRM Restroom	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.07	4,697	338	1	$10	Noah: Loc.Color: White Ceil ht: 8.5 ‖ ‖ Fix Color: White 0 – ‖ Existing control Ceiling Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	2		Already Controlled	1	0.03	4,667	122	0			216
586	Police Dept	Upper floor ‖Interior Fixture no: 50 ‖ RRM	EWN3225N	Existing Vanity 3' 2L F25 T8 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	none taken	0.13	6,262	789	1	$24	Noah: ‖ ‖ Auditor Suggests: Replace	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.07	4,667	338	1	$2		451
587	Police Dept	Upper floor ‖Interior Fixture no: 51 ‖ RRU HOLDING Restroom	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	6,262	363	1	$5	Noah: Loc.Color: White Ceil ht: 8 ‖ This is a holding restroom switched outside ‖ Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	6,262	150	0	$1		213
588	Police Dept	Upper floor ‖Interior Fixture no: 52 ‖ Copy room Office (Open)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.16	6,262	1,014	2	$14	Noah: Loc.Color: White Ceil ht: 8 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 0 – Breakers ‖ Auditor Noah: Loc.Color: White ‖ Under cabinet ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	6,262	451	1	$3		564
589	Police Dept	Upper floor ‖Interior Fixture no: 53 ‖ Copy room	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.10	6,262	601	1	$11		4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3				0.04	6,262	225	0	$1		376
590	Police Dept	Upper floor ‖Interior Fixture no: 54 ‖ Reception Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	4,697	545	1	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	4,667	225	0	$2		319
591	Police Dept	Upper floor ‖Interior Fixture no: 55 ‖ Closet 3 roof access Storage (active)	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory plate.. Existing	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	9		$0		23
592	Police Dept	Upper floor ‖Interior Fixture no: 56 ‖ Closet 3 roof access Storage (active)	EVAN2117N	Existing Vanity 2' 1L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	24		$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory plate.. Existing	2TLED9-1	Retrofit 1L to 2' TLED type B - 9w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	14		$0		10
593	Police Dept	Upper floor ‖Interior Fixture no: 57 ‖ 332 Conference Storage (active)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	4				Upgrade Fixtures & Controls	none taken	0.25	1,420	358		$9	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	2	0.10	1,420	148		$1		210
604	Police Dept	Upper floor ‖Interior Fixture no: 58 ‖ 332 Conference	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.12	4,138	497	1	$18	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	4				0.05	4,138	215	1			281
605	Police Dept	Upper floor ‖Interior Fixture no: 59 ‖ 332 Conference	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.09	4,138	352	1	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1				0.04	4,138	149	0	$1		203
606	Police Dept	Upper floor ‖Interior Fixture no: 60 ‖ 332 Closet Storage (active)	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/Ivory plate.. Existing	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	9		$0		23
607	Police Dept	Upper floor ‖Interior Fixture no: 61 ‖ 312 interview Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
608	Police Dept	Upper floor ‖Interior Fixture no: 62 ‖ 309 interview Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	3,310	563	2	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	3,310	238	1	$2		324
609	Police Dept	Upper floor ‖Interior Fixture no: 63 ‖ 346 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
610	Police Dept	Upper floor ‖Interior Fixture no: 64 ‖ 354 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
611	Police Dept	Upper floor ‖Interior Fixture no: 65 ‖ 353 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
612	Police Dept	Upper floor ‖Interior Fixture no: 66 ‖ 352 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
613	Police Dept	Upper floor ‖Interior Fixture no: 67 ‖ 354 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
614	Police Dept	Upper floor ‖Interior Fixture no: 68 ‖ 349 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
615	Police Dept	Upper floor ‖Interior Fixture no: 69 ‖ 348 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
616	Police Dept	Upper floor ‖Interior Fixture no: 70 ‖ 347 detective Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	4,138	521	1	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	2	0.05	3,310	172	1	$1		349
617	Police Dept	Upper floor ‖Interior Fixture no: 71 ‖ Hallways Hallway	EDI6232N	Existing Direct / Indirect 6' 2L F32 T8 Lamps, NBF Ballast	22				Upgrade Fixtures	none taken	1.28	8,760	11,178	13	$450	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	22				0.53	8,760	4,625	5	$26		6,552
618	Police Dept	Upper floor ‖Interior Fixture no: 72 ‖ Hallways	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	10				Upgrade Fixtures	none taken	0.30	6,262	1,879	3	$61	Noah: Loc.Color: Painted ‖ ‖ Fix Color: Silver	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	10				0.06	6,262	376	1	$8		1,503
619	Police Dept	Upper floor ‖Interior Fixture no: 73 ‖ Hallways	ECFLP26	Existing CFL Pin Based 26 watt Lamp(s)	28				Upgrade Fixtures	none taken	0.84	6,262	5,260	8	$182	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 cr 6", 13w, 900lm, Sylvania	28				0.36	6,262	2,279	4			2,981
620	Police Dept	Upper floor ‖Interior Fixture no: 74 ‖ Hallways	EXLED	Existing LED Exit Sign	10				Upgrade Fixtures	none taken	0.06	8,760	526		$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ ‖ Auditor Suggests: Retrofit	EXLED	Existing LED Exit Sign	10				0.06	8,760	526		$2		
621	Police Dept	Upper floor ‖Interior Fixture no: 75 ‖ Hallways	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures	none taken	0.58	8,760	5,081	6	$64	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White 0 – ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10				0.24	8,760	2,102	2	$12		2,978
622	Police Dept	Upper floor ‖Interior Fixture no: 76 ‖ Hallways	ENC2L10	Existing Nothfar Sign Incandescent 2L 10 watt Lamps	4				Upgrade Fixtures	none taken	0.08	6,262	501	1	$13	Noah: ‖In use light for interview rooms ‖ Auditor Suggests: Retrofit	2-4WLEDB10CB	(2) 3.5 watt B10C Candle Base, Bullet Dimmable LED lamp - Sylvania	4				0.03	6,262	175	0	$2		326
623																													
624	Police Dept	Exterior ‖Exterior Fixture no: 215 ‖ Exterior Exterior (Perimeter)	EWP90CMH	Existing Wall Pack, 90w Ceramic e-MH	2				Upgrade Fixtures	none taken	0.19	4,380	841		$17	Noah: Loc.Color: Brick ‖ ‖ Fix Color: Gray JST: mounted on an adjsustable knuckle but aimed horiz to ground jst: if	MLLG75	LED Retrofit Kit for Shoebox - 75w, 12375lm - MLLG	2				0.15	4,380	657				184
625	Police Dept	Exterior ‖Exterior Fixture no: 216 ‖ Exterior	EFHPS250	Existing Fixture High Pressure Sodium 250 watt Lamp	5				Upgrade Fixtures	none taken	1.48	4,380	6,461		$30	Noah: ‖ ‖ Fix Color: Bronze JST: order Type 5 optics silver with slipfitter	NCHLED95	New AEL LED CobraHead 95 watts ATBM, 11,600 Lumen	5				0.48	4,380	2,081				4,380

AMERESCO
Green • Clean • Sustainable

Project Name	City of Bend OR - Part III
Date	July 19, 2018

Note to subcontractor: Remember to take power measurements on the existing and as-built lights according to the guidelines provided by Ameresco unless specifically instructed in writing not to.

Version 3.09

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
1	Wall St Annex	Wall St Annex || Fixture no: 141 || Rear entry/ Halls Hallway	EINC60	Existing Incandescent 60 watt Lamp(s)	13			Upgrade Fixtures & Controls	Ave: 6.88 || 4.5, 5.9, 7, 9, 8	0.78	2,926	2,282	0.36	$114	Noah: Loc.Color: Painted Ceil ht: 10 || Black insert These are being replaced with LED	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	13		(3) Wireless Ceiling PIR with 2 PowPaks	1	0.13	2,487	323	2	$1		1,959
2	Wall St Annex	Wall St Annex || Fixture no: 142 || Rear entry/ Halls	ELEDLAMP12	Existing LED Lamp 12 watts	2			Remain As Is	none taken	0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP12	Existing LED Lamp 12 watts	2				0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Exclude	
3	Wall St Annex	Wall St Annex || Fixture no: 143 || Rear entry/ Halls	E54232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	14			Upgrade Fixtures & Controls	none taken	0.81	2,926	2,376	10	$34	Noah: || This is the guest on the sixth or type fixtures are coached at 15 feet could not get up to verify, Please verify	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	14		(9) Wireless Ceiling PIR with 3 PowPaks	1	0.34	2,487	836	4	$5		1,540
4	Wall St Annex	Wall St Annex || Fixture no: 144 || Rear entry/ Halls	EINC6L40	Existing Incandescent 6L 40 watt Lamps	2			Upgrade Fixtures & Controls	none taken	0.48	2,926	1,404	6	$105	Noah: || || Auditor Suggests: Retrofit	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	12	3	Controlled by a device on another line		0.07	2,487	164	1	$1		1,240
5	Wall St Annex	Wall St Annex || Fixture no: 145 || It storage Storage (inactive)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	1			Upgrade Fixtures & Controls	none taken	0.14	251	35		$0	Noah: || ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9		$0		26
6	Wall St Annex	Wall St Annex || Fixture no: 146 || RRM Restroom	ELEDLAMP9	Existing LED Lamp 9 watts	7			Remain As Is	none taken	0.06	2,926	184	1	$0	Noah: Loc.Color: Painted || || Fix Color: Silver 1 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing	ELEDLAMP9	Existing LED Lamp 9 watts	7				0.06	2,926	184	1	$0	Noah: Loc.Color: Painted || || Fix Color: Silver 1 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing	
7	Wall St Annex	Wall St Annex || Fixture no: 147 || RRM	ELEDLAMP12	Existing LED Lamp 12 watts	2			Remain As Is	none taken	0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Do Nothing	ELEDLAMP12	Existing LED Lamp 12 watts	2				0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Do Nothing	
8	Wall St Annex	Wall St Annex || Fixture no: 148 || RRW Restroom	ELEDLAMP9	Existing LED Lamp 9 watts	7			Remain As Is	none taken	0.06	2,926	184	1	$0	Noah: Loc.Color: Painted || || Fix Color: Silver 1 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing	ELEDLAMP9	Existing LED Lamp 9 watts	7				0.06	2,926	184	1	$0	Noah: Loc.Color: Painted || || Fix Color: Silver 1 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing	
9	Wall St Annex	Wall St Annex || Fixture no: 149 || RRW	ELEDLAMP12	Existing LED Lamp 12 watts	2			Remain As Is	none taken	0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Do Nothing	ELEDLAMP12	Existing LED Lamp 12 watts	2				0.02	2,926	70	0	$0	Noah: || || Auditor Suggests: Do Nothing	
10	Wall St Annex	Wall St Annex || Fixture no: 150 || Lobby 1 Hallway	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Ceil ht: 10 || Delamped to 2 single ballast || Socket % damaged: 25 Fix Color: White 1 --	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		538
11	Wall St Annex	Wall St Annex || Fixture no: 151 || Lobby 1	EINC100	Existing Incandescent 100 watt Lamp(s)	4			Upgrade Fixtures	none taken	0.40	2,926	1,170	5	$35	Noah: || || 1 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing control: None	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	4				0.06	2,926	187	1	$0		983
12	Wall St Annex	Wall St Annex || Fixture no: 152 || Hall 102 Hallway	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	25			Upgrade Fixtures	none taken	0.80	2,926	2,341	10	$23	Noah: Loc.Color: White Ceil ht: 10 || Black insert || Fix Color: White Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	25				0.25	2,926	732	3	$3		1,609
13	Wall St Annex	Wall St Annex || Fixture no: 153 || Hall 102	EINC100	Existing Incandescent 100 watt Lamp(s)	3			Upgrade Fixtures	none taken	0.30	2,926	878	4	$26	Noah: || || Fix Color: White Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	3				0.05	2,926	140	1	$0		737
14	Wall St Annex	Wall St Annex || Fixture no: 154 || Hall 102	ET4340E	Existing Troffer 4' 3L F40 T12 Lamps, Elec Ballast	9			Upgrade Fixtures	none taken	0.95	2,926	2,765	11	$26	Noah: || 3 are parabolic small || Socket % damaged: 25 3 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	9				0.32	2,926	948	4	$5		1,817
15	Wall St Annex	Wall St Annex || Fixture no: 155 || Hall 102	ES3130E	Existing Strip 3' 1L F30 T12 Lamp, Elec Ballast	2			Upgrade Fixtures	none taken	0.05	2,926	146	1	$4	Noah: Loc.Color: Painted || || Socket % damaged: 25 Fix Color: White Conduit: EMT color: Silver/Galv. Length:	3TLED12-1	Retrofit 1L to 3' TLED type B - 12w - bypass ballast	2				0.02	2,926	70	0	$0		76
16	Wall St Annex	Wall St Annex || Fixture no: 156 || Hall 102	EXNC415	Existing Exit Incandescent 4L 15 watt Lamps	3			Upgrade Fixtures	none taken	0.18	2,926	527	2	$105	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Replace	NEXEG	New Green LED Exit Sign w Emergency Lights	3				0.01	2,926	26	0			500
17	Wall St Annex	Wall St Annex || Fixture no: 170 || Hall 102	E54140N	Existing Strip 4' 1 Lamp(s) F40 T12 Standard Ballast	2			Upgrade Fixtures	none taken	0.18	2,926	533	2	$4	Noah: || Under cabinet || Auditor Suggests: Replace	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2				0.02	2,926	70	0	$0		462
18	Wall St Annex	Wall St Annex || Fixture no: 157 || Office 1 Office (Private)	ED8432N	Existing Direct/Indirect Fixture 8' 4L F32 T8 Lamps, NBF Ballast	2			Upgrade Fixtures	none taken	0.22	2,926	655	3	$18	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		375
19	Wall St Annex	Wall St Annex || Fixture no: 158 || Office 1	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures	none taken	0.21	2,926	614	3	$7	Noah: || || Socket %: damaged: 25 Fix Color: White Conduit: EMT color: White Length: 7 ft Size: 3/4 Mounting: Rigid	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	2,926	211	1	$1		404
20	Wall St Annex	Wall St Annex || Fixture no: 159 || Office 2 Office (Private)	ED8632N	Existing Direct / Indirect 8' 6L F32 T8 Lamps, NBF Ballast	1			Upgrade Fixtures	none taken	0.17	2,926	497	2	$13	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-6	Retrofit 6L to 4' TLED type B - 12w - bypass ballast	1				0.07	2,926	211	1	$1		287
21	Wall St Annex	Wall St Annex || Fixture no: 160 || Office 3 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		538
22	Wall St Annex	Wall St Annex || Fixture no: 161 || Office 4 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		538
23	Wall St Annex	Wall St Annex || Fixture no: 162 || Office 5 Office (Private)	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	6			Upgrade Fixtures	none taken	0.42	2,926	1,229	5	$15	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	2,926	421	2	$2		808
24	Wall St Annex	Wall St Annex || Fixture no: 163 || Office 6 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3				0.14	2,926	421	2	$2		808
25	Wall St Annex	Wall St Annex || Fixture no: 164 || Office 6 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4			Upgrade Fixtures	none taken	0.56	2,926	1,639	7	$14	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4				0.19	2,926	562	2	$3		1,077
26	Wall St Annex	Wall St Annex || Fixture no: 165 || Office 6	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	3			Upgrade Fixtures	none taken	0.10	2,926	281	1	$3	Noah: || || Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	3				0.03	2,926	88	0	$0		193
27	Wall St Annex	Wall St Annex || Fixture no: 166 || Office 7 Office (Private)	ET14240N	Existing Prismatic Troffer 1x4 2 Lamp(s) F40 T12 Standard Ballast	4			Upgrade Fixtures & Controls	none taken	1.18	2,926	3,453	14	$8	Noah: Loc.Color: White Ceil ht: 10 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		3,214
28	Wall St Annex	Wall St Annex || Fixture no: 167 || Office 7	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	7			Upgrade Fixtures	none taken	0.22	2,926	655	3	$6	Noah: ||Black ring || 2 -- Dimming (Manual) || Ivory switch w/ Ivory plate. Move with other switching see	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	7				0.07	2,926	205	1	$1		451
29	Wall St Annex	Wall St Annex || Fixture no: 168 || Office 7 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		538

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
30	Wall St Annex	Wall St Annex || Fixture no: 169 || Office 8 Office (Private)	ET4432N	Existing Prismatic Troffer 2x4 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2			Upgrade Fixtures	none taken	0.22	2,926	655	3	$7	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	2,926	281	1	$2		375
31	Wall St Annex	Wall St Annex || Fixture no: 171 || Office 9 (map 18) Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
32	Wall St Annex	Wall St Annex || Fixture no: 172 || Conference Room 2 Kestrel Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
33	Wall St Annex	Wall St Annex || Fixture no: 173 || lt open office area	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	14			Upgrade Fixtures	none taken	1.96	2,926	5,735	24	$48	Noah: Loc.Color: Painted Ceil ht: 18 || Socket %: damaged: 25 Fix Color: White Conduit: EMT color: White	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	14				0.67	2,926	1,966	8	$11		3,769
34	Wall St Annex	Wall St Annex || Fixture no: 174 || Office 10(16) Office (Private)	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	6			Upgrade Fixtures	none taken	0.42	2,926	1,229	5	$15	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	2,926	421	2	$2		808
35	Wall St Annex	Wall St Annex || Fixture no: 175 || Office 11 (15) Office (Private)	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	6			Upgrade Fixtures	none taken	0.42	2,926	1,229	5	$15	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6				0.14	2,926	421	2	$2		808
36	Wall St Annex	Wall St Annex || Fixture no: 176 || IT Hall Hallway	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	3			Upgrade Fixtures	none taken	0.10	2,926	281	1	$3	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Retrofit	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	3				0.03	2,926	79	0	$0		202
37	Wall St Annex	Wall St Annex || Fixture no: 178 || IT Hall	ET4340E	Existing Troffer 4' 3L F40 T12 Lamps, Elec Ballast	1			Upgrade Fixtures	none taken	0.11	2,926	307	1	$3	Noah: || || Socket %: damaged: 25 3 -- Standard Toggle || Ivory switch w/ Ivory plate. Existing control: None Propose 3	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1				0.04	2,926	105	0	$1		202
38	Wall St Annex	Wall St Annex || Fixture no: 180 || IT Hall	EXNC415	Existing Exit Incandescent 4L 15 watt Lamps	3			Upgrade Fixtures	none taken	0.18	2,926	527	2	$105	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Replace	NEXEG	New Green LED Exit Sign w Emergency Lights	3				0.01	2,926	26	0			500
39	Wall St Annex	Wall St Annex || Fixture no: 181 || Conference Room 3 Peregrine Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
40	Wall St Annex	Wall St Annex || Fixture no: 182 || Office 12 (map 20) Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc.Color: White Ceil ht: 16 || || Socket %: damaged: 25 Fix Color: White Conduit: WireMold color: Black Length:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
41	Wall St Annex	Wall St Annex || Fixture no: 183 || Conference Room 4 Lansdowne Office (Private)	ELEDLAMP12	Existing LED Lamp 12 watts	6			Upgrade Controls Only	none taken	0.07	2,926	211	1	$0	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White Conduit: WireMold color: Black Length: 9 ft Size: 1/2 4 --	ELEDLAMP12	Existing LED Lamp 12 watts	6		(1) Wireless Ceiling PIR with 1 PowPak	1	0.07	2,487	179	1	$0	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: White Conduit: WireMold color: Black Length: 9 ft Size: 1/2 4 --	32
42	Wall St Annex	Wall St Annex || Fixture no: 184 || Conference Room 4 Lansdowne	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	5			Remain As Is	none taken	0.50	2,926	1,463	6	$2	Noah: || ||	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	5				0.50	2,926	1,463	6	$2	Noah: || ||	
43	Wall St Annex	Wall St Annex || Fixture no: 185 || EIPD Halls Hallway	ELEDLAMP30	Existing LED Lamp 30 watts	6			Remain As Is	none taken	0.18	2,926	527	2	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Retrofit	ELEDLAMP30	Existing LED Lamp 30 watts	6				0.18	2,926	527	2	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Retrofit	
44	Wall St Annex	Wall St Annex || Fixture no: 186 || EIPD Halls	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	8			Upgrade Fixtures	none taken	0.56	2,926	1,639	7	$19	Noah: Loc.Color: Painted Ceil ht: 18 || Socket %: damaged: 25 Fix Color: White Conduit: EMT color: Painted	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8				0.19	2,926	562	2	$3		1,077
45	Wall St Annex	Wall St Annex || Fixture no: 187 || EIPD Halls	EXLEDB	Existing LED Exit Sign w/ BugEye	3			Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Replace	EXLEDB	Existing LED Exit Sign w/ BugEye	3				0.02	8,760	158		$1	Noah: || || Fix Color: Red/White Exit Auditor Suggests: Replace	
46	Wall St Annex	Wall St Annex || Fixture no: 188 || EIPD Halls	ELEDLAMP30	Existing LED Lamp 30 watts	25			Remain As Is	none taken	0.75	2,926	2,195	9	$2	Noah: || || Auditor Suggests: Exclude	ELEDLAMP30	Existing LED Lamp 30 watts	25				0.75	2,926	2,195	9	$2	Noah: || || Auditor Suggests: Exclude	
47	Wall St Annex	Wall St Annex || Fixture no: 210 || EIPD Halls	ES4140N	Existing Strip 4' 1 Lamp(s) F40 T12 Standard Ballast	5			Upgrade Fixtures	none taken	0.46	2,926	1,331	5	$10	Noah: Loc.Color: Painted || Over stairs || Fix Color: White Auditor Suggests: Retrofit	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	5				0.06	2,926	176	1	$1		1,156
48	Wall St Annex	Wall St Annex || Fixture no: 189 || EIPD Office 1 Office (Private)	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	1			Upgrade Fixtures & Controls	none taken	0.04	2,926	102	0	$2	Noah: Loc.Color: Painted Ceil ht: 10 || One is wall mounted see photos || Socket %: damaged: 50 Fix Color: White	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,487	30	0	$0		73
49	Wall St Annex	Wall St Annex || Fixture no: 190 || EIPD Office 1	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	1			Upgrade Fixtures	none taken	0.04	2,926	102	0	$2	Noah: Loc.Color: Painted Ceil ht: 10 || Socket %: damaged: 50 Fix Color: White Mounting: Rigid Pendant length: 3	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1				0.01	2,926	35	0	$0		67
50	Wall St Annex	Wall St Annex || Fixture no: 191 || EIPD Office 1	ELEDLAMP30	Existing LED Lamp 30 watts	4			Remain As Is	none taken	0.12	2,926	351	1	$0	Noah: Loc.Color: Painted || ||	ELEDLAMP30	Existing LED Lamp 30 watts	4				0.12	2,926	351	1	$0	Noah: Loc.Color: Painted || ||	
51	Wall St Annex	Wall St Annex || Fixture no: 192 || EIPD Office 2 Office (Private)	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.07	2,926	205	1	$4	Noah: Loc.Color: Painted Ceil ht: 10 || Socket %: damaged: 50 Fix Color: White Conduit: EMT color: Silver/Galv.	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	60	0	$0		145
52	Wall St Annex	Wall St Annex || Fixture no: 193 || EIPD Office 2	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	2			Upgrade Fixtures	none taken	0.07	2,926	205	1	$4	Noah: Loc.Color: Painted Ceil ht: 10 || Socket %: damaged: 50 Fix Color: White Mounting: Rigid Pendant length: 3	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2				0.02	2,926	70	0	$0		135
53	Wall St Annex	Wall St Annex || Fixture no: 194 || EIPD Office 2	ELEDLAMP30	Existing LED Lamp 30 watts	2			Remain As Is	none taken	0.06	2,926	176	1	$0	Noah: Loc.Color: Painted || ||	ELEDLAMP30	Existing LED Lamp 30 watts	2				0.06	2,926	176	1	$0	Noah: Loc.Color: Painted || ||	
54	Wall St Annex	Wall St Annex || Fixture no: 195 || EIPD Office 3 Office (Private)	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.07	2,926	205	1	$4	Noah: Loc.Color: Painted Ceil ht: 10 || Socket %: damaged: 50 Fix Color: White Conduit: EMT color: Silver/Galv.	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	60	0	$0		145
55	Wall St Annex	Wall St Annex || Fixture no: 196 || EIPD Office 3	EDI4140E	Existing Direct / Indirect 4' 1L F40 T12 Lamp, Elec Ballast	2			Upgrade Fixtures	none taken	0.07	2,926	205	1	$4	Noah: Loc.Color: Painted Ceil ht: 10 || Socket %: damaged: 50 Fix Color: White Mounting: Rigid Pendant length: 3	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2				0.02	2,926	70	0	$0		135
56	Wall St Annex	Wall St Annex || Fixture no: 197 || EIPD Office 3	ELEDLAMP30	Existing LED Lamp 30 watts	2			Remain As Is	none taken	0.06	2,926	176	1	$0	Noah: Loc.Color: Painted || ||	ELEDLAMP30	Existing LED Lamp 30 watts	2				0.06	2,926	176	1	$0	Noah: Loc.Color: Painted || ||	
57	Wall St Annex	Wall St Annex || Fixture no: 198 || EIPD Office 4	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4			Upgrade Fixtures & Controls	none taken	0.56	2,926	1,639	7	$14	Noah: Loc.Color: White Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 -- Standard Toggle || Ivory switch w/ Noah: Loc.Color: White Ceil ht: 8 ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,487	478	2	$3		1,161
58	Wall St Annex	Wall St Annex || Fixture no: 199 || EIPD Office 5	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 -- Standard Toggle || Ivory switch w/ Noah: Loc.Color: White Ceil ht: 8 ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
59	Wall St Annex	Wall St Annex || Fixture no: 200 || EIPD Office 6	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 -- Standard Toggle || Ivory switch w/ Noah: Loc.Color: White Ceil ht: 8 ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
60	Wall St Annex	Wall St Annex || Fixture no: 201 || EIPD Office 7	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 -- Standard Toggle || Ivory switch w/ Noah: Loc.Color: White Ceil ht: 8 ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
61	Wall St Annex	Wall St Annex || Fixture no: 202 || EIPD Office 8	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
62	Wall St Annex	Wall St Annex || Fixture no: 203 || EIPD Office 9	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	7			Upgrade Fixtures	none taken	0.98	2,926	2,867	12	$24	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	7				0.34	2,926	983	4	$5		1,884
63	Wall St Annex	Wall St Annex || Fixture no: 204 || Closet 1 Storage (inactive)	EC_LED10	Existing Can Light LED 10 watts	1			Remain As Is	none taken	0.01	251	3		$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	1				0.01	251	3		$0	Noah: || || Auditor Suggests: Exclude	
64	Wall St Annex	Wall St Annex || Fixture no: 205 || EIPD Office 10	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
65	Wall St Annex	Wall St Annex || Fixture no: 206 || EIPD Office 11	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
66	Wall St Annex	Wall St Annex || Fixture no: 207 || EIPD Office 12	ET14240E	Existing Troffer 1x4 2L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.14	2,926	410	2	$5	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,487	119	1	$1		289
67	Wall St Annex	Wall St Annex || Fixture no: 208 || Closet 2 Storage (inactive)	EINC60	Existing Incandescent 60 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: || || Auditor Suggests: Exclude	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	1				0.01	251	2		$0		13
68	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 209 || Conference Room Archimedes Conference / Meeting	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3				0.14	2,926	421	2	$2		808
69	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 211 || EIPD Office 13	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
70	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 212 || EIPD Office 14	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
71	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 213 || EIPD Office 15	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
72	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 214 || EIPD Office 16	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
73	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 215 || EIPD Office 17	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
74	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 216 || EIPD Office 18	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
75	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 217 || EIPD Office 19	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
76	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 218 || EIPD Upstairs open office	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	13			Upgrade Fixtures	none taken	1.82	2,926	5,325	22	$45	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	13				0.62	2,926	1,826	7	$10		3,499
77	Wall St Annex	Wall St Annex || Fixture no: 219 || EIPD Upstairs open office	EC_LED10	Existing Can Light LED 10 watts	5			Remain As Is	none taken	0.05	2,926	146	1	$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	5				0.05	2,926	146	1	$0	Noah: || || Auditor Suggests: Exclude	
78	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 220 || EIPD Office 20	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
79	Wall St Annex	Wall St Annex Floor: 2 || Fixture no: 221 || EIPD Office 21	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,487	358	2	$2		871
80	Wall St Annex	Wall St Annex || Fixture no: 222 || Conference Room osprey Office (Private)	ELEDLAMP30	Existing LED Lamp 30 watts	7			Upgrade Controls Only	none taken	0.21	2,926	614	3	$0	Noah: Loc.Color: White Cell ht: 10 || Black ring || Socket %: damaged: 25 Fix Color: White Conduit: WireMold	ELEDLAMP30	Existing LED Lamp 30 watts	7		(1) Wireless Ceiling PIR with 1 PowPak	1	0.21	2,487	522	3	$0	Noah: Loc.Color: White Cell ht: 10 || Black ring || Socket %: damaged: 25 Fix Color: White Conduit: WireMold	92
81	Wall St Annex	Wall St Annex || Fixture no: 223 || Conference Room osprey	ELEDLAMP30	Existing LED Lamp 30 watts	2			Remain As Is	none taken	0.06	2,926	176	1	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP30	Existing LED Lamp 30 watts	2				0.06	2,926	176	1	$0	Noah: || || Auditor Suggests: Exclude	
82	Wall St Annex	Wall St Annex || Fixture no: 224 || Office 13 (map 11)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
83	Wall St Annex	Wall St Annex || Fixture no: 225 || Office 14 (map 13)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
84	Wall St Annex	Wall St Annex || Fixture no: 226 || Office 14 (map 13)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	3			Upgrade Fixtures	none taken	0.10	2,926	281	1	$3	Noah: || Black ring || Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	3				0.03	2,926	88	0	$0		193
85	Wall St Annex	Wall St Annex || Fixture no: 227 || Office 15 (map 12)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
86	Wall St Annex	Wall St Annex || Fixture no: 228 || Office 15 (map 12)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	3			Upgrade Fixtures	none taken	0.10	2,926	281	1	$3	Noah: || || Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	3				0.03	2,926	88	0	$0		193
87	Wall St Annex	Wall St Annex || Fixture no: 229 || Office 16 (map 10)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		581
88	Wall St Annex	Wall St Annex || Fixture no: 230 || Office 16 (map 10)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	6			Upgrade Fixtures	none taken	0.19	2,926	562	2	$6	Noah: || || Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	6				0.06	2,926	176	1	$1		386
89	Wall St Annex	Wall St Annex || Fixture no: 231 || Open office/hall	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	5			Upgrade Fixtures & Controls	none taken	0.70	2,926	2,048	8	$17	Noah: Loc.Color: White Cell ht: 8 || || Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.24	2,487	597	3	$3		1,451
90	Wall St Annex	Wall St Annex || Fixture no: 232 || Open office/hall	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	9			Upgrade Fixtures	none taken	0.29	2,926	843	3	$8	Noah: || || Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	9				0.09	2,926	263	1	$1		579
91	Wall St Annex	Wall St Annex || Fixture no: 233 || Basement Storage (inactive)	EST296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2			Upgrade Fixtures & Controls	none taken	0.40	251	99		$2	Noah: Loc.Color: Brick Cell ht: 10 || || Socket %: damaged: 0 Fix Color: White 1 – Standard Toggle || Ivory switch w/	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17804 lm	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.23	188	43				57

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (KWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (KWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (KWh/Yr)
92	Wall St Annex	Wall St Annex ‖ Fixture no: 234 ‖ Basement	EINC100	Existing Incandescent 100 watt Lamp(s)	5			Upgrade Fixtures	none taken	0.50	2,926	1,463	6	$44	Noah: ‖ ‖ Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	5				0.08	2,926	234	1	$1		1,229
93	Wall St Annex	Wall St Annex ‖ Fixture no: 235 ‖ Exterior door Storage (inactive)	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2			Upgrade Fixtures & Controls	none taken	0.40	4,380	1,734		$19	Noah: Loc.Color: Brick Ceil ht: 10 ‖ Could not gain access to space tech is a guess needs verification ‖ Socket %	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.23	4,380	980				745
94	Wall St Annex	Wall St Annex ‖ Fixture no: 236 ‖ Exterior door	EINC100	Existing Incandescent 100 watt Lamp(s)	5			Upgrade Fixtures	none taken	0.50	4,380	2,190		$66	Noah: ‖ ‖ Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	5				0.08	4,380	350		$1		1,840
95	Wall St Annex	Wall St Annex ‖ Fixture no: 237 ‖ Exterior Exterior (Perimeter)	EINC100	Existing Incandescent 100 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.10	4,380	438		$13	Noah: Loc.Color: Painted Ceil ht: 12 ‖ Black ring ‖ Auditor Suggests: Retrofit	17WLEDP38	17 watt Par 38 Dimmable LED Lamp, Sylvania	1				0.02	4,380	74		$0		364
96	Wall St Annex	Wall St Annex ‖ Fixture no: 238 ‖ Exterior	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	1			Upgrade Fixtures	none taken	0.30	4,380	1,292		$6	Noah: Loc.Color: Painted ‖ ‖ Auditor Suggests: Replace	NXTWLED102P	New Cooper Crossbow Maxx LED Wallpack, 102 watts, 12539 + Photocell	1				0.10	4,380	447				845
97	South Sister	3 B South Sister ‖ Fixture no: 239 ‖ Office 1 Office (Private)	ETLED2-1L60	Existing Troffer LED 2' 60 watts	2			Upgrade Controls Only	Ave: 48 ‖ 46, 48, 47, 50, 49	0.12	2,926	351	1	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	ETLED2-1L60	Existing Troffer LED 2' 60 watts	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.12	2,487	288	1	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	53
98	South Sister	3 B South Sister ‖ Fixture no: 240 ‖ Office 2 Office (Private)	ETLED2-1L60	Existing Troffer LED 2' 60 watts	1			Upgrade Controls Only	none taken	0.06	2,926	176	1	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	ETLED2-1L60	Existing Troffer LED 2' 60 watts	1		(1) Wireless Ceiling PIR with 1 PowPak	1	0.06	2,487	149	1	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	26
99	South Sister	3 B South Sister ‖ Fixture no: 241 ‖ Copy room 3 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 10 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 10 ‖ ‖	
100	South Sister	3 B South Sister ‖ Fixture no: 242 ‖ RRU 4 Restroom	EFIXLED10	Existing Fixture LED 10 watts	2			Upgrade Controls Only	none taken	0.02	2,926	59	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EFIXLED10	Existing Fixture LED 10 watts	2		Wall Switch Sensor, DT, 1 pole	1	0.02	2,487	50	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	9
101	South Sister	3 B South Sister ‖ Fixture no: 243 ‖ Office 5 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
102	South Sister	3 B South Sister ‖ Fixture no: 244 ‖ Office 6 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
103	South Sister	3 B South Sister ‖ Fixture no: 245 ‖ Kitchen 7 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2	Already Controlled	1	Remain As Is	none taken	0.06	2,487	139	1	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	2		Already Controlled	1	0.06	2,487	139	1	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
104	South Sister	3 B South Sister ‖ Fixture no: 246 ‖ Office 8 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
105	South Sister	3 B South Sister ‖ Fixture no: 247 ‖ Office 9 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
106	South Sister	3 B South Sister ‖ Fixture no: 248 ‖ Office 10 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	
107	South Sister	3 B South Sister ‖ Fixture no: 249 ‖ 001 bike area Storage (active)	ESLED8-1L60	Existing Strip LED 8' 60 watts	2			Remain As Is	none taken	0.12	251	30		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ESLED8-1L60	Existing Strip LED 8' 60 watts	2				0.12	251	30		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
108	South Sister	3 B South Sister ‖ Fixture no: 250 ‖ 001 bike area	EXLEDB	Existing LED Exit Sign w/ BugEye	1			Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
109	South Sister	3 B South Sister ‖ Fixture no: 251 ‖ Conference room 11 Office (Private)	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.06	2,487	139	1	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	1		Already Controlled	1	0.06	2,487	139	1	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
110	South Sister	3 B South Sister ‖ Fixture no: 252 ‖ Office 12/13 Office (Private)	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	2	Already Controlled	1	Remain As Is	none taken	0.11	2,487	279	1	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	2		Already Controlled	1	0.11	2,487	279	1	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
111	South Sister	3 B South Sister ‖ Fixture no: 253 ‖ Office 14/15 Office (Private)	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	32	Already Controlled	1	Remain As Is	none taken	1.79	2,487	4,457	22	$7	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-4L14	Existing Wrap LED 4' 4L 14 watt Lamps	32		Already Controlled	1	1.79	2,487	4,457	22	$7	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
112	South Sister	3 B South Sister ‖ Fixture no: 254 ‖ Office 16 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
113	South Sister	3 B South Sister ‖ Fixture no: 255 ‖ Office 17 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
114	South Sister	3 B South Sister ‖ Fixture no: 256 ‖ Office 18 Office (Private)	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1	Already Controlled	1	Remain As Is	none taken	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	1		Already Controlled	1	0.03	2,487	70	0	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing Noah: Loc.Color: White Ceil ht: 8 ‖ ‖	
115	South Sister	3 B South Sister ‖ Fixture no: 257 ‖ Conference 19/20 Office (Private)	ETLED2-1L60	Existing Troffer LED 2' 60 watts	4	Already Controlled	1	Remain As Is	none taken	0.24	2,487	597	3	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	ETLED2-1L60	Existing Troffer LED 2' 60 watts	4		Already Controlled	1	0.24	2,487	597	3	$0	Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	
116	South Sister	3 B South Sister ‖ Fixture no: 258 ‖ Hallway Hallway	ETLED2-1L60	Existing Troffer LED 2' 60 watts	2			Remain As Is	none taken	0.12	2,926	351	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED2-1L60	Existing Troffer LED 2' 60 watts	2				0.12	2,926	351	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
117	South Sister	3 B South Sister ‖ Fixture no: 259 ‖ Hallway	EWLED4-1L60	Existing Wrap LED 4' 60 watts	6			Remain As Is	none taken	0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED4-1L60	Existing Wrap LED 4' 60 watts	6				0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
118	South Sister	3 B South Sister ‖ Fixture no: 260 ‖ Exterior Exterior [Area]	EINC100	Existing Incandescent 100 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.10	4,380	438		$13	Noah: ‖ ‖	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1				0.02	4,380	70		$0		368
119	South Sister	3 B South Sister ‖ Fixture no: 261 ‖ Exterior	EWLED20	Existing Wallpack LED 20 watts	1			Remain As Is	none taken	0.02	4,380	88		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED20	Existing Wallpack LED 20 watts	1				0.02	4,380	88		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
120	Franklin Annex	Franklin Annex ‖ Fixture no: 262 ‖ Lobby Hallway	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	4			Remain As Is	none taken	0.40	2,926	1,170	5	$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	4				0.40	2,926	1,170	5	$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
121	Franklin Annex	Franklin Annex ‖ Fixture no: 263 ‖ Open office area Office (Open)	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	45			Remain As Is	none taken	4.50	2,926	13,167	54	$14	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	45				4.50	2,926	13,167	54	$14	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
122	Franklin Annex	Franklin Annex ‖ Fixture no: 264 ‖ Open office area	ELED12WMR16	Existing LED Lamp 12 watt MR16	10			Remain As Is	none taken	0.12	2,926	351	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ELED12WMR16	Existing LED Lamp 12 watt MR16	10				0.12	2,926	351	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
123	Franklin Annex	Franklin Annex ‖ Fixture no: 265 ‖ Office 1 Office (Private)	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	6			Remain As Is	none taken	0.60	2,926	1,756	7	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	6				0.60	2,926	1,756	7	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
124	Franklin Annex	Franklin Annex ‖ Fixture no: 266 ‖ Office 1	EINC100	Existing Incandescent 100 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.20	2,926	585	2	$18	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	2				0.02	2,926	59	0	$0		527
125	Franklin Annex	Franklin Annex ‖ Fixture no: 267 ‖ Office 2 Office (Private)	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	6			Remain As Is	none taken	0.60	2,926	1,756	7	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	EFLLED5L20W	Existing Flood LED 5L 20 watt Lamps	6				0.60	2,926	1,756	7	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
126	Franklin Annex	Franklin Annex ‖ Fixture no: 268 ‖ Office 2	EINC100	Existing Incandescent 100 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.20	2,926	585	2	$18	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	2				0.02	2,926	59	0	$0		527
127	Franklin Annex	Franklin Annex ‖ Fixture no: 269 ‖ RRM Restroom	EVANLED4L7W	Existing Vanity 4L 7 watt LED Lamps	1			Remain As Is	none taken	0.03	2,926	82	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EVANLED4L7W	Existing Vanity 4L 7 watt LED Lamps	1				0.03	2,926	82	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
128	Franklin Annex	Franklin Annex ‖ Fixture no: 270 ‖ RRM	EINC100	Existing Incandescent 100 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.10	2,926	293	1	$9	Noah: Loc.Color: White Ceil ht: 8 ‖ This is a fan combo ‖ 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	40	0	$0		253
129	Franklin Annex	Franklin Annex ‖ Fixture no: 271 ‖ RRMW Restroom	EVANLED4L7W	Existing Vanity 4L 7 watt LED Lamps	1			Remain As Is	none taken	0.03	2,926	82	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EVANLED4L7W	Existing Vanity 4L 7 watt LED Lamps	1				0.03	2,926	82	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
130	Franklin Annex	Franklin Annex ‖ Fixture no: 272 ‖ RRMW	EINC100	Existing Incandescent 100 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.10	2,926	293	1	$9	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing control: None	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	40	0	$0		253
131	Franklin Annex	Franklin Annex ‖ Fixture no: 273 ‖ Break room Breakroom / Lounge	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Socket %: damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
132	Franklin Annex	Franklin Annex ‖ Fixture no: 274 ‖ Break room Breakroom / Lounge	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2			Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Socket %: damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2	131	Controlled by a device on another line		0.05	2,487	119	1	$1		220
133	Franklin Annex	Franklin Annex ‖ Fixture no: 275 ‖ Office 1 Office (Private)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	1			Remain As Is	none taken	0.06	2,926	176	1	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	1				0.06	2,926	176	1	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
134	Franklin Annex	Franklin Annex ‖ Fixture no: 276 ‖ Office 1	EINC100	Existing Incandescent 100 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.20	2,926	585	2	$18	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	2				0.02	2,926	59	0	$0		527
135	Franklin Annex	Franklin Annex ‖ Fixture no: 277 ‖ Storage room Storage (active)	ES1296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.20	251	50		$1	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket %: damaged: 0 Fix Color: White 1 -- Standard Toggle ‖ Ivory	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	1		Wall Switch Sensor, PIR, 1 pole	1	0.11	188	21				28
136	Franklin Annex	Franklin Annex ‖ Fixture no: 278 ‖ Storage room 2 Storage (active)	ES1296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.20	251	50		$1	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket %: damaged: 0 Fix Color: White 1 -- Standard Toggle ‖ Ivory	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	1		Wall Switch Sensor, PIR, 1 pole	1	0.11	188	21				28
137	South Sister	South sister ‖ Fixture no: 279 ‖ Conference 1 Conference / Meeting	ETLED2-1L60	Existing Troffer LED 2' 60 watts	4			Remain As Is	none taken	0.24	2,926	702	3	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	ETLED2-1L60	Existing Troffer LED 2' 60 watts	4				0.24	2,926	702	3	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
138	South Sister	South sister ‖ Fixture no: 284 ‖ Hallway Hallway	ETLED2-1L60	Existing Troffer LED 2' 60 watts	5			Remain As Is	none taken	0.30	3,385	1,016	4	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	ETLED2-1L60	Existing Troffer LED 2' 60 watts	5				0.30	3,385	1,016	4	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
139	South Sister	South sister ‖ Fixture no: 285 ‖ Hallway	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	1			Remain As Is	none taken	0.06	3,385	203	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	1				0.06	3,385	203	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
140	South Sister	South sister ‖ Fixture no: 286 ‖ RRU Restroom	EFIXLED20	Existing Fixture LED 20 watts	1			Remain As Is	none taken	0.02	3,385	68	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EFIXLED20	Existing Fixture LED 20 watts	1				0.02	3,385	68	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
141	South Sister	South sister ‖ Fixture no: 287 ‖ Office area Office (Open)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	6			Remain As Is	none taken	0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	6				0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
142	South Sister	South sister ‖ Fixture no: 288 ‖ Conference 2 Conference / Meeting	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	6			Remain As Is	none taken	0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	6				0.36	2,926	1,053	4	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
143	South Sister	South sister ‖ Fixture no: 289 ‖ Break room Breakroom / Lounge	ETLED2-1L60	Existing Troffer LED 2' 60 watts	1			Remain As Is	none taken	0.06	3,385	203	1	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	ETLED2-1L60	Existing Troffer LED 2' 60 watts	1				0.06	3,385	203	1	$0	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White Auditor Suggests: Exclude	
144	Lift Station	West side lift station ‖ Fixture no: 280 ‖ Main floors Manufacturing (General)	EH4240E	Existing Hood 4' 2L F40 T12 Lamp, Elec Ballast	26			Upgrade Fixtures	none taken	1.82	251	457	22	$9	Noah: Loc.Color: Brick Ceil ht: 12 ‖ ‖ Socket %: damaged: 25 Fix Color: White Conduit: Liquid Tight color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	26				0.62	251	157	7	$1		300
145	Lift Station	West side lift station ‖ Fixture no: 281 ‖ Main floors	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	12			Upgrade Fixtures	none taken	0.70	251	175	8	$4	Noah: Loc.Color: Painted Ceil ht: 10 ‖ ‖ Socket %: damaged: 25 Fix Color: White Conduit: EMT color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	12				0.29	251	72	3	$0		102
146	Lift Station	West side lift station ‖ Fixture no: 282 ‖ Generator room	EH4240E	Existing Hood 4' 2L F40 T12 Lamp, Elec Ballast	8			Upgrade Fixtures	none taken	0.56	251	141	7	$3	Noah: Loc.Color: Brick Ceil ht: 14 ‖ ‖ Socket %: damaged: 25 Fix Color: White Conduit: Liquid Tight color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8				0.19	251	48	2	$0		92
147	Lift Station	West side lift station ‖ Fixture no: 283 ‖ Exterior Exterior (Perimeter)	EWMH100	Existing Wall Pack Metal Halide 100 watt Lamp	4			Upgrade Fixtures	none taken	0.52	4,380	2,260		$24	Noah: Loc.Color: Painted ‖ Unsure of base type could not open fixture. Needs verification between mogul and Edison	NXTWLED40P	New Cooper Crossbar LED Wallpack, 38 watts, 4205lm + Photocell	4				0.15	4,380	666				1,594
148	Crows Feet	Crows feet commons Floor: 2 ‖ Fixture no: 290 ‖ Upstairs room 1 Office (Private)	ECIRCFC2T8	Existing Circline Lamp F32058 T8 Double Circle	1			Upgrade Fixtures & Controls	none taken	0.07	2,926	190	1	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Bronze 1 -- Standard Toggle ‖ White switch w/ White plate. Existing	NSMBLED37	New Surface Mount LED Bowl, 37w, Brownlee 2059	1		Wall Switch Sensor, PIR, 1 pole	1	0.04	2,487	92	0			98
149	Crows Feet	Crows feet commons ‖ Fixture no: 291 ‖ Upstairs room 1	ELEDLAMP9	Existing LED Lamp 9 watts	1			Remain As Is	none taken	0.01	2,926	26	0	$0	Noah: ‖ ‖	ELEDLAMP9	Existing LED Lamp 9 watts	1				0.01	2,926	26	0	$0	Noah: ‖ ‖	
150	Crows Feet	Crows feet commons Floor: 2 ‖ Fixture no: 292 ‖ Upstairs room 2	ECIRCFC2T8	Existing Circline Lamp F32058 T8 Double Circle	1			Upgrade Fixtures & Controls	none taken	0.07	2,926	190	1	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Bronze 1 -- Standard Toggle ‖ White switch w/ White plate. Existing	NSMBLED37	New Surface Mount LED Bowl, 37w, Brownlee 2059	1		Wall Switch Sensor, PIR, 1 pole	1	0.04	2,487	92	0			98
151	Crows Feet	Crows feet commons Floor: 2 ‖ Fixture no: 293 ‖ Upstairs RR Restroom	EINC4L40	Existing Incandescent 4L 40 watt Lamps	2			Upgrade Fixtures & Controls	none taken	0.32	2,926	936	4	$70	Noah: Loc.Color: Painted Ceil ht: 8 ‖ ‖ Fix Color: Silver 1 -- Standard Toggle ‖ White switch w/ White plate. Existing	NVANLED2-29	New Cooper Vanity LED 1x2, 29 watts, 2600lm	2		Wall Switch Sensor, DT, 1 pole	1	0.06	2,487	144	1			792
152	Crows Feet	Crows feet commons Floor: 2 ‖ Fixture no: 294 ‖ Upstairs open room	ELEDLAMP9	Existing LED Lamp 9 watts	1			Upgrade Controls Only	none taken	0.01	2,926	26	0	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Bronze 1 -- Standard Toggle ‖ White switch w/ White plate. Existing	ELEDLAMP9	Existing LED Lamp 9 watts	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,487	22	0	$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: Bronze 1 -- Standard Toggle ‖ White switch w/ White plate. Existing	4
153	Crows Feet	Crows feet commons Floor: 2 ‖ Fixture no: 295 ‖ Stairwell Hallway	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.04	2,926	105	0	$2	Noah: Loc.Color: White ‖ ‖ Auditor Suggests: Replace	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	2				0.01	2,926	32	0	$0		73

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
154	Crows Feet	Crows feet commons Floor: 1 || Fixture no: 296 || Downstairs open area	ELEDLAMP9	Existing LED Lamp 9 watts	2			Upgrade Controls Only	none taken	0.02	2,926	53	0	$0	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: Bronze 1 -- Standard Toggle || White switch w/ White plate, Existing	ELEDLAMP9	Existing LED Lamp 9 watts	2		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	45	0	$0	Noah: Loc.Color: White Ceil ht: 8 || || Fix Color: Bronze 1 -- Standard Toggle || White switch w/ White plate, Existing	8
155	Crows Feet	Crows feet commons || Fixture no: 297 || Downstairs open area	ELED12WMR16	Existing LED Lamp 12 watt MR16	60			Remain As Is	none taken	0.72	2,926	2,107	9	$4	Noah: Loc.Color: White Ceil ht: 10 || || Auditor Suggests: Exclude	ELED12WMR16	Existing LED Lamp 12 watt MR16	60				0.72	2,926	2,107	9	$4	Noah: Loc.Color: White Ceil ht: 10 || || Auditor Suggests: Exclude	
156	Crows Feet	Crows feet commons || Fixture no: 298 || Kitchen Kitchen (commercial)	E54140N	Existing Strip 4' 1 Lamp(s) F40 T12 Standard Ballast	1			Upgrade Fixtures	none taken	0.09	2,926	266	1	$2	Noah: || Under cabinet light || Auditor Suggests: Replace	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1				0.01	2,926	35	0	$0		231
157	Crows Feet	Crows feet commons || Fixture no: 299 || Kitchen	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.03	2,926	94	0	$1	Noah: Loc.Color: White Ceil ht: 8 || Black ring || Fix Color: White 1 -- Standard Toggle || White switch w/	10WLEDBR30	10 watt BR30 Style Dimmable LED Lamp - Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.01	2,487	25	0	$0		69
158	Crows Feet	Crows feet commons || Fixture no: 300 || Kitchen	EW2217N	Existing Wrap 2' 2L F17 T8 Lamps, NBF Ballast	1			Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: || || Auditor Suggests: Replace	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
159	Crows Feet	Crows feet commons || Fixture no: 301 || Basement Storage (active)	ELEDLAMP9	Existing LED Lamp 9 watts	5			Remain As Is	none taken	0.05	8,760	394		$1	Noah: || || Auditor Suggests: Exclude	ELEDLAMP9	Existing LED Lamp 9 watts	5				0.05	8,760	394		$1	Noah: || || Auditor Suggests: Exclude	
160	Crows Feet	Crows feet commons || Fixture no: 302 || RRU 1 Restroom	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.02	2,926	53	0	$1	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 1 -- Standard Toggle || White switch w/ White plate, Existing	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,487	14	0	$0		39
161	Crows Feet	Crows feet commons || Fixture no: 303 || RRU 2	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.02	2,926	53	0	$1	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White 1 -- Standard Toggle || White switch w/ White plate, Existing	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,487	14	0	$0		39
162	Crows Feet	Crows feet commons || Fixture no: 304 || Exterior Exterior (Perimeter)	ECFLP42	Existing CFL Pin Based 42 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.09	4,380	403		$10	Noah: Loc.Color: Wood Dark || || Fix Color: Black Auditor Suggests: Retrofit	NXTWLED30P	New Cooper Crossbar LED Wallpack, 26 watts, 2710lm + Photocell	2				0.05	4,380	228				175
163	Crows Feet	Crows feet commons || Fixture no: 305 || Exterior	EINC60	Existing Incandescent 60 watt Lamp(s)	2			Upgrade Fixtures	none taken	0.12	4,380	526		$26	Noah: || Watch out for bees || Auditor Suggests: Replace	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2				0.02	4,380	79		$0		447
164	Crows Feet	Crows feet commons || Fixture no: 306 || Exterior	ESHPS250	Existing Shoebox HPS 250 watts	9			Upgrade Fixtures	none taken	2.59	4,380	11,353		$54	Noah: || Round SB One is a double headed Pole || Fix Color: Bronze Mounting: 5 in round pole Noah: Loc.Color: White Ceil ht: 10 ||	MLLG100	LED Retrofit Kit for Shoebox - 100w, 1550lm - MLLG	9				0.90	4,380	3,942				7,411
165	Bond	Bond Annex || Fixture no: 307 || Main Hall Hallway	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	45			Upgrade Fixtures & Controls	none taken	6.30	251	1,581		$22	This space is used as active storage is in a giant disarray at the moment, We	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	45		(5) Wireless Ceiling PIR with 6 PowPaks	1	2.16	188	407		$2		1,175
166	Bond	Bond Annex || Fixture no: 308 || Main Hall	HALBUG	Existing Halogen BugEye	4			Upgrade Fixtures	none taken	0.12	355	43		$2	Noah: || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
167	Bond	Bond Annex || Fixture no: 309 || Main Hall	EXNC215	Exit Sign Incandescent with 2 - 15 watt Lamps	3			Upgrade Fixtures	none taken	0.09	2,926	263	1	$53	Noah: || || Auditor Suggests: Replace	NEXEG	New Green LED Exit Sign w Emergency Lights	3				0.01	2,926	26	0			237
168	Bond	Bond Annex || Fixture no: 310 || RRW Restroom	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.14	2,487	358	2	$2		871
169	Bond	Bond Annex || Fixture no: 311 || RRW	EVAN4228NT5	Existing Vanity 4' 2L F28 T5 Lamps, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.06	2,926	187	1	$2	Noah: Loc.Color: Painted || || Fix Color: Silver Switched with rr Auditor Suggests: Replace	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	1	168	Controlled by a device on another line		0.03	2,487	65	0	$0		123
170	Bond	Bond Annex || Fixture no: 312 || JC Storage (inactive)	ES4240E	Existing Strip 4' 2L F40 T12 Lamp, Elec Ballast	1			Upgrade Fixtures & Controls	none taken	0.07	251	18		$0	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5		$0		13
171	Bond	Bond Annex || Fixture no: 313 || RRM	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.14	2,487	358	2	$2		871
172	Bond	Bond Annex || Fixture no: 314 || RRM	EVAN4228NT5	Existing Vanity 4' 2L F28 T5 Lamps, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.06	2,926	187	1	$2	Noah: Loc.Color: Painted || || Fix Color: Silver Auditor Suggests: Replace	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	1	172	Controlled by a device on another line		0.03	2,487	65	0	$0		123
173	Bond	Bond Annex || Fixture no: 315 || File room 1	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.28	2,926	819	3	$7	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		581
174	Bond	Bond Annex || Fixture no: 316 || File room 2	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4			Upgrade Fixtures & Controls	none taken	0.56	2,926	1,639	7	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.19	2,487	478	2	$3		1,161
175	Bond	Bond Annex || Fixture no: 317 || File room 3	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4			Upgrade Fixtures & Controls	none taken	0.56	2,926	1,639	7	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.19	2,487	478	2	$3		1,161
176	Bond	Bond Annex || Fixture no: 318 || File room 4	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4			Upgrade Fixtures & Controls	none taken	0.56	2,926	1,639	7	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.19	2,487	478	2	$3		1,161
177	Bond	Bond Annex || Fixture no: 319 || File room 5	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	3			Upgrade Fixtures & Controls	none taken	0.42	2,926	1,229	5	$10	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: White 1 -- Standard Toggle || Ivory switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		(1) Wireless Ceiling PIR with 1 PowPak	1	0.14	2,487	358	2	$2		871
178	Bend Centennial Parking	Bend Centenial parking || Fixture no: 320 || Rooftop parking Parking Garage	ES8LED100	Existing Shoebox LED 100 watts	8			Remain As Is	none taken	0.80	8,760	7,008	10	$1	Noah: Loc.Color: Gray/Silver || I am not sure of this technology see photographs this will need to be verified, I see no	ESBLED100	Existing Shoebox LED 100 watts	8				0.80	8,760	7,008	10	$1	Noah: Loc.Color: Gray/Silver || I am not sure of this technology see photographs this will need to be verified, I see no	
179	Bend Centennial Parking	Bend Centenial parking || Fixture no: 321 || Rooftop parking	EXLED	Existing LED Exit Sign	4			Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	
180	Bend Centennial Parking	Bend Centenial parking || Fixture no: 322 || Rooftop parking	ECNLED100	Existing Canopy LED 100 watts	6			Remain As Is	none taken	0.60	8,760	5,256	7	$1	Noah: Loc.Color: Painted Ceil ht: 14 || Unsure of this technology looks to be LED needs verification could not reach	ECNLED100	Existing Canopy LED 100 watts	6				0.60	8,760	5,256	7	$1	Noah: Loc.Color: Painted Ceil ht: 14 || Unsure of this technology looks to be LED needs verification could not reach	
181	Bend Centennial Parking	Bend Centenial parking || Fixture no: 323 || Garage floors Parking Garage	EP370IND	Existing 70w Induction Parking Garage fixture	180			Upgrade Fixtures & Controls	none taken	13.32	8,760	116,683	160		Noah: Ceil ht: 10 || || Fix Color: Bronze jst: this is not circline - they are induction, Jst: 70w induction (est) has	NPGLED42	New LED Garage Porto, Rab 42w, 5,077lm, Integrated Dimming Sensor	180		Sensor comes integrated into each fixture	180	7.74	4,818	37,291	93			79,392
182	Bend Centennial Parking	Bend Centenial parking || Fixture no: 324 || Garage floors	EXLED	Existing LED Exit Sign	80			Remain As Is	none taken	0.48	8,760	4,205		$22	Noah: || || Fix Color: Green/Black Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	80				0.48	8,760	4,205		$22	Noah: || || Fix Color: Green/Black Exit Auditor Suggests: Exclude	
183	Bend Centennial Parking	Bend Centenial parking || Fixture no: 325 || Garage floors	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	48			Upgrade Fixtures	none taken	2.78	8,760	24,388	33	$306	Noah: Ceil ht: 10 || || Socket % damaged: 25 Fix Color: Gray Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	48				1.15	8,760	10,092	14	$56		14,296
184	Bend Centennial Parking	Bend Centenial parking || Fixture no: 326 || Elivator 1 Hallway	ELED12WMR16	Existing LED Lamp 12 watt MR16	4			Remain As Is	none taken	0.05	8,760	420	1	$1	Noah: || ||	ELED12WMR16	Existing LED Lamp 12 watt MR16	4				0.05	8,760	420	1	$1	Noah: || ||	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
185	Bend Centennial Parking	Bend Centenial parking || Fixture no: 327 || Elivator 2	ELED12WMR16	Existing LED Lamp 12 watt MR16	4			Remain As Is	none taken	0.05	8,760	420	1	$1	Noah: || ||	ELED12WMR16	Existing LED Lamp 12 watt MR16	4				0.05	8,760	420	1	$1	Noah: || ||	
186	Bend Centennial Parking	Bend Centenial parking || Fixture no: 328 || Sprinkler riser room Storage (inactive)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6			Upgrade Fixtures & Controls	none taken	0.35	251	87		$2	Noah: Ceil ht: 16 || || Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv, Length: 28 ft	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.14	188	27		$0		60
187	Bend Centennial Parking	Bend Centenial parking || Fixture no: 329 || Electrical Storage (inactive)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6			Upgrade Fixtures & Controls	none taken	0.35	251	87		$2	Noah: Ceil ht: 16 || || Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv, Length: 28 ft	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.14	188	27		$0		60
188	Bend Centennial Parking	Bend Centenial parking || Fixture no: 330 || Storage Storage (inactive)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6			Upgrade Fixtures & Controls	none taken	0.35	251	87		$2	Noah: Ceil ht: 16 || || Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv, Length: 28 ft	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.14	188	27		$0		60
189	Bend Centennial Parking	Bend Centenial parking || Fixture no: 331 || Storage 2 Storage (inactive)	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6			Upgrade Fixtures & Controls	none taken	0.35	251	87		$2	Noah: Ceil ht: 16 || || Socket % damaged: 25 Fix Color: White Conduit: Flex color: Silver/Galv, Length: 28 ft	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.14	188	27		$0		60
190	Bend Airport	Airport || Fixture no: 332 || Cafe/entry Cafeteria / Food Service	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	6			Upgrade Fixtures	none taken	0.22	5,030	1,086	3	$32	Noah: Loc.Color: Black Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	6				0.08	5,030	392	1			694
191	Bend Airport	Airport || Fixture no: 333 || Cafe/entry	E50MR16	Existing Halogen 50 watt MR16 Style Lamp	40			Upgrade Fixtures	none taken	2.00	5,030	10,060	24	$604	Noah: Loc.Color: Black || || Auditor Suggests: Retrofit	8WLEDMR16	9 watt MR16 Style LED Lamp - Philips	40				0.36	5,030	1,811	4	$13		8,249
192	Bend Airport	Airport || Fixture no: 334 || Cafe/entry	ELEDLAMP12	Existing LED Lamp 12 watts	4			Remain As Is	none taken	0.05	5,030	241	1	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP12	Existing LED Lamp 12 watts	4				0.05	5,030	241	1	$0	Noah: || || Auditor Suggests: Exclude	
193	Bend Airport	Airport || Fixture no: 335 || Cafe/entry	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9			Upgrade Fixtures	none taken	0.52	5,030	2,626	6	$34	Noah: || || Socket % damaged: 50 jst estimating egress	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9				0.22	5,030	1,086	3	$6		1,539
194	Bend Airport	Airport || Fixture no: 336 || Cafe/entry	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	8			Upgrade Fixtures	none taken	0.14	5,030	724	2	$12	Noah: || || Auditor Suggests: Retrofit	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	9				0.04	5,030	221	1	$2		503
195	Bend Airport	Airport || Fixture no: 337 || Cafe/entry	EXLED	Existing LED Exit Sign	2			Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Auditor Suggests: Exclude	
196	Bend Airport	Airport || Fixture no: 338 || Back hall Hallway	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	5			Upgrade Fixtures	none taken	0.18	5,030	905	2	$26	Noah: Loc.Color: White Ceil ht: 12 || || Fix Color: Silver 2 – 2 Switch / 3-Way || Ivory switch w/ Ivory plate. Existing	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	5				0.07	5,030	327	1			578
197	Bend Airport	Airport || Fixture no: 339 || Office 1 Office (Private)	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	4			Upgrade Fixtures & Controls	none taken	0.27	5,030	1,368	3	$26	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	4,276	410	1			958
198	Bend Airport	Airport || Fixture no: 340 || Office 2 Office (Private)	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	6			Upgrade Fixtures & Controls	none taken	0.41	5,030	2,052	5	$40	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	6		Wall Switch Sensor, DT, 1 pole	1	0.14	4,276	616	2			1,437
199	Bend Airport	Airport || Fixture no: 351 || RRM Restroom	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	684	2	$13	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	4,276	205	1			479
200	Bend Airport	Airport || Fixture no: 352 || RRW Restroom	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	684	2	$13	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	4,276	205	1			479
201	Bend Airport	Airport || Fixture no: 353 || Office 3simulator Office (Private)	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	4			Upgrade Fixtures & Controls	none taken	0.27	5,030	1,368	3	$26	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	4,276	410	1			958
202	Bend Airport	Airport || Fixture no: 354 || Office 5 Office (Private)	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	684	2	$13	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	4,276	205	1			479
203	Bend Airport	Airport || Fixture no: 355 || Elevator mech room IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1			Upgrade Fixtures	none taken	0.06	251	15		$0	Noah: Loc.Color: Painted Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6		$0		9
204	Bend Airport	Airport || Fixture no: 356 || HVAC IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1			Upgrade Fixtures	none taken	0.06	251	15		$0	Noah: Loc.Color: Painted Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6		$0		9
205	Bend Airport	Airport || Fixture no: 357 || Phone room IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1			Upgrade Fixtures & Controls	none taken	0.06	251	15		$0	Noah: Loc.Color: Painted Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5		$0		10
206	Bend Airport	Airport || Fixture no: 359 || Phone room	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.04	251	11		$0	Noah: || || Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5		$0		7
207	Bend Airport	Airport || Fixture no: 358 || Stairwell Hallway	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	4			Upgrade Fixtures	none taken	0.27	251	68		$3	Noah: || || G24q-1	LED4PH8-2	Retrofit 4 Pin LED -(2) lamp 8W G24q - Horizontal, Maxlite	4				0.06	251	16		$0		52
208	Bend Airport	Airport || Fixture no: 360 || Kitchen Kitchenette	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2			Upgrade Fixtures & Controls	none taken	0.12	5,030	583	1	$8	Noah: Loc.Color: Painted Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	4,276	205	1	$1		378
209	Bend Airport	Airport Floor: 1 || Fixture no: 361 || Office 1 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.34	5,030	1,710	4	$18	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.14	4,276	616	2	$3		1,095
210	Bend Airport	Airport || Fixture no: 362 || Office 1	EC_LED10	Existing Can Light LED 10 watts	3			Remain As Is	none taken	0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	3				0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	
211	Bend Airport	Airport Floor: 1 || Fixture no: 363 || Office 2 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3			Upgrade Fixtures & Controls	none taken	0.26	5,030	1,283	3	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.11	4,276	462	1	$3		821
212	Bend Airport	Airport || Fixture no: 364 || Office 2	EC_LED10	Existing Can Light LED 10 watts	3			Remain As Is	none taken	0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	3				0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	
213	Bend Airport	Airport Floor: 1 || Fixture no: 365 || Office 3 copy room Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3			Upgrade Fixtures & Controls	none taken	0.26	5,030	1,283	3	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.11	4,276	462	1	$3		821
214	Bend Airport	Airport || Fixture no: 366 || Office 3 copy room	EC_LED10	Existing Can Light LED 10 watts	3			Remain As Is	none taken	0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	3				0.03	5,030	151	0	$0	Noah: || || Auditor Suggests: Exclude	
215	Bend Airport	Airport Floor: 1 || Fixture no: 367 || Office 4 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3			Upgrade Fixtures & Controls	none taken	0.26	5,030	1,283	3	$14	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 50 Fix Color: Silver 1 – Standard Toggle || Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.11	4,276	462	1	$3		821

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
216	Bend Airport	Airport ‖ Fixture no: 368 ‖ Office 4	EC_LED10	Existing Can Light LED 10 watts	3			Remain As Is	none taken	0.03	5,030	151	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	3				0.03	5,030	151	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
217	Bend Airport	Airport Floor: 1 ‖ Fixture no: 369 ‖ Office open Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	18			Upgrade Fixtures & Controls	none taken	1.53	5,030	7,696	18	$82	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 50 Fix Color: Silver 1 -- Standard Toggle ‖ Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	18		(4) Wireless Ceiling PIR with 1 PowPak	1	0.65	4,276	2,771	8	$15		4,925
218	Bend Airport	Airport ‖ Fixture no: 370 ‖ Office open	EC_LED10	Existing Can Light LED 10 watts	12			Remain As Is	none taken	0.12	5,030	604	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	12				0.12	5,030	604	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
219	Bend Airport	Airport ‖ Fixture no: 371 ‖ Comp room IT/Mech/Elec	E54232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1			Upgrade Fixtures & Controls	none taken	0.06	5,030	282	1	$4	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	4,276	103	0	$1		189
220	Bend Airport	Airport ‖ Fixture no: 372 ‖ Comp room	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.04	5,030	221	1	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1	220	Controlled by a device on another line		0.02	4,276	103	0	$1		119
221	Bend Airport	Airport Floor: 1 ‖ Fixture no: 373 ‖ Office 1 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4			Upgrade Fixtures & Controls	none taken	0.34	5,030	1,710	4	$18	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 50 Fix Color: Silver 1 -- Standard Toggle ‖ Ivory switch w/	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.14	4,276	616	2	$3		1,095
222	Bend Airport	Airport ‖ Fixture no: 374 ‖ Office 1	EC_LED10	Existing Can Light LED 10 watts	3			Remain As Is	none taken	0.03	5,030	151	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	3				0.03	5,030	151	0	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
223	Bend Airport	Airport ‖ Fixture no: 375 ‖ JC IT/Mech/Elec	E54232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1			Upgrade Fixtures & Controls	none taken	0.06	5,030	282	1	$4	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	4,276	103	0	$1		189
224	Bend Airport	Airport ‖ Fixture no: 376 ‖ JC	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.04	5,030	221	1	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1	223	Controlled by a device on another line		0.02	4,276	103	0	$1		119
225	Bend Airport	Airport ‖ Fixture no: 377 ‖ RRM Restroom	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.02	5,030	91	0	$2	Noah: ‖ ‖ These could be 4 PIN could not access. No ladder on site Auditor Suggests: Retrofit	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1				0.01	5,030	40	0			50
226	Bend Airport	Airport ‖ Fixture no: 383 ‖ RRM	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.06	5,030	282	1	$4	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 -- Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	4,276	103	0	$1		189
227	Bend Airport	Airport ‖ Fixture no: 381 ‖ Exterior	ECFLP42	Existing CFL Pin Based 42 watt Lamp(s)	7			Upgrade Fixtures	none taken	0.32	4,380	1,410		$33	Noah: Loc.Color: White Ceil ht: 14 ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	7				0.09	4,380	399				1,012
228	Bend Airport	Airport ‖ Fixture no: 382 ‖ Exterior	EWLED9	Existing Wallpack LED 9 watts	2			Remain As Is	none taken	0.02	4,380	79		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	2				0.02	4,380	79		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
229	Bend Airport	Airport ‖ Fixture no: 384 ‖ RRW Restroom	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.02	5,030	91	0	$2	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1				0.01	5,030	40	0			50
230	Bend Airport	Airport ‖ Fixture no: 385 ‖ RRW	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1			Upgrade Fixtures & Controls	none taken	0.06	5,030	282	1	$4	Noah: Loc.Color: Painted Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 -- Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	4,276	103	0	$1		189
231	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 341 ‖ Hangar Warehouse	ES3296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	17			Upgrade Fixtures & Controls	none taken	3.37	5,030	16,931	40	$176	Noah: Loc.Color: White ‖ ‖ Fix Color: White 2 -- Standard Toggle ‖ Ivory switch w/ Ivory plate,. Existing control.	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	17		(2) Wireless Ceiling PIR with 2 PowPaks	1	1.92	4,276	8,213	23			8,718
232	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 342 ‖ Office 1 Office (Private)	ET4240E	Existing Troffer 4' 2L F40 T12 Lamps, Elec Ballast	6			Upgrade Fixtures & Controls	none taken	0.42	5,030	2,113	5	$23	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.14	4,276	616	2	$3		1,497
233	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 343 ‖ Office 2 Office (Private)	ET4240E	Existing Troffer 4' 2L F40 T12 Lamps, Elec Ballast	6			Upgrade Fixtures & Controls	none taken	0.42	5,030	2,113	5	$23	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.14	4,276	616	2	$3		1,497
234	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 344 ‖ Office 3 Office (Private)	ET4240E	Existing Troffer 4' 2L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	704	2	$8	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.05	4,276	205	1	$1		499
235	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 345 ‖ Office 4 Office (Private)	ET4240E	Existing Troffer 4' 2L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	704	2	$8	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.05	4,276	205	1	$1		499
236	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 346 ‖ RRU Restroom	E50MR16	Existing Halogen 50 watt MR16 Style Lamp	1			Upgrade Fixtures	none taken	0.05	5,030	252	1	$15	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Auditor Suggests: Retrofit	9WLEDMR16	9 watt MR16 Style LED Lamp - Philips	1				0.01	5,030	45	0	$0		206
237	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 347 ‖ Office 5 Office (Private)	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	1			Upgrade Fixtures & Controls	none taken	0.14	5,030	704	2	$5	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.05	4,276	205	1	$1		499
238	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 348 ‖ Office 6 Office (Private)	EW4240E	Existing Wrap 4' 2L F40 T12 Lamps, Elec Ballast	2			Upgrade Fixtures & Controls	none taken	0.14	5,030	704	2	$8	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.05	4,276	205	1	$1		499
239	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 349 ‖ Office 7 upstairs Office (Private)	ES4240E	Existing Strip 4' 2L F40 T12 Lamp, Elec Ballast	6			Upgrade Fixtures & Controls	none taken	0.42	5,030	2,113	5	$23	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket % damaged: 50 Fix Color: White 2 -- Standard Toggle ‖ Black switch w/	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		(2) Wireless Ceiling PIR with 2 PowPaks	1	0.14	4,276	616	2	$3		1,497
240	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 350 ‖ Office 7 upstairs	EINC60	Existing Incandescent 60 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.06	5,030	302	1	$15	Noah: ‖ ‖ Auditor Suggests: Replace	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	1				0.01	5,030	45	0	$0		257
241	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 378 ‖ Exterior Exterior (Perimeter)	EF_LED75	Existing Flood LED 75 watts	1			Remain As Is	none taken	0.08	4,380	329		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EFLLED75	Existing Flood LED 75 watts	1				0.08	4,380	329		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
242	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 379 ‖ Exterior	EFLMH150	Existing Flood Metal Halide 150 watt Lamp	3			Upgrade Fixtures	none taken	0.56	4,380	2,431		$18	Noah: ‖ ‖ Auditor Suggests: Retrofit	NFLED52	New LED Flood, Rab FFLED52 Flood, 54 watts	3				0.16	4,380	710				1,721
243	Bend Airport	Airport hanger 1 Red ‖ Fixture no: 380 ‖ Exterior	EINC100	Existing Incandescent 100 watt Lamp(s)	1			Upgrade Fixtures	none taken	0.10	4,380	438		$13	Noah: ‖ Piped I from bottom ‖ Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1				0.02	4,380	70		$0		368
244	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 386 ‖ Storage 1 Storage (active)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.03	251	8		$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	188	2		$0		6
245	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 387 ‖ Storage 2 Storage (active)	ES3296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2			Upgrade Fixtures & Controls	none taken	0.40	251	99		$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate,. Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Wall Switch Sensor, PIR, 1 pole	1	0.23	188	43				57
246	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 388 ‖ RRU Restroom	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1			Upgrade Fixtures & Controls	none taken	0.02	5,030	91	0	$2	Noah: Loc.Color: Painted Ceil ht: 10 ‖ ‖ Fix Color: Painted 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate,.	6WLEDA19	5.5 watt A-19 Style Dimmable LED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	4,276	24	0	$0		67

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
247	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 389 ‖ Storage 4 Storage (active)	ES(296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	6			Upgrade Fixtures & Controls Upgrade	none taken	1.19	251	298		$6	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	6		Wall Switch Sensor, DT, 1 pole	1	0.68	188	128				171
248	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 390 ‖ Storage 5 Storage (active)	ES(296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	6			Fixtures & Controls Upgrade	none taken	1.19	251	298		$6	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	6		Wall Switch Sensor, DT, 1 pole	1	0.68	188	128				171
249	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 391 ‖ Storage 6 Storage (active)	ES(296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	6			Fixtures & Controls Upgrade	none taken	1.19	251	298		$6	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	6		Wall Switch Sensor, DT, 1 pole	1	0.68	188	128				171
250	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 392 ‖ Storage 7 Storage (active)	ES(296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2			Fixtures & Controls	none taken	0.40	251	99		$2	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Wall Switch Sensor, DT, 1 pole	1	0.23	188	43				57
251	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 393 ‖ Hanger Parking Garage	ES(296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	8			Upgrade Fixtures	none taken	1.58	5,030	7,968	19	$83	Noah: Loc.Color: White Ceil ht: 12 ‖ ‖ Fix Color: White 1 -- Standard Toggle ‖ Ivory switch w/ Ivory plate, Existing	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	8				0.90	5,030	4,547	11			3,420
252	Bend Airport	Airport hanger 2 Blue ‖ Fixture no: 394 ‖ Exterior Exterior (Perimeter)	EF.LED60	Existing Flood LED 60 watts	4			Remain As Is	none taken	0.24	4,380	1,051		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EFLLED60	Existing Flood LED 60 watts	4				0.24	4,380	1,051		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Project Name	City of Bend OR - Part II
Date	July 19, 2018

Note to subcontractor: Remember to take power measurements on the existing and as-built lights according to the guidelines provided by Ameresco unless specifically instructed in writing not to.

Version 3.09

Site Information			Existing																Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (fm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
1	Fire Station South	South Fire Station/ Police ‖ Fixture no: 1 ‖ 114 Evidence Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 29 ‖ 28, 29, 30, ,	0.12	3,723	432	1.392	$6	Noah: Loc.Color: White Ceil ht: 10 ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 – ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	3,723	179	1	$1		253
2	Fire Station South	South Fire Station/ Police ‖ Fixture no: 2 ‖ 113 Interview Office (Private)	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 31.666666666 6667 ‖ 30, 32,	0.11	2,969	321	1	$5	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
3	Fire Station South	South Fire Station/ Police ‖ Fixture no: 3 ‖ 118 RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
4	Fire Station South	South Fire Station/ Police ‖ Fixture no: 4 ‖ 117 Office 1 Office (Private)	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 31.666666666 6667 ‖ 30, 32,	0.11	2,969	321	1	$5	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
5	Fire Station South	South Fire Station/ Police ‖ Fixture no: 5 ‖ 116 Office 2 Office (Private)	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 31.666666666 6667 ‖ 30, 32,	0.11	2,969	321	1	$5	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
6	Fire Station South	South Fire Station/ Police ‖ Fixture no: 6 ‖ 112/115 Open Office	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	4,380	710	2	$10	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	3,723	268	1	$1		442
7	Fire Station South	South Fire Station/ Police ‖ Fixture no: 7 ‖ 112/115 Open Office	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.11	4,380	473	1	$14	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3				0.04	4,380	171	0			302
8	Fire Station South	South Fire Station/ Police ‖ Fixture no: 8 ‖ 119 Office Office (Private)	EFT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,969	505	2	$6	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,227	160	1	$1		344
9	Fire Station South	South Fire Station/ Police ‖ Fixture no: 9 ‖ 120 JC Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
10	Fire Station South	South Fire Station/ Police ‖ Fixture no: 10 ‖ Elivator Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	8,760	508		$6	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	8,760	210		$1		298
11	Fire Station South	South Fire Station/ Police ‖ Fixture no: 11 ‖ 110 stairwell Hallway	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	8,760	1,524		$19	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	8,760	631		$4		894
12	Fire Station South	South Fire Station/ Police ‖ Fixture no: 12 ‖ 109 hall Hallway	ECFLP216	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.08	4,380	350	1	$12	Noah: Loc.Color: Painted Ceil ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.03	3,723	97	0			254
13	Fire Station South	South Fire Station/ Police ‖ Fixture no: 13 ‖ 108 office Office (Private)	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	2,969	321	1	$5	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
14	Fire Station South	South Fire Station/ Police ‖ Fixture no: 14 ‖ 106 Conference Conference / Meeting	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	6				Upgrade Fixtures & Controls	Ave: 25.8 ‖ 24, 26, 25, 26, 28	0.22	2,969	641	3	$20	Noah: Loc.Color: Wood Dark Ceil ht: 12 ‖ ‖ Fix Color: White 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	6		Wall Switch Sensor, DT, 2 pole	1	0.09	2,227	134	1	$1		508
15	Fire Station South	South Fire Station/ Police ‖ Fixture no: 15 ‖ 106 Conference	ECFLP216	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.08	2,969	236	1	$8	Noah: Loc.Color: Painted Ceil ht: 8 ‖ ‖ 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate. Existing control:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Wall Switch Sensor, DT, 1 pole	1	0.03	2,227	58	0			180
16	Fire Station South	South Fire Station/ Police ‖ Fixture no: 16 ‖ 102 office Office (Private)	EFT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,969	481	2	$7	Noah: Loc.Color: White Ceil ht: 10 ‖ lens dim: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,227	160	1	$1		321
17	Fire Station South	South Fire Station/ Police ‖ Fixture no: 17 ‖ 105 RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
18	Fire Station South	South Fire Station/ Police ‖ Fixture no: 18 ‖ 104 RRW Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
19	Fire Station South	South Fire Station/ Police ‖ Fixture no: 19 ‖ 121 IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
20	Fire Station South	South Fire Station/ Police ‖ Fixture no: 20 ‖ 122 IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
21	Fire Station South	South Fire Station/ Police ‖ Fixture no: 21 ‖ 131 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
22	Fire Station South	South Fire Station/ Police ‖ Fixture no: 22 ‖ 130 stairwell Hallway	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	8,760	1,524		$19	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	8,760	631		$4		894
23	Fire Station South	South Fire Station/ Police ‖ Fixture no: 23 ‖ 129 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	188	33		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	188	14		$0		19
24	Fire Station South	South Fire Station/ Police ‖ Fixture no: 24 ‖ 128 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
25	Fire Station South	South Fire Station/ Police ‖ Fixture no: 25 ‖ 127 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
26	Fire Station South	South Fire Station/ Police ‖ Fixture no: 26 ‖ 126 laundry Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
27	Fire Station South	South Fire Station/ Police ‖ Fixture no: 27 ‖ 125 EMT Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
28	Fire Station South	South Fire Station/ Police ‖ Fixture no: 28 ‖ 124 hose Storage (active)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	12		$0	Noah: Loc.Color: Painted Ceil ht: 10 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2		Already Controlled	1	0.02	188	3		$0		9
29	Fire Station South	South Fire Station/ Police ‖ Fixture no: 29 ‖ 123 Apparatus bay Parking Garage	EHB8632N	Existing Highbay 8' 6L F32 T8 Lamps, NBF Ballast	20				Upgrade Fixtures & Controls	none taken	3.40	4,380	14,892	41	$307	Noah: Difficult, add 10% because: Height Loc.Color: Painted Ceil ht: 24 ‖ ‖ Fix Color: White Conduit: Flex color:	4TLED12-8	Retrofit 8L to 4' TLED type B - 12w - bypass ballast	20		Fixture Mount PIR for low mounting	20	1.44	3,723	5,361	17	$30		9,531
30	Fire Station South	South Fire Station/ Police ‖ Fixture no: 32 ‖ 123 Apparatus bay	EXLED	Existing LED Exit Sign	6				Remain As Is	none taken	0.04	8,760	315		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	6				0.04	8,760	315		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	
31	Fire Station South	South Fire Station/ Police ‖ Fixture no: 30 ‖ 101 lobby Hallway	ECFLP813	Existing Pin Based CFL Lamps 8L 13 watts	2				Upgrade Fixtures	none taken	0.24	4,380	1,051	3	$26	Noah: Loc.Color: Wood Dark Ceil ht: 12 ‖ ‖ Mounting: Rigid Pendant length: 2 dim: color: Auditor	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	4,380	420	1	$5		631

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
32	Fire Station South	South Fire Station/ Police ‖ Fixture no: 31 ‖ 101 lobby	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	7				Upgrade Fixtures	none taken	0.28	4,380	1,226	3	$41	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	7				0.09	4,380	399	1			828
33	Fire Station South	South Fire Station/ Police ‖ Fixture no: 33 ‖ Upstairs storage 1 Storage (active)	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	188	8		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Already Controlled	1	0.01	188	2				6
34	Fire Station South	South Fire Station/ Police ‖ Fixture no: 34 ‖ 200 kitchen Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	188	66		$2	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	188	27		$0		38
35	Fire Station South	South Fire Station/ Police ‖ Fixture no: 35 ‖ 200 kitchen	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	4,380	175	0	$6	Noah: ‖ ‖ Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	4,380	57	0			118
36	Fire Station South	South Fire Station/ Police ‖ Fixture no: 36 ‖ 200 kitchen	ES2115N	Existing Strip 2' 1L F15 T8 Lamp, NBF Ballast	1				Upgrade Fixtures	none taken	0.02	2,969	45	0	$3	Noah: ‖ Under cabinet ‖ 1 – Standard Toggle ‖ Auditor Suggests: Replace	UC18-10	Undercabinet 18" 9.7w LED, 5t59m	1				0.01	2,969	29	0			16
37	Fire Station South	South Fire Station/ Police ‖ Fixture no: 37 ‖ 200 kitchen	ES3125N	Existing Strip 3' 1L F25 T8 Lamp, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	4,380	110	0	$5	Noah: ‖ Under cabinet ‖ Auditor Suggests: Replace	3TLED12-1	Retrofit 1L to 3' TLED type B - 12w - bypass ballast	1				0.01	4,380	53	0	$0		57
38	Fire Station South	South Fire Station/ Police ‖ Fixture no: 38 ‖ 200 kitchen	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.10	4,380	420	1	$8	Noah: ‖ Under cabinet ‖ Auditor Suggests: Replace	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3				0.04	4,380	158	0	$1		263
39	Fire Station South	South Fire Station/ Police ‖ Fixture no: 39 ‖ 222 exercise Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	188	66		$2	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	188	27		$0		38
40	Fire Station South	South Fire Station/ Police ‖ Fixture no: 40 ‖ 220 closet Restroom	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
41	Fire Station South	South Fire Station/ Police ‖ Fixture no: 41 ‖ Storage 2 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
42	Fire Station South	South Fire Station/ Police ‖ Fixture no: 42 ‖ Storage 3 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
43	Fire Station South	South Fire Station/ Police ‖ Fixture no: 43 ‖ Storage 4 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
44	Fire Station South	South Fire Station/ Police ‖ Fixture no: 44 ‖ Storage 5 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
45	Fire Station South	South Fire Station/ Police ‖ Fixture no: 45 ‖ 200 Dining Conference / Meeting	EDFLP32	Existing CFL Pin Based 32 watt Lamp(s)	8				Upgrade Fixtures & Controls	none taken	0.29	2,969	855	3	$27	Noah: Loc,Color: Wood Dark Cell ht: 12 ‖ ‖ Fix Color: White Mounting: Conduit length: 3 dim: color: 2 –	LED4PO10	Retrofit 4 Pin LED - 18W GX24q - Omni, LED-LLC	8		Wall Switch Sensor, DT, 1 pole	1	0.08	2,227	178	1	$1		677
46	Fire Station South	South Fire Station/ Police ‖ Fixture no: 46 ‖ 200 Dining	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.08	4,380	350	1	$12	Noah: Loc,Color: Painted Cell ht: 8 ‖ ‖ 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate., Existing control:	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	2				0.03	4,380	114	0			237
47	Fire Station South	South Fire Station/ Police ‖ Fixture no: 47 ‖ 229 Locker room Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	3,723	432	1	$6	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	3,723	179	1	$1		253
48	Fire Station South	South Fire Station/ Police ‖ Fixture no: 48 ‖ 229 Locker room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures	none taken	0.46	4,380	2,032	6	$27	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Lenses needed: 3dim: Standard ‖ Socket % damaged: 25 Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8				0.19	4,380	841	2	$5		1,191
49	Fire Station South	South Fire Station/ Police ‖ Fixture no: 49 ‖ 229 Locker room	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.27	4,380	1,181	3	$24	Noah: ‖ Wet location ‖ Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	4				0.10	4,380	420	1			771
50	Fire Station South	South Fire Station/ Police ‖ Fixture no: 50 ‖ 228 Women Locker room Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
51	Fire Station South	South Fire Station/ Police ‖ Fixture no: 51 ‖ 228 Women Locker room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	4,380	1,016	3	$14	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Lenses needed: 3dim: Standard ‖ Socket % damaged: 25 Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	4,380	420	1	$2		596
52	Fire Station South	South Fire Station/ Police ‖ Fixture no: 52 ‖ 226 Women Locker room	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.14	4,380	596	2	$12	Noah: ‖ Wet location ‖ Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2				0.05	4,380	210	1			385
53	Fire Station South	South Fire Station/ Police ‖ Fixture no: 53 ‖ 200 living space hall Hallway	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	6				Upgrade Fixtures & Controls	none taken	0.24	4,380	1,051	3	$35	Noah: Loc,Color: Painted Cell ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	6		Wall Switch Sensor, PIR, 1 pole	1	0.08	3,723	290	1			761
54	Fire Station South	South Fire Station/ Police ‖ Fixture no: 54 ‖ 200 living space hall	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	4,380	1,270	3	$17	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	4,380	526	1	$3		745
55	Fire Station South	South Fire Station/ Police ‖ Fixture no: 55 ‖ 200 living space hall	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
56	Fire Station South	South Fire Station/ Police ‖ Fixture no: 56 ‖ 200 RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
57	Fire Station South	South Fire Station/ Police ‖ Fixture no: 57 ‖ Bunk 8	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate., Noah: Loc,Color: Painted ‖ ‖ Fix Color: White 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.,	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
58	Fire Station South	South Fire Station/ Police ‖ Fixture no: 58 ‖ Bunk 8	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1		LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
59	Fire Station South	South Fire Station/ Police ‖ Fixture no: 59 ‖ Upstairs storage 10 Storage (active)	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	188	8		$0	Noah: Loc,Color: Painted Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Already Controlled	1	0.01	188	2				6
60	Fire Station South	South Fire Station/ Police ‖ Fixture no: 60 ‖ Bunk 7	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate., Noah: Loc,Color: Painted ‖ ‖ Fix Color: White 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.,	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
61	Fire Station South	South Fire Station/ Police ‖ Fixture no: 61 ‖ Bunk 7	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1		LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
62	Fire Station South	South Fire Station/ Police ‖ Fixture no: 62 ‖ Bunk 6	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.,	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
63	Fire Station South	South Fire Station/ Police ‖ Fixture no: 63 ‖ Bunk 6	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted ‖ ‖ Fix Color: White 2 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.,	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
64	Fire Station South	South Fire Station/ Police ‖ Fixture no: 64 ‖ Bunk 5	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Cell ht: 8 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Silver/Metalic switch w/ Silver plate.,	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
65	Fire Station South	South Fire Station/ Police || Fixture no: 65 || Bunk 5	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	251	8		$1	Noah: Loc.Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	251	2		$0		6
66	Fire Station South	South Fire Station/ Police || Fixture no: 66 || Bunk 4	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc.Color: White Cell ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
67	Fire Station South	South Fire Station/ Police || Fixture no: 67 || Bunk 4	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	251	8		$1	Noah: Loc.Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	251	2		$0		6
68	Fire Station South	South Fire Station/ Police || Fixture no: 68 || Bunk 3	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc.Color: White Cell ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
69	Fire Station South	South Fire Station/ Police || Fixture no: 69 || Bunk 3	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc.Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
70	Fire Station South	South Fire Station/ Police || Fixture no: 70 || Bunk 2	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc.Color: White Cell ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
71	Fire Station South	South Fire Station/ Police || Fixture no: 71 || Bunk 2	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc.Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
72	Fire Station South	South Fire Station/ Police || Fixture no: 72 || Bunk 1	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	251	27		$1	Noah: Loc.Color: White Cell ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9		$0		18
73	Fire Station South	South Fire Station/ Police || Fixture no: 73 || Bunk 1 closet Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
74	Fire Station South	South Fire Station/ Police || Fixture no: 74 || Exterior Exterior (Perimeter)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	22				Upgrade Fixtures	none taken	0.70	4,380	3,084		$30	Noah: Loc.Color: Painted || || Fix Color: Bronze Auditor Suggests: Retrofit	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	22				0.20	4,380	867		$4		2,216
75	Fire Station South	South Fire Station/ Police || Fixture no: 75 || Exterior	EWHPS250	Existing Wall Pack High Pressure Sodium 250 watt Lamp	6				Upgrade Fixtures	none taken	1.77	4,380	7,753		$36	Noah: || Unsure of this technology could not be opened do you height verification needed. || Auditor	NXTWLED102P	New Cooper Crosstour/Nexx LED Wallpack, 102 watts, 12539+ Photocell	6				0.61	4,380	2,681				5,072
76	Fire Station South	South Fire Station/ Police || Fixture no: 76 || Exterior	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.14	4,380	596		$12	Noah: || || Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2				0.05	4,380	210				385
77	Fire Station South	South Fire Station/ Police || Fixture no: 77 || Exterior	ESBLED75	Existing Shoebox LED 75 watts	3				Remain As Is	none taken	0.23	4,380	986		$0	Noah: || || Auditor Suggests: Exclude	ESBLED75	Existing Shoebox LED 75 watts	3				0.23	4,380	986		$0	Noah: || || Auditor Suggests: Exclude	
78	Fire Station East	East Fire Station || Fixture no: 78 || 114 Evidence Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	3,723	432	1	$6	Noah: Loc.Color: White Cell ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	3,723	179	1	$1		253
79	Fire Station East	East Fire Station || Fixture no: 79 || 113 Interview Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	2,969	321	1	$5	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
80	Fire Station East	East Fire Station || Fixture no: 80 || 116 RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
81	Fire Station East	East Fire Station || Fixture no: 81 || 117 Office 1 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	4,380	473	1	$7	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	3,723	179	1	$1		294
82	Fire Station East	East Fire Station || Fixture no: 82 || 116 Office 2 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	4,380	473	1	$7	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	3,723	179	1	$1		294
83	Fire Station East	East Fire Station || Fixture no: 83 || 112/115 Open Office	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	4,380	710	2	$10	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	3,723	268	1	$1		442
84	Fire Station East	East Fire Station || Fixture no: 84 || 112/115 Open Office	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.11	4,380	473	1	$14	Noah: Loc.Color: White Cell ht: 10 || Fix Color: Silver 1 – Standard Toggle || Silver/Metallic switch w/ Silver plate..	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	3				0.04	4,380	171	0			302
85	Fire Station East	East Fire Station || Fixture no: 85 || 119 Office Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	4,380	745	2	$8	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.07	3,723	268	1	$1		477
86	Fire Station East	East Fire Station || Fixture no: 86 || 120 JC Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
87	Fire Station East	East Fire Station || Fixture no: 87 || Elivator Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	8,760	508		$6	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	8,760	210		$1		298
88	Fire Station East	East Fire Station || Fixture no: 88 || 110 stairwell Hallway	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	8,760	1,524		$19	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	8,760	631		$4		894
89	Fire Station East	East Fire Station || Fixture no: 89 || 109 hall Hallway	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.08	4,380	350	1	$12	Noah: Loc.Color: Painted Cell ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.03	3,723	97	0			254
90	Fire Station East	East Fire Station || Fixture no: 90 || 108 office Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	2,969	321	1	$5	Noah: Loc.Color: White Cell ht: 10 || Plenum lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,227	107	1	$1		214
91	Fire Station East	East Fire Station || Fixture no: 91 || 106 Conference Conference / Meeting	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	6				Upgrade Fixtures & Controls	none taken	0.22	2,969	641	3	$20	Noah: Loc.Color: Wood Dark Cell ht: 12 || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	6		Wall Switch Sensor, DT, 1 pole	1	0.08	2,227	174	1			468
92	Fire Station East	East Fire Station || Fixture no: 92 || 106 Conference	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.08	2,969	238	1	$8	Noah: Loc.Color: Painted Cell ht: 8 || || 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.. Existing control:	RT5-13	Retrofit RC LED Module 5 cr 8", 13w, 900lm, Sylvania	2				0.03	2,969	77	0			160
93	Fire Station East	East Fire Station || Fixture no: 93 || 102 office Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,969	481	2	$7	Noah: Loc.Color: White Cell ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,227	160	1	$1		321
94	Fire Station East	East Fire Station || Fixture no: 94 || 105 RRM Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
95	Fire Station East	East Fire Station || Fixture no: 95 || 104 RRW Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
96	Fire Station East	East Fire Station || Fixture no: 96 || 121 IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
97	Fire Station East	East Fire Station || Fixture no: 97 || 122 IT/Mech/Elec	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: Painted Cell ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
98	Fire Station East	East Fire Station || Fixture no: 98 || 131 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
99	Fire Station East	East Fire Station || Fixture no: 99 || 130 stairwell Hallway	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	8,760	1,524		$19	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	8,760	631		$4		894
100	Fire Station East	East Fire Station || Fixture no: 100 || 129 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	188	33		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	188	14		$0		19
101	Fire Station East	East Fire Station || Fixture no: 101 || 128 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
102	Fire Station East	East Fire Station || Fixture no: 102 || 127 Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
103	Fire Station East	East Fire Station || Fixture no: 103 || 126 laundry Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
104	Fire Station East	East Fire Station || Fixture no: 104 || 125 EMT Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	188	22		$1	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	188	9		$0		13
105	Fire Station East	East Fire Station || Fixture no: 105 || 124 base Storage (active)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	12		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	9WLED A19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2		Already Controlled	1	0.02	188	3		$0		9
106	Fire Station East	East Fire Station || Fixture no: 106 || 123 Apparatus bay Parking Garage	EHB8632N	Existing Highbay 8' 8L F32 T8 Lamps, NBF Ballast	20				Upgrade Fixtures & Controls	none taken	3.40	4,380	14,892	41	$307	Noah: Difficult, add 100% because: Height Loc,Color: Painted Ceil ht: 24 || Fix Color: White Conduit: Flex color:	NHBLED110U	New LED 2x2 High Bay 16486 Lumens 110w - James ZYH2 with lens	20		Fixture Mount PIR for high mounting	20	2.00	3,723	7,446	24			7,446
107	Fire Station East	East Fire Station || Fixture no: 109 || 123 Apparatus bay	EXLED	Existing LED Exit Sign	6				Remain As Is	none taken	0.04	8,760	315		$2	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	6				0.04	8,760	315		$2	Noah: || || Auditor Suggests: Exclude	
108	Fire Station East	East Fire Station || Fixture no: 107 || 101 lobby Hallway	ECFLP813	Existing Pin Based CFL Lamps 8L 13 watts	2				Upgrade Fixtures	none taken	0.24	4,380	1,051	3	$26	Noah: Loc,Color: Wood Dark Ceil ht: 12 || || Mounting: Rigid Pendant length: 2 dim: color: Auditor	LEDPL6-8	Retrofit 2 Pin LED - (8) lamp 6W - Horizontal, Maxlite	2				0.10	4,380	420	1	$5		631
109	Fire Station East	East Fire Station || Fixture no: 108 || 101 lobby	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	7				Upgrade Fixtures	none taken	0.28	4,380	1,226	3	$41	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	7				0.09	4,380	399	1			828
110	Fire Station East	East Fire Station || Fixture no: 110 || Upstairs storage 1 Storage (active)	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	188	8		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Already Controlled	1	0.01	188	2				6
111	Fire Station East	East Fire Station || Fixture no: 111 || 200 kitchen Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	188	66		$2	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	188	27		$0		38
112	Fire Station East	East Fire Station || Fixture no: 112 || 200 kitchen	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.04	4,380	175	0	$6	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	1				0.01	4,380	57	0			118
113	Fire Station East	East Fire Station || Fixture no: 113 || 200 kitchen	ES2115N	Existing Strip 2' 1L F15 T8 Lamp, NBF Ballast	1				Upgrade Fixtures	none taken	0.02	2,969	45	0	$3	Noah: || Under cabinet || 1 – Standard Toggle || Auditor Suggests: Replace	UC18-10	Undercabinet 18" 9.7w LED, 5t59m	1				0.01	2,969	29	0			16
114	Fire Station East	East Fire Station || Fixture no: 114 || 200 kitchen	ES3125N	Existing Strip 3' 1L F25 T8 Lamp, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	4,380	110	0	$5	Noah: || Under cabinet || Auditor Suggests: Replace	3TLED12-1	Retrofit 1L to 3' TLED type B - 12w - bypass ballast	1				0.01	4,380	53	0	$0		57
115	Fire Station East	East Fire Station || Fixture no: 115 || 200 kitchen	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.10	4,380	420	1	$8	Noah: || Under cabinet || Auditor Suggests: Replace	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3				0.04	4,380	158	0	$1		263
116	Fire Station East	East Fire Station || Fixture no: 116 || 222 exercise Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.35	188	66		$2	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	188	27		$0		38
117	Fire Station East	East Fire Station || Fixture no: 117 || 220 closet Restroom	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
118	Fire Station East	East Fire Station || Fixture no: 118 || Storage 2 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
119	Fire Station East	East Fire Station || Fixture no: 119 || Storage 3 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
120	Fire Station East	East Fire Station || Fixture no: 120 || Storage 4 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
121	Fire Station East	East Fire Station || Fixture no: 121 || Storage 5 Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
122	Fire Station East	East Fire Station || Fixture no: 122 || 200 Dining Conference / Meeting	ECFLP32	Existing CFL Pin Based 32 watt Lamp(s)	8				Upgrade Fixtures & Controls	none taken	0.28	4,380	1,261	3	$38	Noah: Loc,Color: Wood Dark Ceil ht: 12 || || Fix Color: White Mounting: Conduit length: 3 dim: color: 2 –	LED4PO10	Retrofit 4 Pin LED - 10W GX24q - Omni, LED-LLC	8		Wall Switch Sensor, DT, 1 pole	1	0.08	3,723	298	1	$2		964
123	Fire Station East	East Fire Station || Fixture no: 123 || 200 Dining	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.08	4,380	350	1	$12	Noah: Loc,Color: Painted Ceil ht: 8 || || 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate. Existing control:	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	2				0.03	4,380	114	0			237
124	Fire Station East	East Fire Station || Fixture no: 124 || 229 Locker room Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	3,723	432	1	$6	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	3,723	179	1	$1		253
125	Fire Station East	East Fire Station || Fixture no: 125 || 229 Locker room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures	none taken	0.46	4,380	2,032	6	$27	Noah: Loc,Color: White Ceil ht: 8 || Lenses needed: 3dim: Standard || Socket % damaged: 25 Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8				0.19	4,380	841	2	$5		1,191
126	Fire Station East	East Fire Station || Fixture no: 126 || 229 Locker room	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	4				Upgrade Fixtures	none taken	0.27	4,380	1,191	3	$24	Noah: || Wet location || Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2600lm, Sylvania	4				0.10	4,380	420	1			771
127	Fire Station East	East Fire Station || Fixture no: 127 || 228 Women Locker room Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
128	Fire Station East	East Fire Station || Fixture no: 128 || 228 Women Locker room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	4,380	1,016	3	$14	Noah: Loc,Color: White Ceil ht: 8 || Lenses needed: 3dim: Standard || Socket % damaged: 25 Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	4,380	420	1	$2		596
129	Fire Station East	East Fire Station || Fixture no: 129 || 228 Women Locker room	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.14	4,380	596	2	$12	Noah: || Wet location || Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2600lm, Sylvania	2				0.05	4,380	210	1			385
130	Fire Station East	East Fire Station || Fixture no: 130 || 200 living space hall Hallway	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	6				Upgrade Fixtures & Controls	none taken	0.24	4,380	1,051	3	$35	Noah: Loc,Color: Painted Ceil ht: 8 || || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	6		Wall Switch Sensor, PIR, 1 pole	1	0.08	3,723	290	1			761

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
131	Fire Station East	East Fire Station || Fixture no: 131 || 200 living space hall	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	4,380	1,270	3	$17	Noah: || || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	4,380	526	1	$3		745
132	Fire Station East	East Fire Station || Fixture no: 132 || 200 living space hall	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	
133	Fire Station East	East Fire Station || Fixture no: 133 || 200 RRU Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	3,723	216	1	$3	Noah: Loc,Color: Painted Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	3,723	89	0	$1		127
134	Fire Station East	East Fire Station || Fixture no: 134 || Bunk 8	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
135	Fire Station East	East Fire Station || Fixture no: 135 || Bunk 8	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
136	Fire Station East	East Fire Station || Fixture no: 136 || Upstairs storage 10 Storage (active)	ECFLP218	Existing CFL Pin Based with 2 - 18 watt Lamp(s)	1		Already Controlled	1	Upgrade Fixtures	none taken	0.04	188	8		$0	Noah: Loc,Color: Painted Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	RT5-5	Retrofit RC LED Module 5 or 6", 6w, 700lm, Sylvania	1		Already Controlled	1	0.01	188	2				6
137	Fire Station East	East Fire Station || Fixture no: 137 || Bunk 7	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
138	Fire Station East	East Fire Station || Fixture no: 138 || Bunk 7	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
139	Fire Station East	East Fire Station || Fixture no: 139 || Bunk 6	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
140	Fire Station East	East Fire Station || Fixture no: 140 || Bunk 6	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
141	Fire Station East	East Fire Station || Fixture no: 141 || Bunk 5	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
142	Fire Station East	East Fire Station || Fixture no: 142 || Bunk 5	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	251	8		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	251	2		$0		6
143	Fire Station East	East Fire Station || Fixture no: 143 || Bunk 4	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
144	Fire Station East	East Fire Station || Fixture no: 144 || Bunk 4	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	251	8		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	251	2		$0		6
145	Fire Station East	East Fire Station || Fixture no: 145 || Bunk 3	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
146	Fire Station East	East Fire Station || Fixture no: 146 || Bunk 3	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
147	Fire Station East	East Fire Station || Fixture no: 147 || Bunk 2	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.07	251	17		$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: Silver 1 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5				13
148	Fire Station East	East Fire Station || Fixture no: 148 || Bunk 2	ECFLP213	Existing CFL Pin Based with 2 - 13 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	251	15		$1	Noah: Loc,Color: Painted || || Fix Color: White 2 – Standard Toggle || Silver/Metalic switch w/ Silver plate.	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	2				0.01	251	3		$0		12
149	Fire Station East	East Fire Station || Fixture no: 149 || Bunk 1	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.11	251	27		$1	Noah: Loc,Color: White Ceil ht: 10 || lens dirt: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	188	9		$0		18
150	Fire Station East	East Fire Station || Fixture no: 150 || Bunk 1 closet Restroom	EVAN4232N	Existing Vanity Fixture 4' 2L F32 T8 Lamp, NBF Ballast	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	188	11		$0	Noah: Loc,Color: Painted Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	188	5		$0		6
151	Fire Station East	East Fire Station || Fixture no: 151 || Exterior Exterior (Perimeter)	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	22				Upgrade Fixtures	none taken	0.70	4,380	3,084		$30	Noah: Loc,Color: Painted || || Fix Color: Bronze Auditor Suggests: Retrofit	8WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	22				0.20	4,380	867		$4		2,216
152	Fire Station East	East Fire Station || Fixture no: 152 || Exterior	EWHPS250	Existing Wall Pack High Pressure Sodium 250 watt Lamp	6				Upgrade Fixtures	none taken	1.77	4,380	7,753		$36	Noah: || Unsure of this technology could not be opened do you height verification needed. || Auditor	NXTWLED102P	New Cooper CrosstourMaxx LED Wallpack, 102 watts, 12539+ Photocell	6				0.61	4,380	2,681				5,072
153	Fire Station East	East Fire Station || Fixture no: 153 || Exterior	ECFLP232	Existing CFL Pin Based with 2 - 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.14	4,380	596		$12	Noah: || || Auditor Suggests: Retrofit	RT8-24	Retrofit RC LED Module 8", 24w, 2000lm, Sylvania	2				0.05	4,380	210				385
154	Fire Station East	East Fire Station || Fixture no: 154 || Exterior	ESBLED75	Existing Shoebox LED 75 watts	3				Remain As Is	none taken	0.23	4,380	986		$0	Noah: || || Auditor Suggests: Exclude	ESBLED75	Existing Shoebox LED 75 watts	3				0.23	4,380	986		$0	Noah: || || Auditor Suggests: Exclude	
155	Fire Station East	East Fire Station || Fixture no: 155 || Under stairs	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc,Color: Painted Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
156	Fire Station East	Flags and smoky || Fixture no: 156 || Exterior flags and smoky the bear Exterior (Area)	EFLHPS250	Existing Flood Fixture High Pressure Sodium 250 watt Lamp	8				Upgrade Fixtures	none taken	2.36	4,380	10,337		$48	Noah: || In all locations we seem to fill up with water in short circuit, Need a new flag post solution. Maybe Randys	NFLED78	New LED Flood Rab FXLED78, 79 watts	8				0.63	4,380	2,768				7,569
157	Fire Station East	Flags and smoky || Fixture no: 157 || Exterior flags and smoky the bear	E30MR16	Existing Halogen 50 watt MR16 Style Lamp	12				Upgrade Fixtures	none taken	0.60	4,380	2,628		$158	Noah: || All of these fixtures are full of water did not break open due to shorting factor. These all need to be	8WLEDMR16	9 watt MR16 Style LED Lamp - Philips	12				0.11	4,380	473		$4		2,155
158	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 2 || Upstairs Lobby Office (Open)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	5				Upgrade Fixtures & Controls	Ave: 26.4 || 28, 26, 28, 25, 27	0.32	2,728	859	4	$19	Noah: Loc,Color: White Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	5		(2) Wireless Ceiling PIR with 1 PowPak	1	0.13	2,046	266	2	$1		593
159	PubWorks Campus	Public works front, Offices and bays || Fixture no: 3 || Upstairs Lobby	ECLLED15	Existing Can Light LED 15 watts	14				Remain As Is	none taken	0.21	3,230	678	3	$1	Noah: || || Auditor Suggests: Exclude	ECLLED15	Existing Can Light LED 15 watts	14				0.21	3,230	678	3	$1	Noah: || || Auditor Suggests: Exclude	
160	PubWorks Campus	Public works front, Offices and bays || Fixture no: 40 || Upstairs Lobby	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
161	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 4 || Office 1 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	Ave: 29.8 || 28, 29, 30, 31, 31	0.19	2,728	516	2	$12	Noah: Loc,Color: White Ceil ht: 8 || Stepped dimming || Socket % damaged: 25 Fix Color: White 2 –	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	3		Wall Switch Sensor, DT, 2 pole	1	0.08	2,046	160	1	$1		356
162	PubWorks Campus	Public works front, Offices and bays || Fixture no: 5 || Office 1	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.02	2,728	49	0	$1	Noah: || || Fix Color: White Auditor Suggests: Retrofit	10WLEDBR30	10 watt BR30 Style Dimmable ,ED Lamp - Sylvania	1				0.01	2,728	27	0	$0		22
163	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 6 || Office 2 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.13	2,728	344	2	$8	Noah: Loc,Color: White Ceil ht: 8 || Step dimming || Socket % damaged: 25 Fix Color: White 2 – Standard	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, DT, 2 pole	1	0.05	2,046	106	1	$1		237

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
164	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 7 || Office 3 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	3				Upgrade Fixtures & Controls	Ave: 31.6 || 33, 30, 31, 31, 33	0.19	2,726	516	2	$12	Noah: Loc.Color: White Cell ht: 8 || Stop dimming || Socket % damaged: 25 Fix Color: White 2 – Standard	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	3		Wall Switch Sensor, DT, 2 pole	1	0.08	2,046	160	1	$1		356
165	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 8 || Office 4 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	1		none taken		Upgrade Fixtures & Controls		0.06	2,726	172	1	$4	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	1		Wall Switch Sensor, DT, 2 pole	1	0.03	2,046	53	0	$0		119
166	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 9 || Office 5 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2		none taken		Upgrade Fixtures & Controls		0.13	2,726	344	2	$8	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, DT, 2 pole	1	0.05	2,046	106	1	$1		237
167	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 10 || Office 6 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	2		none taken		Upgrade Fixtures & Controls		0.13	2,726	344	2	$8	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TSLED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	2		Wall Switch Sensor, DT, 2 pole	1	0.05	2,046	106	1	$1		237
168	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 11 || Office 7 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		none taken		Upgrade Fixtures & Controls		0.26	2,726	696	3	$8	Noah: Loc.Color: White Cell ht: 8 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.11	2,046	221	1	$1		475
169	PubWorks Campus	Public works front, Offices and bays || Fixture no: 12 || Office 7	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures		0.03	355	11		$1	Noah: Loc.Color: White Cell ht: 8 || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
170	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 13 || Office 7 Attic storage Storage (active)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	3		none taken		Upgrade Fixtures & Controls		0.66	1,420	941		$19	Noah: Loc.Color: Wood Light Cell ht: 8 || Piped in and out both ends || Fix Color: White Conduit: EMT color:	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	3		(4) Wireless Ceiling PIR with 1 PowPak	1	0.14	1,420	204		$1		737
171	PubWorks Campus	Public works front, Offices and bays || Fixture no: 14 || Office 7 Attic storage	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		none taken		Upgrade Fixtures		0.12	1,420	165		$3	Noah: || || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	1,420	68		$0		97
172	PubWorks Campus	Public works front, Offices and bays || Fixture no: 15 || Office 7 Attic storage	ES4240L	Existing Strip 4' 2 Lamp(s) F40 T12 Energy Efficient Ballast	3		none taken		Upgrade Fixtures		0.20	1,420	281		$4	Noah: || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	1,420	102		$1		179
173	PubWorks Campus	Public works front, Offices and bays || Fixture no: 16 || Office 7 Attic storage	ELEDLAMP9	Existing LED Lamp 9 watts	1				Remain As Is		none taken	0.01	1,420	13		$0	Noah: || ||	ELEDLAMP9	Existing LED Lamp 9 watts	1				0.01	1,420	13		$0	Noah: || ||	
174	PubWorks Campus	Public works front, Offices and bays || Fixture no: 27 || Office 7 Attic storage	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures		none taken	0.06	355	21		$1	Noah: || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
175	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 17 || Office 7 conference area Office (Private)	ET4432N	Existing Prismatic Troffer 2x4 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		none taken		Upgrade Fixtures & Controls		0.22	2,726	611	3	$7	Noah: Loc.Color: White Cell ht: 8 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		415
176	PubWorks Campus	Public works front, Offices and bays || Fixture no: 18 || Office 7 conference area	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures		none taken	0.03	355	11		$1	Noah: Loc.Color: White Cell ht: 8 || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
177	PubWorks Campus	Public works front, Offices and bays || Fixture no: 28 || Office 7 conference area	EINC75	Existing Incandescent 75 watt Lamp(s)	3				Upgrade Fixtures		none taken	0.23	2,726	614	3	$25	Noah: || || 1 – Standard Toggle || Ivory switch w/ Ivory plate. Switched with Troffer switch see photo JST:	12WLEDP30	12.5 watt Par 30 Dimmable LED Lamp, Sylvania	3				0.04	2,726	102	0	$0		512
178	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 19 || Office 8 Office (Private)	ET4432N	Existing Prismatic Troffer 2x4 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		none taken		Upgrade Fixtures & Controls		0.22	2,726	611	3	$7	Noah: Loc.Color: White Cell ht: 8 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		415
179	PubWorks Campus	Public works front, Offices and bays || Fixture no: 20 || Office 8	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures		none taken	0.03	355	11		$1	Noah: Loc.Color: White Cell ht: 8 || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
180	PubWorks Campus	Public works front, Offices and bays || Fixture no: 21 || Office 8	ELEDLAMP9	Existing LED Lamp 9 watts	1				Remain As Is		none taken	0.01	2,726	25	0	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP9	Existing LED Lamp 9 watts	1				0.01	2,726	25	0	$0	Noah: || || Auditor Suggests: Exclude	
181	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 22 || Office 7 conf Attic storage Storage (active)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	3				Upgrade Fixtures & Controls		none taken	0.66	1,420	941		$19	Noah: Loc.Color: Wood Light Cell ht: 8 || || Fix Color: White Conduit: EMT color: Silver/Galv. Length: 30 Size: 1/2	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	3		(4) Wireless Ceiling PIR with 1 PowPak	1	0.14	1,420	204		$1		737
182	PubWorks Campus	Public works front, Offices and bays || Fixture no: 23 || Office 7 conf Attic storage	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures		none taken	0.12	1,420	165		$3	Noah: || || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	1,420	68		$0		97
183	PubWorks Campus	Public works front, Offices and bays || Fixture no: 24 || Office 7 conf Attic storage	ES4240L	Existing Strip 4' 2 Lamp(s) F40 T12 Energy Efficient Ballast	3				Upgrade Fixtures		none taken	0.20	1,420	281		$4	Noah: || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	1,420	102		$1		179
184	PubWorks Campus	Public works front, Offices and bays || Fixture no: 25 || Office 7 conf Attic storage	ELEDLAMP9	Existing LED Lamp 9 watts	1				Remain As Is		none taken	0.01	1,420	13		$0	Noah: || ||	ELEDLAMP9	Existing LED Lamp 9 watts	1				0.01	1,420	13		$0	Noah: || ||	
185	PubWorks Campus	Public works front, Offices and bays || Fixture no: 26 || Office 7 conf Attic storage	EW4434N	Existing Wrap 4' 4 Lamp(s) F34 T12 Standard Ballast	2				Upgrade Fixtures		none taken	0.59	1,420	838		$2	Noah: || || Auditor Suggests: Replace	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	1,420	136		$1		701
186	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 29 || Service walkway Hallway	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures		none taken	0.22	8,760	1,936		$31	Noah: Loc.Color: Wood Light Cell ht: 8 || || Auditor Suggests: Replace	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	1				0.05	8,760	420		$2		1,515
187	PubWorks Campus	Public works front, Offices and bays || Fixture no: 30 || Service walkway	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures		none taken	0.09	8,760	745		$8	Noah: || || Auditor Suggests: Replace	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1				0.04	8,760	315		$2		429
188	PubWorks Campus	Public works front, Offices and bays || Fixture no: 31 || Service walkway	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures		none taken	0.06	8,760	508		$6	Noah: || || Auditor Suggests: Replace	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	8,760	210		$1		298
189	PubWorks Campus	Public works front, Offices and bays || Fixture no: 32 || Service walkway	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures		none taken	0.03	355	11		$1	Noah: || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
190	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 34 || Office 8 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4		none taken		Upgrade Fixtures & Controls		none taken	0.56	2,726	1,526	7	$13	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		1,135
191	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 35 || Office 9 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4		none taken		Upgrade Fixtures & Controls		none taken	0.56	2,726	1,526	7	$13	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		1,135
192	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 36 || Office 10 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2		none taken		Upgrade Fixtures & Controls		none taken	0.28	2,726	764	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		567
193	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 37 || Office 11 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2		none taken		Upgrade Fixtures & Controls		none taken	0.28	2,726	764	3	$7	Noah: Loc.Color: White Cell ht: 8 || || Socket % damaged: 25 Fix Color: White 2 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		567
194	PubWorks Campus	Public works front, Offices and bays Floor: 1/2 || Fixture no: 38 || Stairwell 2	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	1				Upgrade Fixtures		none taken	0.14	8,760	1,226		$9	Noah: Difficult, add 100% because: Over stairs Needs: Scaffolding Loc.Color: White Cell ht: 14 || ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1				0.05	8,760	420		$2		806
195	PubWorks Campus	Public works front, Offices and bays || Fixture no: 39 || Stairwell 2	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is		none taken	0.01	8,760	53		$0	Noah: || || Conduit: EMT color: Silver/Galv. Length: 2 Size: 3/4	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: || || Conduit: EMT color: Silver/Galv. Length: 2 Size: 3/4	
196	PubWorks Campus	Public works front, Offices and bays Floor: 2 || Fixture no: 41 || 10 storage Storage (inactive)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures & Controls		none taken	0.22	251	55		$2	Noah: Loc.Color: Wood Light Cell ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate.	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	1		Wall Switch Sensor, PIR, 1 pole	1	0.05	184	9		$0		46

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
197	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 43 ‖ 10 storage	HALBUG	Existing Halogen BugEye	1				Upgrade Fixtures	none taken	0.03	355	11		$1	Noah: ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	1				0.00	355	1				10
198	PubWorks Campus	Public works front, Offices and bays Floor: 2 ‖ Fixture no: 42 ‖ 10 storage 2 Storage (inactive)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.46	251	116		$3	Noah: Loc,Color: Wood Light Ceil ht: 8 ‖ Could not walk this space floor rated for 25 lbs per sq verify ‖ Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Wall Switch Sensor, PIR, 1 pole	1	0.19	188	36		$0		80
199	PubWorks Campus	Public works front, Offices and bays Floor: 2 ‖ Fixture no: 44 ‖ Office 12 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.06	2,728	172	1	$4	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	1		Wall Switch Sensor, PIR, 2 pole	1	0.03	2,046	53	0	$0		119
200	PubWorks Campus	Public works front, Offices and bays Floor: 2 ‖ Fixture no: 45 ‖ 13 A&B Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	1				Upgrade Fixtures & Controls	none taken	0.14	2,728	382	2	$3	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.05	2,046	98	1	$1		284
201	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 46 ‖ 13 A&B	EINC65	Existing Incandescent 65 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.07	3,230	210	1	$10	Noah: ‖ ‖	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	1				0.01	3,230	29	0	$0		181
202	PubWorks Campus	Public works front, Offices and bays Floor: 2 ‖ Fixture no: 47 ‖ Office 13 Office (Private)	EV~4228NT5	Existing Volum Troffer 4' 2L F28 T5 Lamps, NBF Ballast	4				Upgrade Fixtures & Controls	none taken	0.25	2,728	687	3	$15	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4T5LED13-2	Retrofit 2L to 4' TLED T5SO type B - 13w - bypass ballast	4		Wall Switch Sensor, PIR, 2 pole	1	0.10	2,046	213	1	$1		475
203	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 48 ‖ Office 13	EDFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	2,728	175	1	$2	Noah: Loc,Color: White Ceil ht: 8 ‖ ‖ Auditor Suggests: Retrofit	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2				0.02	2,728	49	0	$0		125
204	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 49 ‖ Enter/Lobby Hallway	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	19				Upgrade Fixtures	none taken	2.28	3,230	7,364	27	$72	Noah: Loc,Color: White Ceil ht: 8 ‖ lens dirn: Standard ‖ Socket % damaged: 50 Fix Color: White 1 –	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	19				0.91	3,230	2,946	11	$16		4,419
205	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 50 ‖ Enter/Lobby	ECLLED15	Existing Can Light LED 15 watts	12				Remain As Is	none taken	0.18	3,230	581	2	$1	Noah: ‖ ‖	EGLLED15	Existing Can Light LED 15 watts	12				0.18	3,230	581	2	$1	Noah: ‖ ‖	
206	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 51 ‖ Enter/Lobby	EW4434N	Existing Wrap 4' 4 Lamp(s) F34 T12 Standard Ballast	2				Upgrade Fixtures	none taken	0.59	3,230	1,906	7	$4	Noah: ‖ ‖ Auditor Suggests: Replace	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2				0.10	3,230	310	1	$2		1,596
207	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 52 ‖ Enter/Lobby	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	3,230	749	3	$11	Noah: ‖ ‖ Auditor Suggests: Replace	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	3,230	310	1	$2		439
208	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 53 ‖ Enter/Lobby	HALBUG	Existing Halogen BugEye	4				Upgrade Fixtures	none taken	0.12	355	43		$2	Noah: ‖ ‖ Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
209	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 54 ‖ Enter/Lobby	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
210	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 55 ‖ Enter/Lobby	EDFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	3,230	207	1	$2	Noah: ‖ ‖ Auditor Suggests: Replace	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	2				0.02	3,230	58	0	$0		149
211	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 56 ‖ Office 14 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.56	2,728	1,528	7	$13	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		1,135
212	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 57 ‖ Open office 15 Office (Open)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	15				Remain As Is	none taken	0.90	2,728	2,455	11	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	15				0.90	2,728	2,455	11	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
213	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 58 ‖ Open office 15	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9				Upgrade Fixtures	none taken	0.52	2,728	1,424	6	$21	Noah: Loc,Color: White Ceil ht: 12 ‖ ‖ Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9				0.22	2,728	589	3	$3		835
214	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 59 ‖ Open office 15	EXLEDB	Existing LED Exit Sign w/ BugEye	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	4				0.02	8,760	210		$1	Noah: ‖ ‖ Fix Color: Red/White Exit Auditor Suggests: Exclude	
215	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 60 ‖ Office 16 Office (Private)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	2				Remain As Is	none taken	0.12	2,728	327	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	2				0.12	2,728	327	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
216	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 61 ‖ Office 17 Office (Private)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	3				Remain As Is	none taken	0.18	2,728	491	2	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	3				0.18	2,728	491	2	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
217	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 62 ‖ Office 18 Office (Private)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	2				Remain As Is	none taken	0.12	2,728	327	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	2				0.12	2,728	327	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
218	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 63 ‖ Pump room IT/Mech/Elec	ES4434E	Existing Strip 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	3,230	775	3	$8	Noah: ‖ ‖ Auditor Suggests: Replace	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,423	233	1	$1		543
219	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 64 ‖ Hallway	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				Remain As Is	none taken	0.08	3,230	258	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				0.08	3,230	258	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
220	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 65 ‖ Rr hall Hallway	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				Remain As Is	none taken	0.08	3,230	258	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				0.08	3,230	258	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
221	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 66 ‖ RRM Restroom	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2		Already Controlled	1	Remain As Is	none taken	0.08	2,423	194	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2		Already Controlled	1	0.08	2,423	194	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude	
222	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 67 ‖ RRW Restroom	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2		Already Controlled	1	Remain As Is	none taken	0.08	2,423	194	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2		Already Controlled	1	0.08	2,423	194	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude	
223	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 68 ‖ Office 19 Office (Private)	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				Remain As Is	none taken	0.08	2,728	218	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EWLED4-1L40	Existing Wrap LED 4' 1L 40 watts	2				0.08	2,728	218	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
224	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 69 ‖ Closet Storage (inactive)	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.02	251	5		$0	Noah: Loc,Color: White Ceil ht: 10 ‖ Unable to gain access to the space, Unknown technology ‖ Fix Color:	9WLEDA19	5.5 watt A-19 Style Dimmable ,ED Lamp - Sylvania	1				0.01	251	1		$0		3
225	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 70 ‖ Office 20 Office (Private)	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.28	2,728	764	3	$7	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		567
226	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 71 ‖ Conference Conference / Meeting	ET4440E	Existing Troffer 4' 4L F40 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.56	2,728	1,528	7	$13	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Socket % damaged: 25 Fix Color: White 2 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		1,135
227	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 1 ‖ Data room IT/Mech/Elec	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.09	3,230	275	1	$3	Noah: Loc,Color: White Ceil Ht: 8 ‖ lens dirn: Standard ‖ Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.04	2,423	87	0	$0		187
228	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 72 ‖ Lounge/quiet room Office (Private)	EW4434N	Existing Wrap 4' 4 Lamp(s) F34 T12 Standard Ballast	3				Upgrade Fixtures & Controls	none taken	0.89	2,728	2,414	11	$6	Noah: Loc,Color: White Ceil Ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ivory plate. Existing	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.14	2,046	295	2	$2		2,120
229	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 73 ‖ Lounge/quiet room	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.04	3,230	142	1	$3	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1				0.02	3,230	78	0	$0		65

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
230	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 74 ‖ Lounge Office (Private)	EW4434N	Existing Wrap 4' 4 Lamp(s) F34 T12 Standard Ballast	6				Upgrade Fixtures & Controls	none taken	1.77	2,728	4,829	21	$11	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, DT, 1 pole	1	0.29	2,046	589	3	$3			4,239
231	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 75 ‖ Lounge	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.04	3,230	142	1	$3	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1				0.02	3,230	78	0	$0			65
232	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 76 ‖ Bay 1 Closet Storage (inactive)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	4				Upgrade Fixtures & Controls	none taken	0.88	251	222		$7	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.19	184	36		$0			186
233	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 77 ‖ Bay 1 Warehouse	EH8286H	Existing Hood 8' 2 Lamp(s) F96 T12 HO Ballast	6				Upgrade Fixtures & Controls	none taken	1.33	3,230	4,283	16	$44	Noah: Loc.Color: Wood Light Ceil ht: 20 ‖ ‖ Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size:	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	6		Fixture Mount PIR for high mounting	6	0.68	2,423	1,642	8				2,641
234	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 78 ‖ Bay 1	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.56	3,230	1,809	7	$19	Noah: ‖ ‖ Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	5				0.24	3,230	775	3	$4			1,034
235	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 79 ‖ Bay 1	EHBMH250	Existing High Bay Fixture Metal Halide 250 watts	7				Upgrade Fixtures & Controls	none taken	2.07	3,230	6,670	25	$32	Noah: ‖ ‖	NHBLED110J	New LED 2x2 High Bay 16466 Lumens 110w - James ZYH2 with lens	7		Fixture Mount PIR for high mounting	7	0.70	2,423	1,696	8				4,974
236	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 80 ‖ Lounge 2 Office (Private)	EW4432N	Existing Wrap 4' 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.67	2,728	1,833	8	$20	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %: damaged: 100 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	6		(1) Wireless Ceiling PIR with 1 PowPak	1	0.29	2,046	589	3	$3			1,244
237	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 81 ‖ Lounge 2	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	3,230	375	1	$5	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	3,230	155	1	$1			220
238	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 82 ‖ Lounge 2	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures	none taken	0.22	3,230	714	3	$12	Noah: ‖ ‖ Socket %: damaged: 0 Auditor Suggests: Replace	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	1				0.05	3,230	155	1	$1			559
239	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 83 ‖ Office 21 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1			458
240	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 84 ‖ Office 22 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1			458
241	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 85 ‖ Bay 2 Warehouse	EHB4454H	Existing Highbay 4' 4L F54 T5 Lamps, HBF Ballast	18				Upgrade Fixtures & Controls	none taken	4.21	3,230	13,605	51	$68	Noah: Loc.Color: Wood Light Ceil ht: 20 ‖ ‖ Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size:	NHBLED165J4	New LED 2x4 High Bay 24563 Lumens 165w - James ZYH3 with lens	18		Fixture Mount PIR for high mounting	18	2.97	2,423	7,195	36				6,410
242	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 86 ‖ Bay 2	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures	none taken	0.68	3,230	2,196	8	$26	Noah: ‖ Piped end to end 1 inch cuts both sides ‖ Auditor Suggests: Retrofit	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8				0.29	3,230	930	3	$5			1,266
243	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 87 ‖ Bay 3 Warehouse	EHB4454H	Existing Highbay 4' 4L F54 T5 Lamps, HBF Ballast	16				Upgrade Fixtures & Controls	none taken	3.74	3,230	12,093	45	$61	Noah: Loc.Color: Wood Light Ceil ht: 20 ‖ ‖ Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size:	NHBLED165J4	New LED 2x4 High Bay 24563 Lumens 165w - James ZYH3 with lens	16		Fixture Mount PIR for high mounting	16	2.64	2,423	6,395	32				5,698
244	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 88 ‖ Bay 3	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.11	3,230	362	1	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1				0.05	3,230	155	1	$1			207
245	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 89 ‖ Bay 4 Warehouse	EHB4454H	Existing Highbay 4' 4L F54 T5 Lamps, HBF Ballast	36				Upgrade Fixtures & Controls	none taken	8.42	3,230	27,210	101	$137	Noah: Loc.Color: Wood Light Ceil ht: 20 ‖ ‖ Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size:	NHBLED165J4	New LED 2x4 High Bay 24563 Lumens 165w - James ZYH3 with lens	36		Fixture Mount PIR for high mounting	36	5.94	2,423	14,390	71				12,820
246	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 90 ‖ Bay 4	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.45	3,230	1,447	5	$15	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4				0.19	3,230	620	2	$3			827
247	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 91 ‖ Bay 4 rear area Warehouse	EH8286H	Existing Hood 8' 2 Lamp(s) F96 T12 HO Ballast	2				Upgrade Fixtures & Controls	none taken	0.44	3,230	1,428	5	$15	Noah: Loc.Color: Wood Light Ceil ht: 20 ‖ ‖ Fix Color: White Conduit: Flex color: Silver/Galv. Length: 6 ea Size:	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,423	547	3				860
248	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 92 ‖ Bay 4 rear area	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	7				Upgrade Fixtures	none taken	0.98	3,230	3,165	12	$27	Noah: ‖ ‖ Socket %: damaged: 25 Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	7				0.34	3,230	1,085	4	$6			2,080
249	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 93 ‖ Bay 4 rear area	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	3,230	103	0	$1	Noah: ‖ ‖	9WLEDA19	9 watt A-19 Style Dimmable LED Lamp - Sylvania	1				0.01	3,230	29	0	$0			74
250	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 94 ‖ Bay 4 Closet Storage (inactive)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	11				Upgrade Fixtures & Controls	none taken	2.43	251	610		$19	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	11		(4) Wireless Ceiling PIR with 1 PowPak	1	0.53	184	99		$1			511
251	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 95 ‖ Bay 4 Closet	ES4240L	Existing Strip 4' 2 Lamp(s) F40 T12 Energy Efficient Ballast	1				Upgrade Fixtures	none taken	0.07	251	17		$0	Noah: ‖ ‖ Auditor Suggests: Replace	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	251	6		$0			11
252	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 96 ‖ Bay 4 rear area closet under stairs Office (Private)	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	1				Upgrade Fixtures & Controls	none taken	0.14	251	35		$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.05	184	9		$0			26
253	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 97 ‖ Bay 4 rear area closet under stairs	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	251	11		$0	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	184	5		$0			7
254	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 98 ‖ Office 23 Office (Private)	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.56	2,728	1,528	7	$13	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2			1,135
255	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 99 ‖ Office 23	EW4240L	Existing Wrap 4' 2 Lamp(s) F40 T12 Energy Efficient Ballast	2				Upgrade Fixtures & Controls	none taken	0.93	2,728	2,532	11	$4	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,046	98	1	$1			2,433
256	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 100 ‖ RRW Restroom	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3		Already Controlled	1	Remain As Is	none taken	0.08	2,423	203	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude	EWLED4-2L14	Existing Wrap LED 4' 2L 14 watt Lamps	3		Already Controlled	1	0.08	2,423	203	1	$0	Noah: ‖ ‖ 1 – ‖ Existing control: Multiple / Combination Auditor Suggests: Exclude		
257	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 101 ‖ RRW	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.03	3,230	103	0	$1	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Auditor Suggests: Replace	10WLEDBR30	10 watt BR30 Style Dimmable ,ED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,423	24	0	$0			79
258	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 102 ‖ Office 23 Office (Private)	EW4440E	Existing Wrap 4' 4L F40 T12 Lamps, Elec Ballast	1				Upgrade Fixtures & Controls	none taken	0.14	2,728	382	2	$3	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.05	2,046	98	1	$1			264
259	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 103 ‖ Office 23	ESLED8-1L40	Existing Strip LED 8' 1L 40 watts	2				Upgrade Controls Only	none taken	0.08	2,728	218	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ESLED8-1L40	Existing Strip LED 8' 1L 40 watts	2		Wall Switch Sensor, PIR, 1 pole	1	0.08	2,046	164	1	$0	Noah: ‖ ‖ Auditor Suggests: Exclude		55
260	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 104 ‖ Safety Storage Storage (active)	ET4434E	Existing Troffer 4' 4L F34 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.48	1,420	682		$8	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Socket %: damaged: 25 Fix Color: White 1 – Standard Toggle ‖ White	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	1,420	273		$2			409
261	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 105 ‖ Bay 4 rear area closet under stairs Office (Private)	EW4240E	Existing Wrap 4' 2L F40 T12 Lamps, Elec Ballast	1				Upgrade Fixtures & Controls	none taken	0.07	251	18		$0	Noah: Loc.Color: White Ceil ht: 8 ‖ ‖ Fix Color: White 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate.. Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	184	5		$0			13
262	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 106 ‖ Bay 4 rear area closet under stairs	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	251	11		$0	Noah: ‖ ‖ Auditor Suggests: Retrofit	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	184	5		$0			7

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
263	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 107 ‖ RRM locker Restroom	EW4234N	Existing Wrap 4' 2 Lamp(s) F34 T12 Standard Ballast	2		Already Controlled	1	Upgrade Fixtures	none taken	0.38	2,423	911	5	$3	Noah: ‖ ‖ 1 – ‖Existing control: Multiple / Combination Auditor Suggests: Exclude	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,423	116	1	$1		795
264	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 108 ‖ RRM locker	ECFLS32	Existing CFL Screw-in 32 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.06	3,230	207	1	$2	Noah: Loc.Color: White Cell ht: 8 ‖ ‖ Auditor Suggests: Replace	10WLEDBR30	10 watt BR30 Style Dimmable ,LED Lamp - Sylvania	2				0.02	3,230	65	0	$0		142
265	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 109 ‖ RRM locker	EVANLED4L9	Existing Vanity LED 4L 9 watts	1				Remain As Is	none taken	0.04	3,230	116	0	$0	Noah: ‖ Delamped to 2 ‖ Auditor Suggests: Exclude	EVANLED4L9	Existing Vanity LED 4L 9 watts	1				0.04	3,230	116	0	$0	Noah: ‖ Delamped to 2 ‖ Auditor Suggests: Exclude	
266	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 110 ‖ Bay 4 rear area closet under stairs Office (Private)	EW4240E	Existing Wrap 4' 2L F40 T12 Lamps, Elec Ballast	3				Upgrade Fixtures & Controls	none taken	0.21	251	53		$1	Noah: Loc.Color: White Cell ht: 8 ‖ This is a guess no access ‖ Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	188	14		$0		39
267	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 111 ‖ Bay 4 rear area closet under stairs	ES3225N	Existing Strip 3' 2L F25 T8 Lamps, NBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.04	251	11		$0	Noah: ‖ ‖ JST: Repeat?	3TLED12-2	Retrofit 2L to 3' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	5		$0		7
268	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 112 ‖ Office 24 115 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.48	2,728	1,309	6	$13	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		917
269	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 113 ‖ Office 25 114 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		458
270	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 114 ‖ Office 26 113 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		458
271	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 115 ‖ Supply office 112 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		458
272	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 116 ‖ Conference 111 Conference / Meeting	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.48	2,728	1,309	6	$13	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.19	2,046	393	2	$2		917
273	PubWorks Campus	Public works front, Offices and bays Floor: 1 ‖ Fixture no: 117 ‖ Office 116 Office (Private)	EW4434E	Existing Wrap 4' 4L F34 T12 Lamps, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.24	2,728	655	3	$7	Noah: Loc.Color: White Cell ht: 8 ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,046	196	1	$1		458
274	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 118 ‖ RRW Restroom	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,423	281	1	$4	Noah: ‖ ‖ 1 – ‖Existing control: Multiple / Combination Auditor Suggests: Exclude	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,423	116	1	$1		165
275	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 119 ‖ RRM Restroom	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,423	281	1	$4	Noah: ‖ ‖ 1 – ‖Existing control: Multiple / Combination Auditor Suggests: Exclude	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,423	116	1	$1		165
276	PubWorks Campus	Public works front, Offices and bays Floor: 2 ‖ Fixture no: 120 ‖ Office 7 Attic storage Storage (active)	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	6				Upgrade Fixtures & Controls	none taken	1.33	1,420	1,883		$37	Noah: Loc.Color: Wood Light Cell ht: 8 ‖ ‖ Fix Color: White Conduit: EMT color: Silver/Galv. Length: 30 Size: 1/2	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L 12watt TLED Type B	6		(4) Wireless Ceiling PIR with 1 PowrPak	1	0.29	1,420	409		$2		1,474
277	PubWorks Campus	Public works front, Offices and bays ‖ Fixture no: 123 ‖ Office 7 Attic storage	ELEDLAMP8	Existing LED Lamp 9 watts	1				Remain As Is	none taken	0.01	251	2		$0	Noah: ‖ ‖	ELEDLAMP9	Existing LED Lamp 9 watts	1				0.01	251	2		$0	Noah: ‖ ‖	
278	City Hall	City hall Floor: 2 ‖ Fixture no: 2 ‖ Aubrey butte Conference room Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	Ave: 43.6 ‖ 45, 42, 43, 43, 45	0.23	2,467	577	3	$9	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,467	239	1	$2		338
279	City Hall	City hall Floor: 2 ‖ Fixture no: 10 ‖ Copy room Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,467	144	1	$2	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,467	60	0	$0		85
280	City Hall	City hall Floor: 2 ‖ Fixture no: 3 ‖ Office 1 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 51.8 ‖ 52, 54, 52, 52, 49	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
281	City Hall	City hall Floor: 2 ‖ Fixture no: 4 ‖ Office 2 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 52.4 ‖ 54, 55, 53, 49, 51	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
282	City Hall	City hall Floor: 2 ‖ Fixture no: 5 ‖ Open Office 1 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8		Already Controlled	1	Upgrade Fixtures	Ave: 55.6 ‖ 56, 55, 56, 54, 57	0.46	2,467	1,154	6	$18	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Already Controlled	1	0.19	2,467	478	2	$3		676
283	City Hall	City hall Floor: 2 ‖ Fixture no: 6 ‖ Office 3 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
284	City Hall	City hall Floor: 2 ‖ Fixture no: 7 ‖ Office 4 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Needs step dimming ‖ Socket % damaged: 25 Fix Color: White 1 – ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
285	City Hall	City hall Floor: 2 ‖ Fixture no: 8 ‖ Office 5 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,467	433	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,467	179	1	$1		254
286	City Hall	City hall Floor: 2 ‖ Fixture no: 9 ‖ Office 6 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	Ave: 34 ‖ 32, 33, 34, 34, 37	0.06	2,467	144	1	$2	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,467	60	0	$0		85
287	City Hall	City hall Floor: 2 ‖ Fixture no: 11 ‖ Open Office 2 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,467	577	3	$9	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,467	239	1	$2		338
288	City Hall	City hall ‖ Fixture no: 12 ‖ Open Office 2	ECLLED9	Existing Can Light LED 9 watts	18				Remain As Is	none taken	0.16	2,926	474	2	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	18				0.16	2,926	474	2	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
289	City Hall	City hall ‖ Fixture no: 24 ‖ Open Office 2	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
290	City Hall	City hall Floor: 2 ‖ Fixture no: 13 ‖ Office 7 Office (Private)	EW4332N	Existing Wrap 4' 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.48	2,467	1,224	6	$9	Noah: Loc.Color: White Cell ht: 10 ‖ Delamped to 2 ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.11	2,467	269	1	$2		955
291	City Hall	City hall Floor: 2 ‖ Fixture no: 14 ‖ Office 8 Office (Private)	EW4332N	Existing Wrap 4' 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.48	2,467	1,224	6	$9	Noah: Loc.Color: White Cell ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Ceiling	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.11	2,467	269	1	$2		955
292	City Hall	City hall Floor: 2 ‖ Fixture no: 15 ‖ Mount Bachelor Conference room Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,467	577	3	$9	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,467	239	1	$2		338
293	City Hall	City hall Floor: 2 ‖ Fixture no: 16 ‖ Office 9 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	Ave: 49 ‖ 50, 49, 48, ,	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
294	City Hall	City hall Floor: 2 ‖ Fixture no: 17 ‖ Office 10 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,467	289	1	$4	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,467	119	1	$1		169
295	City Hall	City hall Floor: 2 ‖ Fixture no: 18 ‖ Office 11 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,467	433	2	$7	Noah: Loc.Color: White Cell ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,467	179	1	$1		254

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
296	City Hall	City hall Floor: 2 || Fixture no: 19 || Open Office 3 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
297	City Hall	City hall || Fixture no: 20 || Open Office 3	ECLLED9	Existing Can Light LED 9 watts	6				Remain As Is	none taken	0.05	2,926	158	1	$0	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	6				0.05	2,926	158	1	$0	Noah: || || Auditor Suggests: Exclude	
298	City Hall	City hall || Fixture no: 25 || Open Office 3	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	
299	City Hall	City hall Floor: 2 || Fixture no: 21 || Snack room/Break Breakroom / Lounge	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7		Already Controlled	1	Upgrade Fixtures	none taken	0.41	2,487	1,010	5	$15	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	7		Already Controlled	1	0.17	2,487	418	2	$3		592
300	City Hall	City hall || Fixture no: 23 || Snack room/Break	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
301	City Hall	City hall Floor: 2 || Fixture no: 39 || Closet break room	ECFLS2L9	Existing Screw-in CFL 2L 9 watts	2				Upgrade Fixtures & Controls	none taken	0.04	1,420	51		$2	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	4WLEDA15	4.5 watt A-15 Style Dimmable ,ED Lamp - Sylvania	4		Wall Switch Sensor, PIR, 1 pole	1	0.02	1,420	26		$0		26
302	City Hall	City hall Floor: 2 || Fixture no: 22 || Office 12 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
303	City Hall	City hall Floor: 2 || Fixture no: 26 || RRU Restroom	ECLLED9	Existing Can Light LED 9 watts	2				Remain As Is	none taken	0.02	2,926	53	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	2				0.02	2,926	53	0	$0	Noah: || || Auditor Suggests: Exclude	
304	City Hall	City hall || Fixture no: 27 || RRU	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	2,487	55	0	$4	Noah: Loc.Color: White Ceil ht: 10 || Delamped this to 1 lamp || 1 – || Existing control: Wall Switch Propose 1	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Already Controlled	1	0.01	2,487	20	0			35
305	City Hall	City hall || Fixture no: 28 || RRU	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				Remain As Is	none taken	0.03	2,926	73	0	$2	Noah: || || Auditor Suggests: Replace	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				0.03	2,926	73	0	$2	Noah: || || Auditor Suggests: Replace	
306	City Hall	City hall Floor: 2 || Fixture no: 29 || Closet top stairs	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	31		$2	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	11				20
307	City Hall	City hall || Fixture no: 30 || Closet top stairs	ECFLP23	Existing CFL Pin Based 23 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.03	251	7		$1	Noah: || || Auditor Suggests: Retrofit	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1				0.01	251	2				5
308	City Hall	City hall Floor: 2 || Fixture no: 31 || RRW Restroom	EVAN2217N	Existing Vanity Fixture 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: || || Auditor Suggests: Exclude	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
309	City Hall	City hall || Fixture no: 32 || RRW	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1		Already Controlled	1	Upgrade Fixtures	none taken	0.02	2,487	55	0	$4	Noah: Loc.Color: White Ceil ht: 10 || || 1 – || Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	1		Already Controlled	1	0.01	2,487	20	0			35
310	City Hall	City hall Floor: 2 || Fixture no: 33 || IT room IT/Mech/Elec	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
311	City Hall	City hall Floor: 2 || Fixture no: 34 || Office 13 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
312	City Hall	City hall Floor: 2 || Fixture no: 35 || Office 14 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
313	City Hall	City hall Floor: 2 || Fixture no: 36 || Office 15 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
314	City Hall	City hall Floor: 2 || Fixture no: 37 || Office 16 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,487	577	3	$9	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,487	239	1	$2		338
315	City Hall	City hall Floor: 2 || Fixture no: 38 || Office 17 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
316	City Hall	City hall Floor: 2 || Fixture no: 40 || Office 18 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
317	City Hall	City hall Floor: 2 || Fixture no: 41 || Office 19 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
318	City Hall	City hall Floor: 2 || Fixture no: 42 || Office 20 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
319	City Hall	City hall Floor: 2 || Fixture no: 43 || Office 21 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
320	City Hall	City hall Floor: 2 || Fixture no: 44 || Office 22 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
321	City Hall	City hall Floor: 2 || Fixture no: 45 || Office 23 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
322	City Hall	City hall Floor: 2 || Fixture no: 46 || Office 24 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
323	City Hall	City hall Floor: 2 || Fixture no: 47 || Office 25 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
324	City Hall	City hall Floor: 2 || Fixture no: 48 || Office 26 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
325	City Hall	City hall Floor: 2 || Fixture no: 49 || Office 27 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
326	City Hall	City hall Floor: 2 || Fixture no: 50 || Office 228 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
327	City Hall	City hall Floor: 2 || Fixture no: 51 || Office 229 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
328	City Hall	City hall Floor: 2 || Fixture no: 52 || RRM Restroom	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				Remain As Is	none taken	0.03	2,926	73	0	$2	Noah: || || Auditor Suggests: Exclude	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				0.03	2,926	73	0	$2	Noah: || || Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected														Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
329	City Hall	City hall || Fixture no: 53 || RRM	ECLLED9	Existing Can Light LED 9 watts	2		Already Controlled	1	Remain As Is	none taken	0.02	2,487	45	0	$0	Noah: Loc.Color: White Ceil ht: 10 || || 1-- || Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	ECLLED9	Existing Can Light LED 9 watts	2		Already Controlled	1	0.02	2,487	45	0	$0	Noah: Loc.Color: White Ceil ht: 10 || || 1-- || Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	
330	City Hall	City hall Floor: 2 || Fixture no: 54 || Printing room Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4		Already Controlled	1	Upgrade Fixtures	none taken	0.23	2,487	577	3	$9	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1-- || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Already Controlled	1	0.10	2,487	239	1	$2		338
331	City Hall	City hall Floor: 2 || Fixture no: 55 || Office 230 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1-- || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
332	City Hall	City hall Floor: 2 || Fixture no: 56 || Office 231 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1-- || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
333	City Hall	City hall Floor: 2 || Fixture no: 57 || Office 232 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,487	144	1	$2	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1-- || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,487	60	0	$0		85
334	City Hall	City hall Floor: 2 || Fixture no: 58 || Records Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
335	City Hall	City hall || Fixture no: 59 || Upstairs lobby and hallway Hallway	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	13		Upgrade Fixtures & Controls	none taken	0.75	2,926	2,206	9	$32	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 3-- Standard Toggle ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	13		(6) Wireless Ceiling PIR with 3 PowPaks	1	0.31	2,487	776	4	$4		1,430
336	City Hall	City hall || Fixture no: 60 || Upstairs lobby and hallway	ECFLP23	Existing CFL Pin Based 23 watt Lamp(s)	2				Upgrade Fixtures	none taken	0.05	2,926	158	1	$7	Noah: || || Auditor Suggests: Retrofit	RT5-8	Retrofit RC LED Module 5 or 6", 8w, 700lm, Sylvania	2				0.02	2,926	47	0			111
337	City Hall	City hall || Fixture no: 61 || Upstairs lobby and hallway	ECLLED9	Existing Can Light LED 9 watts	26				Remain As Is	none taken	0.23	2,926	685	3	$2	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	26				0.23	2,926	685	3	$2	Noah: || || Auditor Suggests: Exclude	
338	City Hall	City hall || Fixture no: 62 || Upstairs lobby and hallway	ECFLP2L9	Existing Pin Based CFL Lamps 2L 9 watts	1				Upgrade Fixtures	none taken	0.02	2,926	64	0	$4	Noah: Loc.Color: Painted || || Auditor Suggests: Retrofit	LEDPL6-2	Retrofit 2 Pin LED - (2) lamp 6W - Horizontal, Maxlite	1				0.01	2,926	18	0	$0		47
339	City Hall	City hall Floor: 2 || Fixture no: 63 || Admin Conference room Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
340	City Hall	City hall || Fixture no: 64 || 2nd floor entry and stairwell Hallway	ELEDLAMP100	Existing LED Lamp 100 watts	4				Remain As Is	none taken	0.40	2,926	1,170	5	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP100	Existing LED Lamp 100 watts	4				0.40	2,926	1,170	5	$0	Noah: || || Auditor Suggests: Exclude	
341	City Hall	City hall || Fixture no: 65 || 2nd floor entry and stairwell	ECLLED9	Existing Can Light LED 9 watts	4				Remain As Is	none taken	0.04	2,926	105	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	4				0.04	2,926	105	0	$0	Noah: || || Auditor Suggests: Exclude	
342	City Hall	City hall || Fixture no: 66 || 2nd floor entry and stairwell	ELEDLAMP9	Existing LED Lamp 9 watts	8				Remain As Is	none taken	0.07	2,926	211	1	$0	Noah: || || Auditor Suggests: Exclude	ELEDLAMP9	Existing LED Lamp 9 watts	8				0.07	2,926	211	1	$0	Noah: || || Auditor Suggests: Exclude	
343	City Hall	City hall || Fixture no: 67 || 2nd floor entry and stairwell	ES2217N	Existing Strip 2' 2L F17 T8 Lamps, NBF Ballast	2				Upgrade Fixtures	none taken	0.07	2,926	193	1	$5	Noah: || In trophy case || Auditor Suggests: Retrofit	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	2				0.04	2,926	117	0	$1		76
344	City Hall	City hall || Fixture no: 68 || Elevator	ES4234E	Existing Strip 4' 2L F34 T12 Lamps, Elec Ballast	1				Upgrade Fixtures	none taken	0.06	8,760	526		$6	Noah: Loc.Color: Gray/Silver Ceil ht: 8 || || Socket % damaged: 25 Auditor Suggests: Replace	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	8,760	210		$1		315
345	City Hall	City hall Floor: 1 || Fixture no: 1 || Electrical room IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	1,420	247		$4	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1-- ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	1,420	102		$1		145
346	City Hall	City hall Floor: 1 || Fixture no: 69 || Office 100 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
347	City Hall	City hall Floor: 1 || Fixture no: 70 || Office 101 Office (Private)	EW4332N	Existing Wrap 4' 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.16	2,487	408	2	$3	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Ceiling	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	2,487	90	0	$1		318
348	City Hall	City hall Floor: 1 || Fixture no: 71 || Badlands Conference room Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9		Already Controlled	1	Upgrade Fixtures	none taken	0.52	2,487	1,296	6	$20	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9		Already Controlled	1	0.22	2,487	537	3	$4		761
349	City Hall	City hall Floor: 1 || Fixture no: 72 || Office 102 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
350	City Hall	City hall Floor: 1 || Fixture no: 73 || Open Office 1 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	18		Already Controlled	1	Upgrade Fixtures	none taken	1.04	2,487	2,587	13	$40	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	18		Already Controlled	1	0.43	2,487	1,074	5	$7		1,522
351	City Hall	City hall || Fixture no: 74 || Open Office 1	ECLLED9	Existing Can Light LED 9 watts	18				Remain As Is	none taken	0.16	2,926	474	2	$1	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	18				0.16	2,926	474	2	$1	Noah: || || Auditor Suggests: Exclude	
352	City Hall	City hall || Fixture no: 75 || Open Office 1	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	
353	City Hall	City hall || Fixture no: 76 || Open Office 1	ECFLP223	Existing CFL Pin Based 2- 23 watt Lamp(s)	3				Upgrade Fixtures	none taken	0.14	2,926	404	2	$12	Noah: || || Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	3				0.04	2,926	114	0			290
354	City Hall	City hall Floor: 1 || Fixture no: 77 || Office 103 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	Ave: 54 || 54, 53, 55, ,	0.17	2,926	509	2	$7	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: None	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	2,487	179	1	$1		330
355	City Hall	City hall Floor: 1 || Fixture no: 78 || Office 104 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: None	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,487	119	1	$1		220
356	City Hall	City hall Floor: 1 || Fixture no: 79 || Office 105 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
357	City Hall	City hall Floor: 1 || Fixture no: 80 || Office 106 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,487	144	1	$2	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,487	60	0	$0		85
358	City Hall	City hall Floor: 1 || Fixture no: 81 || Office 107 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1-- || Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
359	City Hall	City hall Floor: 1 || Fixture no: 82 || Open Office 2 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	21		Already Controlled	1	Upgrade Fixtures	none taken	1.22	2,487	3,029	15	$46	Noah: Loc.Color: White Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1-- || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	21		Already Controlled	1	0.50	2,487	1,253	6	$8		1,776
360	City Hall	City hall || Fixture no: 83 || Open Office 2	ECLLED9	Existing Can Light LED 9 watts	2				Remain As Is	none taken	0.02	2,926	53	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	2				0.02	2,926	53	0	$0	Noah: || || Auditor Suggests: Exclude	
361	City Hall	City hall || Fixture no: 84 || Open Office 2	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing														Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
362	City Hall	City hall Floor: 1 ‖ Fixture no: 85 ‖ Office 108 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
363	City Hall	City hall Floor: 1 ‖ Fixture no: 86 ‖ Storage Storage (active)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	1,420	165		$3	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	1,420	68		$0		97
364	City Hall	City hall Floor: 1 ‖ Fixture no: 87 ‖ Closet break room	ECFLS2L9	Existing Screw-in CFL 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	26		$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	4WLEDA15	4.5 watt A-15 Style Dimmable ,ED Lamp - Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	13		$0		13
365	City Hall	City hall Floor: 1 ‖ Fixture no: 88 ‖ RRM	ECFLS2L9	Existing Screw-in CFL 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	26		$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	4WLEDA15	4.5 watt A-15 Style Dimmable ,ED Lamp - Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	13		$0		13
366	City Hall	City hall ‖ Fixture no: 89 ‖ RRM	EVAN2217N	Existing Vanity Fixture 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: ‖ ‖ Auditor Suggests: Retrofit	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
367	City Hall	City hall Floor: 1 ‖ Fixture no: 90 ‖ RRW	ECFLS2L9	Existing Screw-in CFL 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	26		$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	4WLEDA15	4.5 watt A-15 Style Dimmable ,ED Lamp - Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	13		$0		13
368	City Hall	City hall ‖ Fixture no: 91 ‖ RRW	EVAN2217N	Existing Vanity Fixture 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: ‖ ‖ Auditor Suggests: Retrofit	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
369	City Hall	City hall Floor: 2 ‖ Fixture no: 92 ‖ RRM Restroom	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				Remain As Is	none taken	0.03	2,926	73	0	$2	Noah: ‖ ‖ Auditor Suggests: Exclude	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				0.03	2,926	73	0	$2	Noah: ‖ ‖ Auditor Suggests: Exclude	
370	City Hall	City hall ‖ Fixture no: 93 ‖ RRM	ECLLED2L9	Existing Can Light LED 2L 9 watts	2		Already Controlled	1	Remain As Is	none taken	0.04	2,487	90	0	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ 1 – ‖ Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	ECLLED2L9	Existing Can Light LED 2L 9 watts	2		Already Controlled	1	0.04	2,487	90	0	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ 1 – ‖ Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	
371	City Hall	City hall Floor: 2 ‖ Fixture no: 94 ‖ RRW Restroom	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				Remain As Is	none taken	0.03	2,926	73	0	$2	Noah: ‖ ‖ Auditor Suggests: Exclude	EVAN3121NT5	Existing Vanity 3' 1L F21 T5 Lamp, NBF Ballast	1				0.03	2,926	73	0	$2	Noah: ‖ ‖ Auditor Suggests: Exclude	
372	City Hall	City hall ‖ Fixture no: 95 ‖ RRW	ECLLED2L9	Existing Can Light LED 2L 9 watts	2		Already Controlled	1	Remain As Is	none taken	0.04	2,487	90	0	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ 1 – ‖ Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	ECLLED2L9	Existing Can Light LED 2L 9 watts	2		Already Controlled	1	0.04	2,487	90	0	$0	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ 1 – ‖ Existing control: Wall Switch Propose 1 Wall Switch DT Auditor	
373	City Hall	City hall Floor: 1 ‖ Fixture no: 96 ‖ Conference Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
374	City Hall	City hall ‖ Fixture no: 97 ‖ Conference	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
375	City Hall	City hall Floor: 1 ‖ Fixture no: 98 ‖ Open Office 3 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	24		Already Controlled	1	Upgrade Fixtures	none taken	1.39	2,487	3,462	17	$53	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	24		Already Controlled	1	0.58	2,487	1,433	7	$9		2,029
376	City Hall	City hall ‖ Fixture no: 99 ‖ Open Office 3	ECLLED10	Existing Can Light LED 10 watts	12				Remain As Is	none taken	0.12	2,926	351	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	12				0.12	2,926	351	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
377	City Hall	City hall ‖ Fixture no: 100 ‖ Open Office 3	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
378	City Hall	City hall Floor: 1 ‖ Fixture no: 101 ‖ Office 109 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,487	144	1	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,487	60	0	$0		85
379	City Hall	City hall Floor: 1 ‖ Fixture no: 102 ‖ Office 110 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.06	2,487	144	1	$2	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.02	2,487	60	0	$0		85
380	City Hall	City hall Floor: 1 ‖ Fixture no: 103 ‖ Office 111 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
381	City Hall	City hall Floor: 1 ‖ Fixture no: 104 ‖ Office 112 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
382	City Hall	City hall Floor: 1 ‖ Fixture no: 105 ‖ Office 113 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
383	City Hall	City hall Floor: 1 ‖ Fixture no: 106 ‖ Office 114 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
384	City Hall	City hall Floor: 1 ‖ Fixture no: 107 ‖ Office 115 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
385	City Hall	City hall Floor: 1 ‖ Fixture no: 108 ‖ Office 116 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
386	City Hall	City hall ‖ Fixture no: 110 ‖ RRM	EVAN2217N	Existing Vanity Fixture 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: ‖ ‖ Auditor Suggests: Retrofit	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
387	City Hall	City hall ‖ Fixture no: 112 ‖ RRW	EVAN2217N	Existing Vanity Fixture 2' 2L F17 T8 Lamps, NBF Ballast	1				Upgrade Fixtures	none taken	0.03	2,926	97	0	$2	Noah: ‖ ‖ Auditor Suggests: Retrofit	2TLED9-2	Retrofit 2L to 2' TLED type B - 9w - bypass ballast	1				0.02	2,926	59	0	$0		38
388	City Hall	City hall Floor: 1 ‖ Fixture no: 113 ‖ Closet	ECFLS2L9	Existing Screw-in CFL 2L 9 watts	1				Upgrade Fixtures & Controls	none taken	0.02	1,420	26		$1	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: Silver 1 – Standard Toggle ‖ Ivory switch w/ Ivory plate. Existing	4WLEDA15	4.5 watt A-15 Style Dimmable ,ED Lamp - Sylvania	2		Wall Switch Sensor, PIR, 1 pole	1	0.01	1,420	13		$0		13
389	City Hall	City hall Floor: 1 ‖ Fixture no: 114 ‖ 69 Conference room Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9		Already Controlled	1	Upgrade Fixtures	none taken	0.52	2,487	1,298	6	$20	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9		Already Controlled	1	0.22	2,487	537	3	$4		761
390	City Hall	City hall ‖ Fixture no: 120 ‖ 69 Conference room	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
391	City Hall	City hall Floor: 1 ‖ Fixture no: 115 ‖ Office 117 Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ Plenum ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
392	City Hall	City hall Floor: 1 ‖ Fixture no: 116 ‖ Hall Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – ‖ Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
393	City Hall	City hall Floor: 1 ‖ Fixture no: 117 ‖ City council chambers Conference / Meeting	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9		Already Controlled	1	Upgrade Fixtures	none taken	0.52	2,487	1,298	6	$20	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Socket % damaged: 25 Fix Color: White 1 – Standard Toggle ‖ Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	9		Already Controlled	1	0.22	2,487	537	3	$4		761
394	City Hall	City hall ‖ Fixture no: 118 ‖ City council chambers	ECFLP23	Existing CFL, Pin Based 23 watt Lamp(s)	13				Upgrade Fixtures	none taken	0.35	2,926	1,027	4	$43	Noah: Loc.Color: Cream/Beige ‖ ‖ Fix Color: Silver Auditor Suggests: Retrofit	RT5-13	Retrofit RC LED Module 5 or 6", 13w, 900lm, Sylvania	13				0.17	2,926	494	2			533

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected														Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
395	City Hall	City hall ‖ Fixture no: 119 ‖ City council chambers	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
396	City Hall	City hall ‖ Fixture no: 121 ‖ Main hall Hallway	ECLLED9	Existing Can Light LED 9 watts	18				Remain As Is	none taken	0.16	2,926	474	2	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED9	Existing Can Light LED 9 watts	18				0.16	2,926	474	2	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
397	City Hall	City hall ‖ Fixture no: 122 ‖ Main hall	ELEDLAMP9	Existing LED Lamp 9 watts	12				Remain As Is	none taken	0.11	2,926	316	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ELEDLAMP9	Existing LED Lamp 9 watts	12				0.11	2,926	316	1	$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
398	City Hall	City hall ‖ Fixture no: 123 ‖ Main hall	ECLHPS50	Existing Can Light High Pressure Sodium 50 watt Lamp	2				Upgrade Fixtures	none taken	0.13	2,926	386	2	$9	Noah: Loc.Color: White Ceil ht: 10 ‖ ‖ Fix Color: White Auditor Suggests: Retrofit	LEDR24	24 watt HiDteLED Lamp- Light Efficient Design -bypass ballast	2				0.05	2,926	140	1			246
399	City Hall	City hall ‖ Fixture no: 124 ‖ Main hall	EXLED	Existing LED Exit Sign	6				Remain As Is	none taken	0.04	8,760	315		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	6				0.04	8,760	315		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	
400	City Hall	City hall ‖ Fixture no: 125 ‖ Exterior Exterior (Perimeter)	ECLLED10	Existing Can Light LED 10 watts	14				Remain As Is	none taken	0.14	4,380	613		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	14				0.14	4,380	613		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
401	City Hall	City hall ‖ Fixture no: 126 ‖ Exterior	EBOLLED10	Existing Bollard LED 10 watts	10				Remain As Is	none taken	0.10	4,380	438		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	EBOLLED10	Existing Bollard LED 10 watts	10				0.10	4,380	438		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	
402	City Hall	City hall ‖ Fixture no: 127 ‖ Exterior	ESBLED100	Existing Shoebox LED 100 watts	6				Remain As Is	none taken	0.60	4,380	2,628		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	ESBLED100	Existing Shoebox LED 100 watts	6				0.60	4,380	2,628		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
403	Outback Water	Filtration building (4) ‖ Fixture no: 1 ‖ Break Room Breakroom / Lounge	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	Ave: 65 ‖ 65, 66, 64, 65, 65	0.32	2,601	843	4	$13	Noah: Loc.Color: White Ceil ht: 12 ‖ Plenum Could not open did not have Tall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	2,601	375	2	$3		468
404	Outback Water	Filtration building (4) ‖ Fixture no: 2 ‖ Membrane 1 Manufacturing (Task)	EHB150IND	Existing Highbay, 150w Induction	26				Upgrade Fixtures & Controls	Ave: 40.4 ‖ 56, 57, 40, 32, 17: Several	4.29	3,468	14,878	51		Noah: Difficult, add 50% because: Getting around equipment Loc.Color: Painted Ceil ht: 20 ‖ 3 on 24? ‖ Fix	NVBTLED105-s	New 2X2 IP66 LED High Bay 15578 Lumens 105w - Orion VTOD1 with integ sensor	26		Sensor comes integrated into each fixture	26	2.73	2,601	7,101	33			7,777
405	Outback Water	Filtration building (4) ‖ Fixture no: 3 ‖ Membrane 1	EH82-150IND	Existing Highbay with (2) 150 watt Induction lamps	6				Upgrade Fixtures & Controls	none taken	1.98	3,468	6,867	24		Noah: ‖ 1 fixture 1 lamp 24 hour burn ‖ Auditor Suggests: Replace	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Orion VTOD1 with integ sensor	6		Sensor comes integrated into each fixture	6	1.41	2,601	3,667	17			3,199
406	Outback Water	Filtration building (4) ‖ Fixture no: 4 ‖ Membrane 1	EXLEDB	Existing LED Exit Sign w/ BugEye	12				Remain As Is	none taken	0.07	8,760	631		$3	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	12				0.07	8,760	631		$3	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
407	Outback Water	Filtration building (4) ‖ Fixture no: 5 ‖ Membrane 1	LEDBUG	Existing LED BugEye	14				Remain As Is	none taken	0.08	355	30		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	LEDBUG	Existing LED BugEye	14				0.08	355	30		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
408	Outback Water	Filtration building (4) ‖ Fixture no: 6 ‖ Membrane 1	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	11				Upgrade Fixtures	none taken	0.64	3,468	2,213	8	$30	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	11				0.26	3,468	916	3	$5		1,297
409	Outback Water	Filtration building (4) ‖ Fixture no: 7 ‖ Membrane 1	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	3,468	1,006	3	$14	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	3,468	416	1	$2		590
410	Outback Water	Filtration building (4) ‖ Fixture no: 8 ‖ Membrane 2 through door 7 Manufacturing (Task)	EHB150IND	Existing Highbay, 150w Induction	1				Upgrade Fixtures & Controls	none taken	0.17	3,468	572	2		Noah: Difficult, add 50% because: Getting around equipment Loc.Color: Painted Ceil ht: 20 ‖ ‖ Fix Color:	NVBTLED105-s	New 2X2 IP66 LED High Bay 15578 Lumens 105w - Orion VTOD1 with integ sensor	1		Sensor comes integrated into each fixture	1	0.11	2,601	273	1			299
411	Outback Water	Filtration building (4) ‖ Fixture no: 9 ‖ Membrane 2 through door 7	EH82-150IND	Existing Highbay with (2) 150 watt Induction lamps	3				Upgrade Fixtures & Controls	none taken	0.99	3,468	3,433	12		Noah: ‖ ‖ Auditor Suggests: Replace	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Orion VTOD1 with integ sensor	3		Sensor comes integrated into each fixture	3	0.71	2,601	1,834	8			1,600
412	Outback Water	Filtration building (4) ‖ Fixture no: 10 ‖ Membrane 2 through door 7	EXLEDB	Existing LED Exit Sign w/ BugEye	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	2				0.01	8,760	105		$1	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
413	Outback Water	Filtration building (4) ‖ Fixture no: 11 ‖ Membrane 2 through door 7	LEDBUG	Existing LED BugEye	4				Remain As Is	none taken	0.02	355	9		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	LEDBUG	Existing LED BugEye	4				0.02	355	9		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	
414	Outback Water	Filtration building (4) ‖ Fixture no: 12 ‖ Membrane 2 through door 7	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures	none taken	0.58	3,468	2,011	7	$28	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10				0.24	3,468	832	3	$5		1,179
415	Outback Water	Filtration building (4) ‖ Fixture no: 13 ‖ Membrane 3 across from cps Manufacturing (Task)	EHB150IND	Existing Highbay, 150w Induction	4				Upgrade Fixtures & Controls	none taken	0.66	3,468	2,289	8		Noah: Difficult, add 50% because: Getting around equipment Loc.Color: Painted Ceil ht: 20 ‖ ‖ Fix Color:	NVBTLED105-s	New 2X2 IP66 LED High Bay 15578 Lumens 105w - Orion VTOD1 with integ sensor	4		Sensor comes integrated into each fixture	4	0.42	2,601	1,092	5			1,186
416	Outback Water	Filtration building (4) ‖ Fixture no: 14 ‖ Membrane 3 across from cps	EH82-150IND	Existing Highbay with (2) 150 watt Induction lamps	1				Upgrade Fixtures & Controls	none taken	0.33	3,468	1,144	4		Noah: ‖ ‖ Auditor Suggests: Replace	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Orion VTOD1 with integ sensor	1		Sensor comes integrated into each fixture	1	0.24	2,601	611	3			533
417	Outback Water	Filtration building (4) ‖ Fixture no: 15 ‖ Membrane 3 across from cps	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
418	Outback Water	Filtration building (4) ‖ Fixture no: 16 ‖ Membrane 3 across from cps	HALBUG	Existing Halogen BugEye	4				Upgrade Fixtures	none taken	0.12	355	43		$2	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	4				0.01	355	4				38
419	Outback Water	Filtration building (4) ‖ Fixture no: 17 ‖ Tote room Manufacturing (Task)	EHB150IND	Existing Highbay, 150w Induction	4				Upgrade Fixtures & Controls	none taken	0.66	3,468	2,289	8		Noah: Difficult, add 50% because: Getting around equipment Loc.Color: Painted Ceil ht: 20 ‖ ‖ Fix Color:	NVBTLED105-s	New 2X2 IP66 LED High Bay 15578 Lumens 105w - Orion VTOD1 with integ sensor	4		Sensor comes integrated into each fixture	4	0.42	2,601	1,092	5			1,186
420	Outback Water	Filtration building (4) ‖ Fixture no: 18 ‖ Tote room	EH82-150IND	Existing Highbay with (2) 150 watt Induction lamps	1				Upgrade Fixtures & Controls	none taken	0.33	3,468	1,144	4		Noah: ‖ ‖ Auditor Suggests: Replace	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Orion VTOD1 with integ sensor	1		Sensor comes integrated into each fixture	1	0.24	2,601	611	3			533
421	Outback Water	Filtration building (4) ‖ Fixture no: 19 ‖ Tote room	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
422	Outback Water	Filtration building (4) ‖ Fixture no: 20 ‖ Tote room	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: ‖ ‖ Auditor Suggests: Exclude	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
423	Outback Water	Filtration building (4) ‖ Fixture no: 21 ‖ Tote room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	3,468	402	1	$6	Noah: ‖ ‖ Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	3,468	166	1	$1		236
424	Outback Water	Filtration building (4) ‖ Fixture no: 22 ‖ Mechanical room Manufacturing (Task)	EHB150IND	Existing Highbay, 150w Induction	4				Upgrade Fixtures & Controls	none taken	0.66	3,468	2,289	8		Noah: Difficult, add 50% because: Getting around equipment Loc.Color: Painted Ceil ht: 20 ‖ ‖ Fix Color:	NVBTLED105-s	New 2X2 IP66 LED High Bay 15578 Lumens 105w - Orion VTOD1 with integ sensor	4		Sensor comes integrated into each fixture	4	0.42	2,601	1,092	5			1,186
425	Outback Water	Filtration building (4) ‖ Fixture no: 23 ‖ Mechanical room	EH82-150IND	Existing Highbay with (2) 150 watt Induction lamps	1				Upgrade Fixtures & Controls	none taken	0.33	3,468	1,144	4		Noah: ‖ ‖ Auditor Suggests: Replace	NVBTLED235-s	New IP66 LED High Bay 36309 Lumens 235w - Orion VTOD1 with integ sensor	1		Sensor comes integrated into each fixture	1	0.24	2,601	611	3			533
426	Outback Water	Filtration building (4) ‖ Fixture no: 24 ‖ Mechanical room	EXLEDB	Existing LED Exit Sign w/ BugEye	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLEDB	Existing LED Exit Sign w/ BugEye	1				0.01	8,760	53		$0	Noah: ‖ ‖ Fix Color: Green/White Exit Auditor Suggests: Exclude	
427	Outback Water	Filtration building (4) ‖ Fixture no: 25 ‖ Mechanical room	LEDBUG	Existing LED BugEye	2				Remain As Is	none taken	0.01	355	4		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	LEDBUG	Existing LED BugEye	2				0.01	355	4		$0	Noah: ‖ ‖ Auditor Suggests: Exclude	

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
428	Outback Water	Filtration building (4) || Fixture no: 26 || Mechanical room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures	none taken	0.29	3,468	1,006	3	$14	Noah: || || 1 – Standard Toggle || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5				0.12	3,468	416	1	$2		590
429	Outback Water	Filtration building (4) || Fixture no: 27 || Stairwell 1 Hallway	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.17	3,468	603	2	$8	Noah: Loc.Color: Brick Ceil ht: 30 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	3,468	250	1	$1		354
430	Outback Water	Filtration building (4) || Fixture no: 28 || Stairwell 2 Hallway	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.17	3,468	603	2	$8	Noah: Loc.Color: Brick Ceil ht: 30 || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	3,468	250	1	$1		354
431	Outback Water	Filtration building (4) || Fixture no: 29 || Attic Mechanical IT/Mech/Elec	EIIB70IND	Existing 70w Induction High Bay fixture	18				Upgrade Fixtures	Ave: 56.2 || 55, 56, 59, 55, 56	1.33	3,468	4,619	16		Noah: Loc.Color: Gray/Silver Ceil ht: 12 || || Fix Color: Bronze Conduit: WireMold color: Black Length: 1 ea	NGDLED55L	New Gum-Drop LED Low Bay 6677m, 54w - Lumecon LFS	18				0.97	3,468	3,371	12			1,248
432	Outback Water	Filtration building (4) || Fixture no: 30 || Attic Mechanical	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures	none taken	0.17	3,468	603	2	$8	Noah: || || Socket % damaged: 25 Fix Color: White Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3				0.07	3,468	250	1	$1		354
433	Outback Water	Filtration building (4) || Fixture no: 31 || Attic Mechanical	LEDBUG	Existing LED BugEye	3				Remain As Is	none taken	0.02	355	6		$0	Noah: || || Auditor Suggests: Exclude	LEDBUG	Existing LED BugEye	3				0.02	355	6		$0	Noah: || || Auditor Suggests: Exclude	
434	Outback Water	Filtration building (4) || Fixture no: 32 || Attic Mechanical	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit	
435	Outback Water	Filtration building (4) || Fixture no: 33 || Shop Office (Open)	ECL70IND	Existing 70w Induction Can Light fixture	5				Upgrade Fixtures & Controls	none taken	0.37	3,468	1,283	4		Noah: Loc.Color: White Ceil ht: 12 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Silver plate. Existing	LRD10H	Retro RC - LED Module - 19" 43watts, 4000lm - LumenOptix with 12° Conring	5		Wall Switch Sensor, DT, 1 pole	1	0.22	2,661	559	3			724
436	Outback Water	Filtration building (4) || Fixture no: 34 || Laboratory Laboratory	ECL70IND	Existing 70w Induction Can Light fixture	4				Upgrade Fixtures & Controls	none taken	0.30	3,468	1,027	4		Noah: Loc.Color: White Ceil ht: 12 || || Fix Color: Silver 1 – Standard Toggle || Ivory switch w/ Silver plate. Existing	LRD10H	Retro RC - LED Module - 19" 43watts, 4000lm - LumenOptix with 12° Conring	4		Wall Switch Sensor, DT, 1 pole	1	0.17	2,661	447	2			579
437	Outback Water	Filtration building (4) || Fixture no: 35 || Office 1 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,601	442	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,661	187	1	$1		255
438	Outback Water	Filtration building (4) || Fixture no: 36 || Office 2 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,601	442	2	$5	Noah: Loc.Color: White Ceil ht: 10 || Plenum || Socket % damaged: 25 Fix Color: White 1 – || Existing control:	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.07	2,661	187	1	$1		255
439	Outback Water	Filtration building (4) || Fixture no: 37 || JC Storage (active)	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	1,420	82		$1	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	1,420	34		$0		48
440	Outback Water	Filtration building (4) || Fixture no: 38 || Locker hall Hallway	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	3,468	201	1	$3	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,661	62	0	$0		139
441	Outback Water	Filtration building (4) || Fixture no: 39 || Locker Locker	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	3,468	402	1	$6	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,661	125	1	$1		277
442	Outback Water	Filtration building (4) || Fixture no: 40 || Locker	LEDBUG	Existing LED BugEye	1				Upgrade Controls Only	none taken	0.01	355	2		$0	Noah: || || Propose 1 Ceiling Sensor PIR - 1PPControls by outside hall seperate put in ceiling sensor Auditor	LEDBUG	Existing LED BugEye	1		(1) Wireless Ceiling PIR with 1 PowPak	1	0.01	355	2		$0	Noah: || || Propose 1 Ceiling Sensor PIR - 1PPControls by outside hall seperate put in ceiling sensor Auditor	
443	Outback Water	Filtration building (4) || Fixture no: 41 || RRU Locker	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	3,468	201	1	$3	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,661	62	0	$0		139
444	Outback Water	Filtration building (4) || Fixture no: 42 || RRU 2 Locker	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	3,468	201	1	$3	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,661	62	0	$0		139
445	Outback Water	Filtration building (4) || Fixture no: 43 || Electrical room IT/Mech/Elec	EH4232N	Existing Hood 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures & Controls	Ave: 45.8 || 45, 46, 47, 46, 45	0.58	3,468	2,011	7	$28	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || 1 e ballasted 24 hour burn || Fix Color: White Conduit: EMT color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		Wall Switch Sensor, DT, 1 pole	2	0.24	2,661	624	3	$3		1,387
446	Outback Water	Filtration building (4) || Fixture no: 44 || Electrical room	HALBUG	Existing Halogen BugEye	2				Upgrade Fixtures	none taken	0.06	355	21		$1	Noah: Loc.Color: Brick || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	2				0.01	355	2				19
447	Outback Water	Filtration building (4) || Fixture no: 45 || Control Room Breakroom / Lounge	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6		Already Controlled	1	Upgrade Fixtures	none taken	0.32	2,601	843	4	$13	Noah: Loc.Color: White Ceil ht: 12 || || Socket % damaged: 25 Fix Color: White 2 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Already Controlled	1	0.14	2,661	375	2	$3		468
448	Outback Water	Filtration building (4) || Fixture no: 46 || JC IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	3,468	201	1	$3	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White Conduit: WireMold color: Black	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.02	2,661	62	0	$0		139
449	Outback Water	Filtration building (4) || Fixture no: 47 || Exterior Exterior (Perimeter)	EWLED40	Existing Wallpack LED 40 watts	12				Remain As Is	none taken	0.48	4,380	2,102		$1	Noah: || 3 burns 24/7 || Pc Auditor Suggests: Exclude	EWLED40	Existing Wallpack LED 40 watts	12				0.48	4,380	2,102		$1	Noah: || 3 burns 24/7 || Pc Auditor Suggests: Exclude	
450	Outback Water	Filtration building (4) || Fixture no: 48 || Exterior	EWP100IND	Existing Wall Pack, 100w Induction	7				Upgrade Fixtures	none taken	0.81	4,380	3,526		$1	Noah: Loc.Color: Brick || Unsure of internal technology needs to be verified || Fix Color: Bronze Auditor	NXTWLED80P	New Cooper CrossfoxMaxx LED Wallpack, 81 watts, 8373 + Photocell	7				0.57	4,380	2,483				1,042
451	Outback Water	1 || Fixture no: 49 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	Ave: 40.25 || 38, 40, 41, 42,	0.23	3,468	805	3	$11	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,661	250	1	$1		555
452	Outback Water	1 || Fixture no: 50 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	
453	Outback Water	2 || Exterior Fixture no: 51 || Exterior Exterior (Area)	EFIIS150IND	Existing Stanchion Mnt Farm Head, 150w Induction	2				Upgrade Fixtures	none taken	0.33	4,380	1,445			Noah: Loc.Color: Black || Unsure of wattage needs verification call could not reach fixture	NCHLED95	New AEL LED CobraHead 95 watts ATBM, 11,600 Lumen	2				0.19	4,380	832				613
454	Outback Water	3 well 6 || Fixture no: 52 || Well 6 pump room IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10				Upgrade Fixtures & Controls	Ave: 80 || 81, 79, 78, 82, 80	0.58	3,468	2,011	7	$28	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		Wall Switch Sensor, DT, 1 pole	2	0.24	2,661	624	3	$3		1,387
455	Outback Water	3 well 6 || Fixture no: 53 || Well 6 chlorine room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.17	3,468	603	2	$8	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,661	187	1	$1		416
456	Outback Water	3 well 6 || Fixture no: 54 || Well 6 generator room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.35	3,468	1,207	4	$17	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, PIR, 1 pole	2	0.14	2,661	375	2	$2		832
457	Outback Water	3 well 6 || Fixture no: 61 || Exterior	EWLED9	Existing Wallpack LED 9 watts	3				Remain As Is	none taken	0.03	4,380	118		$0	Noah: || ||	EWLED9	Existing Wallpack LED 9 watts	3				0.03	4,380	118		$0	Noah: || ||	
458	Outback Water	5 well 5 || Fixture no: 55 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	3,468	805	3	$11	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,661	250	1	$1		555
459	Outback Water	5 well 5 || Fixture no: 56 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	
460	Outback Water	6 well 3 || Fixture no: 57 || Well 6 pump room IT/Mech/Elec	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	none taken	0.46	3,468	1,609	6	$22	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	8		Wall Switch Sensor, PIR, 1 pole	2	0.19	2,661	499	2	$3		1,110

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected											Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
461	Outback Water	6 well 3 || Fixture no: 58 || Well 6 chlorine room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	3,468	402	1	$6	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,601	125	1	$1		277
462	Outback Water	6 well 3 || Fixture no: 59 || Well 6 generator room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	3,468	805	3	$11	Noah: Difficult, add 25% because: Maneuvering equipment Loc.Color: Painted Ceil ht: 10 || lens dim:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,601	250	1	$1		555
463	Outback Water	6 well 3 || Fixture no: 60 || Exterior Exterior (Area)	EWLED9	Existing Wallpack LED 9 watts	2				Remain As Is	none taken	0.02	4,380	79		$0	Noah: || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	2				0.02	4,380	79		$0	Noah: || || Auditor Suggests: Exclude	
464	Outback Water	7 well 2 || Fixture no: 62 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.17	3,468	603	2	$8	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,601	187	1	$1		416
465	Outback Water	7 well 2 || Fixture no: 63 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Replace	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Replace	
466	Outback Water	8 well 4 || Fixture no: 64 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	3,468	805	3	$11	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,601	250	1	$1		555
467	Outback Water	8 well 4 || Fixture no: 65 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	
468	Outback Water	9 Storage garage || Fixture no: 66 || Bay 1 Warehouse	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.22	3,468	777	3	$8	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,601	250	1	$1		527
469	Outback Water	9 Storage garage || Fixture no: 67 || Bay 2	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures & Controls	none taken	0.22	3,468	766	3	$13	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L, 12watt TLED Type B	1		Wall Switch Sensor, DT, 1 pole	1	0.05	2,601	125	1	$1		642
470	Outback Water	9 Storage garage || Fixture no: 68 || Bay 3	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures & Controls	none taken	0.22	3,468	766	3	$13	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L, 12watt TLED Type B	1		Wall Switch Sensor, DT, 1 pole	1	0.05	2,601	125	1	$1		642
471	Outback Water	9 Storage garage || Fixture no: 69 || Bay 4	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures & Controls	none taken	0.22	3,468	766	3	$13	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L, 12watt TLED Type B	1		Wall Switch Sensor, DT, 1 pole	1	0.05	2,601	125	1	$1		642
472	Outback Water	9 Storage garage || Fixture no: 70 || Bay 5	ES8296H	Existing Strip 8' 2 Lamp(s) F96 T12 HO Ballast	2				Upgrade Fixtures & Controls	none taken	0.44	3,468	1,533	5	$25	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	SKR8412LED	1x8 Strip Kit with Reflector, 4' 4L, 12watt TLED Type B	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,601	250	1	$1		1,283
473	Outback Water	9 Storage garage || Fixture no: 71 || Bay 6	EHB4454H	Existing Highbay 4' 4L F54 T5 Lamps, HBF Ballast	3				Upgrade Fixtures & Controls	none taken	0.70	3,468	2,435	8	$12	Noah: Loc.Color: Gray/Silver Ceil ht: 14 || || Socket % damaged: 50 Fix Color: White 1 – Standard Toggle ||	NHBLED165J4	New LED 2x4 High Bay 24563 Lumens 165w - James ZYH3 with lens	3		(2) Wireless Ceiling PIR with 1 PowPak	1	0.50	2,601	1,287	6			1,147
474	Outback Water	9 Storage garage || Fixture no: 72 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	5				Remain As Is	none taken	0.05	4,380	197		$0	Noah: Loc.Color: Painted || || Fix Color: Bronze Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	5				0.05	4,380	197		$0	Noah: Loc.Color: Painted || || Fix Color: Bronze Auditor Suggests: Exclude	
475	Outback Water	10 generator || Fixture no: 73 || Pump room IT/Mech/Elec	EH8286H	Existing Hood 8' 2 Lamp(s) F96 T12 HO Ballast	2				Upgrade Fixtures & Controls	none taken	0.44	3,468	1,533	5	$15	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Wall Switch Sensor, PIR, 1 pole	1	0.23	2,601	598	3			945
476	Outback Water	10 generator || Fixture no: 74 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	
477	Outback Water	11 chlorine || Fixture no: 75 || Pump room IT/Mech/Elec	EH8286H	Existing Hood 8' 2 Lamp(s) F96 T12 HO Ballast	1				Upgrade Fixtures & Controls	none taken	0.22	3,468	766	3	$8	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	1		Wall Switch Sensor, PIR, 1 pole	1	0.11	2,601	294	1			473
478	Outback Water	11 chlorine || Fixture no: 77 || Pump room	EV8296H	Existing Vapor Tight 8' 2 Lamp(s) F96 T12 HO Ballast	2				Upgrade Fixtures	none taken	0.44	3,468	1,533	5	$25	Noah: || || Auditor Suggests: Replace	NVT8-84	New Vapcrt Tight LED 1x8, 84w, 9772lm	2				0.19	3,468	652	2			881
479	Outback Water	11 chlorine || Fixture no: 76 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Replace	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Replace	
480	Outback Water	12 CT Control room || Fixture no: 78 || Pump room IT/Mech/Elec	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	3,468	805	3	$11	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,601	250	1	$1		555
481	Outback Water	12 CT Control room || Fixture no: 79 || Exterior Exterior (Perimeter)	EWLED9	Existing Wallpack LED 9 watts	1				Remain As Is	none taken	0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	EWLED9	Existing Wallpack LED 9 watts	1				0.01	4,380	39		$0	Noah: Loc.Color: Brick || || Auditor Suggests: Exclude	
482	Outback Water	Shed || Fixture no: 80 || Shed	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.06	3,468	201	1	$3	Noah: || Unsure of technology in this space cannot gain access it is only 5 x 5 I assume that there is an E 19 inside	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1				0.02	3,468	83	0	$0		118
483	Outback Water	Driveway || Fixture no: 81 || Driveway Exterior (Path)	ES8250ND	Existing Shoebox with 250 watt Induction lamp	2				Upgrade Fixtures	none taken	0.55	4,380	2,409			Noah: Loc.Color: Gray/Silver || || Fix Color: Gray Mounting: Tapered pole length: dim: color: PC	NCHLED170	New AEL LED Cobrahead 170 watts ATBL B, 18,600 Lumen	2				0.34	4,380	1,489				920
484	Boyd Acres Bldg A	Building A || Fixture no: 1 || Front Office Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures & Controls	Ave: 34 || 30, 32, 36, 34, 38	0.68	2,926	1,990	8	$24	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	8		(2) Wireless Ceiling PIR with 1 PowPak	1	0.29	2,467	716	3	$4		1,273
485	Boyd Acres Bldg A	Building A || Fixture no: 2 || Front Office	ES4140E	Existing Strip 4' 1L F40 T12 Lamp, Elec Ballast	2				Upgrade Fixtures	none taken	0.07	2,926	205	1	$4	Noah: Loc.Color: Wood Dark || Under cabinet lamp || Lenses needed: 2dim: 3 x4 || Fix Color: White Switched with	UC48-19	Undercabinet 1x4' 19.5w LED, 1603 lm	2				0.04	2,926	114	0			91
486	Boyd Acres Bldg A	Building A || Fixture no: 4 || Front Office	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
487	Boyd Acres Bldg A	Building A || Fixture no: 3 || Office 1 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	Ave: 28.4 || 26, 28, 29, 30, 29	0.23	2,926	679	3	$10	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || Single	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		440
488	Boyd Acres Bldg A	Building A || Fixture no: 5 || Office 2 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || Single	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		440
489	Boyd Acres Bldg A	Building A || Fixture no: 6 || Office 3 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,467	119	1	$1		220
490	Boyd Acres Bldg A	Building A || Fixture no: 7 || Office 4 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,467	119	1	$1		220
491	Boyd Acres Bldg A	Building A || Fixture no: 8 || Training room hall Hallway	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 35.2 || 34, 36, 35, 36, 35	0.17	2,926	497	2	$6	Noah: Loc.Color: White Ceil ht: 10 || || lens dim: Standard || Socket % damaged: 25 Fix Color: White 2 – 2	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 2 PowPaks	1	0.07	2,467	179	1	$1		318
492	Boyd Acres Bldg A	Building A || Fixture no: 10 || Training room hall	ECLLED10	Existing Can Light LED 10 watts	2				Remain As Is	none taken	0.02	2,926	59	0	$0	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	2				0.02	2,926	59	0	$0	Noah: || || Auditor Suggests: Exclude	
493	Boyd Acres Bldg A	Building A || Fixture no: 9 || IT closet IT/Mech/Elec	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.09	1,420	121		$2	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.04	1,420	51		$0		70

AMERESCO
Green • Clean • Sustainable

Site Information			Existing												Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
484	Boyd Acres Bldg A	Building A || Fixture no: 11 || Training Room Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	9				Upgrade Fixtures & Controls	Ave: 40.8 || 38, 39, 41, 37, 49	0.77	2,926	2,236	9	$26	Noah: Loc.Color: White Ceil ht: 10 || || Socket ¾ damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	9		(2) Wireless Ceiling PIR with 1 PowPak	1	0.32	2,467	806	4	$4		1,433
485	Boyd Acres Bldg A	Building A || Fixture no: 13 || Training Room	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
486	Boyd Acres Bldg A	Building A || Fixture no: 14 || IT closet IT/Mech/Elec	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.10	1,420	142		$4	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 –	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, DT, 1 pole	1	0.02	1,420	23		$0		119
487	Boyd Acres Bldg A	Building A || Fixture no: 15 || Lactation station Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.09	2,926	248	1	$3	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 –	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, DT, 1 pole	1	0.04	2,467	90	0	$0		159
488	Boyd Acres Bldg A	Building A || Fixture no: 16 || McArther Conference Room Office (Open)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.34	2,926	995	4	$12	Noah: Loc.Color: White Ceil ht: 10 || || Socket ¾ damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	4		(2) Wireless Ceiling PIR with 1 PowPak	1	0.14	2,467	356	2	$2		637
489	Boyd Acres Bldg A	Building A || Fixture no: 17 || McArther Conference Room	EXLED	Existing LED Exit Sign	1				Remain As Is	none taken	0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	1				0.01	8,760	53		$0	Noah: || || Auditor Suggests: Exclude	
500	Boyd Acres Bldg A	Building A || Fixture no: 18 || McArther Conference Room	ECLLED10	Existing Can Light LED 10 watts	4				Remain As Is	none taken	0.04	2,926	117	0	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	4				0.04	2,926	117	0	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Exclude	
501	Boyd Acres Bldg A	Building A || Fixture no: 19 || Kitchen Breakroom / Lounge	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,926	497	2	$6	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		318
502	Boyd Acres Bldg A	Building A || Fixture no: 20 || RRU Restroom	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	2,467	211	1	$3	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 – ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	2,467	90	0	$1		122
503	Boyd Acres Bldg A	Building A || Fixture no: 21 || RRU Restroom	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.09	2,467	211	1	$3	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 – ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.04	2,467	90	0	$1		122
504	Boyd Acres Bldg A	Building A || Fixture no: 22 || Conference hall 2 Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,926	497	2	$6	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 2 – 2	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.07	2,467	179	1	$1		318
505	Boyd Acres Bldg A	Building A || Fixture no: 23 || Office 5A hall	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	Ave: 36.8 || 34, 35, 38, 39, 38	0.43	2,926	1,244	5	$15	Noah: Difficult, add 100% because: Add switch? Loc.Color: White Ceil ht: 10 || Single switch in office step dimming ?	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.18	2,467	448	2	$2		796
506	Boyd Acres Bldg A	Building A || Fixture no: 24 || Office 5 hall	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,926	497	2	$6	Noah: Difficult, add 100% because: Add switch? Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		318
507	Boyd Acres Bldg A	Building A || Fixture no: 25 || Office 6 hall	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.51	2,926	1,492	6	$18	Noah: Difficult, add 100% because: Add switch? Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, DT, 1 pole	1	0.22	2,467	537	3	$3		955
508	Boyd Acres Bldg A	Building A || Fixture no: 26 || Office 7 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		440
509	Boyd Acres Bldg A	Building A || Fixture no: 27 || Office 8 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		440
510	Boyd Acres Bldg A	Building A || Fixture no: 28 || Office 9 Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,926	497	2	$6	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		318
511	Boyd Acres Bldg A	Building A || Fixture no: 29 || Office 10 Office (Private)	EPT4332N	Existing Parabolic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	Ave: 33.4 || 32, 34, 33, 34, 34	0.17	2,926	497	2	$6	Noah: Loc.Color: White Ceil ht: 10 || || Socket ¾ damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,467	179	1	$1		318
512	Boyd Acres Bldg A	Building A || Fixture no: 30 || Office 11 Office (Open)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.17	2,926	497	2	$6	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		318
513	Boyd Acres Bldg A	Building A || Fixture no: 31 || IT closet IT/Mech/Elec	ET2232N	Existing Prismatic Troffer 2x2 2L F32 T8 32 watt U-Tube Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	1,420	173		$3	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 –	TK2310LED	2x2 Troffer Retrofit with Centering Bracket 2' 3L 10 watt TLED typeB	2		Wall Switch Sensor, DT, 1 pole	1	0.06	1,420	85		$1		88
514	Boyd Acres Bldg A	Building A || Fixture no: 32 || Office 12 Office (Open)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		440
515	Boyd Acres Bldg A	Building A || Fixture no: 33 || Office 13 Office (Open)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,926	474	2	$7	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		295
516	Boyd Acres Bldg A	Building A || Fixture no: 34 || Office 14 Office (Open)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,926	474	2	$7	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		295
517	Boyd Acres Bldg A	Building A || Fixture no: 35 || Office 15 Office (Open)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.16	2,926	474	2	$7	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		295
518	Boyd Acres Bldg A	Building A || Fixture no: 36 || Office 16 Office (Open)	ES4140E	Existing Strip 4' 1L F40 T12 Lamp, Elec Ballast	6				Upgrade Fixtures & Controls	none taken	0.21	2,926	614	3	$12	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, DT, 1 pole	1	0.07	2,467	179	1	$1		435
519	Boyd Acres Bldg A	Building A || Fixture no: 37 || Office 17 Office (Open)	ES4140E	Existing Strip 4' 1L F40 T12 Lamp, Elec Ballast	3				Upgrade Fixtures & Controls	none taken	0.11	2,926	307	1	$6	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, DT, 1 pole	1	0.04	2,467	90	0	$0		218
520	Boyd Acres Bldg A	Building A || Fixture no: 38 || Office 17 Office (Open)	ES4140E	Existing Strip 4' 1L F40 T12 Lamp, Elec Ballast	2				Upgrade Fixtures & Controls	none taken	0.07	2,926	205	1	$4	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.02	2,467	60	0	$0		145
521	Boyd Acres Bldg A	Building A || Fixture no: 39 || Copy office Office (Open)	EW4432N	Existing Wrap 4' 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.22	2,926	655	3	$7	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,467	239	1	$1		417
522	Boyd Acres Bldg A	Building A || Fixture no: 40 || Office 18 Office (Open)	ES4140E	Existing Strip 4' 1L F40 T12 Lamp, Elec Ballast	4				Upgrade Fixtures & Controls	none taken	0.14	2,926	410	2	$5	Noah: Difficult, add 100% because: Need to add stepped switch and ballast Loc.Color: White Ceil ht: 10 || ||	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, DT, 1 pole	1	0.05	2,467	119	1	$1		290
523	Boyd Acres Bldg A	Building A || Fixture no: 41 || JC Storage (active)	EINC6L40	Existing Incandescent 6L 40 watt Lamps	1		Already Controlled	1	Upgrade Fixtures	none taken	0.24	188	45		$4	Noah: Loc.Color: Gray/Silver Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 – ||	NLSLED16-4	New Cooper Lensed Strip SNLED 1x4, 16 watts, 2313lm	1		Already Controlled	1	0.02	188	3				42
524	Boyd Acres Bldg A	Building A || Fixture no: 42 || JC	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.10	251	25		$1	Noah: Loc.Color: Painted Ceil ht: 8 || Fan fixture || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	188	3		$0		22
525	Boyd Acres Bldg A	Building A || Fixture no: 43 || RRW Restroom	EINC6L40	Existing Incandescent 6L 40 watt Lamps	1		Already Controlled	1	Upgrade Fixtures	none taken	0.24	2,467	597	3	$45	Noah: Loc.Color: Gray/Silver Ceil ht: 10 || lens dim: Standard || Socket ¾ damaged: 25 Fix Color: White 1 – ||	NLSLED16-4	New Cooper Lensed Strip SNLED 1x4, 16 watts, 2313lm	1		Already Controlled	1	0.02	2,467	40	0			557
526	Boyd Acres Bldg A	Building A || Fixture no: 44 || RRW	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.10	2,926	293	1	$9	Noah: Loc.Color: Painted Ceil ht: 8 || || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate.	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,467	40	0	$0		253

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
527	Boyd Acres Bldg A	Building A || Fixture no: 45 || IT closet IT/Mech/Elec	EINC100	Existing Incandescent 100 watt Lamp(s)	2				Upgrade Fixtures & Controls	none taken	0.20	1,420	284		$9	Noah: Loc.Color: White Ceil ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	2		Wall Switch Sensor, DT, 1 pole	1	0.03	1,420	45		$0		239
528	Boyd Acres Bldg A	Building A || Fixture no: 46 || Nimitz Conference Room Office (Open)	ECLLED10	Existing Can Light LED 10 watts	10				Upgrade Controls Only	none taken	0.10	2,926	293	1	$1	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	ECLLED10	Existing Can Light LED 10 watts	10		(2) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,467	249	1	$1	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	44
529	Boyd Acres Bldg A	Building A || Fixture no: 48 || Nimitz Conference Room	ECLLED10	Existing Can Light LED 10 watts	8				Remain As Is	none taken	0.08	2,926	234	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	8				0.08	2,926	234	1	$0	Noah: Loc.Color: White Ceil ht: 10 || || Fix Color: White Auditor Suggests: Exclude	
530	Boyd Acres Bldg A	Building A || Fixture no: 49 || RRM Restroom	EINC9L40	Existing Incandescent 9L 40 watt Lamps	1		Already Controlled	1	Upgrade Fixtures	none taken	0.24	2,467	597	3	$45	Noah: Loc.Color: Gray/Silver Ceil ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	NLSLED16-4	New Cooper Lensed Strip SNLED 1x4, 16 watts, 2313lm	1		Already Controlled	1	0.02	2,467	40	0			557
531	Boyd Acres Bldg A	Building A || Fixture no: 50 || RRM	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.10	2,926	293	1	$9	Noah: Loc.Color: Painted Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate.	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,467	40	0	$0		253
532	Boyd Acres Bldg A	Building A || Fixture no: 51 || RRW Restroom	EINC6L40	Existing Incandescent 6L 40 watt Lamps	3		Already Controlled	1	Upgrade Fixtures	none taken	0.72	2,467	1,781	9	$134	Noah: Loc.Color: Gray/Silver Ceil ht: 10 || lens dim: Standard || Socket % damaged: 25 Fix Color: White 1 –	NLSLED16-4	New Cooper Lensed Strip SNLED 1x4, 16 watts, 2313lm	3		Already Controlled	1	0.05	2,467	119	1			1,671
533	Boyd Acres Bldg A	Building A || Fixture no: 52 || RRW	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.10	2,926	293	1	$9	Noah: Loc.Color: Painted Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate.	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,467	40	0	$0		253
534	Boyd Acres Bldg A	Building A || Fixture no: 53 || Exterior Exterior (Perimeter)	EWLED30	Existing Wallpack LED 30 watts	7				Remain As Is	none taken	0.21	4,380	920		$1	Noah: || || Auditor Suggests: Exclude	EWLED30	Existing Wallpack LED 30 watts	7				0.21	4,380	920		$1	Noah: || || Auditor Suggests: Exclude	
535	Boyd Acres Bldg A	Building A || Fixture no: 54 || Exterior	EFLLED60	Existing Flood LED 60 watts	3				Remain As Is	none taken	0.18	4,380	788		$0	Noah: || || Auditor Suggests: Exclude	EFLLED60	Existing Flood LED 60 watts	3				0.18	4,380	788		$0	Noah: || || Auditor Suggests: Exclude	
536	Boyd Acres Bldg A	Building A || Fixture no: 55 || Main hall Hallway	ECLLED10	Existing Can Light LED 10 watts	40				Remain As Is	none taken	0.40	2,926	1,170	5	$2	Noah: || || Auditor Suggests: Exclude	ECLLED10	Existing Can Light LED 10 watts	40				0.40	2,926	1,170	5	$2	Noah: || || Auditor Suggests: Exclude	
537	Boyd Acres Bldg A	Building A || Fixture no: 56 || Main hall	EXLED	Existing LED Exit Sign	10				Remain As Is	none taken	0.06	8,760	526		$3	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	10				0.06	8,760	526		$3	Noah: || || Auditor Suggests: Exclude	
538	Boyd Acres Bldg A	Building A || Fixture no: 57 || Main hall	HALBUG	Existing Halogen BugEye	10				Upgrade Fixtures	none taken	0.30	355	107		$6	Noah: Loc.Color: Painted || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	10				0.03	355	11				96
539	Boyd Acres Bldg B	Building B || Fixture no: 58 || Bay 22 Warehouse	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.11	2,926	328	1	$3	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 jst: no exits? No bugeyes?	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1				0.05	2,926	140	1	$1		187
540	Boyd Acres Bldg B	Building B || Fixture no: 59 || Bay 22	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.40	2,926	1,159	5	$13	Noah: || || JST: 7800 mean lm/lamp exist	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,467	562	3			597
541	Boyd Acres Bldg B	Building B || Fixture no: 60 || Bay 21 Warehouse	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.40	2,926	1,159	5	$13	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,467	562	3			597
542	Boyd Acres Bldg B	Building B || Fixture no: 61 || Bay 20 Warehouse	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.40	2,926	1,159	5	$13	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,467	562	3			597
543	Boyd Acres Bldg B	Building B || Fixture no: 62 || Bay 19 Warehouse	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures	none taken	0.11	2,926	328	1	$3	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1				0.05	2,926	140	1	$1		187
544	Boyd Acres Bldg B	Building B || Fixture no: 63 || Bay 19	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	1				Upgrade Fixtures & Controls	none taken	0.20	2,926	579	2	$7	Noah: || || Auditor Suggests: Replace	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	1		Fixture Mount PIR for high mounting	1	0.11	2,467	281	1			298
545	Boyd Acres Bldg B	Building B || Fixture no: 64 || Bay 19	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	2,926	339	1	$5	Noah: Loc.Color: Painted Ceil ht: 8 || lens dim: Standard || Socket % damaged: 25 Fix Color: White Auditor	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	2,926	140	1	$1		199
546	Boyd Acres Bldg B	Building B || Fixture no: 65 || Bay 19	EINC100	Existing Incandescent 100 watt Lamp(s)	1				Upgrade Fixtures	none taken	0.10	2,926	293	1	$9	Noah: || || Auditor Suggests: Replace	16WLEDA21	16 watt A-21 Style Dimmable LED Lamp, Sylvania	1				0.02	2,926	47	0	$0		246
547	Boyd Acres Bldg B	Building B || Fixture no: 66 || Bay 17-18 Warehouse	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.45	2,926	1,311	5	$14	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4				0.19	2,926	562	2	$3		749
548	Boyd Acres Bldg B	Building B || Fixture no: 67 || Bay 17-18	EINC2L100	Existing Incandescent 2L 100 watt Lamps	1				Upgrade Fixtures & Controls	none taken	0.20	2,926	585	2	$18	Noah: Loc.Color: Painted Ceil ht: 10 || Fix Color: Painted 1 – Standard Toggle || Painted switch w/ Painted	NVANLED2-29	New Cooper Vanity LED 1x2, 29 watts, 2800lm	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	2,467	72	0			513
549	Boyd Acres Bldg B	Building B || Fixture no: 68 || Bay 16 Warehouse	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.40	2,926	1,159	5	$13	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,467	562	3			597
550	Boyd Acres Bldg B	Building B || Fixture no: 69 || Bay 15 Warehouse	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	2				Upgrade Fixtures & Controls	none taken	0.40	2,926	1,159	5	$13	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	2		Fixture Mount PIR for high mounting	2	0.23	2,467	562	3			597
551	Boyd Acres Bldg B	Building B || Fixture no: 70 || Bay 14 Warehouse	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.45	2,926	1,311	5	$14	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	4				0.19	2,926	562	2	$3		749
552	Boyd Acres Bldg B	Building B || Fixture no: 71 || Bay 13-11 Warehouse	ES8296HT8	Existing Strip 8' 2L F96 T8HO 86 watt Lamp(s), HBF Ballast	6				Upgrade Fixtures & Controls	none taken	1.19	2,926	3,476	14	$40	Noah: Loc.Color: Painted Ceil ht: 20 || Socket % damaged: 25 Auditor Suggests: Retrofit	LBLED8-113	New Cooper Lensed High Bay 1x8, 113 watts, 17604 lm	6		Fixture Mount PIR for high mounting	2	0.68	2,467	1,686	8			1,790
553	Boyd Acres Bldg B	Building B || Fixture no: 72 || Exterior Exterior (Perimeter)	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	4				Upgrade Fixtures	none taken	1.18	4,380	5,168		$24	Noah: Loc.Color: Brick || || Fix Color: Bronze Auditor Suggests: Replace	NXTWLED102P	New Cooper CrossfourMaxx LED Wallpack, 102 watts, 12539 + Photocell	4				0.41	4,380	1,787				3,381
554	Boyd Acres Bldg C	Building C || Fixture no: 73 || Upstairs Storage (active)	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	25		Already Controlled	1	Upgrade Fixtures	none taken	1.45	188	273		$6	Noah: Loc.Color: Painted Ceil ht: 10 || Only 12 are emergency ballasted || Socket % damaged: 25 Fix Color:	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	25		Already Controlled	1	0.60	188	113		$1		160
555	Boyd Acres Bldg C	Building C || Fixture no: 74 || Upstairs	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures	none taken	0.12	2,926	339	1	$5	Noah: || ||	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2				0.05	2,926	140	1	$1		199
556	Boyd Acres Bldg C	Building C || Fixture no: 75 || Upstairs	EXLED	Existing LED Exit Sign	6				Remain As Is	none taken	0.04	8,760	315		$2	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	6				0.04	8,760	315		$2	Noah: || || Auditor Suggests: Exclude	
557	Boyd Acres Bldg C	Building C Floor: 1 || Fixture no: 76 || Halls Hallway	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	17		Already Controlled	1	Upgrade Fixtures	none taken	0.99	2,467	2,452	12	$37	Noah: Loc.Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 4 – || Existing control: Wall	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	17		Already Controlled	1	0.41	2,467	1,015	5	$7		1,438
558	Boyd Acres Bldg C	Building C || Fixture no: 77 || Halls	EXLED	Existing LED Exit Sign	4				Remain As Is	none taken	0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	4				0.02	8,760	210		$1	Noah: || || Auditor Suggests: Exclude	
559	Boyd Acres Bldg C	Building C || Fixture no: 78 || Men Locker room Restroom	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10		Already Controlled	1	Upgrade Fixtures	Ave: 27.2 || 26, 27, 25, 28, 30	0.58	2,467	1,443	7	$22	Noah: Loc.Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 0 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		Already Controlled	1	0.24	2,467	597	3	$4		846

AMERESCO
Green • Clean • Sustainable

Site Information			Existing													Selected										Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
560	Boyd Acres Bldg C	Building C || Fixture no: 79 || Men Locker room	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	none taken	0.29	2,487	721	3	$11	Noah: || || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.12	2,487	298	1	$2		423
561	Boyd Acres Bldg C	Building C || Fixture no: 80 || Men Locker room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: || || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
562	Boyd Acres Bldg C	Building C || Fixture no: 81 || Men Locker room	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	
563	Boyd Acres Bldg C	Building C || Fixture no: 82 || Woman Locker room	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	10		Already Controlled	1	Upgrade Fixtures	none taken	0.58	2,487	1,443	7	$22	Noah: Loc,Color: Painted Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 0 – || Existing control: Ceiling	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	10		Already Controlled	1	0.24	2,487	597	3	$4		846
564	Boyd Acres Bldg C	Building C || Fixture no: 83 || Woman Locker room	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	none taken	0.29	2,487	721	3	$11	Noah: || || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.12	2,487	298	1	$2		423
565	Boyd Acres Bldg C	Building C || Fixture no: 84 || Woman Locker room	EV4232N	Existing Vapor Tight 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: || || Socket % damaged: 25 Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
566	Boyd Acres Bldg C	Building C || Fixture no: 85 || Woman Locker room	EXLED	Existing LED Exit Sign	3				Remain As Is	none taken	0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	3				0.02	8,760	158		$1	Noah: || || Auditor Suggests: Exclude	
567	Boyd Acres Bldg C	Building C || Fixture no: 86 || Keyed office Office (Private)	ET4332N	Existing Prismatic Troffer 2x4 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	6				Upgrade Fixtures & Controls	none taken	0.51	2,926	1,492	6	$18	Noah: Loc,Color: White Ceil ht: 10 || Unable to gain access to this area - this is the best guess for the space. ||	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	6		Wall Switch Sensor, DT, 1 pole	1	0.22	2,487	537	3	$3		955
568	Boyd Acres Bldg C	Building C || Fixture no: 87 || Lactation room Office (Private)	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	2,926	170	1	$2	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.02	2,487	60	0	$0		110
569	Boyd Acres Bldg C	Building C || Fixture no: 88 || Laundry room	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3				Upgrade Fixtures & Controls	none taken	0.17	2,926	509	2	$7	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Wall Switch Sensor, PIR, 1 pole	1	0.07	2,487	179	1	$1		330
570	Boyd Acres Bldg C	Building C || Fixture no: 89 || Laundry room	E**14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: || || || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, PIR, 1 pole	1	0.05	2,487	119	1	$1		220
571	Boyd Acres Bldg C	Building C || Fixture no: 90 || Office 1 Office (Private)	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.16	2,487	403	2	$7	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		224
572	Boyd Acres Bldg C	Building C || Fixture no: 91 || Office 1A Office (Private)	EW4332N	Existing Wrap 4' 3L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.16	2,926	480	2	$3	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	4TLED12-3	Retrofit 3L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.04	2,487	90	0	$0		390
573	Boyd Acres Bldg C	Building C || Fixture no: 92 || Boyd Conference room	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,487	269	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		149
574	Boyd Acres Bldg C	Building C || Fixture no: 93 || Boyd Conference room	E**14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: || || Auditor Suggests: Retrofit	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.05	2,487	119	1	$1		220
575	Boyd Acres Bldg C	Building C || Fixture no: 94 || Under stairs Storage (active)	ES4132N	Existing Strip 4' 1L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.03	251	8		$0	Noah: Loc,Color: Painted || Unable to get into the space customer since photograph of what exists. This is best	4TLED12-1	Retrofit 1L to 4' TLED type B - 12w - bypass ballast	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	184	2		$0		6
576	Boyd Acres Bldg C	Building C || Fixture no: 95 || Office 2	EPT14232N	Existing Parabolic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
577	Boyd Acres Bldg C	Building C || Fixture no: 96 || Office 3	EPT4232N	Existing Parabolic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,487	269	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		149
578	Boyd Acres Bldg C	Building C || Fixture no: 97 || Print room	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,487	239	1	$1		440
579	Boyd Acres Bldg C	Building C || Fixture no: 98 || Office 4	EPT14232N	Existing Parabolic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	3		Already Controlled	1	Upgrade Fixtures	none taken	0.17	2,487	433	2	$7	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	3		Already Controlled	1	0.07	2,487	179	1	$1		254
580	Boyd Acres Bldg C	Building C || Fixture no: 99 || Office 5	ET4232N	Existing Prismatic Troffer 2x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || White	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		Wall Switch Sensor, PIR, 1 pole	1	0.10	2,487	239	1	$1		440
581	Boyd Acres Bldg C	Building C || Fixture no: 100 || Office 5A	E**14232N	Existing Prismatic Troffer 1x4 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
582	Boyd Acres Bldg C	Building C || Fixture no: 101 || Bays Warehouse	EHB4432N	Existing Highbay 4' 4L, F32 T8 Lamps, NBF Ballast	10		Already Controlled	1	Upgrade Fixtures	none taken	1.12	2,487	2,786	13	$50	Noah: Difficult, add 100% because: Height Loc,Color: Painted Ceil ht: 20 || || Socket % damaged: 25 Fix Color:	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	10		Already Controlled	1	0.48	2,487	1,194	6	$8		1,592
583	Boyd Acres Bldg C	Building C || Fixture no: 106 || Bays	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: || || Fix Color: Green/White Exit Auditor Suggests: Exclude	
584	Boyd Acres Bldg C	Building C || Fixture no: 102 || Bays Office 1	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
585	Boyd Acres Bldg C	Building C || Fixture no: 103 || Bays Office 2	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
586	Boyd Acres Bldg C	Building C || Fixture no: 104 || Bays Office 3	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2		Already Controlled	1	Upgrade Fixtures	none taken	0.12	2,487	289	1	$4	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		Already Controlled	1	0.05	2,487	119	1	$1		169
587	Boyd Acres Bldg C	Building C || Fixture no: 105 || Bays work bench	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5		Already Controlled	1	Upgrade Fixtures	none taken	0.29	2,487	721	3	$11	Noah: Loc,Color: White Ceil ht: 10 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Existing	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		Already Controlled	1	0.12	2,487	298	1	$2		423
588	Boyd Acres Bldg C	Building C || Fixture no: 107 || Exterior Exterior (Perimeter)	EWMH250	Existing Wall Pack Metal Halide 250 watt Lamp	6				Upgrade Fixtures	none taken	1.77	4,380	7,753		$36	Noah: Loc,Color: Brick || || Fix Color: Bronze Auditor Suggests: Replace	NXTWLED102P	New Cooper CrosstourMaxx LED Wallpack, 102 watts, 12539+ Photocell	6				0.61	4,380	2,681				5,072
589	Boyd Acres Bldg C	Building C || Fixture no: 108 || Exterior	HALBUG	Existing Halogen BugEye	3				Upgrade Fixtures	none taken	0.09	4,380	394		$16	Noah: || || Auditor Suggests: Replace	NBUG	New Stand alone Bug-Eyes	3				0.01	4,380	39				355
590	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 109 || Office 1 Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.12	2,926	339	1	$5	Noah: Loc,Color: White Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.05	2,487	119	1	$1		220
591	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 110 || Office 1	EW4432N	Existing Wrap 4' 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1		Already Controlled	1	Upgrade Fixtures	none taken	0.11	2,487	279	1	$3	Noah: || || Auditor Suggests: Retrofit	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	1		Already Controlled	1	0.05	2,487	119	1	$1		159
592	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 111 || Office 1A	EW4432N	Existing Wrap 4' 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.22	2,926	655	3	$7	Noah: Loc,Color: White Ceil ht: 8 || || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		417

AMERESCO
Green • Clean • Sustainable

Site Information			Existing																Selected												Savings
Item #	Site	Location (floor, room #, etc.)	Exist. Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Existing Controls Description	Device Quantity	Selected Solution	Foot Candle Reading (lm/ft²)	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments (# of bulbs burned out, lens condition, light switchings, etc.)	Selected Fixture Code	Fixture Description	Fixture Quantity	If Controlled by a Device on another Line, Enter Item # Here	Selected Controls Description	Device Quantity	Total Power (kW)	Burn Hours (Hrs/Yr)	Energy Consumption (kWh/Yr)	Demand (kW/Yr)	Average Annual Maintenance Cost ($/Yr)	Comments	Energy Savings (kWh/Yr)
593	Boyd Acres Bldg D	Building D || Fixture no: 112 || RRU Restroom	EINC2L100	Existing Incandescent 2L 100 watt Lamps	1				Upgrade Fixtures & Controls	none taken	0.20	2,926	585	2	$18	Noah: Loc,Color: White Ceil ht: 8 || Light fan combo || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory	NVANLED2-29	New Cooper Vanity LED 1x2, 29 watts, 2800lm	1		Wall Switch Sensor, PIR, 1 pole	1	0.03	2,487	72	0			513
594	Boyd Acres Bldg D	Building D || Fixture no: 113 || RRU	ESLED1-1L30	Existing Strip LED 1' 30 watts	1				Remain As Is	none taken	0.03	2,926	88	0	$0	Noah: || || Auditor Suggests: Exclude	ESLED1-1L30	Existing Strip LED 1' 30 watts	1				0.03	2,956	88	0	$0	Noah: || || Auditor Suggests: Exclude	
595	Boyd Acres Bldg D	Building D || Fixture no: 114 || Bay 1 Warehouse	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				Remain As Is	none taken	0.23	2,926	658	3	$0	Noah: || || Auditor Suggests: Exclude	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				0.23	2,956	658	3	$0	Noah: || || Auditor Suggests: Exclude	
596	Boyd Acres Bldg D	Building D || Fixture no: 115 || Bay 1	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	8				Upgrade Fixtures	none taken	0.90	2,926	2,622	11	$28	Noah: Loc,Color: Painted Ceil ht: 18 || Socket % damaged: 25 Fix Color: White 1 – Breakers || Auditor	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	8				0.38	2,956	1,124	5	$6		1,498
597	Boyd Acres Bldg D	Building D || Fixture no: 116 || Work shop 1 Manufacturing (Task)	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	2				Upgrade Fixtures & Controls	none taken	0.22	2,926	655	3	$7	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	2		Wall Switch Sensor, DT, 1 pole	1	0.10	2,487	239	1	$1		417
598	Boyd Acres Bldg D	Building D || Fixture no: 117 || Work shop 2 Manufacturing (Task)	ES8432N	Existing Strip 1x8 Fixture 4L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	none taken	0.56	2,926	1,639	7	$17	Noah: Loc,Color: Painted Ceil ht: 10 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-4	Retrofit 4L to 4' TLED type B - 12w - bypass ballast	5		Wall Switch Sensor, DT, 1 pole	1	0.24	2,487	597	3	$3		1,042
599	Boyd Acres Bldg D	Building D || Fixture no: 118 || Work shop 2	ES4232N	Existing Strip 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures	none taken	0.23	2,926	679	3	$10	Noah: Loc,Color: Painted Ceil ht: 14 || Socket % damaged: 25 Fix Color: White Conduit: EMT color: Silver/Galv.	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4				0.10	2,956	281	1	$2		398
600	Boyd Acres Bldg D	Building D || Fixture no: 119 || Bay 2-5 Warehouse	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				Remain As Is	none taken	0.23	2,926	658	3	$0	Noah: || || Auditor Suggests: Exclude	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				0.23	2,956	658	3	$0	Noah: || || Auditor Suggests: Exclude	
601	Boyd Acres Bldg D	Building D || Fixture no: 120 || Bay 2-5	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	
602	Boyd Acres Bldg D	Building D || Fixture no: 121 || Bay 6 Warehouse	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				Remain As Is	none taken	0.23	2,926	658	3	$0	Noah: || || Auditor Suggests: Exclude	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				0.23	2,956	658	3	$0	Noah: || || Auditor Suggests: Exclude	
603	Boyd Acres Bldg D	Building D || Fixture no: 122 || Bay 6	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	
604	Boyd Acres Bldg D	Building D || Fixture no: 123 || RRU Restroom	ECFLS18	Existing CFL Screw-in 18 watt Lamp(s)	1				Upgrade Fixtures & Controls	none taken	0.02	2,926	53	0	$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	BWLED419	5.5 watt A-19 Style Dimmable ,ED Lamp - Sylvania	1		Wall Switch Sensor, PIR, 1 pole	1	0.01	2,487	14	0	$0		39
605	Boyd Acres Bldg D	Building D || Fixture no: 124 || RRU	ERIXLED30	Existing Fixture LED 30 watts	1				Remain As Is	none taken	0.03	2,926	88	0	$0	Noah: || || Auditor Suggests: Exclude	ERIXLED30	Existing Fixture LED 30 watts	1				0.03	2,956	88	0	$0	Noah: || || Auditor Suggests: Exclude	
606	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 125 || Back exit room Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	1				Upgrade Fixtures & Controls	none taken	0.06	2,926	170	1	$2	Noah: Loc,Color: White Ceil ht: 8 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	1		(1) Wireless Ceiling PIR with 1 PowPak	1	0.02	2,487	60	0	$0		110
607	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 127 || Office 1 Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	5				Upgrade Fixtures & Controls	none taken	0.29	2,926	849	3	$12	Noah: Loc,Color: White Ceil ht: 8 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	5		(1) Wireless Ceiling PIR with 1 PowPak	1	0.12	2,487	298	1	$2		550
608	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 128 || Office 1 Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc,Color: White Ceil ht: 8 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
609	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 129 || Office Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	7				Upgrade Fixtures & Controls	none taken	0.41	2,926	1,188	5	$17	Noah: Loc,Color: White Ceil ht: 8 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	7		(1) Wireless Ceiling PIR with 1 PowPak	1	0.17	2,487	418	2	$2		770
610	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 130 || Office Office (Private)	EW4232N	Existing Wrap 4' 2L F32 T8 32 watt Lamp(s), Normal Ballast Factor	4				Upgrade Fixtures & Controls	none taken	0.23	2,926	679	3	$10	Noah: Loc,Color: White Ceil ht: 8 || Socket % damaged: 25 Fix Color: White 1 – Standard Toggle || Ivory	4TLED12-2	Retrofit 2L to 4' TLED type B - 12w - bypass ballast	4		(1) Wireless Ceiling PIR with 1 PowPak	1	0.10	2,487	239	1	$1		440
611	Boyd Acres Bldg D	Building D || Fixture no: 131 || Bay 6 Warehouse	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				Remain As Is	none taken	0.23	2,926	658	3	$0	Noah: || || Auditor Suggests: Exclude	EHBLED4-1L75	Existing High Bay LED 4' 75 watts	3				0.23	2,956	658	3	$0	Noah: || || Auditor Suggests: Exclude	
612	Boyd Acres Bldg D	Building D || Fixture no: 132 || Bay 6	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	
613	Boyd Acres Bldg D	Building D || Fixture no: 133 || Bay 6	ESLED1-1L30	Existing Strip LED 1' 30 watts	4				Remain As Is	none taken	0.12	2,926	351	1	$0	Noah: || || Auditor Suggests: Exclude	ESLED1-1L30	Existing Strip LED 1' 30 watts	4				0.12	2,956	351	1	$0	Noah: || || Auditor Suggests: Exclude	
614	Boyd Acres Bldg D	Building D || Fixture no: 134 || Bay 6 Warehouse	EHBLED4-1L75	Existing High Bay LED 4' 75 watts					Remain As Is	none taken		2,926				Noah: || || Auditor Suggests: Exclude	EHBLED4-1L75	Existing High Bay LED 4' 75 watts						2,956				Noah: || || Auditor Suggests: Exclude	
615	Boyd Acres Bldg D	Building D || Fixture no: 135 || Bay 6	EXLED	Existing LED Exit Sign	2				Remain As Is	none taken	0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	EXLED	Existing LED Exit Sign	2				0.01	8,760	105		$1	Noah: Loc,Color: Painted Ceil ht: 18 || Fix Color: Green/White Exit 1 – Breakers || Auditor Suggests: Replace	
616	Boyd Acres Bldg D	Building D || Fixture no: 136 || Bay 6	ESLED8-1L30	Existing Strip LED 8' 30 watts	2				Remain As Is	none taken	0.06	2,926	176	1	$0	Noah: || || Auditor Suggests: Exclude	ESLED8-1L30	Existing Strip LED 8' 30 watts	2				0.06	2,956	176	1	$0	Noah: || || Auditor Suggests: Exclude	
617	Boyd Acres Bldg D	Building D Floor: 1 || Fixture no: 137 || Office Office (Private)	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	14				Remain As Is	none taken	0.84	2,926	2,458	10	$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	ETLED4-1L60	Existing Troffer LED 4' 1L 60 watts	14				0.84	2,956	2,458	10	$1	Noah: Loc,Color: White Ceil ht: 8 || Fix Color: White 1 – Standard Toggle || Ivory switch w/ Ivory plate. Existing	
618	Boyd Acres Bldg D	Building D || Fixture no: 138 || Exterior Exterior (Perimeter)	EWLED75	Existing Wallpack LED 75 watts	10				Remain As Is	none taken	0.75	4,380	3,285		$1	Noah: || || Auditor Suggests: Exclude	EWLED75	Existing Wallpack LED 75 watts	10				0.75	4,380	3,285		$1	Noah: || || Auditor Suggests: Exclude	
619	Boyd Acres	Parking || Exterior Fixture no: 139 || Parking Exterior (Area)	ESBLED75	Existing Shoebox LED 75 watts	8				Remain As Is	none taken	0.60	4,380	2,628		$1	Noah: Loc,Color: Painted || || Fix Color: Bronze Auditor Suggests: Exclude	ESBLED75	Existing Shoebox LED 75 watts	8				0.60	4,380	2,628		$1	Noah: Loc,Color: Painted || || Fix Color: Bronze Auditor Suggests: Exclude	
620	Boyd Acres	Parking || Exterior Fixture no: 140 || Parking	EFLLED75	Existing Flood LED 75 watts	5				Remain As Is	none taken	0.38	4,380	1,643		$0	Noah: || || Auditor Suggests: Exclude	EFLLED75	Existing Flood LED 75 watts	5				0.38	4,380	1,643		$0	Noah: || || Auditor Suggests: Exclude	

Appendix C – Plumbing

Existing and Proposed Summary

Project Na City of Bend

Building: Airport

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1			Womens Restroom	WC	floor mount	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
2				WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
3				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
4			Mens Restroom	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
5				UR	wall mount large	1	1.0	Urinal - New Ultra Low Flow	0.13	
6				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
7			Kitchen & Restaurant	SNK	aerator	1	5.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
8				SNK	aerator	1	2.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
9			Refreshments	SNK	aerator	1	1.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
10		1st Floor	Mens Restroom	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
11				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
12			Womens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
13				LAV	aerator	1	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: Bend Fire Dept. Admin Building

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1		2nd Floor		LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
2				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
3				SH	hand held	1	2.5	Low-flow Handheld Showerhead	1.50	
4			Womens Restroom	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
5				LAV	aerator	2	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6				SH	1 standard, 1 hand held	2	2.5	Low-flow Showerhead	1.50	
7			Mens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
8				SNK	aerator	1	3.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
9		1st Floor	Mens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
10				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
11			Womens Restroom	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
12				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
13			Coffee Bar	SNK	aerator	1	3.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
14			Unisex Restroom	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
15				LAV	aerator	1	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
16		Police Sub Station	West Station	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
17				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
18			Shop	SNK	aerator	1	5.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
19			EMS Room	MS	no change	1		Any Fixture - No Change		
20				SNK	no change	1		Any Fixture - No Change		
21			Public Restroom Mens	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
22				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
23			Public RR Womens	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
24				LAV	aerator	1	1.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
25			Janitor Closet	MS	mop sink - no change	1		Any Fixture - No Change		
26		2nd Floor	Womens Locker Room	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
27				LAV	aerator	2	1.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
28				SH	hand held	1	2.5	Low-flow Handheld Showerhead	1.50	
29			Mens Locker Room	WC	tank type ADA left hand	2	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	

Project Name: City of Bend

Building: Bend Fire Dept. Admin Building

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
30				UR	wall mount small	2	1.0	Urinal - New Ultra Low Flow	0.13	
31				LAV	aerator	3	1.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
32				SH	2 standard, 1 hand held	3	2.5	Low-flow Showerhead	1.50	
33			Kitchen	SNK	aerator	1	2.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
34				SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
35			Janitor Closet	MS	mop sink - no change	1		Any Fixture - No Change		
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Existing and Proposed Summary

Project Nam City of Bend

Building: Eastside Fire Station

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1			Unisex Restroom	WC	floor mount - flush valve	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
2				LAV	aerator	1	2.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
3			Public Restroom Mens	WC	floor mount - flush valve	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
4				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
5			Public RR Womens	WC	floor mount - flush valve	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
6				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
7			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
8			Womens Locker Room	WC	flush valve ADA w/ primer tailpiece	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
9				LAV	aerator	2	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10				SH	hand held	1	2.5	Low-flow Handheld Showerhead	1.50	
11			Mens Locker Room	WC	flush valve	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
12				WC	flush valve ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
13				UR	wall mount small	2	1.0	Urinal - New Ultra Low Flow	0.13	
14				LAV	aerator	3	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
15				SH	1 hand held, 1 standard	3	2.5	Low-flow Showerhead	1.50	
16			Kitchen	SNK	aerator	1	5.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
17				SNK	aerator	1	1.8	Sink - Reduce to 1.5 gpm w/aerator	1.50	
18			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
19			SCBA	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
20			Laundry	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
21			EMS	SNK	no change	1	3.0	Any Fixture - No Change	3.00	
22				MS	no change	1	8.0	Any Fixture - No Change	8.00	
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: North Fire Station

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1		Police Sub Station		WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
2				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
3			Inventory Room	SNK	aerator	1	2.8	Sink - Reduce to 1.5 gpm w/aerator	1.50	
4			EMS	SNK	no change	2	3.0	Any Fixture - No Change	3.00	
5				MS	no change	1	8.0	Any Fixture - No Change	8.00	
6				SNK	aerator	1	5.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
7			Public Restroom Mens	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
8				LAV	aerator	1	1.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
9			Public RR Womens	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
10				LAV	aerator	1	1.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
11			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
12			Womens Locker Room	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
13				LAV	aerator	2	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
14				SH	hand held	1	2.5	Low-flow Handheld Showerhead	1.50	
15			Mens Locker Room	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
16				WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
17				UR	wall mount small	2	1.0	Urinal - New Ultra Low Flow	0.13	
18				LAV	aerator	3	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
19				SH	2 standard, 1 hand held	3	2.5	Low-flow Showerhead	1.50	
20			Kitchen	SNK	aerator	2	1.8	Sink - Reduce to 1.5 gpm w/aerator	1.50	
21			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
22		Warehouse	NO PLMG FIXTURES							
23		Training Center	Coffee Bar	SNK	aerator	1	4.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
24			Womens Restroom	WC	floor mount - flush valve - NOT TT	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
25				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
26			Mens Restroom	WC	Floor Mount - flush valve - NOT TT	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
27				UR	wall mount small	2	1.0	Urinal - New Ultra Low Flow	0.13	

Project Name: City of Bend

Building: North Fire Station

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
28				LAV	aerator	1	2.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
29				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
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										

Existing and Proposed Summary

Project Name: City of Bend

Building: Boyd Acres

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1		Admin	Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
2				SNK	janitor sink - no change	1	8.0	Any Fixture - No Change	8.00	
3			Coffee Area	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
4			Mens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
5				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6			Womens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
7				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
8			Mens Restroom	WC	tank type ADA right hand	1	3.5	Water Closet - New Tank Style PA 1.0 gpf	1.00	
9				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10			Training Room	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
11			Training Room RR	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
12				LAV	aerator	1	5.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
13			South Side Unisex RR	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
14				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
15			Kitchen	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: Boyd Acres

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16		Building B	Lab Area	SNK	drop in laundry sink	1	8.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
17			Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
18				LAV	aerator	1	2.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
19			Break Room	SNK	aerator	1	1.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
20			Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
21				LAV	aerator	1	5.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: Boyd Acres

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22		Building C	Mens RR/Locker Room	WC	tank type wall hung	3	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
23				UR	large wall mount	3	0.3	Urinal - New Ultra Low Flow	0.13	
24				LAV	aerator	3	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
25				SH	standard	4	2.5	Low-flow Showerhead	1.50	
26			Womens RR/Locker Rm	WC	tank type wall hung	2	1.6	Water Closet - New Wall-mount tank type	1.60	
27				LAV	aerator	2	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
28				SH	1 standard, 1 hand held	2	2.5	Low-flow Showerhead	1.50	

Project Name: City of Bend

Building: Boyd Acres

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
29			Laundry Room	SNK	aerator	1	1.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
30			Coffee Area	SNK	aerator	1	1.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
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										

Project Name: City of Bend

Building: Boyd Acres

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
30										
31		Building D	Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
32				LAV	aerator	1	3.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
33			Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
34				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
35			Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
36				LAV	aerator	1	2.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
37				SNK	aerator	1	1.8	Sink - Reduce to 1.5 gpm w/aerator	1.50	
38			Shop	SNK	aerator	1	5.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Existing and Proposed Summary

Project Name: City of Bend

Building: Police Dept.

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1		1st Floor	Mens Restroom	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
2				UR	wall mount small	1	1.0	Urinal - New Ultra Low Flow	0.13	
3				LAV	aerator	2	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
4			Womens Restroom	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
5				LAV	aerator	2	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6			Municipal Court Mens	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
7				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
8			Municipal Court Wome	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
9				LAV	aerator	2	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10			Kitchen Break Room	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
11			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
12			Patrol Mens Restroom	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
13				LAV	aerator	1	7.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
14			Patrol Womens Restro	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
15				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
16			Mail Room	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
17			Mens RR by Kitchen	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
18				UR	wall mount large	1	1.0	Urinal - New Ultra Low Flow	0.13	
19				LAV	aerator	1	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
20			Womens RR by Kitche	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
21				LAV	aerator	1	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
22			Kitchen Break Room	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
23		Basement	Evidence Room	SNK	aerator	1	3.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
24			Processing Room	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
25			Womens Locker Room	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
26				LAV	aerator	2	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
27				SH	1 hand held, 1 standard	2	2.5	Low-flow Showerhead	1.50	
28			Mens Locker Room	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
29				UR	floor mount	2	1.0	Urinal - New Ultra Low Flow	0.13	

Project Name: City of Bend

Building: Police Dept.

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
30				LAV	aerator	2	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
31				SH	1 hand held, 1 standard	2	2.5	Low-flow Handheld Showerhead	1.50	
32			Temp Holding Cells	WC	Acorn combo unit	2	1.6	Any Fixture - No Change	1.60	
33				LAV	Acorn combo unit	2	0.5	Any Fixture - No Change	0.50	
34			Holding Area 4 Cells	WC	Acorn combo unit	4	1.6	Any Fixture - No Change	1.60	
35				LAV	Acorn combo unit	4	0.5	Any Fixture - No Change	0.50	
36			Shower Room	SH	Acorn	2	2.5	Low-flow Showerhead	1.50	
37			Holding	SNK	aerator	1	1.8	Sink - Reduce to 1.5 gpm w/aerator	1.50	
38		2nd Floor Admin	Mens Restroom	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
39				UR	wall mount small	1	1.0	Urinal - New Ultra Low Flow	0.13	
40				LAV	aerator	2	1.8	Lavatory - Reduce to .5 gpm w/aerator	0.50	
41			Copy Room	SNK	aerator	1	7.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
42			Womens Restroom	WC	wall mount 4 bolt	2	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
43				LAV	aerator	2	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
44			Central Room By Libra	SNK	aerator	1	3.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
45			Womens Restroom	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
46				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
47			Mens Restroom	WC	wall mount 4 bolt	1	1.6	Water Closet - New Wall-mount Unit 1.28 gpf	1.28	
48				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
49			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Existing and Proposed Summary

Project Nam City of Bend

Building: City Hall

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1	City Hall	1st Floor	Mens Restroom	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
2				UR	wall mount large	1	1.5	Urinal - New Ultra Low Flow	0.13	
3				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
4			Womens Restroom	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
5				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6			Employee RR Womens	WC	tank type PA ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
7				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
8			Employee RR Mens	WC	tank type PA ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
9				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10			Building Dept. Mens RR	WC	tank type PA ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
11				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
12			Building Dept. Womens RR	WC	tank type PA ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
13				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
14			Conference Room	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
15		2nd Floor	Mens Admin Restroom	WC	floor mount	1	3.5	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
16				UR	wall mount large	1	1.0	Urinal - New Ultra Low Flow	0.13	
17				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
18			Womens Admin Restroom	WC	Floor mount	2	3.5	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
19				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
20				SH	standard	1	2.5	Low-flow Showerhead	1.50	
21			Breakroom	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
22				SNK	aerator	1	4.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
23		1st Floor	Janitor Room	MS	no change	1	8.0	Any Fixture - No Change	8.00	
24		2nd Floor	Janitor Room	MS	no change	1	8.0	Any Fixture - No Change	8.00	
25			Unisex Restroom	WC	floor mount ADA	1	1.6	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
26				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
27				SH	handheld	1	2.5	Low-flow Handheld Showerhead	1.50	

Existing and Proposed Summary

Project Name: City of Bend

Building: South Sister (747)

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1										
2										
3										
4										
5										
6										
7										
8										
9	North Sister-Also Franklin		Mens Restoom	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
10				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
11			Womens Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
12				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
13			Breakroom	SNK	aerator	1	2.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: South Sister (747)

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1										
2										
3										
4										
5										
6	Middle Sister		Breakroom	SNK	aerator	1	3.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
7			Unisex Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
8				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: Public Works

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1			Womens Restroom	WC	tank type ADA left hand	2	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
2				LAV	aerator	1	7.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
3			Mens Restroom	WC	tank type ADA left hand	2	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
4				UR	wall mount large	1	1.0	Urinal - New Ultra Low Flow	0.13	
5				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6			Break Room	SNK	aerator	1	4.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
7			Mens Restroom	WC	floor mount	2	3.5	Water Closet - New Floor-mount Unit 1.28 gpf	1.28	
8				UR	wall mount large	2	1.0	Urinal - New Ultra Low Flow	0.13	
9				LAV	aerator	2	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10			Storage Room	LS	no change	1	8.0	Any Fixture - No Change	8.00	
11			Womens Restroom	WC	tank type ADA left hand	1	3.5	Water Closet - New Tank Style PA 1.0 gpf	1.00	
12				LAV	aerator	1	3.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
13				SH	1 hand held, 1 standard	2	2.5	Low-flow Showerhead	1.50	
14			Mechanic Stock Room	SNK	janitor sink - no change	1	8.0	Any Fixture - No Change	8.00	
15			East Side Mechanic Bay	SNK	no change	1	8.0	Any Fixture - No Change	8.00	
16			Training Rm RR Unisex	WC	tank type ADA right hand	1	3.5	Water Closet - New Tank Style PA 1.0 gpf	1.00	
17				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
18			Training Rm RR Unisex	WC	tank type ADA left hand	1	3.5	Water Closet - New Tank Style PA 1.0 gpf	1.00	
19				LAV	aerator	1	4.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
20		2nd Floor	Restroom	WC	tank type ADA left hand	1	3.5	Water Closet - New Tank Style PA 1.0 gpf	1.00	
21				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
22				SH	standard	1	2.5	Low-flow Showerhead	1.50	
23		Facility Shop		SNK	aerator	1	4.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
24			Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
25				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: South Sister (747)

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1	South Sister		Breakroom	SNK	aerator	1	5.0	Sink - Reduce to 1.5 gpm w/aerator	1.50	
2		1st Floor	Unisex Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
3				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
4			Unisex Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
5				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: South Fire Station

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1			Police Restroom	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
2				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
3			SCBA	SNK	aerator	1	6.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
4			EMS	SNK	no change	1	3.0	Any Fixture - No Change	3.00	
5				MS	no change	1	8.0	Any Fixture - No Change	8.00	
6			Public Restroom Mens	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
7				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
8			Public RR Womens	WC	tank type ADA left hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
9				LAV	aerator	1	2.2	Lavatory - Reduce to .5 gpm w/aerator	0.50	
10			Womens Locker Room	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
11				LAV	aerator	1	2.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
12				LAV	aerator	1	0.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
13				SH	hand held	1	2.5	Low-flow Handheld Showerhead	1.50	
14			Mens Locker Room	WC	tank type ADA right hand	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
15				WC	tank type right hand standard	1	1.6	Water Closet - New Tank Style PA 1.0 gpf	1.00	
16				UR	wall mount small	2	1.0	Urinal - New Ultra Low Flow	0.13	
17				LAV	aerator	2	4.0	Lavatory - Reduce to .5 gpm w/aerator	0.50	
18				LAV	aerator	1	1.5	Lavatory - Reduce to .5 gpm w/aerator	0.50	
19				SH	2 standard, 1 hand held	3	2.5	Low-flow Showerhead	1.50	
20			Kitchen	SNK	aerator	2	1.5	Sink - Reduce to 1.5 gpm w/aerator	1.50	
21			Janitor Closet	MS	no change	1	8.0	Any Fixture - No Change	8.00	
22										
23										
24										
25										
26										
27										
28										
29										

Existing and Proposed Summary

Project Name: City of Bend

Building: Wall Street Building

	Existing Facility Water Consumption							Proposed Facility Water Consumption		
Line #	Building	Floor / Area	Room	Type	Description	Quantity	GPM or GPF	Description	GPM or GPF	Notes or Comments
1		North Side	Break Room	SNK	aerator	1	2.2	Sink - Reduce to 1.5 gpm w/aerator	1.50	
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										

Appendix D – Building Envelope

I-Star Energy Solutions

is pleased to present

Ameresco

with an

I-STAR™

Building Envelope Assessment

of the

City of Bend, OR

Overview of Project 1

Savings Summary 2

Investment Analysis 3

Environmental Emissions 4

Replacement Products 5

1 City Hall 6

3a Franklin Annex 7

3b South Sister 8

3c Middle Sister 9

3d North Sister 10

7 Streets and Shops at Pilot Butte Campus 11

8a Boyd Acres Bldg. A 12

8b Boyd Acres Bldg. B 13

8c Boyd Acres Bldg. C 14

8d Boyd Acres Bldg. D 15

9a Bend Municipal Airport 16

10 Bend Police Department 17

13 Bend Fire Department Administration 18

14 Bend Fire East Station 19

15 Bend Fire South Station 20

16 Bend Fire West Station 21

17a Bend Fire Training - Training 22

17b Bend Fire Training - Warehouse 23

18 Bend Fire North Station 24

20 Wall Street Annex 25

Scope of Work 26

Ameresco, Inc. **May 24, 2018**
9700 SW Capital Highway, Suite 110
Portland, OR 97239

Attention: **Jason Carver, PE**
Project Development Engineer
Cell: (503) 250-0711, Office (503) 290-1297

Subject: **I-STAR™ Building Envelope Assessment Report**
City of Bend, OR

Dear Mr. Carver,

In accordance with the above referenced contract, we have completed our I-STAR™ Assessment of the referenced facilities and are pleased to hereby present you with the accompanying I-STAR™ Building Envelope Assessment Report. The report includes detailed audit findings, conclusions regarding potential energy savings cost and payback calculations, and a number of recommended work proposals and schedules. I look forward to reviewing these personally with you and others on your team, and answering any questions that you may have about them.

1. Overview of Project

An accurate assessment of the performance of the building envelope is critical to the success of a facility energy management program, even if no envelope related improvements are warranted. Energy losses in building envelope are caused by a range of issues including air leaks, thermal bridging and wet insulation. Air leaks in the envelope of a building can cause direct energy loss. Moisture in the envelope will migrate to the interior of the system, reducing insulation values and damaging building components.

Existing as well as new buildings typically have numerous air-leak paths through the envelope in such locations as gaps at transitions between wall, floor and roof levels; structural penetrations through the wall system and at transitions in wall-system types. The buildings on this project provide significant opportunity for reducing air infiltrations, greatly improving occupant comfort as well as providing valuable energy savings with rapid payback. Leaky buildings can be drafty and uncomfortable, inefficient, and expensive to heat and cool. Air leaks allow unconditioned air to infiltrate the conditioned interior spaces, or to allow conditioned air to exit the building, drastically increasing heating and cooling loads by adding or removing heat and causing HVAC systems to run longer. These same leaks can also contribute to problems with moisture, noise, dust and even insects.

This Energy Conservation Measure (ECM) addresses unwanted air infiltration by locating and sealing the cracks, gaps and openings where unintended air flow occurs. The greatest breaches occur through gaps where walls meet the floors and ceilings, plumbing and electrical penetrations and through gaps or openings around windows and doors. Sealing and weather-stripping are the tools through which these breaches can be repaired.

The source of energy savings derived from this measure is the reduction in heating and cooling load provided by tighter building envelopes.

Base Scope

ECM Name	Savings (MMBTU/yr)	Savings (kWh/yr)	Total Savings ($)	Envelope Remediation ($)	Simple Payback (yr)	Total Air Leakage Area (sq/ft)
Envelope Improvements	1,992	554	19,958	104,505	5.24	99.25

Base Scope and Magnetite Window System

ECM Name	Savings (MMBTU/yr)	Savings (kWh/yr)	Total Savings ($)	Envelope Remediation ($)	Simple Payback (yr)	Total Air Leakage Area (sq/ft)
Envelope Improvements	2,029	784	20,348	109,918	5.40	99.25

Base Scope and Magnetite Window System and Attic Insulation

ECM Name	Savings (MMBTU/yr)	Savings (kWh/yr)	Total Savings ($)	Envelope Remediation ($)	Simple Payback (yr)	Total Air Leakage Area (sq/ft)
Envelope Improvements	2,070	1,033	20,769	121,066	5.83	99.25

2. Facility areas where these measures will be implemented.

No. 01: 1 City Hall

No. 02: 3a Franklin Annex

No. 03: 3b South Sister

No. 04: 3c Middle Sister

No. 05: 3d North Sister

No. 06: 7 Streets and Shops at Pilot Butte Campus

No. 07: 8a Boyd Acres Bldg. A

No. 08: 8b Boyd Acres Bldg. B

No. 09: 8c Boyd Acres Bldg. C

No. 10: 8d Boyd Acres Bldg. D

No. 11: 9a Bend Municipal Airport

No. 12: 10 Bend Police Department

No. 13: 13 Bend Fire Department Administration

No. 14: 14 Bend Fire East Station

No. 15: 15 Bend Fire South Station

No. 16: 16 Bend Fire West Station

No. 17: 17a Bend Fire Training - Training Bldg

No. 18: 17b Bend Fire Training - Warehouse

No. 19: 18 Bend Fire North Station

No. 20: 20 Wall Street Annex

3. Existing Conditions

Our initial investigation was to identify energy loss in the facilities. However, while conducting our assessment we encountered some areas where work should be performed to prevent damage from weather, pests, etc.

Significant quantities of air infiltration into the buildings were discovered during the envelope survey period at the City of Bend, OR. The facilities were found to be in a mixed set of conditions in regard to infiltration losses, mostly due to age and maintenance issues. All observations given in this report are from areas with free access.

Most buildings are in good condition but could use improvements to stop air infiltration/ex-filtration and energy loss. Door systems were found to be the largest areas of air infiltration/ex-filtration. Most entrance doors needed one of the following: weather stripping and sweeps. In most buildings of this age the door seals are either original or have been replaced. Often the replacement seals are of poor quality and are degraded by ultraviolet solar rays. Over time they lose their flexibility and ability to function reliably. Care should be taken to replace seals with products having extensive long term testing (higher cycle count). Sealant is recommended around the perimeter of several windows. Numerous penetrations were observed that need to be sealed.

1. *1 City Hall*

710 NW Wall Street

The City Hall is a two story, 24,376 sq/ft building with a brick and stucco exterior finish. The largest area of infiltration/ex-filtration was at the doors on all sides of the building, with one that has separation around the frame in need of sealant. These doors would benefit from new sweeps and weather strip. We also recommend sealing penetrations to reduce air and moisture infiltration and ex-filtration leading to energy loss. The windows are double pane, tinted with metal frames and in good condition.



1 City Hall



"D1, D2" Recommend sealant around door frame



"D1" Recommend weather strip and door sweeps



"B" Recommend sealant



"D10" Recommend weather strip and door sweeps

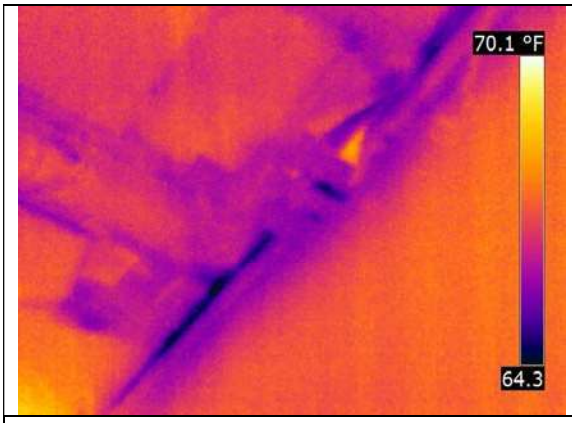
2. *3a Franklin Annex*

639 NW Franklin Ave

The Franklin Annex is a two story, 3,371 sq/ft building with a stucco exterior finish. The building appears to have double pane tinted windows, in good condition. The largest area of infiltration/ex-filtration was at the doors on all sides of the building. These doors would benefit from new sweeps and weather strip. We also recommend sealing around penetrations and wall cracks to reduce air and moisture infiltration and ex-filtration leading to energy loss. The attic area would benefit from additional insulation.



3a Franklin Annex



"A" Energy loss at roof wall seam



"A" Recommend sealing along crack



"C" Recommend sealant at penetrations



"D4" Recommend weather strip and door sweeps

3. *3b South Sister*

726 NW Wall St

3b South Sister is a single-story building with a brick and stucco exterior finish. The building appears to have double pane windows, with wood frames that would benefit from sealant. The window sealant has given way to age, cracking and deterioration. We recommend resealing the ineffective areas of sealant on the window box to wall. The largest area of infiltration/ex-filtration was at the doors on all sides of the building. These doors would benefit from new sweeps and weather strip.



3b South Sister



"D1" Recommend weather strip & sweep



"D3" Recommend weather strip & sweep



"W1" Recommend sealant

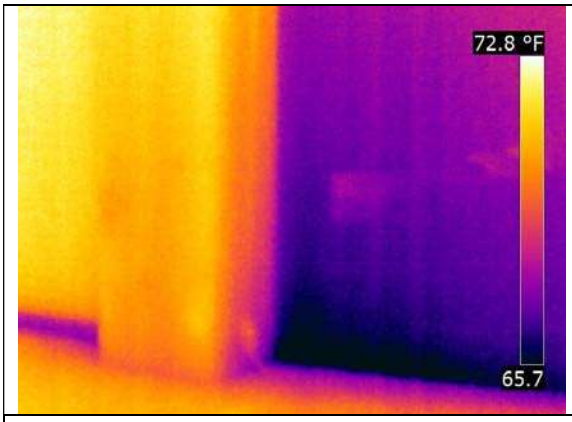
4. *3c Middle Sister*

740 NW Wall St

The Middle Sister is a single-story building, with a brick exterior finish. The doors would benefit from new sweeps and weather strip. The single pane windows are an excellent candidate for installing the Magnetite Window System (alternate scope) which would reduce unwanted air infiltration/ex-filtration, add thermal UV control and reduce conductive heat loss, and also add soundproofing. This building is currently having construction performed.



3c Middle Sister



"W2" Energy loss around windows



"W2" Recommend Magnetite Window System



"D1" Recommend weather strip and sweep

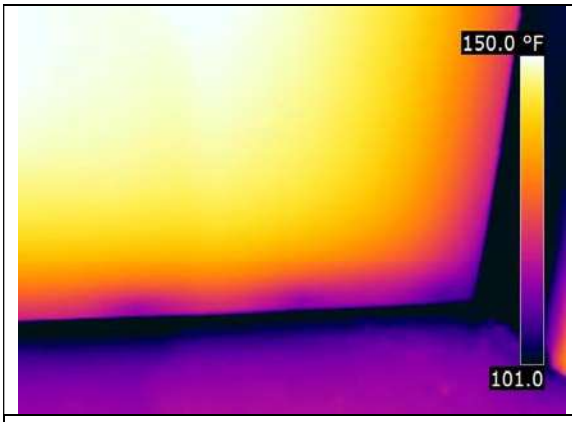
5. *3d North Sister*

639#2 NW Franklin Ave

3d North Sister is a single-story stucco building. The largest area of infiltration/ex-filtration was at the doors on all sides of the buildings. These doors would benefit from new sweeps and weather strip. The double pane, tinted windows appear to be in good condition.



3d North Sister



"D2" Energy loss around door



"D2" Recommend weather strip & door sweep



"D1" Recommend weather strip & door sweep

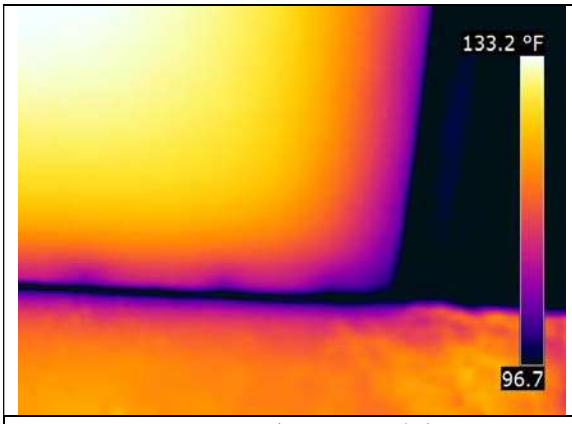
6. *7 Streets and Shops at Pilot Butte Campus*

575 NE 15th St

Streets and Shops at Pilot Butte Campus (Dept. of Public Works), is a two-story building, with a concrete exterior finish. It has five single storied, conditioned, shop buildings with metal exteriors. The doors would benefit from new sweeps, weather strip and astragals where needed. The offices have double pane, tinted windows appear to be in good condition. The remaining garage windows are single pane and would benefit from sealant around the perimeter and the Magnetite Window System. We recommend sealing penetrations, expansion joints, blank openings and wall cracks on all the buildings to reduce air and moisture infiltration and ex-filtration.



Streets and Shops at Pilot Butte Campus



"D9" Energy loss around door



"D9" Recommend weather strip and door sweeps



"K, M" Recommend sealant



"N" Recommend sealant at expansion joints

7. *8a Boyd Acres Bldg A*

62975 Boyd Acres Rd

Boyd Acres Bldg A is a single story, 8,448 sq/ft building, with a concrete exterior finish. The windows are double pane, tinted, insulated with aluminum frames and in good condition and well-sealed. The largest area of infiltration/ex-filtration was around the doors on all sides of the building. The doors would benefit from new sweeps and weather strip to reduce energy loss. We recommend sealing penetrations and expansion joints to reduce air infiltration/ex-filtration and energy loss.



8a Boyd Acres Bldg A



"A" Recommend sealant



"D1" Recommend weather strip and door sweeps



"C" Recommend sealant at expansion joints



"D4" Recommend sealant around door frame

8. 8b Boyd Acres Bldg B

62975 Boyd Acres Rd

Boyd Acres Bldg B, is a single story 8,520 sq/ft building, with a concrete and metal exterior finish. The largest area of infiltration/ex-filtration was at the doors on all sides of the building. These doors would benefit from new sweeps and weather strip where needed. Our team also noted penetrations that need to be sealed to reduce air and moisture infiltration/ex-filtration and energy loss. The windows are double pane, tinted and in good condition.



8b Boyd Acres Bldg B



"D1" Recommend weather strip and door sweep



"D22 OH" Recommend door sweep



"A" Recommend sealant



"D20 OH" Recommend door sweep

9. *8c Boyd Acres Bldg C*

62975 Boyd Acres Rd

Boyd Acres Bldg C is a single story 11,733 sq/ft building with a concrete and metal exterior finish. A large area of infiltration/ex-filtration is at the doors on all sides of the building. These doors would benefit from new sweeps, weather strip and astragals where needed. The windows are double pane, tinted and in good condition.



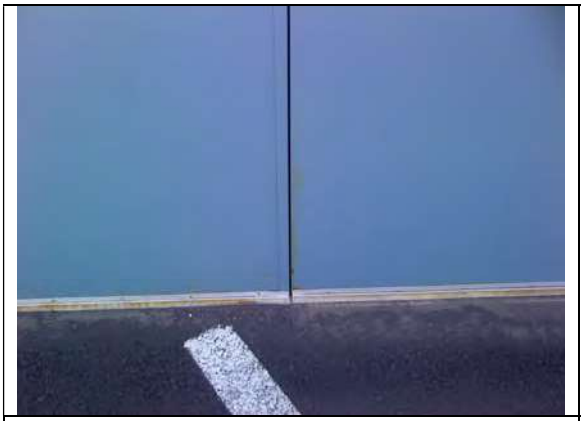
8c Boyd Acres Bldg C



"D1" Recommend weather strip and door sweep



"D6 OH" Recommend door sweep



"D7" Recommend weather strip, astragal & door sweeps

10. 8d Boyd Acres Bldg D

62975 Boyd Acres Rd

Boyd Acres Bldg D is a 17,768 sq/ft two story building, with a metal exterior finish. The doors would benefit from new sweeps and weather strip. Our team also noted blank openings and penetrations that we recommend sealing to reduce air and moisture infiltration/ex-filtration and energy loss. The double pane tinted, vinyl frame windows are in good condition and well-sealed.



8d Boyd Acres Bldg D



"D4 OH" Recommend weather strip & door sweeps



"A" Recommend sealant



"C" Recommend sealant



"D12" Recommend weather strip & door sweeps

11. 9a Bend Municipal Airport

63136 Powell Butte Hwy

9a Bend Municipal Airport is a two story 7,200 sq/ft building, with a brick and metal exterior finish. The largest area of infiltration/ex-filtration was at the doors on all sides of the buildings. These doors would benefit from new sweeps, weather strip and astragals where needed. The windows are double pane, with wood frames and in good condition. We recommend sealing penetrations to reduce unwanted air and moisture infiltration/ex-filtration leading to energy loss.



9a Bend Municipal Airport



"D1" Recommend weather strip, astragal & door sweeps



"D2" Recommend weather strip & door sweeps



"D6" Recommend weather strip, astragal & door sweeps



"A" Recommend sealant

12. 10 Bend Police Department

555 NE 15th Street

Bend Police Department is a three story 47,545 sq/ft building with a brick exterior finish. The doors would benefit from new door sweeps, astragals and weather strip. Our team also noted penetrations that would benefit from sealant to reduce unwanted air and moisture infiltration/ex-filtration and energy loss. The double pane tinted windows appear to be in good condition and well-sealed.



10 Bend Police Department



"D1" Recommend weather strip and door sweeps



"D2" Recommend weather strip, astragal and door sweeps



"D8 OH" Recommend weather strip and door sweeps



"D10" Recommend weather strip and door sweeps

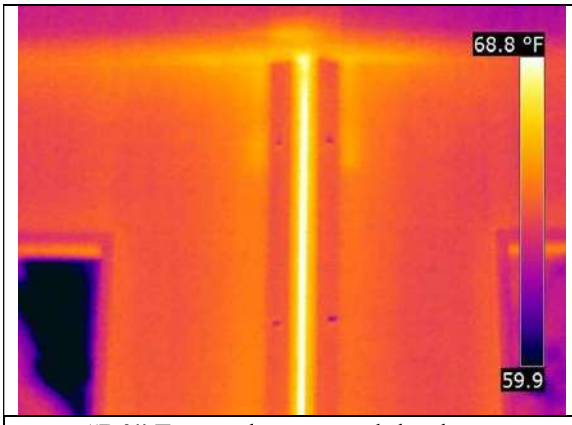
13. 13 Bend Fire Department Administration Building

1212 SW Simpson Ave. "A"

13 Bend Fire Department Administration is a two story 8,736 sq/ft building with a concrete and wood exterior finish. The double pane, tinted, vinyl frame windows appear to be in good condition. The doors would benefit from new sweeps, astragals and weather strip. We also recommend sealing around penetrations to reduce air and moisture infiltration/ex-filtration and energy loss.



13 Bend Fire Department Administration



"D2" Energy loss around the doors



"D2" Recommend weather strip, astragal and door sweeps



"C" Recommend sealant



"D3" Recommend weather strip and door sweeps

14. 14 Bend Fire East Station

62420 Hamby Road

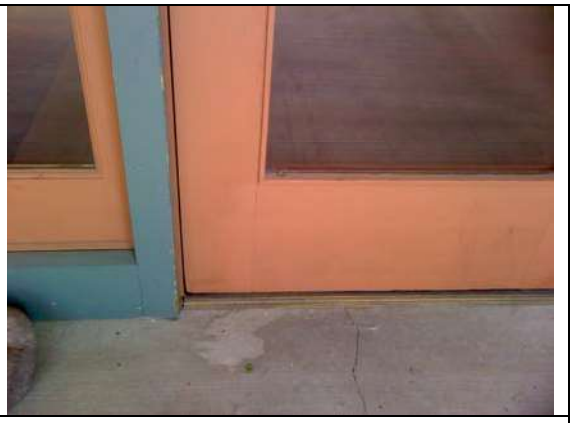
14 Bend Fire East Station, is a two story 12,500 sq/ft building with a concrete and wood siding exterior finish. The doors would benefit from new sweeps and weather strip. The double pane, tinted windows appear to be in good condition. Our team also noted penetrations that would benefit from sealant to reduce unwanted air and moisture infiltration/ex-filtration and energy loss.



14 Bend Fire East Station



"B" Recommend sealant at penetrations



"D6" Recommend weather strip and door sweep



"C" Recommend sealant



"A" Recommend sealant at penetrations

15. 15 Bend Fire South Station

61080 Country Club Drive

15 Bend Fire South Station is a 12,000 sq/ft two story building, with a concrete and wood siding exterior finish. The doors would benefit from new sweeps and weather strip. Our team also noted wall cracks and penetrations that we recommend sealing to reduce air and moisture infiltration/ex-filtration and energy loss. The double pane, vinyl frame windows are in good condition and well-sealed.



15 Bend Fire South Station



"D1" Recommend weather strip & door sweeps



"A" Recommend sealant



"D" Recommend sealant



"D7" Recommend weather strip & door sweeps

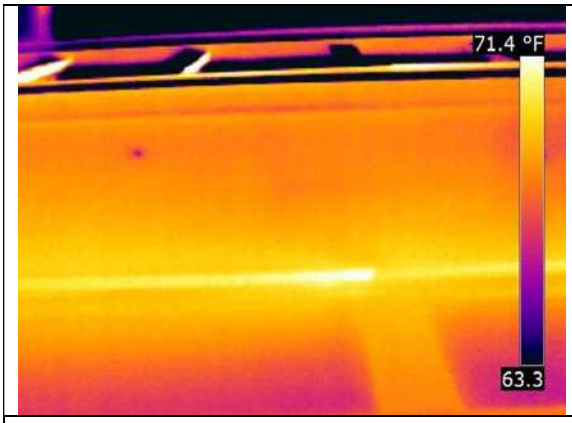
16. 16 Bend Fire West Station

1212 SW Simpson Ave. "A"

16 Bend Fire West Station is a 12,000 sq/ ft two story building, with a concrete and wood siding exterior finish. The doors would benefit from new sweeps and weather strip. Our team also noted penetrations that would benefit from sealant to reduce air and moisture infiltration/ex-filtration and energy loss. The double pane, tinted, vinyl frame windows are in good condition and well-sealed.



16 Bend Fire West Station



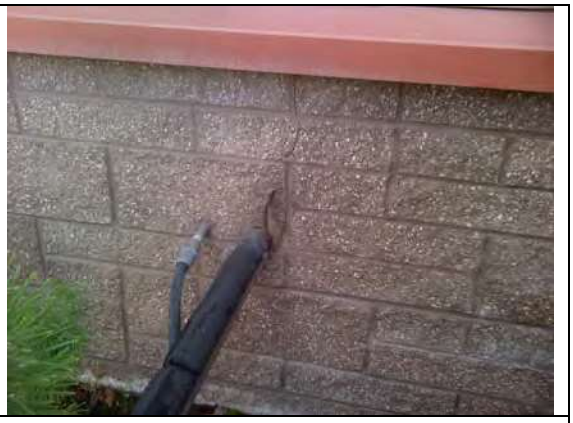
"D3 OH" Energy loss around door



"D3 OH" Recommend weather strip & door sweeps



"D5 OH" Recommend weather strip



"A" Recommend sealant

17. 17a Bend Fire Training - Training BLDG

63377 NE Jamison St

17a Bend Fire Training - Training Bldg is a single story 2,825 sq/ft building, with a wood siding exterior. The doors would benefit from new sweeps, astragals and weather strip. Our team also noted penetrations that we recommend sealing to reduce air and moisture infiltration/ex-filtration and energy loss. The windows are double pane, tinted and have vinyl frames. They are in good condition and well-sealed.



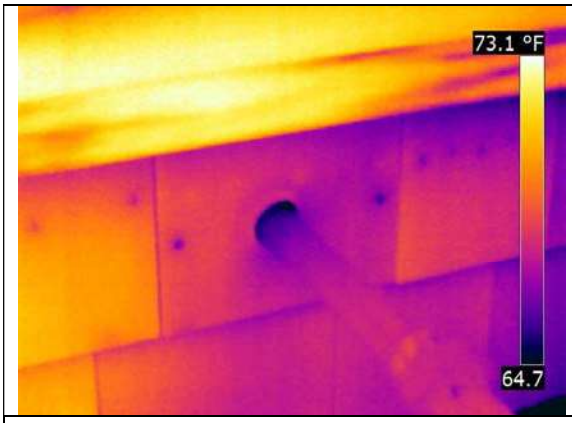
17a Bend Fire Training - Training Bldg.



"D1" Recommend door sweeps



"D3" Recommend aastragal & door sweeps



"A" Energy loss around penetration



"A" Recommend sealing around penetrations

18. 17b Bend Fire Training - Warehouse BLDG

63377 NE Jamison St

17b Bend Fire Training - Warehouse Bldg is a single story 3,075 sq/ft building with a metal exterior finish. The doors would benefit from new door sweeps, astragals and weather strip. Our team also noted penetrations that would benefit from sealant to reduce unwanted air and moisture infiltration/ex-filtration and energy loss. The double pane, tinted, vinyl frame windows appear to be in good condition and well-sealed.



17b Bend Fire Training - Warehouse Bldg



"D1" Recommend weather strip, astragal and door sweeps



"A" Recommend sealant



"B" Recommend sealant



"C" Recommend sealant

19. 18 Bend Fire North Station

63377 NE Jamison St

18 Bend Fire North Station is a two story 12,300 sq/ft building with a brick and wood exterior finish. The double pane windows appear to be in good condition. The doors would benefit from new sweeps, astragals and weather strip. We also recommend sealing and penetrations to reduce air and moisture infiltration/ex-filtration and energy loss.



18 Bend Fire North Station



"D1" Recommend weather strip and door sweeps



"A" Recommend sealant



"D11 OH Recommend weather strip



"D10 OH Recommend weather strip and door sweeps

20. 20 Wall Street Annex

709 NW Wall St

Wall Street Annex, is a two-story building with a brick exterior finish. The doors would benefit from new sweeps, astragals and weather strip to reduce unwanted air and moisture infiltration/ex-filtration and energy loss. The double pane tinted, vinyl frame windows are in good condition and well-sealed. The single pane windows have exterior storms and are in good condition.



Wall Street Annex



"D4" Recommend weather strip, astragal and door sweep



"D5" Recommend weather strip



"D3" Recommend weather strip and door sweeps



"D1" Recommend weather strip and door sweeps

4. *Proposed improvement(s).*

This Energy Conservation Measure includes locating and sealing gaps in the building envelope system to reduce infiltration/ex-filtration. Gaps will be identified by visual inspection, camera, and air flow measurements as indicated in the summary table of the scope of work:

- Doors will be fitted with new weather-stripping, sealant and door sweeps
- Exterior and interior penetrations will be sealed
- Piping and electrical penetrations will be insulated and sealed.
- Roof/wall seams will be sealed as needed

The proposed weather-stripping consists of an extruded aluminum carrier with a frame form insert. It will be installed using a compression fit that allows flexibility should minimal shifting of the door occur. The weather-stripping will be applied at the sides and across the top of the doorframe.

A sweep will be installed on the bottom of the door.

Astragals are the weather-stripping material used to cover the gap between two doors.

All door weather-stripping will be sealed after installation using a paintable, silicon acrylic sealant. Latches will be checked to ensure they close and lock properly. Doors will also be checked for damage, such as old screw holes and penetrations. When found, penetrations will be sealed to minimize air infiltration/ex-filtration.

Please see attached Envelope Improvement - Scope of Work Summary

Notes:

1. After the weather-stripping is installed, the doors will be tested for proper operation. The weather-stripping/ sweep should be inspected annually.

Please see attached Envelope Improvement- Replacement Products and Manufacturer

Notes:

2. Door weather-stripping material is referred to as DF, which references DF Commercial/ Industrial weather-stripping. The reference to DS is for the door sweep material, which is also a Commercial/ Industrial product. Astragals are elongated sweeps. All doors weather-stripping material has a mill finish.

5. *Benefits of improvement(s).*

The benefits of a comprehensive envelope improvement program:

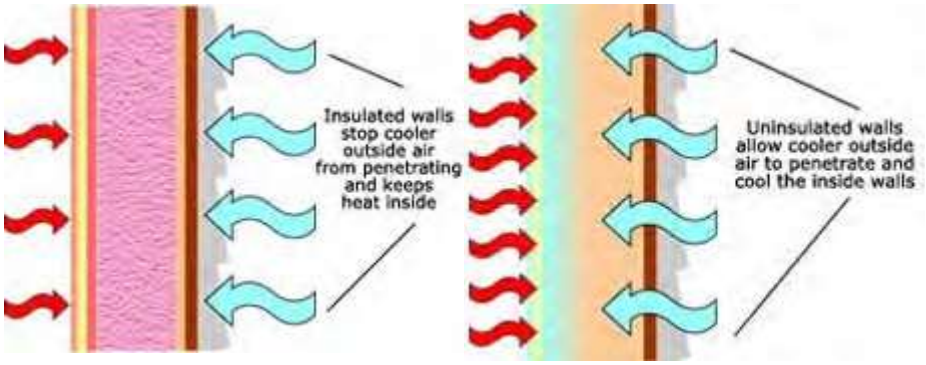
- Reduction in overall energy consumption
- Reduction in space temperature fluctuations leading to improved occupant comfort
- Infrastructure improvement

Increased thermal comfort. Drafts will be reduced providing greater comfort for the building occupants.

Decreased energy consumption. Less conditioned air will be lost through the building envelope and the Heating Equipment will not have to work as hard to maintain the set point of the conditioned space, which will decrease the energy consumed and save on steam energy costs.

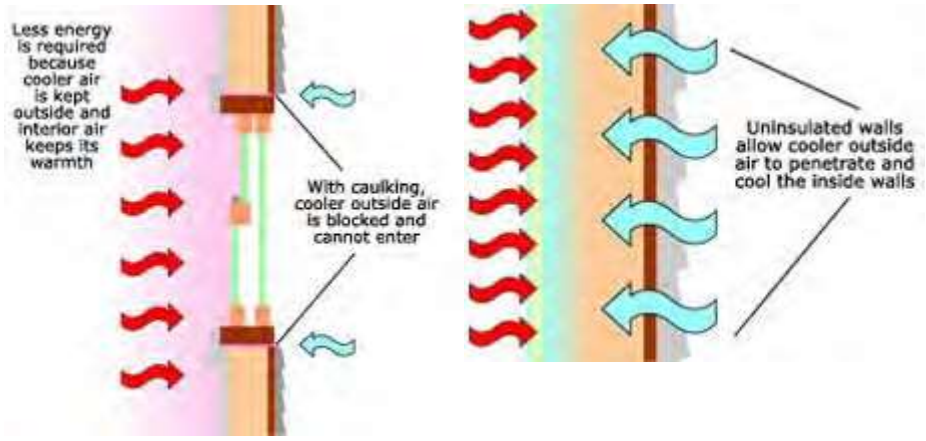
The more complete the integrity of the physical structure, the more efficiently the HVAC system will operate and as originally designed.

We investigated the areas of the buildings that would allow for energy loss through the "Building Envelope". There are three methods for heat transfer: conduction, convection and radiation. Below is a short description of how energy is lost and how through proper remediation we can reduce the energy loss for the buildings that we evaluated.



Conduction is the transfer of heat through solid objects.

- Example: When it's cold outside, uninsulated walls and windows become cooler on the inside.
- Result: More energy is required to replace the heat lost warming the inside of the walls and windows.
- Preventive Measures: Insulation (fiberglass batts/rolls or blown cellulose), low-e insulated windows, storm windows and storm doors slow the migration of heat energy and help maintain the temperature in the conditioned space. Slowing the energy transfer saves on the amount of energy needed to maintain the conditioned space.



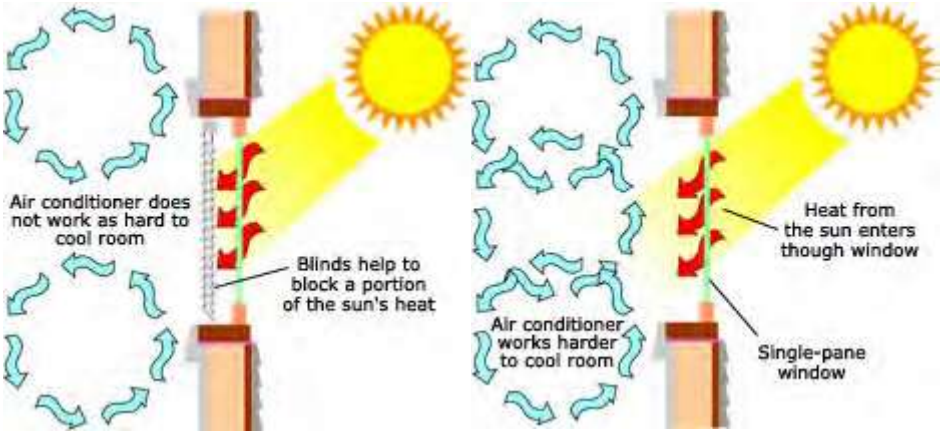
Convection is the transfer of heat through liquids or gases.

Example: When cold air enters a conditioned space it mixes with warm air. Heat energy is transferred to the cooler air and the overall temperature of the room/ building is lowered.

Result: More energy is required to replace the heat transferred to the cooler air.

- Preventive Measures: Weather-stripping, caulking and properly installed foam greatly reduce the uncontrolled flow of air into or out of the building. Reducing the uncontrolled flow of air into or out of the building reduces the amount of energy needed to heat unconditioned air.

Radiation is the transfer of heat through space in the form of electromagnetic energy.



Example: When sunlight enters an air-conditioned room through a single pane window, heat energy is generated in the room.

- Result: The air conditioning system must run longer and work harder to overcome the heat gained through the window.
- Preventive Measures: Low-e insulated windows, blinds and awnings all lessen the heat gained by sunlight entering through windows.
- By creating a thermal barrier and stopping the air infiltration we can achieve a tighter building envelope and consequently achieve savings.

6. Operating hours by area (if this data is used in savings calculations).

Operating hours for this ECM are essentially 24 hours per day for the entire heating season. Operating hours for the cooling season will only impact those buildings with cooling systems installed.

7. Calculation of energy savings.

The energy savings derived from this measure are a result of the heating and cooling systems (chillers and boilers) not having to work as hard to achieve the desired environmental conditions. The amount of savings is dependent on the existing building conditions and the amount of air leakage under the current operating conditions.

Energy savings are based on the ASHRAE crack method calculations. If the process reveals any variation in the as-built conditions, then savings will be adjusted accordingly. Determination of air current air leakage rates is based on many factors, including:

- Linear feet of cracks
- Square feet of openings
- Stack coefficient
- Shield class
- Average wind speed
- Heating or cooling set point
- Average seasonal ambient temperatures

Savings due to infiltration reduction:

The following equation is based on the ASHRAE crack method:

Heat loss per hour: $\dot{q}$ = 1.08 x Q x ΔT

Where Q represents the airflow in cubic feet per minute (CFM) and is calculated in the following manner:

$$Q = A_{crack} \times \sqrt{(C_s \Delta T + C_w V^2}$$

In this equation, *A* represents the crack area in square inches to be reduced. The other values in the equation are standard for these buildings and are based upon shelter class, height, and local wind speed.

- Cw = wind coefficient = 0.0104 average
- V = wind speed = 8.8 average mph
- Cs = stack coefficient = 0,0299 (two-story typical)
- ΔT = temperature difference = $T_{out} - T_{in}$

ΔT is calculated by subtracting the average outdoor air temperature per hour from the indoor temperature, using 24 data points per month to accurately account for weather variances, and subsequently calculating airflow and heat loss for each set of data. Therefore, 288 data points are used, and Δt is the number of hours each data point represents. The total heat loss is calculated as follows:

$$q = \sum_{x=1}^{288} 1.08 \times A_{crack} \times \sqrt{C_s (T_{out} - T_{in}) + C_w V^2} \times (T_{out} - T_{in}) \times \Delta t$$

Savings due to insulation improvements:

Steady-state, one dimensional heat flow through insulation systems is governed by Fourier's law:

q = - k·A·dT/dx * Hrs / 1MMBTU

Where:

q = rate of heat flow, Btu/hr
A = cross sectional area normal to heat flow, ft2
k = thermal conductivity of the insulation material, Btu-in/h ft2°F
dT/dx = temperature gradient, °F/in

Note that changes in occupancy hours, heating and cooling set points and weather conditions will all affect the savings potential of this envelope improvement measure. An increase in operating hours or the heating set point will reduce the savings potential, but at a rate substantially less than heating costs would have been affected prior to the implementation of these strategies.

8. O&M savings (if applicable).

The financial analysis for this RFP response does not include O&M savings for this measure.

9. Environmental factors

Reducing the heating and cooling load through a comprehensive envelope improvement project will reduce the overall energy used, reducing the amount of natural gas and/or other fuels burned in the facilities, which has a positive impact on the environment by lowering fossil fuel emissions,

10. Clarifications

Implementation of the comprehensive envelope improvement project will reduce the overall energy use, reduce the amount of fuel and have a positive impact on the environment by lowering emissions.

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

City of Bend, OR

5/24/2018

Envelope Improvement - Savings Summary

Bldg No.	Description	Infiltration Annual Savings (MMBTU)	Insulation Annual Savings (MMBTU)	Annual MMBTU Savings ($)	Annual Savings (kWh)	Insulation Annual Savings (kWh)	Annual Electric Savings ($)	Total Annual Savings ($)
1	1 City Hall	42	-	$ 424	12	-	$ 1	$ 425
2	3a Franklin Annex	18	-	$ 177	5	-	$ 0	$ 177
3	3b South Sister	11	-	$ 110	3	-	$ 0	$ 110
4	3c Middle Sister	6	-	$ 58	2	-	$ 0	$ 58
5	3d North Sister	8	-	$ 81	2	-	$ 0	$ 81
6	7 Streets and Shops at Pilot Butte Campus	877	-	$ 8,769	255	-	$ 18	$ 8,787
7	8a Boyd Acres Bldg. A	21	-	$ 211	6	-	$ 0	$ 212
8	8b Boyd Acres Bldg. B	80	-	$ 803	24	-	$ 2	$ 804
9	8c Boyd Acres Bldg. C	30	-	$ 302	9	-	$ 1	$ 302
10	8d Boyd Acres Bldg. D	428	-	$ 4,280	125	-	$ 9	$ 4,288
11	9a Bend Municipal Airport	30	-	$ 300	9	-	$ 1	$ 300
12	10 Bend Police Department	169	-	$ 1,694	36	-	$ 3	$ 1,697
13	13 Bend Fire Department Administration	32	-	$ 317	9	-	$ 1	$ 317
14	14 Bend Fire East Station	30	-	$ 295	7	-	$ 0	$ 296
15	15 Bend Fire South Station	48	-	$ 480	11	-	$ 1	$ 481
16	16 Bend Fire West Station	73	-	$ 735	16	-	$ 1	$ 736
17	17a Bend Fire Training - Training Bldg.	8	-	$ 83	2	-	$ 0	$ 83
18	17b Bend Fire Training - Warehouse	8	-	$ 84	2	-	$ 0	$ 84
19	18 Bend Fire North Station	59	-	$ 591	13	-	$ 1	$ 592
20	20 Wall Street Annex	13	-	$ 126	3	-	$ 0	$ 127
21	3c Middle Sister-(Mag)	-	28	$ 279	-	172	$ 12	$ 291
22	7 Streets and Shops at Pilot Butte Campus-(Mag)	-	10	$ 95	-	59	$ 4	$ 99
23	3a Franklin Annex (Insulation)	-	40	$ 404	-	249	$ 17	$ 421
	TOTALS:	**1,992**	**78**	**$ 20,697**	**554**	**480**	**$ 72**	**$ 20,769**

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

City of Bend, OR

5/24/2018

Envelope Improvement - Investment Analysis

Bldg No.	Description	Total Annual Savings ($)	Remediation Estimate (Envelope Improvement)	Simple Payback (Years)	Remediation Estimate (Weatherization)	Total Remediation Estimate	Total Air Leakage Area (Square/Feet)
1	1 City Hall	$ 425	$ 2,401	5.65	$ 635	$ 3,036	2.42
2	3a Franklin Annex	$ 177	$ 989	5.58	$ 491	$ 1,480	1.33
3	3b South Sister	$ 110	$ 648	5.90	$ 175	$ 823	0.82
4	3c Middle Sister	$ 58	$ 301	5.15		$ 301	0.44
5	3d North Sister	$ 81	$ 569	6.99		$ 569	0.61
6	7 Streets and Shops at Pilot Butte Campus	$ 8,787	$ 41,582	4.73	$ 377	$ 41,959	45.73
7	8a Boyd Acres Bldg. A	$ 212	$ 2,089	9.86		$ 2,089	1.43
8	8b Boyd Acres Bldg. B	$ 804	$ 6,056	7.53		$ 6,056	5.42
9	8c Boyd Acres Bldg. C	$ 302	$ 2,851	9.43		$ 2,851	2.04
10	8d Boyd Acres Bldg. D	$ 4,288	$ 17,343	4.04		$ 17,343	22.32
11	9a Bend Municipal Airport	$ 300	$ 3,134	10.44		$ 3,134	1.56
12	10 Bend Police Department	$ 1,697	$ 5,854	3.45	$ 176	$ 6,030	4.66
13	13 Bend Fire Department Administration	$ 317	$ 3,369	10.62		$ 3,369	1.80
14	14 Bend Fire East Station	$ 296	$ 1,692	5.72		$ 1,692	0.90
15	15 Bend Fire South Station	$ 481	$ 2,421	5.03		$ 2,421	1.46
16	16 Bend Fire West Station	$ 736	$ 3,638	4.94		$ 3,638	2.41
17	17a Bend Fire Training - Training Bldg.	$ 83	$ 1,172	14.16	$ 42	$ 1,214	0.62
18	17b Bend Fire Training - Warehouse	$ 84	$ 2,190	26.08		$ 2,190	0.63
19	18 Bend Fire North Station	$ 592	$ 4,202	7.10		$ 4,202	1.94
20	20 Wall Street Annex	$ 127	$ 2,004	15.84		$ 2,004	0.72
21	3c Middle Sister-(Mag)	$ 291	$ 4,036	13.86		$ 4,036	0.00
22	7 Streets and Shops at Pilot Butte Campus-(Mag)	$ 99	$ 1,377	13.87		$ 1,377	0.00
23	3a Franklin Annex (Insulation)	$ 421	$ 11,148	26.47		$ 11,148	0.00
	TOTALS:	**$ 20,769**	**$ 121,066**	**5.83**	**$ 1,896**	**$ 122,962**	**99.25**

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

City of Bend, OR

5/24/2018

Envelope Improvement - Environmental Emissions Reduction

Bldg No.	Description	Annual CO2 Emissions (LBS/MMBTU)	Annual Nox Emissions (LBS/MMBTU)	Annual CE Emissions (LBS/MMBTU)
1	1 City Hall	4,963	24	1,352
2	3a Franklin Annex	2,069	10	564
3	3b South Sister	1,282	6	349
4	3c Middle Sister	682	3	186
5	3d North Sister	950	5	259
6	7 Streets and Shops at Pilot Butte Campus	102,552	492	27,943
7	8a Boyd Acres Bldg. A	2,474	12	674
8	8b Boyd Acres Bldg. B	9,389	45	2,558
9	8c Boyd Acres Bldg. C	3,530	17	962
10	8d Boyd Acres Bldg. D	50,050	240	13,638
11	9a Bend Municipal Airport	3,504	17	955
12	10 Bend Police Department	19,793	95	5,393
13	13 Bend Fire Department Administration	3,701	18	1,008
14	14 Bend Fire East Station	3,451	17	940
15	15 Bend Fire South Station	5,612	27	1,529
16	16 Bend Fire West Station	8,588	41	2,340
17	17a Bend Fire Training - Training Bldg.	966	5	263
18	17b Bend Fire Training - Warehouse	980	5	267
19	18 Bend Fire North Station	6,907	33	1,882
20	20 Wall Street Annex	1,476	7	402
21	3c Middle Sister-(Mag)	3,503	16	954
22	7 Streets and Shops at Pilot Butte Campus-(Mag)	1,195	6	326
23	3a Franklin Annex (Insulation)	5,067	23	1,381
	TOTALS:	**242,684**	**1,163**	**66,127**

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

City of Bend, OR

5/24/2018

Envelope Improvement - Replacement Products and Manufacturer

Replacement Product and Manufacturer	Warranty Information	Expected Failure rate	Website
DAP Premium Polyurethane Concrete & Masonry Sealant #18814	50 yrs	minimum 25 years	www.dap.com
3 M Polyurethane Sealant #535	n/a	minimum 25 years	http://solutions.3m.com
TremSeal D One Component Polyurethane Sealant	1 yr	minimum 25 years	http://www.tremcosealants.com
OSI Enhanced Polyurethane Sealant	1 yr	minimum 25 years	http://www.osipro.com
Dow Corning 790 Silicone Building Sealant	50 yrs	minimum 25 years	http://www.dowcorning.com
GE SCS200 SilPruf Silicone Sealant and Adhesive	n/a	minimum 20 years	http://www.siliconeforbuilding.com
Boss 312 RTV Industrial Silicone Sealant	1 yr	minimum 20 years	http://www.accumetricinc.com
Sikaflex®- 1a	1 yr	minimum 25 years	http://www.sika.com
Sonolastic® NP1™	1 yr	minimum 25 years	http://www.buildingsystems.basf.com
Tremco Sprectrem 2 High-Performance Silcone Sealant	n/a	minimum 20 years	http://www.tremcosealants.com
Loxon S1			
White Lightning Storm Blaster			
950A Siliconized Acrylic Latex Caulk			
Sealeze Nylon Therm-L- Brush Door Sweep	n/a	1,500,000 cycle testing ANSI 156.4, 1980	www.sealeze.com
Sealeze Astra-Sweep Nylon Therm-L- Brush Astragal Seal	n/a	1,500,000 cycle testing ANSI 156.4, 1980	
Sealeze Nylon Therm-L- Brush Weatherseal	n/a	1,500,000 cycle testing ANSI 156.4, 1980	
Amesbury Surface Mount Foam-Tite® Foam Seals	n/a		www.amesbury.com
Amesbury Pocket Mount Foam-Tite® Foam Seals	n/a		
Amesbury Surface Mount Pile Seals	n/a		
Reese Model 810 Door Sweep	n/a		www.reeseusa.com
Reese Model 129 Astragal Seal	n/a		
Reese Model 797 Perimeter Door Smoke Seal	n/a		
Reese Model 815 Perimeter Door Seal	n/a		
FROTH-PAK™ Foam Sealant	n/a		http://building.dow.com
Magnetite Window Systemn			www.magnetite.com

Whereas the above manufacturer may not provide a replacement product, products may be substituted to match existing.

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

1 City Hall			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	2.42	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

1 City Hall		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	347.94	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0051	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (140,330 Btu / 12,000 Btu/ton):	12	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (16,448,642 Btu / 1,000,000 Btu):	16	MMBtu
Heating Season Energy from Weather Table-Unoccupied (18,359,098 Btu / 1,000,000 Btu):	18	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (12 ton-hours * 1.00 kW/ton):	12	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (16 MMBtu / 82 %):	20	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (18 MMBtu / 82 %):	22	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (12 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (20 MMBtu x $10.00 per MMBtu):	$ 201	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (22 MMBtu x $10.00 per MMBtu):	$ 224	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $201 Btu + $224 Btu):	$ 425	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	54	0.281
1/8	126	1.313
1/4	17	0.354
1/2	11	0.458
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		2.406
Penetrations		0.010
		2.416

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3a Franklin Annex			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	1.33	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3a Franklin Annex	City of Bend, OR	
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	191.19	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (61,112 Btu / 12,000 Btu/ton):	5	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (6,881,179 Btu / 1,000,000 Btu):	7	MMBtu
Heating Season Energy from Weather Table-Unoccupied (7,626,470 Btu / 1,000,000 Btu):	8	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (5 ton-hours * 1.00 kW/ton):	5	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (7 MMBtu / 82 %):	8	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (8 MMBtu / 82 %):	9	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (5 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (8 MMBtu x $10.00 per MMBtu):	$ 84	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (9 MMBtu x $10.00 per MMBtu):	$ 93	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $84 Btu + $93 Btu):	$ 177	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	33	0.172
1/8	20	0.208
1/4	3	0.063
1/2		0.000
3/4	14	0.875
1		0.000
1 1/2		0.000
2		0.000
		1.318
Penetrations		0.010
		1.328

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_T = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3a Franklin Annex (Insulation)			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.00	ft^2	
Existing Insulation Area from Survey, ft^2	1813	ft^2	
Existing U-Value	0.14		
Proposed U-Value	0.03		

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3a Franklin Annex (Insulation)		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * ft^2):	0	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (Btu / 1,000,000 Btu):	-	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (MMBtu / 82 %):	-	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $0 Btu + $0 Btu):	$ -	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (1,813 ft^2 x (.14 U-Value - .03 U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	141	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (1,813 ft^2 x (.14 U-Value - .03 U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	108	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (1,813 ft^2 x (.14 U-Value - .03 U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	11	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (1,813 ft^2 x (.14 U-Value - .03 U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	30	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (141 kWh/Yr x $0.07000 per kWh):	$ 10	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (108 kWh/Yr x $0.07000 per kWh):	$ 8	per year
Fuel Energy Cost Savings-Heating Season-Occupied (11 MMBtu x $10.00 per MMBtu):	$ 106	per year
Fuel Energy Cost Savings-Heating Season-Occupied (30 MMBtu x $10.00 per MMBtu):	$ 298	per year
Total Savings Cost ($10 kWh/yr + $8 KWh/yr + $106 Btu + $298 Btu):	$ 421	per year

Crack area Calculation		
Width	LF	ft^2
1/16		0.000
1/8		0.000
1/4		0.000
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.000
Penetrations		
		0.000

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3b South Sister			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.82	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3b South Sister		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	118.5	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (37,877 Btu / 12,000 Btu/ton):	3	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (4,264,971 Btu / 1,000,000 Btu):	4	MMBtu
Heating Season Energy from Weather Table-Unoccupied (4,726,903 Btu / 1,000,000 Btu):	5	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (3 ton-hours * 1.00 kW/ton):	3	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (4 MMBtu / 82 %):	5	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (5 MMBtu / 82 %):	6	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (3 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (5 MMBtu x $10.00 per MMBtu):	$ 52	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (6 MMBtu x $10.00 per MMBtu):	$ 58	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $52 Btu + $58 Btu):	$ 110	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	16	0.083
1/8	59	0.615
1/4	6	0.125
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.823
Penetrations		
		0.823

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3c Middle Sister			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.44	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3c Middle Sister		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * ft^2):	63	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (20,137 Btu / 12,000 Btu/ton):	2	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (2,267,453 Btu / 1,000,000 Btu):	2	MMBtu
Heating Season Energy from Weather Table-Unoccupied (2,513,037 Btu / 1,000,000 Btu):	3	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (2 ton-hours * 1.00 kW/ton):	2	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (2 MMBtu / 82 %):	3	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (3 MMBtu / 82 %):	3	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (2 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (3 MMBtu x $10.00 per MMBtu):	$ 28	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (3 MMBtu x $10.00 per MMBtu):	$ 31	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $28 Btu + $31 Btu):	$ 58	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16		0.000
1/8		0.000
1/4	21	0.438
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.438
Penetrations		
		0.438

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3c Middle Sister-(Mag)			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.00	ft^2	
Existing Insulation Area from Survey, ft^2	226	ft^2	
Existing U-Value	1.09		
Proposed U-Value	0.48		

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3c Middle Sister-(Mag)		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * ft^2):	0	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (Btu / 1,000,000 Btu):	-	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (MMBtu / 82 %):	-	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $0 Btu + $0 Btu):	$ -	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (226 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	97	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (226 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	75	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (226 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	7	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (226 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	21	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (97 kWh/Yr x $0.07000 per kWh):	$ 7	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (75 kWh/Yr x $0.07000 per kWh):	$ 5	per year
Fuel Energy Cost Savings-Heating Season-Occupied (7 MMBtu x $10.00 per MMBtu):	$ 73	per year
Fuel Energy Cost Savings-Heating Season-Occupied (21 MMBtu x $10.00 per MMBtu):	$ 206	per year
Total Savings Cost ($7 kWh/yr + $5 KWh/yr + $73 Btu + $206 Btu):	$ 291	per year

Crack area Calculation		
Width	LF	ft^2
1/16		0.000
1/8		0.000
1/4		0.000
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.000
Penetrations		
		0.000

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

3d North Sister			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.61	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

3d North Sister		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	87.75	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (28,048 Btu / 12,000 Btu/ton):	2	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (3,158,238 Btu / 1,000,000 Btu):	3	MMBtu
Heating Season Energy from Weather Table-Unoccupied (3,500,302 Btu / 1,000,000 Btu):	4	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (2 ton-hours * 1.00 kW/ton):	2	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (3 MMBtu / 82 %):	4	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (4 MMBtu / 82 %):	4	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (2 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (4 MMBtu x $10.00 per MMBtu):	$ 39	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (4 MMBtu x $10.00 per MMBtu):	$ 43	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $39 Btu + $43 Btu):	$ 81	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	17	0.089
1/8		0.000
1/4	19	0.396
1/2	3	0.125
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.609
Penetrations		
		0.609

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

7 Streets and Shops at Pilot Butte Campus			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	45.73	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

7 Streets and Shops at Pilot Butte Campus		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 46 ft^2):	6585.78	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (3,062,615 Btu / 12,000 Btu/ton):	255	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (341,374,505 Btu / 1,000,000 Btu):	341	MMBtu
Heating Season Energy from Weather Table-Unoccupied (377,659,844 Btu / 1,000,000 Btu):	378	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (255 ton-hours * 1.00 kW/ton):	255	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (341 MMBtu / 82 %):	416	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (378 MMBtu / 82 %):	461	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (255 kWh/Yr x $0.07000 per kWh):	$ 18	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (416 MMBtu x $10.00 per MMBtu):	$ 4,163	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (461 MMBtu x $10.00 per MMBtu):	$ 4,606	per year
Total Savings Cost ($18 kWh/yr + $0 kWh/yr + $4163 Btu + $4606 Btu):	$ 8,787	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	300	1.563
1/8	115	1.198
1/4	1841	38.354
1/2	108	4.500
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		45.615
Penetrations		0.120
		45.735

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_T = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

7 Streets and Shops at Pilot Butte Campus-(Mag)			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	0.00	ft^2	
Existing Insulation Area from Survey, ft^2	77.08	ft^2	
Existing U-Value	1.09		
Proposed U-Value	0.48		

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

7 Streets and Shops at Pilot Butte Campus-(Mag)		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * ft^2):	0	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (Btu / 1,000,000 Btu):	-	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (MMBtu / 82 %):	-	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $0 Btu + $0 Btu):	$ -	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (77 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	33	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (77 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	25	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (77 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	2	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (77 ft^2 x (1.09 U-Value - .48 U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	7	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (33 kWh/Yr x $0.07000 per kWh):	$ 2	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (25 kWh/Yr x $0.07000 per kWh):	$ 2	per year
Fuel Energy Cost Savings-Heating Season-Occupied (2 MMBtu x $10.00 per MMBtu):	$ 25	per year
Fuel Energy Cost Savings-Heating Season-Occupied (7 MMBtu x $10.00 per MMBtu):	$ 70	per year
Total Savings Cost ($2 kWh/yr + $2 KWh/yr + $25 Btu + $70 Btu):	$ 99	per year

Crack area Calculation		
Width	LF	ft^2
1/16		0.000
1/8		0.000
1/4		0.000
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.000
Penetrations		
		0.000

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

8a Boyd Acres Bldg. A			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	1.43	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

8a Boyd Acres Bldg. A		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	205.5	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0065	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (77,349 Btu / 12,000 Btu/ton):	6	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (8,267,375 Btu / 1,000,000 Btu):	8	MMBtu
Heating Season Energy from Weather Table-Unoccupied (9,075,505 Btu / 1,000,000 Btu):	9	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (6 ton-hours * 1.00 kW/ton):	6	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (8 MMBtu / 82 %):	10	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (9 MMBtu / 82 %):	11	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (6 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (10 MMBtu x $10.00 per MMBtu):	$ 101	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (11 MMBtu x $10.00 per MMBtu):	$ 111	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $101 Btu + $111 Btu):	$ 212	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	166	0.865
1/8	48	0.500
1/4	3	0.063
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		1.427
Penetrations		
		1.427

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

8b Boyd Acres Bldg. B			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	5.42	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

8b Boyd Acres Bldg. B		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 5 ft^2):	779,94	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0065	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (293,563 Btu / 12,000 Btu/ton):	24	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (31,377,403 Btu / 1,000,000 Btu):	31	MMBtu
Heating Season Energy from Weather Table-Unoccupied (34,444,523 Btu / 1,000,000 Btu):	34	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (24 ton-hours * 1.00 kW/ton):	24	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (31 MMBtu / 82 %):	38	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (34 MMBtu / 82 %):	42	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (24 kWh/Yr x $0.07000 per kWh):	$ 2	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (38 MMBtu x $10.00 per MMBtu):	$ 383	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (42 MMBtu x $10.00 per MMBtu):	$ 420	per year
Total Savings Cost ($2 kWh/yr + $0 kWh/yr + $383 Btu + $420 Btu):	$ 804	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16		0.000
1/8	163	1.698
1/4	178	3.708
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		5.406
Penetrations		0.010
		5.416

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

8c Boyd Acres Bldg. C			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	2.04	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

8c Boyd Acres Bldg. C		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	293.25	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0065	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (110,377 Btu / 12,000 Btu/ton):	9	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (11,797,604 Btu / 1,000,000 Btu):	12	MMBtu
Heating Season Energy from Weather Table-Unoccupied (12,950,812 Btu / 1,000,000 Btu):	13	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (9 ton-hours * 1.00 kW/ton):	9	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (12 MMBtu / 82 %):	14	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (13 MMBtu / 82 %):	16	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (9 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (14 MMBtu x $10.00 per MMBtu):	$ 144	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (16 MMBtu x $10.00 per MMBtu):	$ 158	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $144 Btu + $158 Btu):	$ 302	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	49	0.255
1/8	91	0.948
1/4	40	0.833
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		2.036
Penetrations		
		2.036

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

8d Boyd Acres Bldg. D			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	22.32	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

8d Boyd Acres Bldg. D		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 22 ft^2):	3214.14	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (1,494,686 Btu / 12,000 Btu/ton):	125	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (166,605,239 Btu / 1,000,000 Btu):	167	MMBtu
Heating Season Energy from Weather Table-Unoccupied (184,314,024 Btu / 1,000,000 Btu):	184	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (125 ton-hours * 1.00 kW/ton):	125	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (167 MMBtu / 82 %):	203	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (184 MMBtu / 82 %):	225	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (125 kWh/Yr x $0.07000 per kWh):	$ 9	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (203 MMBtu x $10.00 per MMBtu):	$ 2,032	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (225 MMBtu x $10.00 per MMBtu):	$ 2,248	per year
Total Savings Cost ($9 kWh/yr + $0 kWh/yr + $2032 Btu + $2248 Btu):	$ 4,288	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation

Width	LF	ft^2
1/16		0.000
1/8	119	1.240
1/4	1009	21.021
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		22.260
Penetrations		0.060
		22.320

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

9a Bend Municipal Airport			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	1.56	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

9a Bend Municipal Airport	City of Bend, OR	
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	225	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (104,633 Btu / 12,000 Btu/ton):	9	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (11,662,895 Btu / 1,000,000 Btu):	12	MMBtu
Heating Season Energy from Weather Table-Unoccupied (12,902,567 Btu / 1,000,000 Btu):	13	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (9 ton-hours * 1.00 kW/ton):	9	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (12 MMBtu / 82 %):	14	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (13 MMBtu / 82 %):	16	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (9 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (14 MMBtu x $10.00 per MMBtu):	$ 142	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (16 MMBtu x $10.00 per MMBtu):	$ 157	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $142 Btu + $157 Btu):	$ 300	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	152	0.792
1/8	62	0.646
1/4	6	0.125
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		1.563
Penetrations		
		1.563

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * sqrt(C_S *\Delta t + C_W*U^2)$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

10 Bend Police Department			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	1	Sunday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	7	Saturday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	1	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	24	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	3		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	4.66	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

10 Bend Police Department		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 5 ft^2):	671.19	in^2
Selected Basic Model Stack Coefficient C_S	0.04490	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0060	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (436,294 Btu / 12,000 Btu/ton):	36	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (138,907,921 Btu / 1,000,000 Btu):	139	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (36 ton-hours * 1.00 kW/ton):	36	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	8,760	Hrs/year
Controls Unoccupied Hours Per Year	-	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (139 MMBtu / 82 %):	169	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (36 kWh/Yr x $0.07000 per kWh):	$ 3	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (169 MMBtu x $10.00 per MMBtu):	$ 1,694	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($3 kWh/yr + $0 kWh/yr + $1694 Btu + $0 Btu):	$ 1,697	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 624 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 6918 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	173	0.901
1/8	70	0.729
1/4	95	1.979
1/2	25	1.042
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		4.651
Penetrations		0.010
		4.661

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

13 Bend Fire Department Administration			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	1.80	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

13 Bend Fire Department Administration		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	259.44	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0051	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (104,637 Btu / 12,000 Btu/ton):	9	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (12,264,861 Btu / 1,000,000 Btu):	12	MMBtu
Heating Season Energy from Weather Table-Unoccupied (13,689,384 Btu / 1,000,000 Btu):	14	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (9 ton-hours * 1.00 kW/ton):	9	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (12 MMBtu / 82 %):	15	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (14 MMBtu / 82 %):	17	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (9 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (15 MMBtu x $10.00 per MMBtu):	$ 150	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (17 MMBtu x $10.00 per MMBtu):	$ 167	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $150 Btu + $167 Btu):	$ 317	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	74	0.385
1/8	129	1.344
1/4	3	0.063
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		1.792
Penetrations		0.010
		1.802

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

14 Bend Fire East Station			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	1	Sunday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	7	Saturday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	1	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	24	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	0.90	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

14 Bend Fire East Station		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	129.45	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (83,894 Btu / 12,000 Btu/ton):	7	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (24,212,507 Btu / 1,000,000 Btu):	24	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (7 ton-hours * 1.00 kW/ton):	7	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	8,760	Hrs/year
Controls Unoccupied Hours Per Year	-	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (24 MMBtu / 82 %):	30	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (7 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (30 MMBtu x $10.00 per MMBtu):	$ 295	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $295 Btu + $0 Btu):	$ 296	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 624 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 6918 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	85	0.443
1/8	33	0.344
1/4	3	0.063
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.849
Penetrations		0.050
		0.899

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

15 Bend Fire South Station			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	1	Sunday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	7	Saturday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	1	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	24	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	3	Typical shelter used by other buildings across the street from building under study	
A_L = Effective Air Leakage Area from Survey, ft^2	1.46	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

15 Bend Fire South Station		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	210.51	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0086	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (136,428 Btu / 12,000 Btu/ton):	11	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (39,374,082 Btu / 1,000,000 Btu):	39	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (11 ton-hours * 1.00 kW/ton):	11	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	8,760	Hrs/year
Controls Unoccupied Hours Per Year	-	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (39 MMBtu / 82 %):	48	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (11 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (48 MMBtu x $10.00 per MMBtu):	$ 480	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $480 Btu + $0 Btu):	$ 481	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 624 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 6918 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	123	0.641
1/8	21	0.219
1/4	21	0.438
1/2	3	0.125
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		1.422
Penetrations		0.040
		1.462

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0065
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0086
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0101
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0120
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0138
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0156
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0174
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0192
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0210
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0228

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_T = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

16 Bend Fire West Station			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	1	Sunday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	7	Saturday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	1	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	24	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	2.41	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

16 Bend Fire West Station		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	347.25	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0051	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (194,872 Btu / 12,000 Btu/ton):	16	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (60,265,814 Btu / 1,000,000 Btu):	60	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (16 ton-hours * 1.00 kW/ton):	16	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	8,760	Hrs/year
Controls Unoccupied Hours Per Year	-	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (60 MMBtu / 82 %):	73	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (16 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (73 MMBtu x $10.00 per MMBtu):	$ 735	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $735 Btu + $0 Btu):	$ 736	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 624 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 6918 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	85	0.443
1/8	33	0.344
1/4	78	1.625
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		2.411
Penetrations		
		2.411

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_T = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

17a Bend Fire Training - Training Bldg.			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.62	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

17a Bend Fire Training - Training Bldg.	City of Bend, OR	
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	89.25	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (28,528 Btu / 12,000 Btu/ton):	2	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (3,212,225 Btu / 1,000,000 Btu):	3	MMBtu
Heating Season Energy from Weather Table-Unoccupied (3,560,136 Btu / 1,000,000 Btu):	4	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (2 ton-hours * 1.00 kW/ton):	2	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (3 MMBtu / 82 %):	4	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (4 MMBtu / 82 %):	4	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (2 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (4 MMBtu x $10.00 per MMBtu):	$ 39	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (4 MMBtu x $10.00 per MMBtu):	$ 43	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $39 Btu + $43 Btu):	$ 83	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	41	0.214
1/8	13	0.135
1/4	13	0.271
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.620
Penetrations		
		0.620

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_T = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, $cfm^2/(in^4*°F)$
C_W = Wind Coefficient, $cfm^2/(in^4* mph^2)$
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

17b Bend Fire Training - Warehouse			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	1		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.63	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

17b Bend Fire Training - Warehouse		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	90.57	in^2
Selected Basic Model Stack Coefficient C_S	0.01500	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0039	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (28,950 Btu / 12,000 Btu/ton):	2	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (3,259,733 Btu / 1,000,000 Btu):	3	MMBtu
Heating Season Energy from Weather Table-Unoccupied (3,612,790 Btu / 1,000,000 Btu):	4	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (2 ton-hours * 1.00 kW/ton):	2	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (3 MMBtu / 82 %):	4	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (4 MMBtu / 82 %):	4	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (2 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (4 MMBtu x $10.00 per MMBtu):	$ 40	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (4 MMBtu x $10.00 per MMBtu):	$ 44	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $40 Btu + $44 Btu):	$ 84	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	17	0.089
1/8	37	0.385
1/4	6	0.125
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.599
Penetrations		0.030
		0.629

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

18 Bend Fire North Station			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	1	Sunday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	7	Saturday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	1	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	24	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	1.94	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

18 Bend Fire North Station		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 2 ft^2):	279.27	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0051	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (156,722 Btu / 12,000 Btu/ton):	13	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (48,467,772 Btu / 1,000,000 Btu):	48	MMBtu
Heating Season Energy from Weather Table-Unoccupied (Btu / 1,000,000 Btu):	-	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (13 ton-hours * 1.00 kW/ton):	13	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	8,760	Hrs/year
Controls Unoccupied Hours Per Year	-	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (48 MMBtu / 82 %):	59	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (MMBtu / 82 %):	-	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (13 kWh/Yr x $0.07000 per kWh):	$ 1	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (59 MMBtu x $10.00 per MMBtu):	$ 591	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($1 kWh/yr + $0 kWh/yr + $591 Btu + $0 Btu):	$ 592	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 624 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 6918 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	119	0.620
1/8	21	0.219
1/4	49	1.021
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		1.859
Penetrations		0.080
		1.939

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR
Date of Report; 5/24/2018
Type of Report: Building Envelope Calculation
Weather Data City/State: Redmond Roberts Field, OR

Information provided by customer
Information provided by our company

Definitions:
ASHRAE Fundamentals 16.23-48 Applies $Q=A_L * \sqrt{(C_S * \Delta t + C_W * U^2)}$
$Q_I = Q*I$ = Infiltrated/Exfiltrated Air Flow Rate, Cfm
Q = Air Flow Rate, Cfm
A_L = Effective air leakage area, in^2
C_S = Stack coefficient, cfm^2/(in^4*°F)
C_W = Wind Coefficient, cfm^2/(in^4* mph^2)
Δt = Indoor - Outdoor temperature differential
U = Wind speed, mph
I = Infiltration/Exfiltration Factor

Inputs and Assumptions:

20 Wall Street Annex			City of Bend, OR
Temperature Which Heating Begins	70	°F	Used to Establish Maximum Outdoor Temperature for Heating System Operation
Temperature Which Cooling Begins	72	°F	Used to Establish Minimum Outdoor Temperature for Cooling System Operation
Day Operation Begins (Sunday is Day 1)	2	Monday	These Values Used to Establish Occupied Hours vs Unoccupied Hours
Day Operation Ends (Sunday is Day 1)	6	Friday	
Hour Operation Begins (Hour 1 is Midnight to 1 AM)	7	Hour	
Hour Operation Ends (Hour 1 is Midnight to 1 AM)	17	Hour	
Directional Wind Infiltration/Exfiltration	70%	per cent	
Occupied Cooling Temperature Setpoint	72	°F	Used for Occupied Cooling Enthalpy Calculations
Occupied Heating Temperature Setpoint	70	°F	Used for Occupied Heating ΔT Calculations
Unoccupied Cooling Indoor Temperature Setpoint	85	°F	Used for Unoccupied Cooling Enthalpy Calculations
Unoccupied Heating Indoor Temperature Setpoint	55	°F	Used for Unoccupied Heating ΔT Calculations
Cooling Plant Efficiency	1	kW/ton	
Heating Plant Efficiency	82%	per cent	
Energy Cost $/kWh	$ 0.07000	per kWh	Electric
Fuel Energy Cost $/MMBtu	$ 10.00000	per MMBtu	Natural Gas
# of Floors in Building	2		
Local Shelter Class (see Table 5 below)	4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away	
A_L = Effective Air Leakage Area from Survey, ft^2	0.72	ft^2	
Existing Insulation Area from Survey, ft^2		ft^2	
Existing U-Value			
Proposed U-Value			

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Calculations:

20 Wall Street Annex		City of Bend, OR
Air Leakage from Survey, in^2 = (144 * 1 ft^2):	103.5	in^2
Selected Basic Model Stack Coefficient C_S	0.02990	cfm^2/(in^4 x °F)
Selected Basic Model Wind Coefficient C_W	0.0051	cfm^2/(in^4*mph^2)
Cooling Season Energy from Weather Table-Occupied Cooling ton-hours (41,743 Btu / 12,000 Btu/ton):	3	ton-hours
Cooling Season Energy from Weather Table-Unoccupied Cooling ton-hours (Btu / 12,000 Btu/ton):	-	ton-hours
Heating Season Energy from Weather Table-Occupied (4,892,897 Btu / 1,000,000 Btu):	5	MMBtu
Heating Season Energy from Weather Table-Unoccupied (5,461,191 Btu / 1,000,000 Btu):	5	MMBtu
ECM Energy and Cost Savings:		
Cooling Season kWh Energy Savings-Occupied (3 ton-hours * 1.00 kW/ton):	3	kWh/yr
Cooling Seasons kWh Energy Savings-Unoccupied (ton-hours * 1.00 kW/ton):	-	kWh/yr
Controls Occupied Hours Per Year	2,893	Hrs/year
Controls Unoccupied Hours Per Year	5,867	Hrs/year
Fuel Energy Savings-Heating Season-Occupied (5 MMBtu / 82 %):	6	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (5 MMBtu / 82 %):	7	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (3 kWh/Yr x $0.07000 per kWh):	$ 0	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (6 MMBtu x $10.00 per MMBtu):	$ 60	per year
Fuel Energy Cost Savings-Heating Season-Unoccupied (7 MMBtu x $10.00 per MMBtu):	$ 67	per year
Total Savings Cost ($0 kWh/yr + $0 kWh/yr + $60 Btu + $67 Btu):	$ 127	per year
Building Insulation		
Cooling Season kWh Energy Savings-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 353 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Cooling Season kWh Energy Savings-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 271 CDD / 12,000 Btu/ton) * (1.00 kW/ton):	0	kWh/yr
Fuel Energy Savings-Heating Season-Occupied (ft^2 x (. U-Value - . U-Value) * 24 * 1814 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Fuel Energy Savings-Heating Season-Unoccupied (ft^2 x (. U-Value - . U-Value) * 24 * 5104 HDD / 1,000,000 Btu) / (82 %):	0	MMBtu
Cooling Season kWh Energy Cost Savings-Occupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Cooling Season kWh Energy Cost Savings-Unoccupied (kWh/Yr x $0.07000 per kWh):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Fuel Energy Cost Savings-Heating Season-Occupied (MMBtu x $10.00 per MMBtu):	$ -	per year
Total Savings Cost ($0 kWh/yr + $0 KWh/yr + $0 Btu + $0 Btu):	$ -	per year

Crack area Calculation		
Width	LF	ft^2
1/16	102	0.531
1/8	12	0.125
1/4	3	0.063
1/2		0.000
3/4		0.000
1		0.000
1 1/2		0.000
2		0.000
		0.719
Penetrations		
		0.719

Constants and calculated values used in calculations:

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Occupied Indoor Enthalpy at 72° F and 60% RH	28.295	Btu/lb (air)
Unoccupied Indoor Enthalpy at 85° F and 60% RH	37.535	Btu/lb (air)
ASHRAE Sensible Heat Coefficient	1.08	
ASHRAE Enthalpy Coefficient	4.5	
Btu/ton	12,000	Btu/ton
Btu	1000000	Btu

These calculations are based on ASHRAE Fundamentals 2009, chapter 16, page 16.23, formula number 48 as shown below.

Basic Model. The following calculations are based on the Sherman and Grimsrud (1980) model, which uses the effective air leakage area at 0.016 in. of water. This leakage area can be obtained from a whole-building pressurization test. Using effective air leakage area, the airflow rate from infiltration is calculated according to

$$Q = A_L\sqrt{C_s\Delta t + C_w U^2} \qquad (48)$$

where

Q = airflow rate, cfm
A_L = effective air leakage area, in²
C_s = stack coefficient, cfm²/(in⁴·°F)
Δt = average indoor-outdoor temperature difference for time interval of calculation, °F
C_w = wind coefficient, cfm²/(in⁴·mph²)
U = average wind speed measured at local weather station for time interval of calculation, mph

Table 4 presents values of C_s for one-, two-, and three-story houses. The value of wind coefficient C_w depends on the local shelter class of the building (described in Table 5) and the building height. Table 6 presents values of C_w for one-, two-, and three-story houses in shelter classes 1 through 5. In calculating values in Tables 4 and 6, the following assumptions were made regarding input to the basic model:

ASHRAE TABLE 16.23, Table 4 Basic Model Stack Coefficient C_S:

Story	Stack Coefficient C_S
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE TABLE 16.23, Table 5 Local Shelter Class:

1 No Obstructions or local shielding
2 Typical shelter for an isolated rural house
3 Typical shelter used by other buildings across the street from building under study
4 Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5 Typical shelter produced by building or other structures immediately adjacent

ASHRAE TABLE 16.23, Table 6 Basic Model Wind Coefficient C_W:

# of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5	Values Used
1	0.0119	0.0092	0.0065	0.0039	0.0012	0.0039
2	0.0157	0.0121	0.0086	0.0051	0.0016	0.0051
3	0.0184	0.0143	0.0101	0.0060	0.0018	0.0060
4	0.0218	0.0170	0.0120	0.0071	0.0021	0.0071
5	0.0251	0.0195	0.0138	0.0082	0.0024	0.0082
6	0.0283	0.0221	0.0156	0.0092	0.0027	0.0092
7	0.0316	0.0246	0.0174	0.0103	0.0030	0.0103
8	0.0348	0.0272	0.0192	0.0113	0.0033	0.0113
9	0.0381	0.0297	0.0210	0.0124	0.0036	0.0124
10	0.0413	0.0323	0.0228	0.0134	0.0039	0.0134

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Contact: Pete Boland
Phone #: (720) 788-9474
Email: pboland@irexcorp.com

Project Name: City of Bend, OR

Indoor Cooling Occupied Setpoint Calculations				
Dry Bulb Temp	DB	72	Deg F	
Relative Humidity	RH	60	%	
Humidity Ratio	W	0.0101	lb v/lb dry air	72.0000
		70.54	grains/lb dry air	
Enthalpy	h	28.295	BTH/lb dry air	
Dew Point Temp	DP	57.43	Deg F	
Saturation Pressure	PW	0.2333		
Saturation Pressure	PWS	0.3888		
	TDBR	531.67	Rankin	

* All calculations assume TDB and TWB above 32 Deg F

Indoor Cooling Unoccupied Setpoint Calculations			
Dry Bulb Temp	DB	85	Deg F
Relative Humidity	RH	60	%
Humidity Ratio	W	0.0156	lb v/lb dry air
		109.16	grains/lb dry air
Enthalpy	h	37.535	BTH/lb dry air
Dew Point Temp	DP	69.59	Deg F
Saturation Pressure	PW	0.3579	
Saturation Pressure	PWS	0.5965	
	TDBR	544.67	Rankin

* All calculations assume TDB and TWB above 32 Deg F

Ameresco, Inc. **May 24, 2018**
9700 SW Capital Highway, Suite 110
Portland, OR 97239

Attention: **Jason Carver, PE**
Project Development Engineer
Cell: (503) 250-0711, Office (503) 290-1297

Subject: **I-STAR™ Building Envelope Assessment Report**
City of Bend, OR

Dear Mr. Carver,

In accordance with your request, we present for your review the proposed Scope of Work for the Building Envelope Portion of the City of Bend, OR. The Work Areas and Scope of Work are as follows:

1. Building Areas included in the Energy Assessment Survey.

No. 01: 1 City Hall
No. 02: 3a Franklin Annex
No. 03: 3b South Sister
No. 04: 3c Middle Sister
No. 05: 3d North Sister
No. 06: 7 Streets and Shops at Pilot Butte Campus
No. 07: 8a Boyd Acres Bldg. A
No. 08: 8b Boyd Acres Bldg. B
No. 09: 8c Boyd Acres Bldg. C
No. 10: 8d Boyd Acres Bldg. D
No. 11: 9a Bend Municipal Airport
No. 12: 10 Bend Police Department
No. 13: 13 Bend Fire Department Administration
No. 14: 14 Bend Fire East Station
No. 15: 15 Bend Fire South Station
No. 16: 16 Bend Fire West Station
No. 17: 17a Bend Fire Training - Training
No. 18: 17b Bend Fire Training - Warehouse
No. 19: 18 Bend Fire North Station
No. 20: 20 Wall Street Annex

2. Scope of Work

Weather-Stripping

After the weather-stripping is installed, the doors will be tested for proper operation. The weather-stripping/sweep should be inspected annually. Door weather-stripping material is referred to as DF, which references DF Commercial/ Industrial weather-stripping. All weather-stripping materials shall have a mill finish, unless otherwise specified.

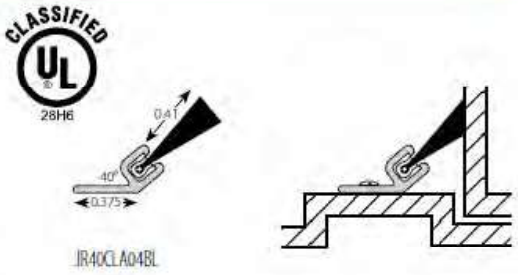
Sealeze Nylon Therm-L-Brush Weatherseal

1,500,000 cycle testing ANSI 156.4, 1980

www.sealeze.com

Jamb Seals

Product Code	Brush Length (inches)	Holder Length (inches)	Holder Angle	Finish Color	Stock (feet)
JR40CLA04BL	0.41	0.375	40°	Clear Anodized	7, 8, 9,10
J135CLA04BL	0.41	0.450	35°	Clear Anodized	7, 10
J135DUR04BL	0.41	0.450	35°	Duranodic	7, 10
J135GLD04BL	0.41	0.450	35°	Gold Anodized	7
J140CLA04BL	0.41	0.750	40°	Clear Anodized	7, 8, 10
J140DUR04BL	0.41	0.750	40°	Duranodic	7, 10



Astragals

Astragals are the weather-stripping material used to cover the gap between two doors.

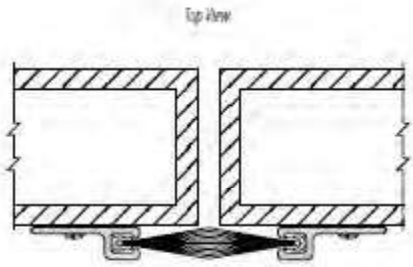
Sealeze Astra-Sweep Nylon Therm-L- Brush Astragal Seal

1,500,000 cycle testing ANSI 156.4, 1980

www.sealeze.com

Astragal Seal Kits

Kit Product Code	Brush Length (inches)	Door Height (feet)
A180CLA04BL14	0.41	7
A180DUR04BL14	0.41	7
A180GLD04BL14	0.41	7
C380CLA06BL14	0.59	7
C380DUR06BL14	0.59	7
C380GLD06BL14	0.59	7
A180CLA04BL16	0.41	8
A180DUR04BL16	0.41	8
A180GLD04BL16	0.41	8
C380CLA06BL16	0.59	8
C380DUR06BL16	0.59	8
C380GLD06BL16	0.59	8



Door Sweeps

The reference to DS is for the door sweep material, which is also a Commercial/ Industrial product. All weather-stripping materials shall have a mill finish, unless otherwise specified.

Sealeze Nylon Therm-L- Brush Door Sweep

1,500,000 cycle testing ANSI 156.4, 1980

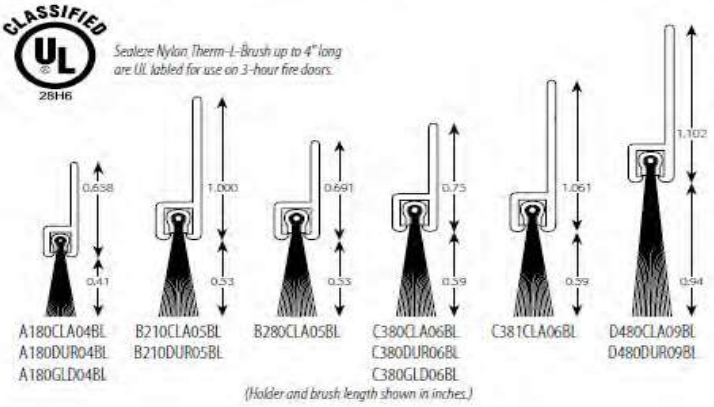
www.sealeze.com

Door Sweeps

Brush weatherseals are ideal for sealing the irregular surfaces of thresholds at door bottoms, conforming to the surface while not impairing the door's movements. Select the right brush and holder, based on the size of the gap to be sealed and the desired appearance of the holder.

CLASSIFIED UL 28H6

Sealeze Nylon Therm-L-Brush up to 4" long are UL labled for use on 3-hour fire doors.



Product Code (inches)	Brush Length (inches)	Holder Length (inches)	Stock Length (feet)
A180CLA04BL	0.41	0.658	7, 8, 10
A180DUR04BL	0.41	0.658	7, 10
A180GLD04BL	0.41	0.658	12
B210CLA05BL	0.53	1.000	3, 7, 10
B210DUR05BL	0.53	1.000	10
B280CLA05BL	0.53	0.691	10
C380CLA06BL	0.59	0.750	3, 7, 10
C380DUR06BL	0.59	0.750	7,10
C380GLD06BL	0.59	0.750	3, 8
C381CLA06BL	0.59	1.061	3, 7, 10
D480CLA09BL	0.94	1.102	3, 7, 8, 9, 10, 12
D480DUR09BL	0.94	1.102	8, 10

Weather-Stripping - Window Seals

Windows are sealed, along the perimeter substrate intersection, with architectural sealant. Most window leaks are the result of mechanical seals, made of textiles or foam, installed by the manufacturer and integral in the construction of the window. These seals have been worn or have collapsed and are no longer functioning as intended. When identified as no longer functioning, in our assessment, they are replaced with similar fabric or foam seals using the original tracks or groves when possible. We do our best to replace these with original equipment replacement products. Due to the nature of window manufacturing these are not always available but we purchase and install suitable replacement products from manufacturers who supply product of similar type, value and function.

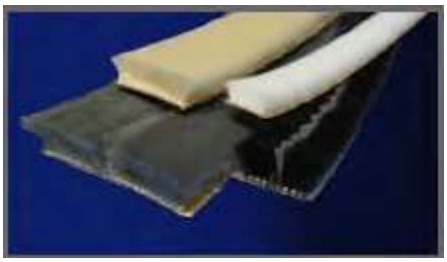
Amesbury Sealing Products are original equipment products supplied to many window manufacturers. The variety of seals and components usually satisfy any need for window seal replacement or retrofit issues.

www.amesbury.com

Amesbury Surface Mount Foam-Tite® Foam Seals-Photo not available



Amesbury Pocket Mount Foam-Tite® Foam Seals



Amesbury Surface Mount Pile Seals

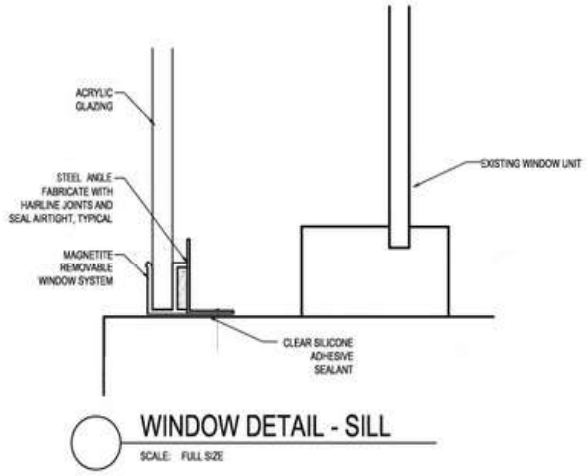
Magnetite Window System

In the same way a refrigerator door seal magnetically seals in the cold, these panels will provide an air barrier and drastically reduce infiltration/ex-filtration in the buildings. The Magnetite® panels are custom fabricated to fit all of the openings in the proposed scope.

In the Magnetite® detail below the existing window unit represents the existing window opening systems that are installed in the buildings included in our scope.

www.magnetite.com

Magnetite® Window System Detail





SEALANTS

Polyurethane Sealants:

We will be installing polyurethane sealant in all wall cracks, concrete cracks, mortar cracks, control joints, and exterior applications unless otherwise specified.

Polyurethanes are usually considered better than silicones for most common exterior building applications. We will be installing a polyurethane sealant that adheres to most common construction materials without primers, offers long service life under severe climate conditions, excellent shear resistance, exceptional elasticity, resists sagging and is non-toxic when cured. Polyurethane sealant becomes tack-free within eight hours and cures fully in about a week. It can be painted, but the paint will not expand or contract with the sealant and may crack or peel.

Type: One-component, ultra-low moisture curing, fast skinning, commercial grade sealant;

Compliance: Sealant shall meet or exceed requirements of these standards:

1. ASTM C920, Type S, Grade NS, Class 35, Use NT, M, A, and O.

DAP Premium Polyurethane Concrete & Masonry Sealant #18814

White Lightning Storm Blaster

http://www.sherwin-williams.com

Loxon S1

http://www.sherwin-williams.com

Silicone Sealants:

We will be installing silicone sealant for all silicone weather-strip application, for capping the exterior edges of any EPDM glazing gaskets, and for sealing joints between non-porous surfaces such as metal and glass unless otherwise specified.

Although silicones are often considered extremely durable, the bonding characteristics of most silicones are not as good as polyurethanes. We will install silicone sealant for adhering weather-strip when specified, for capping the exterior edges of any EPDM glazing gaskets, and for sealing joints between non-porous surfaces such as metal and glass.
Type: One-component, ultra-low modulus, neutral-cure silicone rubber sealant;

Compliance: Sealant shall meet or exceed requirements of these standards:

2. ASTM C920, Type S, Grade NS, Class 100/50, Use T, NT, G, M, A, and O.
3. GSA CID A-A-272A.
4. GSA CID A-A-1556.

Dow Corning 790 Silicone Building Sealant

http://www.dowcorning.com

GE SCS200 SilPruf Silicone Sealant and Adhesive

http://www.siliconeforbuilding.com

950ASiliconized Acrylic Latex Caulk

http://www.sherwin-williams.com

Polyurethane Spray Foam Sealant:

Dow FROTH-PAK™ Foam Sealant

http://building.dow.com

1. 1 City Hall

Quantity	Envelope Improvements
0.01	Sq/ft - Penetrations sealed with polyurethane sealant
37	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
8	Sets of weather-strip DF
8	Door sweeps

Quantity	Weatherization/Preventative Maintenance
4	Sets of weather-strip DF
4	Door sweeps

2. 3a Franklin Annex

Quantity	Envelope Improvements
0.01	Sq/ft - Penetrations sealed with polyurethane sealant
31	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
2	Sets of weather-strip DF
2	Door sweeps
1,813	Sq/ft - Attic insulation up to R-38 (alternate scope)

Quantity	Weatherization/Preventative Maintenance
17	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
3	Sets of weather-strip DF
3	Door sweeps

3. 3b South Sister

Quantity	Envelope Improvements
43	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
2	Sets of weather-strip DF
2	Door sweeps

Quantity	Weatherization/Preventative Maintenance
1	Sets of weather-strip DF
1	Door sweeps

4. 3c Middle Sister

Quantity	Envelope Improvements
1	Sets of weather-strip DF
1	Door sweeps
15	Ea - Magnetite Window System in window openings (alternate scope)

5. 3d North Sister

Quantity	Envelope Improvements
2	Sets of weather-strip DF
2	Door sweeps

6. 7 Streets and Shops at Pilot Butte Campus

Quantity	Envelope Improvements
0.12	Sq/ft - Penetrations sealed with polyurethane sealant
134	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
16	Sets of weather-strip DF
16	Door sweeps
1	Astragals (weather-strip for center of double door)
38	Sets of weather-strip DF (OH Door)
38	Door sweeps (OH Door)
6	Ea - Magnetite Window System in window openings (alternate scope)

Quantity	Weatherization/Preventative Maintenance
2	Sets of weather-strip DF
2	Door sweeps
1	Astragals (weather-strip for center of double door)

7. 8a Boyd Acres Bldg A

Quantity	Envelope Improvements
99	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
6	Sets of weather-strip DF
6	Door sweeps

8. 8b Boyd Acres Bldg B

Quantity	Envelope Improvements
0.01	Sq/ft - Penetrations sealed with polyurethane sealant
10	Sets of weather-strip DF
10	Door sweeps
12	Door sweeps (OH Door)

9. 8C Boyd Acres Bldg C

Quantity	Envelope Improvements
8	Sets of weather-strip DF
8	Door sweeps
1	Astragals (weather-strip for center of double door)
2	Door sweeps (OH Door)

10. 8d Boyd Acres Bldg D

Quantity	Envelope Improvements
0.06	Sq/ft - Penetrations sealed with polyurethane sealant
8	Sets of weather-strip DF
8	Door sweeps
16	Sets of weather-strip DF (OH Door)
16	Door sweeps (OH Door)

11. 9a Bend Municipal Airport

Quantity	Envelope Improvements
10	Sets of weather-strip DF
10	Door sweeps
3	Astragals (weather-strip for center of double door)

12. 10 Bend Police Department

Quantity	Envelope Improvements
0.01	Sq/ft - Penetrations sealed with polyurethane sealant
13	Sets of weather-strip DF
13	Door sweeps
3	Astragals (weather-strip for center of double door)
2	Sets of weather-strip DF (OH Door)
2	Door sweeps (OH Door)

Quantity	Weatherization/Preventative Maintenance
4	Door sweeps

13. 13 Bend Fire Department Administration

Quantity	Envelope Improvements
0.01	Sq/ft - Penetrations sealed with polyurethane sealant
6	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
10	Sets of weather-strip DF
10	Door sweeps
1	Astragals (weather-strip for center of double door)

14. 14 Bend Fire East Station

Quantity	Envelope Improvements
0.05	Sq/ft - Penetrations sealed with polyurethane sealant
6	Sets of weather-strip DF
6	Door sweeps

15. 15 Bend Fire South Station

Quantity	Envelope Improvements
0.04	Sq/ft - Penetrations sealed with polyurethane sealant
7	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
8	Sets of weather-strip DF
8	Door sweeps

16. 16 Bend Fire West Station

Quantity	Envelope Improvements
6	Sets of weather-strip DF
6	Door sweeps
2	Sets of weather-strip DF (OH Door)
2	Door sweeps (OH Door)

17. 17a Bend Fire Training - Training Bldg

Quantity	Envelope Improvements
2	Sets of weather-strip DF
7	Door sweeps
2	Astragals (weather-strip for center of double door)

Quantity	Weatherization/Preventative Maintenance
1	Door sweeps

18. 17b Bend Fire Training – Warehouse Bldg.

Quantity	Envelope Improvements
0.03	Sq/ft - Penetrations sealed with polyurethane sealant
3	Sets of weather-strip DF
3	Door sweeps
1	Astragals (weather-strip for center of double door)

19. 18 Bend Fire North Station

Quantity	Envelope Improvements
0.08	Sq/ft - Penetrations sealed with polyurethane sealant
7	Sets of weather-strip DF
7	Door sweeps
1	Astragals (weather-strip for center of double door)
2	Sets of weather-strip DF (OH Door)
1	Door sweeps (OH Door)

20. 20 Wall Street Annex

Quantity	Envelope Improvements
6	Sets of weather-strip DF
5	Door sweeps
1	Astragals (weather-strip for center of double door)

City of Bend, OR – Overall Scope of Work

Quantity	Envelope Improvements
0.44	Sq/ft - Penetrations sealed with polyurethane sealant
356.17	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
120	Sets of weather-strip DF
152	Door sweeps
14	Astragals (weather-strip for center of double door)
74	Sets of weather-strip DF (OH Door)
59	Door sweeps (OH Door)
21	Ea - Magnetite Window System in window openings (alternate scope)
1,813	Sq/ft - Attic insulation up to R-38 (alternate scope)

Quantity	Weatherization/Preventative Maintenance
17	LF - Wall cracks, window/door frames and vents sealed with polyurethane sealant
10	Sets of weather-strip DF
15	Door sweeps
1	Astragals (weather-strip for center of double door)

3. Exceptions & Clarifications.

1. We do not include the removal of Asbestos Containing Materials, Lead Containing Materials or any other hazardous/ suspect materials.
2. We do not include the removal of Caulking, Coatings, Mastics, Flashings, Insulation or any other materials unless clearly specified.
3. We do not include the repair or installation of Brick or other Masonry Materials or Systems.
4. We do not include the repair or installation of Window or Door Systems, unless clearly identified.
5. We do not include the repair or installation of any Structural Systems.


I-STAR™
Innovation – Savings Through
Assessment and Remediation.



Appendix E – Street Lighting Detailed Audit

Acorn #1



Acorn #2



Ceiling1



Ceiling 2



Farm Light



Wallpack



Pendant 1



Pendant 2



Pendant 3



Pendant 4



Pendant 5



Pendant 6



Pendant 7



Round Shoebox



Lantern



Cobrahead



Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
1	COB	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	kWh Rate	$0.058		4167	4167	916.74	$53.54
2	COB	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	12	165	55	kWh Rate	$0.058		4167	4167	5500.44	$321.23
3	COB	ACORN 1 0HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	150	85	kWh Rate	$0.058		4167	4167	541.71	$31.64
4	COB	*ACORN 1 150HPS*	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	kWh Rate	$0.058		4167	4167	916.74	$53.54
5	COB	*ACORN 1 150HPS*	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	18	165	55	kWh Rate	$0.058		4167	4167	8250.66	$481.84
6	COB	*ACORN 1 150HPS*	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	kWh Rate	$0.058		4167	4167	916.74	$53.54
7	COB	*ACORN 1 150HPS*	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	92	165	55	kWh Rate	$0.058		4167	4167	42170.04	$2,462.73
8	COB	*ACORN 1 150HPS*	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	4	165	55	kWh Rate	$0.058		4167	4167	1833.48	$107.08
9	COB	*ACORN 1 200HPS*	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	225	85	kWh Rate	$0.058		4167	4167	1166.76	$68.14
10	COB	*ACORN 2 250HPS*	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
11	COB	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	kWh Rate	$0.058		4167	4167	250.02	$14.60
12	COB	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	kWh Rate	$0.058		4167	4167	525.042	$30.66
13	COB	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
14	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	295	99	kWh Rate	$0.058		4167	4167	2450.196	$143.09
15	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
16	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
17	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
18	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
19	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
20	COB	COBRA 70LED	No Fixture Change	1	70	70	kWh Rate	$0.058		4167	4167	0	$0.00
21	COB	COBRA 70LED	No Fixture Change	1	70	70	kWh Rate	$0.058		4167	4167	0	$0.00
22	COB	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	kWh Rate	$0.058		4167	4167	391.698	$22.88
23	COB	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	kWh Rate	$0.058		4167	4167	525.042	$30.66
24	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
25	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
26	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
27	COB	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
28	COB	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	kWh Rate	$0.058		4167	4167	1245.933	$72.76
29	COB	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	kWh Rate	$0.058		4167	4167	1245.933	$72.76
30	COB	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	kWh Rate	$0.058		4167	4167	1245.933	$72.76
31	COB	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	kWh Rate	$0.058		4167	4167	558.378	$32.61
32	COB	PENDANT 1 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
33	COB	PENDANT 1 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	23	295	85	kWh Rate	$0.058		4167	4167	20126.61	$1,175.39
34	COB	PENDANT 1 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	295	85	kWh Rate	$0.058		4167	4167	1750.14	$102.21
35	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	5	295	85	kWh Rate	$0.058		4167	4167	4375.35	$255.52
36	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
37	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	5	295	85	kWh Rate	$0.058		4167	4167	4375.35	$255.52
38	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	295	85	kWh Rate	$0.058		4167	4167	1750.14	$102.21
39	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	3	295	85	kWh Rate	$0.058		4167	4167	2625.21	$153.31
40	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
41	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
42	COB	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
43	COB	PENDANT 2 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	1	165	55	kWh Rate	$0.058		4167	4167	458.37	$26.77
44	COB	PENDANT 3 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
45	COB	PENDANT 3 0HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	4	295	85	kWh Rate	$0.058		4167	4167	3500.28	$204.42
46	COB	PENDANT 3 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	20	165	85	kWh Rate	$0.058		4167	4167	6667.2	$389.36
47	COB	PENDANT 6 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	3	295	85	kWh Rate	$0.058		4167	4167	2625.21	$153.31
48	COB	PENDANT 6 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	kWh Rate	$0.058		4167	4167	875.07	$51.10
49	COB	PENDANT 7 150LED	No Fixture Change	1	150	150	kWh Rate	$0.058		4167	4167	0	$0.00
50	COB	ROUND SHOEBOX 0HP	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	10	295	99	kWh Rate	$0.058		4167	4167	8167.32	$476.97
51	COB	ROUND SHOEBOX 0HP	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
52	COB	ROUND SHOEBOX 0HP	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	kWh Rate	$0.058		4167	4167	816.732	$47.70
53	COB	WALLPACK 100HPS	Cooper CrosstourMaxx LED Wallpack, 58 watts, 6038 + Photocell	6	115	58	kWh Rate	$0.058		4167	4167	1425.114	$83.23
54	COB	WALLPACK 250HPS	Cooper CrosstourMaxx LED Wallpack, 102 watts, 12539 + Photocell	1	295	102	kWh Rate	$0.058		4167	4167	804.231	$46.97

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
55	HOA	PENDANT 2 250HPS	No Fixture Change	13	295	295				4167	4167	0	$0.00
56	HOA	PENDANT 5 150HPS	No Fixture Change	15	165	165				4167	4167	0	$0.00
57	HOA	PENDANT 5 150HPS	No Fixture Change	1	165	165				4167	4167	0	$0.00
58	HOA	PENDANT 5 150HPS	No Fixture Change	15	165	165				4167	4167	0	$0.00
59	HOA	PENDANT 5 150HPS	No Fixture Change	1	165	165				4167	4167	0	$0.00
60	HOA	PENDANT 5 150HPS	No Fixture Change	3	165	165				4167	4167	0	$0.00
61	HOA	PENDANT 5 150HPS	No Fixture Change	9	165	165				4167	4167	0	$0.00
62	HOA	PENDANT 5 150HPS	No Fixture Change	8	165	165				4167	4167	0	$0.00
63	ODOT	CEILING 1 100HPS	No Fixture Change	1	115	115				4167	4167	0	$0.00
64	ODOT	CEILING 1 0HPS	No Fixture Change	46	115	115				4167	4167	0	$0.00
65	ODOT	CEILING 2 50HPS	No Fixture Change	9	65	65				4167	4167	0	$0.00
66	ODOT	CEILING 2 100HPS	No Fixture Change	13	115	115				4167	4167	0	$0.00
67	ODOT	WALLPACK 50HPS	No Fixture Change	3	65	65				4167	4167	0	$0.00
68	ODOT	WALLPACK 0HPS	No Fixture Change	1	65	65				4167	4167	0	$0.00
69	PAR	ACORN 1 150HPS	No Fixture Change	10	165	165				4167	4167	0	$0.00
70	PAR	ACORN 1 150HPS	No Fixture Change	4	165	165				4167	4167	0	$0.00
71	PAR	ACORN 1 150HPS	No Fixture Change	11	165	165				4167	4167	0	$0.00
72	PAR	ACORN 1 250HPS	No Fixture Change	2	295	295				4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
73	PAR	ACORN 2 150HPS	No Fixture Change	12	165	165				4167	4167	0	$0.00
74	PAR	ACORN 2 150HPS	No Fixture Change	1	165	165				4167	4167	0	$0.00
75	PAR	ACORN 2 150HPS	No Fixture Change	1	165	165				4167	4167	0	$0.00
76	PAR	ACORN 2 175HPS	No Fixture Change	1	205	205				4167	4167	0	$0.00
77	PAR	PENDANT 4 150LED	No Fixture Change	14	150	150				4167	4167	0	$0.00
78	PAR	PENDANT 4 150LED	No Fixture Change	1	150	150				4167	4167	0	$0.00
79	PPL	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	Cost Per		$4.05	4167	4167	916.74	$97.20
80	PPL	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	6	165	55	Cost Per		$4.05	4167	4167	2750.22	$291.60
81	PPL	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	Cost Per		$4.05	4167	4167	916.74	$97.20
82	PPL	ACORN 1 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	2	165	55	Cost Per		$4.05	4167	4167	916.74	$97.20
83	PPL	ACORN 1 200HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	225	85	Cost Per		$7.33	4167	4167	583.38	$87.96
84	PPL	ACORN 1 175HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	205	85	Cost Per		$4.05	4167	4167	1000.08	$97.20
85	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
86	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
87	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
88	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
89	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
90	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
91	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
92	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
93	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
94	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
95	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	12	115	36	Cost Per		$2.80	4167	4167	3950.316	$403.20
96	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
97	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	4	165	71	Cost Per		$4.05	4167	4167	1566.792	$194.40
98	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
99	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
100	PPL	COBRA 48LED	No Fixture Change	2	40	40	Cost Per			4167	4167	0	$0.00
101	PPL	COBRA 50LED	No Fixture Change	2	50	50	Cost Per			4167	4167	0	$0.00
102	PPL	COBRA 50LED	No Fixture Change	2	50	50	Cost Per			4167	4167	0	$0.00
103	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
104	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
105	PPL	COBRA 50LED	No Fixture Change	4	50	50	Cost Per			4167	4167	0	$0.00
106	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
107	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
108	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
109	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
110	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	3	85	25	Cost Per		$0.93	4167	4167	750.06	$33.48
111	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
112	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
113	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	8	85	25	Cost Per		$0.93	4167	4167	2000.16	$89.28
114	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
115	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
116	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
117	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
118	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
119	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
120	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	5	85	25	Cost Per		$0.93	4167	4167	1250.1	$55.80
121	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
122	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
123	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
124	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
125	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
126	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
127	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	7	85	25	Cost Per		$0.93	4167	4167	1750.14	$78.12
128	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
129	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	7	85	25	Cost Per		$0.93	4167	4167	1750.14	$78.12
130	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
131	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
132	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
133	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
134	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
135	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
136	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
137	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
138	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	22	115	36	Cost Per		$2.80	4167	4167	7242.246	$739.20
139	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
140	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
141	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	5	115	36	Cost Per		$2.80	4167	4167	1645.965	$168.00
142	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
143	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	25	115	36	Cost Per		$2.80	4167	4167	8229.825	$840.00
144	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
145	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
146	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
147	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
148	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
149	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
150	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
151	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
152	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
153	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	19	115	36	Cost Per		$2.80	4167	4167	6254.667	$638.40
154	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
155	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	18	115	36	Cost Per		$2.80	4167	4167	5925.474	$604.80
156	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
157	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
158	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
159	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	33	115	36	Cost Per		$2.80	4167	4167	10863.37	$1,108.80
160	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
161	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
162	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
163	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
164	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
165	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
166	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
167	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
168	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	134	115	36	Cost Per		$2.80	4167	4167	44111.86	$4,502.40
169	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	5	115	36	Cost Per		$2.80	4167	4167	1645.965	$168.00
170	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
171	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
172	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
173	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
174	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
175	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
176	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
177	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
178	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
179	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
180	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
181	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
182	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
183	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
184	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
185	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
186	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
187	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
188	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
189	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
190	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
191	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
192	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
193	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
194	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
195	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
196	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
197	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
198	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
199	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
200	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
201	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
202	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
203	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
204	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
205	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
206	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
207	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	38	115	36	Cost Per		$2.80	4167	4167	12509.33	$1,276.80
208	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
209	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
210	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	9	115	36	Cost Per		$2.80	4167	4167	2962.737	$302.40
211	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
212	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
213	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
214	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	5	115	36	Cost Per		$2.80	4167	4167	1645.965	$168.00
215	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	64	115	36	Cost Per		$2.80	4167	4167	21068.35	$2,150.40
216	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
217	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
218	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
219	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
220	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
221	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
222	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	9	115	36	Cost Per		$2.80	4167	4167	2962.737	$302.40
223	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
224	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
225	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
226	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	27	115	36	Cost Per		$2.80	4167	4167	8888.211	$907.20
227	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
228	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
229	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
230	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
231	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
232	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	18	115	36	Cost Per		$2.80	4167	4167	5925.474	$604.80
233	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
234	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
235	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
236	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
237	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	45	115	36	Cost Per		$2.80	4167	4167	14813.69	$1,512.00
238	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	10	115	36	Cost Per		$2.80	4167	4167	3291.93	$336.00
239	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
240	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
241	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
242	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
243	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
244	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	67	115	36	Cost Per		$2.80	4167	4167	22055.93	$2,251.20
245	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
246	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
247	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
248	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
249	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
250	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
251	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
252	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
253	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
254	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
255	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
256	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
257	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
258	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
259	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
260	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
261	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
262	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
263	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	55	115	36	Cost Per		$2.80	4167	4167	18105.62	$1,848.00
264	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	40	115	36	Cost Per		$2.80	4167	4167	13167.72	$1,344.00
265	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
266	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
267	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
268	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
269	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
270	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
271	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
272	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
273	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	13	115	36	Cost Per		$2.80	4167	4167	4279.509	$436.80
274	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
275	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
276	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
277	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	89	115	36	Cost Per		$2.80	4167	4167	29298.18	$2,990.40
278	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	47	115	36	Cost Per		$2.80	4167	4167	15472.07	$1,579.20
279	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
280	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
281	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
282	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
283	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
284	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
285	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
286	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
287	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
288	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
289	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	8	115	36	Cost Per		$2.80	4167	4167	2633.544	$268.80
290	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
291	PPL	*COBRA 100LED*	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
292	PPL	*COBRA 100LED*	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
293	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
294	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
295	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
296	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
297	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
298	PPL	*COBRA 100HPS*	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
299	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
300	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
301	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
302	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
303	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
304	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
305	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
306	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	3	165	71	Cost Per		$4.05	4167	4167	1175.094	$145.80

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
307	PPL	COBRA 150LED	No Fixture Change	1	150	150	Cost Per			4167	4167	0	$0.00
308	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
309	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
310	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
311	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
312	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
313	PPL	COBRA 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
314	PPL	COBRA 180HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	210	71	Cost Per		$2.80	4167	4167	579.213	$33.60
315	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
316	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
317	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
318	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
319	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
320	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
321	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
322	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
323	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	5	225	99	Cost Per		$7.33	4167	4167	2625.21	$439.80
324	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
325	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
326	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
327	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
328	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
329	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
330	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	225	99	Cost Per		$7.33	4167	4167	2100.168	$351.84
331	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
332	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	5	225	99	Cost Per		$7.33	4167	4167	2625.21	$439.80
333	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
334	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
335	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
336	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	13	225	99	Cost Per		$7.33	4167	4167	6825.546	$1,143.48
337	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
338	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	7	225	99	Cost Per		$7.33	4167	4167	3675.294	$615.72
339	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
340	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
341	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
342	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
343	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
344	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	12	225	99	Cost Per		$7.33	4167	4167	6300.504	$1,055.52
345	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
346	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
347	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
348	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
349	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
350	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
351	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
352	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
353	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
354	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	62	225	99	Cost Per		$7.33	4167	4167	32552.6	$5,453.52
355	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
356	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
357	PPL	COBRA 200LED	No Fixture Change	1	200	200	Cost Per			4167	4167	0	$0.00
358	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
359	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
360	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
361	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	225	99	Cost Per		$7.33	4167	4167	2100.168	$351.84
362	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
363	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
364	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
365	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
366	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
367	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
368	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	7	225	99	Cost Per		$7.33	4167	4167	3675.294	$615.72
369	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
370	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
371	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
372	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
373	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
374	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
375	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
376	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
377	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	225	99	Cost Per		$7.33	4167	4167	2100.168	$351.84
378	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	14	225	99	Cost Per		$7.33	4167	4167	7350.588	$1,231.44

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
379	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
379	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
380	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
381	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
382	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	11	225	99	Cost Per		$7.33	4167	4167	5775.462	$967.56
383	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
384	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
385	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
386	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	24	225	99	Cost Per		$7.33	4167	4167	12601.01	$2,111.04
387	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
388	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	8	225	99	Cost Per		$7.33	4167	4167	4200.336	$703.68
389	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
390	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
391	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	225	99	Cost Per		$7.33	4167	4167	1575.126	$263.88
392	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
393	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
394	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
395	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	5	225	99	Cost Per		$7.33	4167	4167	2625.21	$439.80

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
396	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	28	225	99	Cost Per		$7.33	4167	4167	14701.18	$2,462.88
397	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
398	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
399	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
400	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
401	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
402	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
403	PPL	*COBRA 200HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	225	99	Cost Per		$7.33	4167	4167	2100.168	$351.84
404	PPL	*COBRA 250LED*	No Fixture Change	1	250	250	Cost Per			4167	4167	0	$0.00
405	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
406	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
407	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
408	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
409	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	295	99	Cost Per		$5.18	4167	4167	1633.464	$124.32
410	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
411	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
412	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	11	295	99	Cost Per		$5.18	4167	4167	8984.052	$683.76
413	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
414	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
415	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
416	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
417	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	295	99	Cost Per		$5.18	4167	4167	3266.928	$248.64
418	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
419	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
420	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
421	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
422	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
423	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
424	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	295	99	Cost Per		$5.18	4167	4167	2450.196	$186.48
425	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	295	99	Cost Per		$5.18	4167	4167	2450.196	$186.48
426	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
427	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
428	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
429	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	3	295	99	Cost Per		$5.18	4167	4167	2450.196	$186.48
430	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
431	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	295	99	Cost Per		$5.18	4167	4167	1633.464	$124.32

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
432	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
433	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
434	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
435	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	6	295	99	Cost Per		$5.18	4167	4167	4900.392	$372.96
436	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	295	99	Cost Per		$5.18	4167	4167	1633.464	$124.32
437	PPL	*COBRA 250HPS*	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
438	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
439	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
440	PPL	*COBRA 400HPS*	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
441	PPL	*COBRA 400HPS*	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
442	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	2	464	165	Cost Per		$10.05	4167	4167	2491.866	$241.20
443	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	5	464	165	Cost Per		$10.05	4167	4167	6229.665	$603.00
444	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
445	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	3	464	165	Cost Per		$10.05	4167	4167	3737.799	$361.80
446	PPL	*COBRA 400HPS*	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
447	PPL	*COBRA 400HPS*	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	6	464	165	Cost Per		$10.05	4167	4167	7475.598	$723.60
448	PPL	*COBRA 400HPS*	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	3	464	165	Cost Per		$10.05	4167	4167	3737.799	$361.80
449	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
450	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
451	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
452	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
453	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	7	464	165	Cost Per		$10.05	4167	4167	8721.531	$844.20
454	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
455	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
456	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
457	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
458	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
459	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
460	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
461	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
462	PPL	COBRA 0LED	No Fixture Change	20	100	100	Cost Per			4167	4167	0	$0.00
463	PPL	COBRA 0LED	No Fixture Change	6	100	100	Cost Per			4167	4167	0	$0.00
464	PPL	COBRA 0LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
465	PPL	COBRA 0LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
466	PPL	COBRA 0LED	No Fixture Change	6	100	100	Cost Per			4167	4167	0	$0.00
467	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
468	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
469	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
470	PPL	COBRA 0FLOR	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	100	71	Cost Per		$2.80	4167	4167	120.843	$33.60
471	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
472	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
473	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
474	PPL	COBRA 45LED	No Fixture Change	3	45	45	Cost Per			4167	4167	0	$0.00
475	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
476	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
477	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
478	PPL	COBRA 45LED	No Fixture Change	2	45	45	Cost Per			4167	4167	0	$0.00
479	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
480	PPL	COBRA 45LED	No Fixture Change	2	45	45	Cost Per			4167	4167	0	$0.00
481	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
482	PPL	COBRA 48LED	No Fixture Change	1	40	40	Cost Per			4167	4167	0	$0.00
483	PPL	COBRA 48LED	No Fixture Change	1	40	40	Cost Per			4167	4167	0	$0.00
484	PPL	COBRA 48LED	No Fixture Change	1	40	40	Cost Per			4167	4167	0	$0.00
485	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
486	PPL	COBRA 50LED	No Fixture Change	2	50	50	Cost Per			4167	4167	0	$0.00
487	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
488	PPL	COBRA 65LED	No Fixture Change	2	65	65	Cost Per			4167	4167	0	$0.00
489	PPL	COBRA 65LED	No Fixture Change	1	65	65	Cost Per			4167	4167	0	$0.00
490	PPL	COBRA 65LED	No Fixture Change	1	65	65	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	4	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	3	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	12	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	2	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	6	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	2	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	4	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	5	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 137LED	No Fixture Change	1	137	137	Cost Per			4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 140LED	No Fixture Change	2	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 150LED	No Fixture Change	1	150	150	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	4	85	25	Cost Per		$0.93	4167	4167	1000.08	$44.64
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	5	115	36	Cost Per		$2.80	4167	4167	1645.965	$168.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	5	115	36	Cost Per		$2.80	4167	4167	1645.965	$168.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	13	115	36	Cost Per		$2.80	4167	4167	4279.509	$436.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	45	115	36	Cost Per		$2.80	4167	4167	14813.69	$1,512.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100MV	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	115	25	Cost Per		$2.80	4167	4167	375.03	$33.60
	PPL	COBRA 100MV	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	115	25	Cost Per		$2.80	4167	4167	375.03	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	4	115	36	Cost Per		$2.80	4167	4167	1316.772	$134.40
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
	PPL	COBRA 150MV	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	165	36	Cost Per		$4.05	4167	4167	537.543	$48.60
	PPL	COBRA 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	COBRA 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	COBRA 180HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	210	71	Cost Per		$7.35	4167	4167	579.213	$88.20
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	5	464	165	Cost Per		$10.05	4167	4167	6229.665	$603.00
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	2	464	165	Cost Per		$10.05	4167	4167	2491.866	$241.20
	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 45LED	No Fixture Change	1	45	45	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	1	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 50LED	No Fixture Change	2	50	50	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 70LED	No Fixture Change	1	70	70	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	8	115	36	Cost Per		$2.80	4167	4167	2633.544	$268.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	16	115	36	Cost Per		$2.80	4167	4167	5267.088	$537.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	6	115	36	Cost Per		$2.80	4167	4167	1975.158	$201.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	2	115	36	Cost Per		$2.80	4167	4167	658.386	$67.20

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100LED	No Fixture Change	2	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 140LED	No Fixture Change	1	140	140	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 180LED	No Fixture Change	1	180	180	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 180LED	No Fixture Change	1	180	180	Cost Per			4167	4167	0	$0.00
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	225	99	Cost Per		$7.33	4167	4167	2100.168	$351.84
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	225	99	Cost Per		$7.33	4167	4167	1050.084	$175.92
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	4	295	99	Cost Per		$5.18	4167	4167	3266.928	$248.64
	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	2	295	99	Cost Per		$5.18	4167	4167	1633.464	$124.32
	PPL	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	85	25	Cost Per		$0.93	4167	4167	250.02	$11.16
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	165	71	Cost Per		$4.05	4167	4167	391.698	$48.60
	PPL	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	1	464	165	Cost Per		$10.05	4167	4167	1245.933	$120.60
	PPL	Could Not Identify 70H	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	2	85	25	Cost Per		$0.93	4167	4167	500.04	$22.32
	PPL	Could Not Identify 100	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	3	115	36	Cost Per		$2.80	4167	4167	987.579	$100.80
	PPL	Could Not Identify 200	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	9	225	99	Cost Per		$7.33	4167	4167	4725.378	$791.64
	PPL	FARM 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	3	205	71	Cost Per		$4.05	4167	4167	1675.134	$145.80
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	225	99	Cost Per		$7.33	4167	4167	525.042	$87.96
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 20HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	1	35	25	kWh Rate	$0.058	$0.00	4167	4167	41.67	$2.43
	PPL	FARM 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	FARM 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	FARM 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	FARM 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	FARM 170HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	2	210	71	Cost Per		$4.05	4167	4167	1158.426	$97.20
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	2	205	71	Cost Per		$4.05	4167	4167	1116.756	$97.20
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	5	205	71	Cost Per		$4.05	4167	4167	2791.89	$243.00
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	15	205	71	Cost Per		$4.05	4167	4167	8375.67	$729.00
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	2	205	71	Cost Per		$4.05	4167	4167	1116.756	$97.20
	PPL	FARM 175LED	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	175	71	Cost Per		$4.05	4167	4167	433.368	$48.60
	PPL	FARM 175MV	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	205	36	Cost Per		$4.05	4167	4167	704.223	$48.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	FARM 175MV	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	205	36	Cost Per		$4.05	4167	4167	704.223	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	2	205	71	Cost Per		$4.05	4167	4167	1116.756	$97.20
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	2	205	71	Cost Per		$4.05	4167	4167	1116.756	$97.20
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	6	205	71	Cost Per		$4.05	4167	4167	3350.268	$291.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 250HPS	AEL - ATB0 30BLEDE13 MVOLT Type 3, 3000k NL P7 PCLL 126 watts / 14850 Lumens	1	295	126	Cost Per		$5.18	4167	4167	704.223	$62.16
	PPL	FARM 0HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	175	71	Cost Per		$4.05	4167	4167	433.368	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FARM 175HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	1	205	71	Cost Per		$4.05	4167	4167	558.378	$48.60
	PPL	FLOOD 400MV	Flood, Rab FXLED150NT, 155 watts	1	465	155	Cost Per		$13.89	4167	4167	1291.77	$166.68
	PPL	LANTERN 100HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	1	115	55	Cost Per		$2.80	4167	4167	250.02	$33.60
	PPL	LANTERN 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	165	85	Cost Per		$4.05	4167	4167	333.36	$48.60
	PPL	LANTERN 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	165	85	Cost Per		$4.05	4167	4167	333.36	$48.60
	PPL	LANTERN 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	165	85	Cost Per		$4.05	4167	4167	333.36	$48.60
	PPL	LANTERN 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	165	85	Cost Per		$4.05	4167	4167	333.36	$48.60
	PPL	LANTERN 150HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	165	85	Cost Per		$4.05	4167	4167	333.36	$48.60
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	Cost Per		$5.18	4167	4167	875.07	$62.16
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	7	295	85	Cost Per		$5.18	4167	4167	6125.49	$435.12
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	Cost Per		$5.18	4167	4167	875.07	$62.16
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	Cost Per		$5.18	4167	4167	875.07	$62.16
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	1	295	85	Cost Per		$5.18	4167	4167	875.07	$62.16
	PPL	PENDANT 2 150HPS	Lumecon Tear/Acorn L Retro T30 55w, 6418lm	1	165	55	Cost Per		$4.05	4167	4167	458.37	$48.60
	PPL	PENDANT 2 250HPS	Lumecon Tear/Acorn L Retro T30 85w, 9876lm	2	295	85	Cost Per		$5.18	4167	4167	1750.14	$124.32
	PPL	ROUND SHOEBOX 0HP	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	1	295	99	Cost Per		$5.18	4167	4167	816.732	$62.16
	PPL	SHOEBOX 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60

Item	Owner	Existing Fixture	Proposed Fixture	QTY	Ex Watts	Pr. Watts	Cost Per or kWh Rate	kwh	cost redux	Existing Hours	Proposed Hours	Annual kWh Savings	Annual Cost Savings
	PPL	SHOEBOX 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	SHOEBOX 0HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	11	115	36	Cost Per		$2.80	4167	4167	3621.123	$369.60
	PPL	SHOEBOX 0HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	1	115	36	Cost Per		$2.80	4167	4167	329.193	$33.60
	PPL	SHOEBOX 0LED	No Fixture Change	1	100	100	Cost Per			4167	4167	0	$0.00
	PPL	WALLPACK 0HPS	Cooper Crosstour LED Wallpack, 18 watts, 2103lm + Photocell	1	65	18	Cost Per		$0.00	4167	4167	195.849	$0.00
	PPL	WALLPACK 0HPS	Cooper Crosstour LED Wallpack, 18 watts, 2103lm + Photocell	1	65	18	Cost Per		$0.00	4167	4167	195.849	$0.00
	PPL	WALLPACK 0HPS	Cooper Crosstour LED Wallpack, 18 watts, 2103lm + Photocell	2	65	18	kWh Rate	$0.058	$0.00	4167	4167	391.698	$22.88
	CEC	COBRA 70HPS	AEL - ATB0 10BLEDE70 MVOLT Type 2, 3000k NL P7 PCLL 25 watts / 2994 Lumens	21	85	25	Cost Per		$2.93	4167	4167	5250.42	$738.36
	CEC	COBRA 100HPS	AEL - ATB0 20BLEDE53 MVOLT Type 3, 3000k NL P7 PCLL 36 watts / 4704 Lumens	42	115	36	Cost Per		$2.93	4167	4167	13826.11	$1,476.72
	CEC	COBRA 150HPS	AEL - ATB0 20BLEDE10 MVOLT Type 3, 3000k NL P7 PCLL 71 watts / 8606 Lumens	77	165	71	Cost Per		$2.93	4167	4167	30160.75	$2,707.32
	CEC	COBRA 200HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	8	225	99	Cost Per		$2.93	4167	4167	4200.336	$281.28
	CEC	COBRA 250HPS	AEL - ATB0 20BLEDE15 MVOLT Type 3, 3000k NL P7 PCLL 99 watts / 11181 Lumens	9	295	99	Cost Per		$2.93	4167	4167	7350.588	$316.44
	CEC	COBRA 400HPS	AEL - ATB2 60BLEDE85 MVOLT Type 3, 3000k NL P7 PCLL 165 watts / 21351 Lumens	7	464	165	Cost Per		$2.93	4167	4167	8721.531	$246.12
	CEC	COBRA 100LED	No Fixture Change	4	100	100	Cost Per		$2.93	4167	4167	0	$140.64
	CEC	SHOEBOX 0LED	No Fixture Change	2	100	100	Cost Per		$2.93	4167	4167	0	$70.32

Appendix F – Solar PV Audits

Awbrey Butte Reservoir City of Bend, OR, Bend, OR 97701

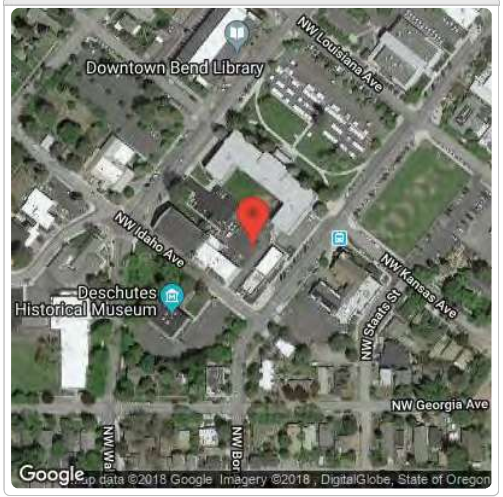
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

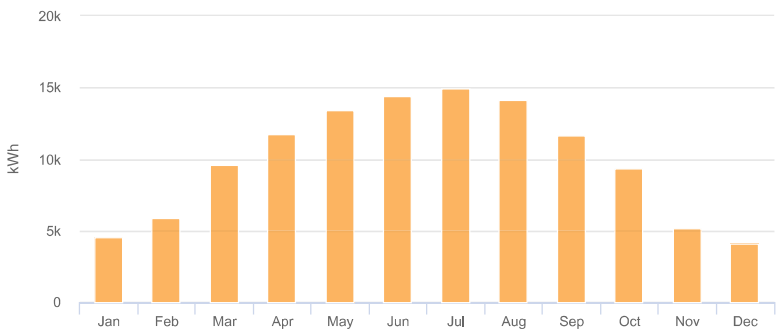
System Metrics

Design	Awbrey Butte Reservoir
Module DC Nameplate	77.8 kW
Inverter AC Nameplate	60.0 kW Load Ratio: 1.30
Annual Production	118.8 MWh
Performance Ratio	84.0%
kWh/kWp	1,527.4
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	6dc1d38aad-32475929d5-92868e0609-be0c0a40f5

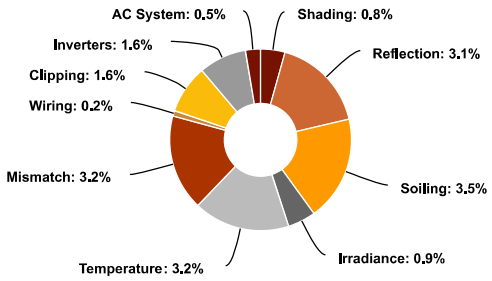
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,818.9	14.4%
	Shaded Irradiance	1,804.3	-0.8%
	Irradiance after Reflection	1,747.7	-3.1%
	Irradiance after Soiling	1,687.3	-3.5%
	Total Collector Irradiance	**1,687.3**	**0.0%**
Energy (kWh)	Nameplate	132,849.5	
	Output at Irradiance Levels	131,633.2	-0.9%
	Output at Cell Temperature Derate	127,465.9	-3.2%
	Output After Mismatch	123,445.7	-3.2%
	Optimal DC Output	123,220.7	-0.2%
	Constrained DC Output	121,263.5	-1.6%
	Inverter Output	119,364.0	-1.6%
	Energy to Grid	**118,768.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		22.1 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Ground Mount
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	15	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
15.2	7.6	3.5	2	2	2	2	2	2	2	5.6	13.3

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA60KTL-DO/US-480 V2.0 (Chint Power Systems)	Default Characterization

Components

Component	Name	Count
Inverters	CPS SCA60KTL-DO/US-480 V2.0 (Chint Power Systems)	1 (60.0 kW)
Strings	10 AWG (Copper)	12 (1,470.1 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	216 (77.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	6-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Portrait (Vertical)	20°	180°	12.7 ft	2x9	12	216	77.8 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Boyd Acres A City of Bend, OR, Bend, OR 97701

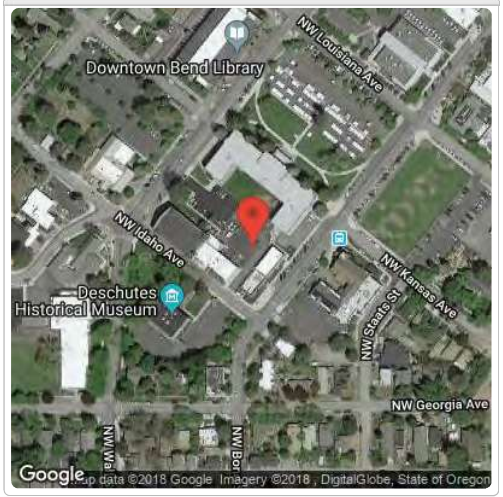
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

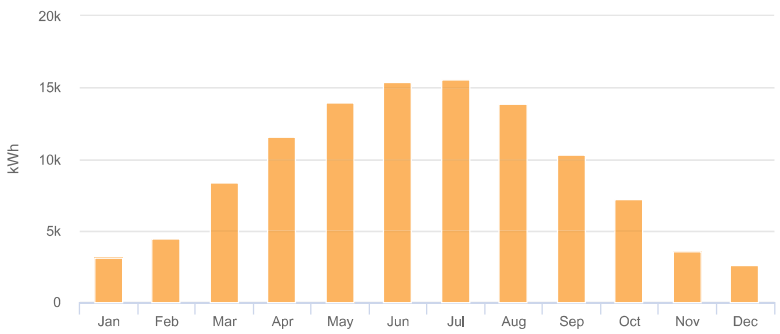
System Metrics

Design	Boyd Acres A
Module DC Nameplate	83.5 kW
Inverter AC Nameplate	73.0 kW Load Ratio: 1.14
Annual Production	109.9 MWh
Performance Ratio	82.7%
kWh/kWp	1,315.3
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	dac026e371-2407dff21b-f47206fac0-aaffa5e676

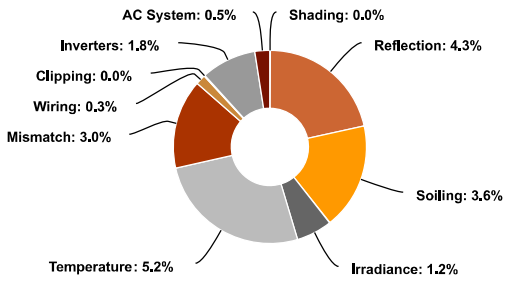
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,590.9	0.0%
	Shaded Irradiance	1,590.8	0.0%
	Irradiance after Reflection	1,522.8	-4.3%
	Irradiance after Soiling	1,468.8	-3.6%
	Total Collector Irradiance	**1,468.8**	**0.0%**
Energy (kWh)	Nameplate	124,200.4	
	Output at Irradiance Levels	122,716.7	-1.2%
	Output at Cell Temperature Derate	116,347.2	-5.2%
	Output After Mismatch	112,883.9	-3.0%
	Optimal DC Output	112,508.1	-0.3%
	Constrained DC Output	112,475.1	0.0%
	Inverter Output	110,405.0	-1.9%
	Energy to Grid	**109,853.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		24.5 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

Condition Set

Description	Rooftop											
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Diffusion Model											
Temperature Model Parameters	Rack Type			U_{const}			U_{wind}					
	Fixed Tilt			29			0					
	Flush Mount			20			0					
	East-West			29			0					
	Carport			29			0					
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	18	10	5	2	2	2	2	2	2	2	8	15
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	0% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module			Characterization								
	ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)			ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN								
Component Characterizations	Device							Characterization				
	CPS SCA23KTL-DO/US-480 (Chint Power Systems America)							CEC 2014-08-16				
	CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)							Default Characterization				

Components

Component	Name	Count
Inverters	CPS SCA23KTL-DO/US-480 (Chint Power Systems America)	1 (23.0 kW)
Inverters	CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	1 (50.0 kW)
Strings	10 AWG (Copper)	14 (1,374.4 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	232 (83.5 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone 2	12	6-18	Along Racking
Wiring Zone 3	12	13-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 2	Flush Mount	Landscape (Horizontal)	5°	89.8071°	0.1 ft	1x1	152	152	54.7 kW
Field Segment 3	Flush Mount	Landscape (Horizontal)	5°	269.793°	0.1 ft	1x1	80	80	28.8 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Pilot Butte Ground Mount City of Bend, OR, Bend, OR 97701

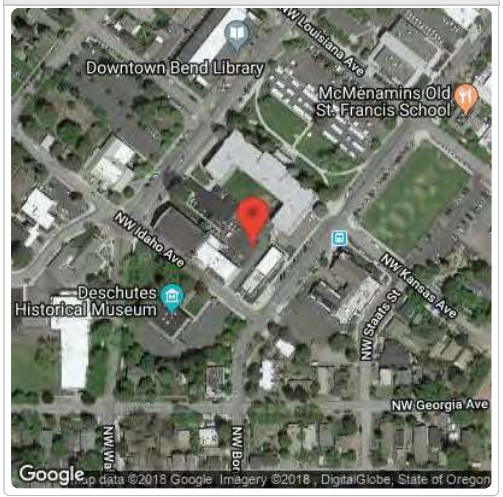
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

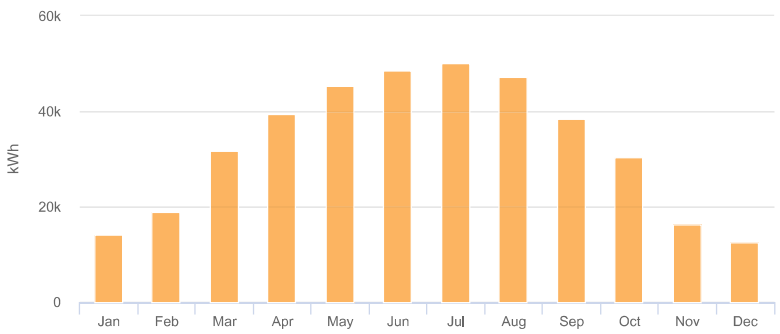
System Metrics

Design	Pilot Butte Ground Mount
Module DC Nameplate	258.5 kW
Inverter AC Nameplate	250.0 kW Load Ratio: 1.03
Annual Production	393.2 MWh
Performance Ratio	83.6%
kWh/kWp	1,521.2
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	02438dc84d-15065d270a-ca63df14a5-d5d7833a30

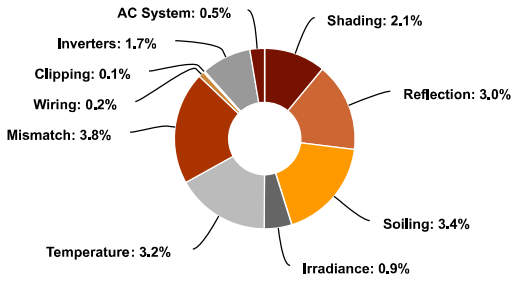
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,818.9	14.4%
	Shaded Irradiance	1,781.1	-2.1%
	Irradiance after Reflection	1,727.7	-3.0%
	Irradiance after Soiling	1,668.4	-3.4%
	Total Collector Irradiance	**1,668.5**	**0.0%**
Energy (kWh)	Nameplate	436,652.8	
	Output at Irradiance Levels	432,587.0	-0.9%
	Output at Cell Temperature Derate	418,872.2	-3.2%
	Output After Mismatch	402,931.0	-3.8%
	Optimal DC Output	402,140.7	-0.2%
	Constrained DC Output	401,911.7	-0.1%
	Inverter Output	395,174.0	-1.7%
	Energy to Grid	**393,198.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		22.0 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Ground Mount
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	15	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
15.2	7.6	3.5	2	2	2	2	2	2	2	5.6	13.3

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	Default Characterization

Components

Component	Name	Count
Inverters	CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	5 (250.0 kW)
Strings	10 AWG (Copper)	43 (4,824.9 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	718 (258.5 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	6-18	Along Racking
Wiring Zone 2	12	6-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Portrait (Vertical)	20°	180°	12.7 ft	2x1	129	258	92.9 kW
Field Segment 3	Fixed Tilt	Portrait (Vertical)	20°	180°	12.7 ft	2x1	230	460	165.6 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Bend City Street Facility Reduced Loads City of Bend, OR, Bend, OR 97701

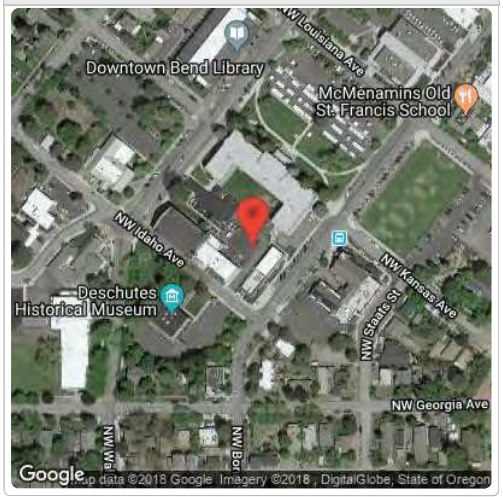
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

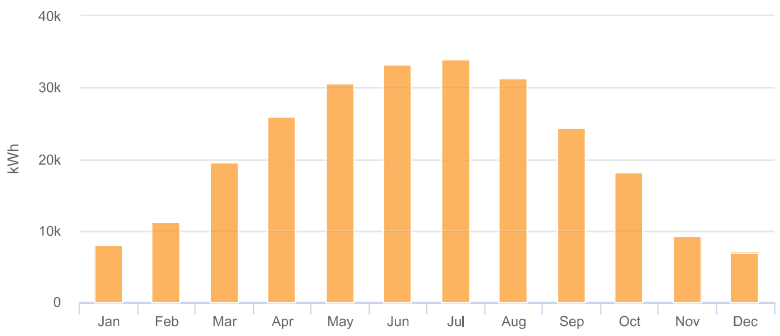
System Metrics

Design	Bend City Street Facility Reduced Loads
Module DC Nameplate	172.8 kW
Inverter AC Nameplate	150.0 kW Load Ratio: 1.15
Annual Production	252.3 MWh
Performance Ratio	84.7%
kWh/kWp	1,460.0
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	bb82093e0f-e15173af32-ecbaebac2d-91b54cf139

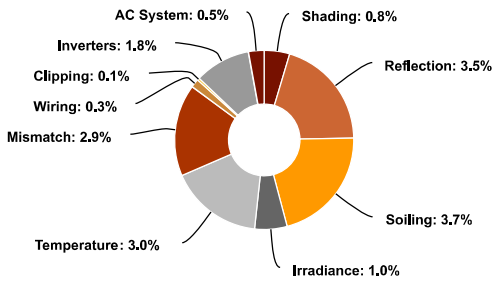
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,724.2	8.4%
	Shaded Irradiance	1,710.2	-0.8%
	Irradiance after Reflection	1,649.7	-3.5%
	Irradiance after Soiling	1,588.1	-3.7%
	Total Collector Irradiance	**1,588.1**	**0.0%**
Energy (kWh)	Nameplate	277,837.3	
	Output at Irradiance Levels	274,973.9	-1.0%
	Output at Cell Temperature Derate	266,851.9	-3.0%
	Output After Mismatch	259,033.3	-2.9%
	Optimal DC Output	258,321.5	-0.3%
	Constrained DC Output	258,147.5	-0.1%
	Inverter Output	253,548.0	-1.8%
	Energy to Grid	**252,280.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		21.5 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Rooftop
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	20	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
18	10	5	2	2	2	2	2	2	2	8	15

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	Default Characterization

Components

Component	Name	Count
Inverters	CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	3 (150.0 kW)
Strings	10 AWG (Copper)	30 (3,623.1 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	480 (172.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	15-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	10°	180°	1.4 ft	1x1	561	480	172.8 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Water Filtration Facility (Standing Seam) City of Bend, OR, Bend, OR 97701

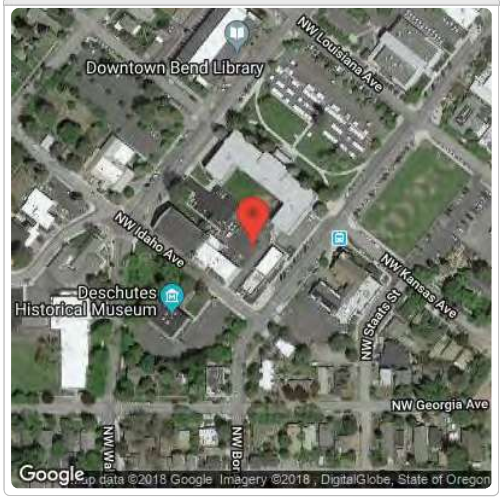
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

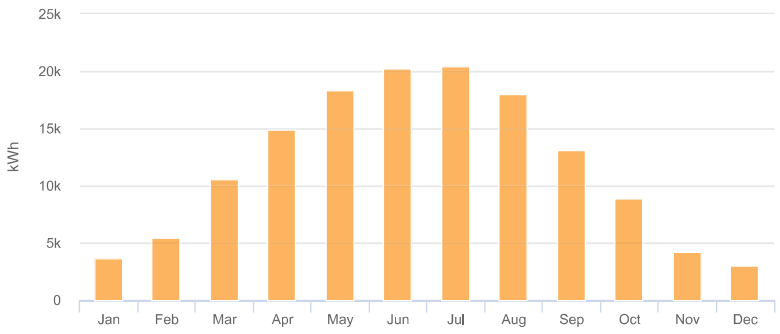
System Metrics

Design	Water Filtration Facility (Standing Seam)
Module DC Nameplate	110.2 kW
Inverter AC Nameplate	100.0 kW Load Ratio: 1.10
Annual Production	140.9 MWh
Performance Ratio	83.0%
kWh/kWp	1,279.2
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	6dc1d38aad-32475929d5-92868e0609-be0c0a40f5

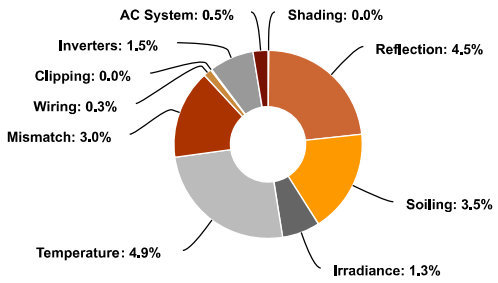
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,541.4	-3.1%
	Shaded Irradiance	1,540.9	0.0%
	Irradiance after Reflection	1,471.3	-4.5%
	Irradiance after Soiling	1,420.4	-3.5%
	Total Collector Irradiance	**1,420.4**	**0.0%**
Energy (kWh)	Nameplate	158,422.1	
	Output at Irradiance Levels	156,407.5	-1.3%
	Output at Cell Temperature Derate	148,695.8	-4.9%
	Output After Mismatch	144,236.6	-3.0%
	Optimal DC Output	143,844.9	-0.3%
	Constrained DC Output	143,791.7	0.0%
	Inverter Output	141,630.0	-1.5%
	Energy to Grid	**140,922.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		24.1 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Rooftop
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	20	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
18	10	5	2	2	2	2	2	2	2	8	15

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	Default Characterization

Components

Component	Name	Count
Inverters	CPS SCA50KTL-DO/US-480 V2.0 (Chint Power Systems)	2 (100.0 kW)
Home Runs	500 MCM (Copper)	2 (28.0 ft)
Home Runs	1/0 AWG (Aluminum)	2 (65.1 ft)
Combiners	1 input Combiner	2
Combiners	8 input Combiner	1
Combiners	9 input Combiner	1
Strings	10 AWG (Copper)	17 (2,210.2 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	306 (110.2 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	18-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	5°	44.868°	0.1 ft	1x1	314	306	110.2 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Water Filtration Facility Ground Mount City of Bend, OR, Bend, OR 97701

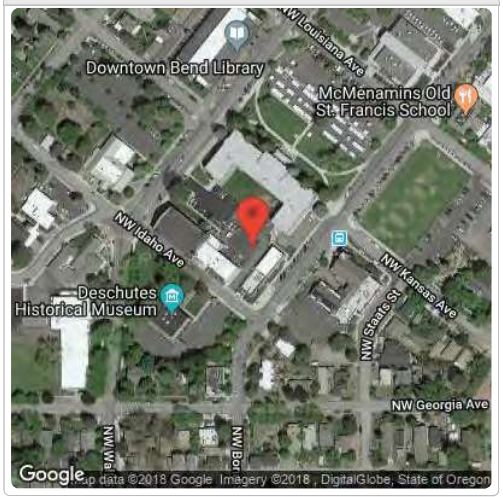
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

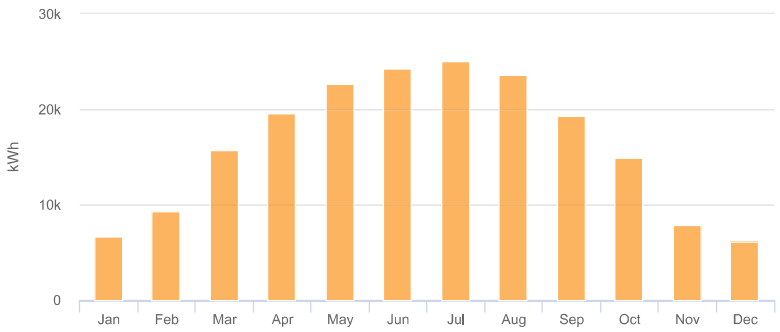
System Metrics

Design	Water Filtration Facility Ground Mount
Module DC Nameplate	129.6 kW
Inverter AC Nameplate	108.0 kW Load Ratio: 1.20
Annual Production	195.0 MWh
Performance Ratio	82.9%
kWh/kWp	1,504.3
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	02438dc84d-15065d270a-ca63df14a5-d5d7833a30

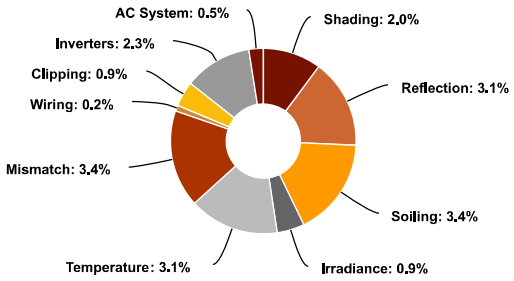
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,815.7	14.2%
	Shaded Irradiance	1,779.1	-2.0%
	Irradiance after Reflection	1,724.4	-3.1%
	Irradiance after Soiling	1,666.0	-3.4%
	Total Collector Irradiance	**1,666.1**	**0.0%**
Energy (kWh)	Nameplate	218,621.8	
	Output at Irradiance Levels	216,559.8	-0.9%
	Output at Cell Temperature Derate	209,826.4	-3.1%
	Output After Mismatch	202,774.8	-3.4%
	Optimal DC Output	202,376.7	-0.2%
	Constrained DC Output	200,623.0	-0.9%
	Inverter Output	195,942.0	-2.3%
	Energy to Grid	**194,962.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		22.0 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Ground Mount
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	15	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
15.2	7.6	3.5	2	2	2	2	2	2	2	5.6	13.3

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA 36KTL-DO (US) (Chint)	Manufacturer

Components

Component	Name	Count
Inverters	CPS SCA 36KTL-DO (US) (Chint)	3 (108.0 kW)
Combiners	1 input Combiner	3
Combiners	6 input Combiner	1
Combiners	7 input Combiner	2
Strings	10 AWG (Copper)	20 (2,659.6 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	360 (129.6 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone 2	12	18-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 2	Fixed Tilt	Portrait (Vertical)	20°	164.505°	7.2 ft	2x1	184	368	132.5 kW

© 2018 Folsom Labs

Detailed Layout



© 2018 Folsom Labs

Fire Department West City of Bend, OR, Bend, OR 97701

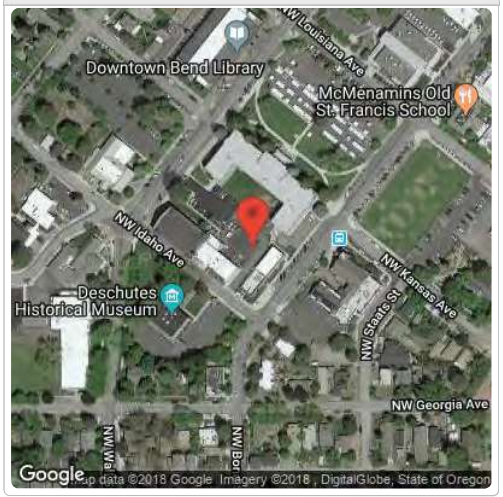
Report

Project Name	City of Bend, OR
Project Address	Bend, OR 97701
Prepared By	Alex Griffiths agriffiths@ameresco.com

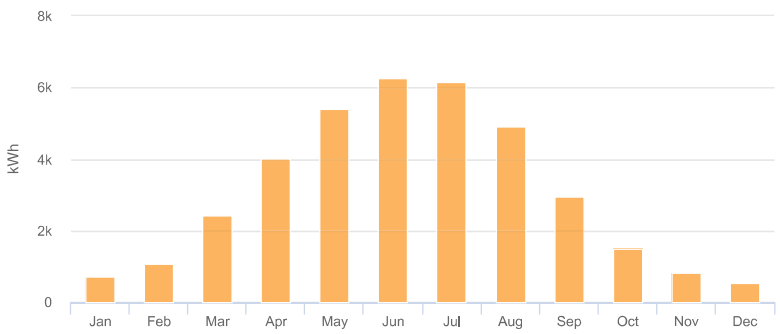
System Metrics

Design	Fire Department West
Module DC Nameplate	41.8 kW
Inverter AC Nameplate	36.0 kW Load Ratio: 1.16
Annual Production	36.72 MWh
Performance Ratio	66.0%
kWh/kWp	879.2
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Simulator Version	bb82093e0f-e15173af32-ecbaebac2d-91b54cf139

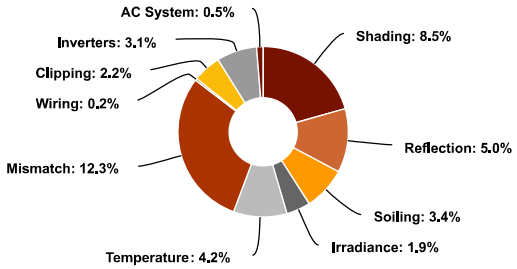
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,590.5	
	POA Irradiance	1,332.3	-16.2%
	Shaded Irradiance	1,219.4	-8.5%
	Irradiance after Reflection	1,158.4	-5.0%
	Irradiance after Soiling	1,119.3	-3.4%
	Total Collector Irradiance	**1,119.3**	**0.0%**
Energy (kWh)	Nameplate	47,308.6	
	Output at Irradiance Levels	46,413.5	-1.9%
	Output at Cell Temperature Derate	44,473.3	-4.2%
	Output After Mismatch	39,024.3	-12.3%
	Optimal DC Output	38,960.5	-0.2%
	Constrained DC Output	38,101.3	-2.2%
	Inverter Output	36,901.8	-3.1%
	Energy to Grid	**36,717.2**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		21.7 °C
Simulation Metrics			
	Operating Hours		4561
	Solved Hours		4561

© 2018 Folsom Labs

Condition Set

Description	Rooftop
Weather Dataset	TMY, REDMOND ROBERTS FIELD, NSRDB (tmy3, II)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Diffusion Model

Temperature Model Parameters

Rack Type	U_{const}	U_{wind}
Fixed Tilt	29	0
Flush Mount	20	0
East-West	29	0
Carport	29	0

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
18	10	5	2	2	2	2	2	2	2	8	15

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	0% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Characterization
ARMC-JAM6(K)-72-360/PR/1500V (JA Solar)	ARMC-JA_Solar_JAM6_K_72_360PR_1500V_RETC_20161206 (2).PAN, PAN

Component Characterizations

Device	Characterization
CPS SCA 36KTL-DO (US) (Chint)	Manufacturer

Components

Component	Name	Count
Inverters	CPS SCA 36KTL-DO (US) (Chint)	1 (36.0 kW)
Strings	10 AWG (Copper)	7 (438.6 ft)
Module	JA Solar, ARMC-JAM6(K)-72-360/PR/1500V (360W)	116 (41.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone 3	12	15-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 4	Flush Mount	Landscape (Horizontal)	33°	180°	0.1 ft	1x1	42	42	15.1 kW
Field Segment 3	Flush Mount	Landscape (Horizontal)	33°	0.347946°	0.1 ft	1x1	74	74	26.6 kW

Detailed Layout

© 2018 Folsom Labs

SOLICITATION NO.: Request for Proposal (RFP) 92/2023
BUYER: Cale Turner
PHONE NO.: (573) 874-7375
E-MAIL: cale.turner@como.gov

TITLE: Professional Services: Energy & Utility Resource Conservation Program Services

ISSUE DATE: May 16, 2024

RETURN PROPOSALS NO LATER THAN: June 14, 2024 AT 5:00 PM CENTRAL TIME (END DATE)

VENDORS ARE ENCOURAGED TO RESPOND ELECTRONICALLY THROUGH THE CITY'S E-BIDDING WEBSITE BUT MAY RESPOND BY HARD COPY (See Mailing Instructions Below)

MAILING INSTRUCTIONS: Print or type **Solicitation Number** and **End Date** on the lower left hand corner of the envelope or package. Delivered sealed proposals must be in the Purchasing Division office (701 E. Broadway, 5th Floor) by the return proposals date and time.

	(U.S. Mail)		(Courier Service)
RETURN PROPOSALS TO:	**CITY OF COLUMBIA PURCHASING** **PO BOX 6015** **COLUMBIA MO 65205**	**or**	**CITY OF COLUMBIA PURCHASING** **701 E. BROADWAY, 5th FLOOR** **COLUMBIA MO 65201**

ORIGINAL CONTRACT PERIOD: Date of Award through Project Completion

DELIVER SUPPLIES/SERVICES FOB (Free On Board) DESTINATION TO THE FOLLOWING ADDRESS:

City of Columbia, Office of Sustainability
Columbia, Missouri

The offeror hereby declares understanding, agreement and certification of compliance to provide the items and/or services, at the prices quoted, in accordance with all requirements and specifications contained herein. The offeror further agrees that the language of this RFP shall govern in the event of a conflict with their proposals. The offeror further agrees that upon receipt of an authorized purchase order from the Purchasing Division or when a Contract/Agreement is signed and issued by an authorized official of the City of Columbia, a binding contract shall exist between the offeror and the City of Columbia.

SIGNATURE REQUIRED

VENDOR NAME Ameresco, Inc.	
MAILING ADDRESS 10 S. LaSalle Street, Suite 3450	
CITY, STATE, ZIP CODE Chicago, IL 60603	
CONTACT PERSON Dana Dunn	**EMAIL ADDRESS** ddunn@ameresco.com
PHONE NUMBER 314.827.3866	**FAX NUMBER** 480.499.9170
VENDOR TAX FILING TYPE WITH IRS (CHECK ONE) X Corporation ___Individual ___State/Local Government ___Partnership ___Sole Proprietor ___IRS Tax-Exempt	
AUTHORIZED SIGNATURE	**DATE** June 12, 2024
PRINTED NAME Ron Haxton	**TITLE** Sr. Vice President - Business Development

AMERESCO



Proposal Inclusive of Exhibits A – G

Professional Services: Energy & Utility Resource Conservation Services

Solicitation No.: Request for Proposal (RFP) 91/2023

Prepared for

City of Columbia, MO
Cale Turner, Purchasing Agent
701 E. Broadway, 5th Floor
Columbia, MO 65201
Submitted via City's E-Bidding Site

Submitted by

Ameresco, Inc.
Dana Dunn, Senior Account Executive
10 S. LaSalle Street, Suite 3450
Chicago, IL 60603
P. 314.325.6048 | E. ddunn@ameresco.com

June 14, 2024

AMERESCO
Green • Clean • Sustainable

10 S. LaSalle Street, Suite 3450
Chicago, IL 60603
ameresco.com

June 14, 2024

City of Columbia Purchasing
Attn: Cale Turner, Purchasing Agent
701 E. Broadway, 5th Floor
Columbia, MO 65201
Submitted Electronically via City's E-Bidding Site: https://columbia.ionwave.net/

Dear Mr. Turner and Selection Committee:

On behalf of Ameresco team, thank you for the opportunity to participate in the City of Columbia's (City) *Request for Proposal (RFP) 91/2023, Professional Services: Energy & Utility Resource Conservation Services*.

Our local team appreciates the opportunity to demonstrate our experience and strong reputation in providing these services and are grateful to the City for consideration of our firm. As a leading cleantech integrator and renewable energy asset developer, owner, and operator, Ameresco, Inc.'s (NYSE: AMRC) comprehensive portfolio includes energy and utility resource efficiency, infrastructure upgrades, asset sustainability, and renewable energy solutions delivered to customers throughout North America.

Founded in 2000, Ameresco has engineered, constructed, and/or provided guaranteed services for over $14 billion in energy projects. What we are most proud of however, is how often we are asked to return after an initial phase is completed to develop and implement subsequent phases of work for our Municipal Customers – We are a true partner in these endeavors. For our work with the Federal Government, the **U.S. DOE has recognized Ameresco as providing more energy savings per dollar invested than any other Energy Service Company (ESCO)** and awarded Ameresco the single largest Energy Saving Performance Contract in its history, at over $795,000,000.

In Missouri, we have completed over $450M in public sector projects and our focus is to deliver turnkey solutions that provide a return for individuals, including the City's staff and the community.

Ameresco is committed to partnering with the City of Columbia to fulfill your energy and utility needs, both today and into a more resilient future. We are committed to providing a partnership that is open and transparent where we can be held accountable, not only with City and staff, but also with the citizens you serve.

There are many ESCOs who are likely wanting to work with the City of Columbia, including Ameresco. We are not aware of any company who can provide the magnitude of services, offerings, and technology that we have implemented. We have identified opportunities with not only City-owned facilities but have also identified potential opportunities for improved efficiencies for Columbia Water and Light, Columbia Solid Waste, and the Parking Utility. We have visited and analyzed the five facilities listed in the RFP multiple times and have evaluated the utility usage provided by the City. Without any doubt, we know we can make a positive impact for achieving the City's goals and provide value to the City, staff, and the community.

As with all Municipalities, the goal of a project like this is risk mitigation and to provide value to the taxpayers of the City of Columbia – Ameresco will accomplish this goal.

As an American-owned ESCO, Ameresco is unique in that we are both **vendor neutral** and **technology agnostic** across all product/service lines and **independent of any parent company** or other competing lines of business. We work collaboratively with our customers to determine the best methodology to upgrading their infrastructure, ensuring the consideration of all solutions, and keeping each customer's unique operational and financial goals at the forefront.

Factors that have guided Ameresco's success include:

- **Full Transparency:** Open book pricing based on turnkey scope of work.
- **Risk Mitigation:** Guaranteed Maximum Price (GMP) with No Change Orders.
- **Vendor Neutral:** We are focused on finding the best products and solutions rather than trying to sell a specific product.
- **Comprehensive:** We are a one-stop, technology independent provider with the ability to develop, design, construct, operate and maintain complex multi-faceted projects.
- **Experienced:** We have over 24 years of experience in Missouri, implementing comprehensive solutions across local and national markets.
- **Dedicated to Community**: Utilizing local qualified subcontractors including MBE and WBE Contractors to enhance job creation in the City of Columbia.
- **Technology & Processes:** We leverage best-in-class technology with a focus on people and the impacts to your community.
- **Thought Leaders:** Ameresco's 1,500 employees have paved the way from performance contracts to battery storage, floating solar arrays, landfill RNG and the latest in Smart City initiatives. Our team of experts are leaders within the ESCO industry.

Our in-house team of engineers, construction managers, technicians, and measurement and verification specialists reduce facility energy intensity and revitalize aging infrastructure with long-term operations and maintenance benefits, maximizing returns on investment and returns for individuals.

We would like to request a meeting or an interview with the City of Columbia to meet one another and discuss how we can partner with achieving the goals of this RFP and the goals of the City and the community.

Should you have any questions or wish to discuss elements of this Proposal further, please do not hesitate to contact me directly at 314.325.6048 or at ddunn@ameresco.com.

On behalf of the Ameresco team, thank you.

Respectfully Submitted,



Dana Dunn
Senior Account Executive
Ameresco, Inc.

Prepared for

City of Columbia, MO

Proposal

Professional Services: Energy & Utility Resource Conservation Services

Solicitation No.: Request for Proposal (RFP) 91/2023

Presented by

Ameresco, Inc.

10 S. LaSalle Street, Suite 3450

Chicago, IL 60603

T: 314 827 3866

June 14, 2024

This Proposal contains data and information that has been submitted in response to a request for proposal or similar solicitation and is provided in confidence. The contents includes proprietary information and trade secrets that belong to Ameresco, Inc., ("Confidential Information") and is disclosed to the recipient only for purposes of evaluation. In the event Ameresco is awarded a contract or purchase order as a result of or in connection with the submission of this proposal, Customer shall have a limited right as set forth in the governing contract or purchase order to disclose the data herein, but only to the extent expressly allowed.

Table of Contents

Table of Contents i

Offeror's Experience, Reliability, and Expertise of Personnel i

Exhibit A. Offeror Information 1

Exhibit B. Experience 11

City of Boulder, CO 11

City and County of Denver, CO 14

City of Mankato, MN 16

City of Missoula, MT 17

City of Plainview, TX 18

City of South Bend, IN 19

City of Wichita Falls, TX 21

Hamilton County, OH 22

Unified Government of Wyandotte County and Kansas City, KS 25

U.S. General Services Administration (GSA) 26

Exhibit C. Personnel Expertise 38

Personnel Qualifications 52

Licenses 52

Method of Performance 53

Exhibit D. Work to be Performed 54

Exhibit G. Sample Work 80

Miscellaneous Submittal Information 81

Appendix A. City of Columbia Facility Observations 83

Utility Analysis 84

General Observations 86

City of Columbia, MO
Proposal for Professional Services:
Energy & Utility Resource Conservation Program Services
(Solicitation No.: Request for Proposal (RFP) 91/2023)

Offeror's Experience, Reliability, and Expertise of Personnel

Offeror's Experience, Reliability, and Expertise of Personnel



Exhibit A. Offeror Information

Offeror Information - The offeror should provide information about the offeror's organization on Exhibit A.

EXHIBIT A

OFFEROR INFORMATION

The offeror should provide the following information about the offeror's organization:

Business Information and Services Performed

Describe the nature of the vendor's business, type of services performed, etc. Identify the vendor's website address, if any.

Founded April 25, 2000, Ameresco, Inc. (NYSE: AMRC) is leading cleantech integrator and renewable energy asset developer, owner, and operator. Our comprehensive portfolio includes the development and delivery of over $14 billion in comprehensive energy services, including energy efficiency and utility conservation, infrastructure upgrades, asset sustainability, and over 4 GWe of renewable energy resources.

As a full-service provider, Ameresco has delivered projects and holds contracts to provide engineering, procurement, and construction services on a site-specific, regional, and nationwide basis. We offer an extensive and diverse portfolio that spans lighting, water, heating, ventilation, cooling, building envelope, smart meters and controls; water and wastewater treatment plant upgrades and rehabilitation; and renewable solutions including solar PV, CHP and cogeneration plants, geothermal, green gas, and wind – all of which can be paired with microgrid and battery storage technologies. Our new construction and renovation project experience covers the full range of technologies and solutions related to building systems, water and wastewater treatment plants, renewable energy, streetlighting, smart metering, lift stations, and a variety of other infrastructure commonly found in cities.

Technical independence coupled with our advanced technology portfolio allows us to integrate best-in-class solutions for the unique needs of each City, paired with practical financial solutions. Whether focused on securing infrastructure upgrades, meeting sustainability goals, or creating resiliency, our customers benefit from a single provider of comprehensive clean technology solutions.

Drawing from over 24 years of experience, Ameresco has successfully completed energy saving, environmentally responsible projects with state, cities and counties, the federal government, higher education institutions, K-12 public and private schools, commercial and industrial clients, healthcare facilities and non-profit organizations throughout North America. Ameresco has more than 1,500 employees providing local expertise in the United States, Canada, and Europe.

Ameresco Web Address: www.ameresco.com

Experts in Local Government



Ameresco has a wealth of experience in planning, designing, and implementing energy cost reduction and decarbonization programs for both large and small governments throughout North America. We have proven field experience in the retrofit and replacement of all types of energy-consuming systems as well as renewable energy technologies. Our role is always to collaborate with each customer to optimize system performance, while managing implementation costs and ensuring efficient, high-quality installation.

We can upgrade, replace, operate, and maintain energy equipment at government facilities to meet or exceed energy efficiency improvements required by federal and state regulations. Additionally, Ameresco can overcome the obstacles inherent in launching community renewable energy projects by taking ownership of new renewable power sources, such as landfill-gas-to-energy plants and solar arrays, which produce consistent, low-cost energy supplies that dramatically reduce greenhouse gas emissions.

Further, because our projects can have a particularly significant impact on local economies, **Ameresco strives to enhance workforce and green job opportunities, and partner with local subcontractors and utilize local vendors whenever possible to maximize the true impact on the communities in which we are invited to work.**

The following table represents just a sampling of Ameresco's local government project experience. Many of these customers have demonstrated their confidence in Ameresco by selecting the team for multiple phases of work. Projects that have been detailed further in this response are **bolded**.

Table A.1. Representative Local Government Experience

Local Government	Project Value	Local Government	Project Value
Carson City	$ 4,246,786	City of Dallas Love Field	$ 5,303,061
Central City	$ 312,581	City of Dallas Water Utilities	$ 18,272,829
City of Anadarko	$ 3,496,250	**City and County of Denver**	**$ 4,105,279**
City of Apple Valley	$ 900,000	City of Englewood	$ 1,587,905
City of Austin – Thermal Energy Storage	$ 5,220,462	City of Englewood Solar	$ 1,300,000
City of Austin – Town Lake Center	$ 222,686	City of Fall River	$ 26,198,678
City of Avondale	$ 2,773,786	City of Fairfax	$ 1,613,014
City of Battle Creek	$ 1,317,229	City of Flagstaff	$ 13,972,759
City of Battle Creek / Kellogg Arena	$ 2,685,667	City of Gallipolis	$ 1,658,033
City of Bellevue	$ 1,145,832	City of Glendale	$ 4,451,356
City of Bellevue Fire Department	$ 14,935	City of Goodyear	$ 2,941,128
City of Belpre	$ 8,479,839	City of Greenville	$ 4,571,303
City of Blue Ash	$ 1,966,155	City of Hattiesburg	$ 2,716,900
City of Boulder	**$ 15,080,325**	City of Henderson	$ 40,406,969
City of Bowie	$ 3,700,881	City of Houston	$ 1,270,000
City of Cameron	$ 2,713,986	City of Knoxville	$ 13,948,370
City of Casa Grande	$ 8,590,108	City of Lawrence	$ 111,483
City of Chandler	$ 10,184,191	City of Longview	$ 3,556,650
City of Chicago	$ 91,670,866	City of Lowell	$ 43,653,691
City of Chicopee	$ 3,271,694	**City of Mankato**	**$ 7,127,106**
City of Cincinnati	$ 6,737,414	City of Mesquite	$ 33,755,704
City of Columbia	$ 1,179,865	City of Methuen	$ 40,809
City of Columbus	$ 1,435,845	City of Miami Beach	$ 14,053,259

Local Government	Project Value
City of Montrose	$ 426,964
City of Newton Solar	$ 2,470,237
City of Olympia	$ 3,361,952
City of Peoria	$ 5,849,700
City of Phoenix	$ 51,825,425
City of Plainview	**$ 9,555,210**
City of Portland	$ 9,466,344
City of Portsmouth	$ 7,425,485
City of Reno	$ 18,603,514
City of Renton	$ 18,603,514
City of Revere	$ 10,059,616
City of Revere	$ 528,228
City of Richmond	$ 1,430,520
City of Rifle	$ 332,304
City of Rockport	$ 9,298,539
City of San Antonio Water System	$ 21,237,896
City of Shelbyville	$ 1,689,475
City of Show Low	$ 3,503,905
City of Smithville	$ 2,607,306
City of South Bend	**$ 10,287,784**
City of Tarpon Springs	$ 1,232,065
City of Tempe	$ 8,232,823

Local Government	Project Value
City of Tucson	$ 15,609,212
City of Tukwila	$ 134,812
City of West Melbourne	$ 823,084
City of Wichita Falls	**$ 18,765,271**
Franklin Township	$ 1,443,372
Lake Havasu City	$ 3,471,995
Metropolitan Area Planning Council	$ 2,441,424
National City	$ 5,403,308
Philadelphia Water Department	$ 47,500,000
Springfield Airport Authority	$ 1,773,658
Town of Ashland	$ 4,200,000
Town of Camillus	$ 533,966
Town of Carbondale	$ 393,675
Town of Farmington	$ 3,351,748
Town of Florence	$ 6,408,564
Town of Oro Valley	$ 4,300,000
Town of Scituate	$ 2,858,067
Town of Steilacoom	$ 239,883
Town of Windsor	$ 263,047
Unified County of Wyandotte County and Kansas City	$ 11,287,699
	$ 753,195,260

Notable Municipal Examples

As the **largest independent provider of energy services to the government sector**, we have completed projects for some of the largest cities in the United States *(as ranked by the World Population Review)*. Project experience includes:

- The delivery of some of the most significant renewable energy projects **New York City (1)** has ever undertaken. Based on the Ameresco teams' performance and partnership, the portfolio was expanded from an initial four sites to include 60 additional locations within various City Departments.
- A partnership with the **City of Chicago, IL (3)** includes the largest smart LED streetlighting retrofit project in the United States that **created job opportunities for local Chicago residents with barriers to employment**, multi-phased energy efficiency projects with the Public Building Commission and Chicago Park District, and a recently awarded solar project. Additionally, Ameresco provides energy supply management services for the City and Chicago Housing Authority.
- Energy conservation, a complete streetlighting retrofit of over 100,000 fixtures to LED, a 20-year biogas and site lease agreement, and solar PV installations with the **City of Phoenix, AZ (5)**.
- A $47.5 million project with the **City of Philadelphia, PA (6)** to design, build, and maintain an innovative WWTP biogas-to-energy facility and an LED retrofit of approximately 130,000 streetlights with lighting controls, currently in construction.
- The **City San Antonio, TX (7)** Water Systems partnered with Ameresco under an EaaS Power Purchase Agreement to create an innovative biogas project that was the first sustainable project

of its kind in the nation.

- The **City of San Diego (6)** PPA recently awarded Ameresco a solar, battery storage, and microgrid project on the newly constructed Oak Park Library. This pilot project will inform process on two subsequent projects.
- History with the **City of Dallas, TX (9)** that has included energy upgrades at Love Field; the design, construction, finance and operation a 4.2 MW biogas cogeneration facility at the Southside Wastewater Treatment Plant; and rooftop solar at three City locations **while creating on the job training opportunities for low income Dallas residents pursuing careers in clean energy**.
- An LED upgrade of over 77,000 streetlights with networked controls in partnership with Memphis Light, Gas and Water and the **City of Memphis (38)** that included a **significant investment in the Memphis economy** through collaboration with local talent who were hired to participate in the construction of the upgrades.

Additionally, Ameresco is a leading provider of community solar development and management to local government partners. Following a fruitful energy savings performance contract to address deferred maintenance and provide energy savings, Montgomery County, MD selected Ameresco to develop the **nation's largest community solar farm to be 100 percent dedicated to low and moderate income residents**. Building on Ameresco's expertise in developing and administering community solar developments across the country, the array, sited on the capped Oaks Landfill in Gaithersburg, **transformed underutilized land into an environmental asset that brings local jobs and clean, renewable energy to the community.** The project, a total of 6 MW, is divided into three 2 MW arrays, and will generate approximately 11.7 million kilowatt hours annually. Array 1 is for use by the County and under a power purchase agreement, providing the County government clean, renewable energy at no upfront cost. Arrays 2 and 3, each 2 MW, will provide low-to-moderate income residents 100% of the generated electricity at a 25% utility cost savings.

Federal Government

In addition to local and state agencies, Ameresco works extensively with the federal government, having **guaranteed more than $4 billion in cost savings to the Federal government over the past twenty years, a billion dollars more than any other Federal energy services provider**. The repeat business presented in Table A.2 substantiates Ameresco's qualifications and customer focus. This success stems from our depth of engineering and operations talent, our commitment to innovation, our readiness to transfer risk from the government, and our responsive management structure.

Table A.2. Repeat Federal Performance Contracting Business

Agency	Ameresco Projects
U.S. Navy	• Multiple phases of ESPC work at Portsmouth & Norfolk Naval Shipyards (PNSY/NNSY) over the past twenty years • Successful ESPC projects delivered at Naval Air Station Fallon and Naval Base San Diego • DOE ESPC task orders in implementation at PNSY and NNSY ***featuring generation, storage, and microgrid controls*** • Competitively ***selected in 2021*** for two ESPCs ***featuring generation, storage, and microgrid controls,*** one at Naval Support Activity Monterey in California and the other at Naval Submarine Base Kings Bay in Georgia • Competitively selected in 2021 by Pacific Gas and Electric to develop a utility energy service contract (UESC) project at Naval Air Weapons Station China Lake in California

Agency	Ameresco Projects
U.S. Air Force	• $44M ESPC at McGuire AFB in New Jersey • $133.5M ESPC at Joint Base San Antonio in Texas ***featuring generation, storage, and microgrid controls*** • $19M ESPC in construction at Cannon AFB in New Mexico featuring generation • $50M ESPC in implementation with $100M second phase pending execution at Joint Base McGuire-Dix-Lakehurst in New Jersey ***featuring generation, storage, and microgrid controls***
U.S. Coast Guard	• $55M ESPC featuring landfill gas to energy (LFGTE) Renewable Energy Center at USCG Yard in Baltimore, Maryland • $39M UESC with Eversource delivering onsite CHP and solar generation at the Coast Guard Academy in Connecticut • ***Selected in 2021*** for an ESPC ***featuring generation, storage, and microgrid controls*** at TRACEN Petaluma
General Services Administration	• Five completed projects in 30 buildings in eight states and Washington, DC, totaling more than $170M in project investment over the past 5 years • $8M UESC with Oklahoma Gas & Electric featuring ***generation, storage, and microgrid controls*** currently in construction at 3 Federal buildings in Oklahoma • ***Selected in 2021*** for a new ESPC at 11 Federal buildings in Texas and Louisiana
Veterans Administration	• Four consecutive competitive selections for projects currently in construction totaling more than $200M in aggregate project investment at 15 VA Medical Centers in 7 states, including Georgia

Ameresco has analyzed, recommended, and installed energy conservation measures (ECMs) in categories ranging in scope from a few select buildings to installation wide ECMs. With respect to resiliency, Ameresco is currently designing or deploying fence-to-fence, Unified Facilities Criteria (UFC)-compliant projects for each military service featuring microgrid solutions encompassing onsite power generation, energy storage, and resiliency controls that address infrastructure needs, with guaranteed equipment availability and efficiency.



Project Spotlight: Fort Leonard Wood, MO

In 2019, Ameresco was awarded a Design-Bid-Build contract under the Energy Resilience and Conservation Investment Program (ERCIP) by the US Army Corps of Engineers Kansas City District to install a 2.5 MW natural gas driven reciprocating engine/combined heat and power (CHP) system at the Specker Boiler Plant at Fort Leonard Wood (FLW), Kansas. The project included all associated pumps, controls, interconnect fees, and civil/mechanical/electrical upgrades. The CHP produces electricity that feeds directly into FLW's local electrical grid (operated by Laclede Electric). The stack gas waste heat generated by the CHP provides heat for the high temp hot water distribution network serving approximately 45 buildings. The generator/CHP runs year-round (aside from regular maintenance), providing baseload heat for the buildings connected to the heating distribution network.

The plant can operate in island mode and provide power to the heating plant in the event of a utility outage. Upon return of utility power, the plant can automatically reconnect to the utility in a closed transition manner and return to normal operations without loss of power to the plant.



Serving Missouri for Over Two Decades

Ameresco has been proudly developing and implementing energy and utility projects throughout Missouri for over 20 years. Since that time, Ameresco has implemented projects with municipalities and the State of Missouri, a $1.9 million project with the **Columbia Housing Authority**, a federal military installation (see **Fort Leonard Wood** on preceding page), and several school districts, including recent awards of nearly $29 million at St. Louis Public Schools. Select project highlights follow.



In partnership between **Jefferson City, the State of Missouri Department of Corrections, Republic Services, and Columbia Water & Light**, Ameresco implemented a complex 3.2 MW renewable energy cogeneration project and energy savings performance contract at the Algoa and Jefferson City Correctional Centers. Through the creative use of financing and investment, the project improved aging infrastructure, and makes better use of the landfill gas waste stream to protect the environment and create affordable power for the community.

Ameresco designed, built, owns, and operates the landfill gas to energy (LFGTE) cogeneration plant located next to the Jefferson City Correction Center. The green power is purchased by Columbia Water & Light through a 20-year power purchase agreement. Ameresco also installed several infrastructure and mechanical upgrades at the correctional centers, as well as several lighting and electrical upgrades at both correctional facilities and the nearby State Police Headquarters with related facilities.



Ameresco's Applied Energy Group (AEG) partners with utilities, government agencies, and other organizations to provide personalized consulting services and customizable technology solutions that solve complex energy challenges. The group provides tools, services, and solutions to address regulatory requirements, automate processes, and increase profits. In Missouri, the group provides program management, application processing, and customer contact center support for **Ameren MO's** Business Solar and Electric Vehicle programs. In this role, the group fields calls and email inquiries from customers and trade allies and works with Ameren MO staff to resolve questions. AEG interfaces with the client's engineering review staff and bi-directional meter install teams to manage the multiple steps required to approve grid connected systems. Trade ally support requires enforcement of program policies and resolution of customer complaints regarding trade allies.

AEG also administers **Spire's** Commercial and Industrial (C&I) custom and prescriptive energy efficiency rebate programs. Besides program management, application processing, and customer contact center support, the group conducts engineering reviews of custom projects for reasonableness and cost effectiveness. The group works with Spire's Energy Efficiency team to provide technical assistance to customers and trade allies and supports the client during third-party evaluation of program impacts and processes. In addition, AEG provides program planning and design services, and regulatory assistance for Spire's overall energy efficiency portfolio.



Since 2003, Ameresco partnered with **Hazelwood School District** performing energy improvement projects and infrastructure upgrades. Nearing $100 million in total improvements across 3.2 million ft^2 and spanning 14 phases, measures range from simple lighting upgrades to deep energy retrofits such as rooftop unit and boiler replacements, to security upgrades, to restroom renovations to meet ADA requirements. As part of a recent project, Ameresco was awarded the Ameren BizSavers Trade Ally Star (2020) for our design and implementation of energy retrofits, districtwide. Notably and reinforcing our dedication to the communities in which we service, Ameresco has utilized **38% aggregate MBE participation** for projects with the District.

Financial Strength

Ameresco recognizes that it is paramount to have an energy partner that is not only technically qualified, but also financially strong, with a stable and solid track record of performance in the capital markets. With 2023 revenues of $1.37 billion and a construction backlog of $1.3 billion, Ameresco is a leading independent energy services companies in the United States. For the year ending 2023, Ameresco had total assets of approximately $3.7 billion and a $495 million credit facility. In addition, we maintain a $2 billion surety credit facility through a corporate provider with an AM Best Rating of "A Excellent."

Accreditations and Pre-Qualifications

NAESCO

The National Association of Energy Service Companies (NAESCO) is the leading advocacy and accreditation organization for Energy Service Companies dedicated to modernizing America's infrastructure through performance contracting. Ameresco's CEO, George Sakellaris, was one of the founding members of NAESCO, and served as its president for several years.

Encompassing energy and utility resource conservation and procurement services, the NAESCO accreditation is a rigorous examination of a company's core competencies and business practices. The examination includes an evaluation of the precise nature of the applicant's business; the range of measures and services offered to customers; the availability of a performance-based project approach; ethical business practice commitment; project engineering and design, financing, project management, operations and maintenance capabilities; and the capability to verify and monitor energy cost savings. **Ameresco met, and embodies, all these criteria and will leverage these core competencies for a resultant project with the City.**

Prequalifications

Ameresco is recognized by both the U.S. Department of Defense (DOD) and Department of Energy (DOE) as a federal qualified ESCO. Like NAESCO's accreditation process, these federal qualifications are based on independent evaluations of Ameresco's capabilities and ability to successfully develop, finance, implement, and perform long-term performance services on behalf of its customers.

Current Contracts/Clients

Provide a list of and a short summary of information regarding the vendor's current contracts/clients.

As large, publicly traded company, the company reported in its most recent quarterly filing for the period ending March 31, 2024 and Q1 2024 Supplemental Information, the following sources of revenue:

- $204.3M Projects: Energy efficiency and renewable energy projects
- $68.5M Recurring: Energy & incentive revenue from owned energy assets; plus recurring O&M from projects
- $25.6M Other: Services, software and integrated PV

Current clients span market sectors including Federal, state and local governments, utilities, healthcare and educational institutions, housing authorities, and commercial and industrial customers, including

several of those referenced throughout this document. Additional current projects announced since Q1 include:

- $33 Million Energy Project to Reduce Emissions while Modernizing Infrastructure at Key U.S. National Archives and Records Administration Sites
- Ameresco Awarded $21 Million Contract to Illuminate Henderson's Streets with State-of-the-Art LED Technology
- Installation of Energy-Efficient Solar Arrays in Partnership with Wakefield Municipal Gas & Light
- Energy Savings Performance Contract to Upgrade Energy Efficiency & Modernize Historic Building in Columbia County, Oregon
- Ameresco Begins Construction of Biogas Cogeneration Project in Sacramento, California

Contracts/Clients Gained and Lost with Past Two Years

List, identify, and provide reasons for each contract/client gained and lost in the past two (2) years.

Our customers choose to prioritize efficiency and the development of clean, green energy sources and our solutions are customized to serve the specific needs of each customer and meaningfully reduce or offset their carbon footprint. From energy conservation through a variety of measures to the generation of green, renewable power, our customers and their communities reap the benefits of reducing energy consumption, costs, and associated carbon emissions.

In 2023, we served customers throughout the United States, Canada, and Europe. Approximately 71.8% of our revenues were derived from federal, state, provincial, or local government entities, including public housing authorities, public universities, and municipal utilities.

Ameresco's new awards in 2023 were approximately $2.2 billion, double 2022's $1.1 billion. During the year, we increased Ameresco-owned Assets in development by 199 MWe to 669 MWe, while also bringing 118 MWe into operation in 2023. Ameresco's robust backlog and growing assets in development are strong indicators of how well aligned our capabilities are with market demand.

We strive to be a trusted sustainability partner creating valued, single-sourced, efficient energy solutions delivered with passion, expertise, teamwork, and a relentless focus on customer satisfaction. Accordingly, while there have been customer-initiated scope modifications or discontinuation of services (e.g., M&V, O&M, et al) for various reasons, Ameresco has never had a contract terminated for cause.

History of Firm and Years in Business

Please provide a brief history of your firm and number of years in the ESCO business.

As noted earlier in this Exhibit, Ameresco was founded in April 2000, and has operated under its current name since its inception. A visionary and entrepreneur, Mr. George Sakellaris aspired to build an entirely product-neutral and supplier-independent energy company that had the skills, capabilities, and foresight to create independent energy solutions that went beyond just conservation; one that addressed a customer's entire energy stream including supply and demand, energy efficiency and renewable energy.

Mr. Sakellaris remains Ameresco's President and CEO today and the firm has been offering ESCO services for nearly a quarter of a century.

In-House Resources and Expertise

Describe your firm's in-house resources and expertise in the areas described above, as this will be considered a strong point for leveraging best practices and for ensuring a single point of accountability.

We are a one-stop provider with the ability to develop, design, construct, guarantee, operate and maintain complex multi-faceted projects. At the core, customers choose Ameresco because we are uniquely positioned as...

- **Innovative:** Ameresco is an innovative technology integrator with a comprehensive portfolio of energy and utility resource conservation and renewable energy solutions. Our creative staff with specialized technical knowledge drive state-of-the-art design and engineering. We believe in excellence and innovation in every project.
- **Experts:** We deliver a broad and deep solution portfolio within a single energy and utility resource partner. From design and development to financing and construction, our in-house technical expertise sets us apart. **Energy and utility resource efficiency along with distributed energy generation is at the core of our business. It is who we are, and it is what we do.**
- **Independent:** Our objective approach enables us to implement the most advanced technologies to meet the unique needs of each customer. We deploy best-in-class solutions with **no technical or vendor bias**.

At the City's direction, Ameresco can assist in the identification and implementation of both demand- and supply-side energy and utility resource solutions.



Our projects incorporate innovative technology and techniques, customized to improve the efficiency of major building systems. **Energy Efficiency** measures and upgrades often include lighting, water, heating, ventilation, cooling, building envelope, smart meters, water and wastewater treatment plants, and controls.

We promote resiliency and sustainability by developing and building **Distributed Energy Generation, Storage Systems, and Microgrids**. We can build, operate, and maintain these plants, or can build plants under our ownership to mitigate customer risk while providing the localized benefit of onsite energy generation.

Ameresco's experience in building modernization, retrofits, and work with utility distribution systems and design-build construction falls into the **Infrastructure** expertise bucket. Ameresco has worked to monetize existing energy and water/wastewater assets and take ownership and operation off a customers' balance sheet.

Data drives our **Energy Analytics & Supply** solutions ranging from our proprietary asset management software, AssetPlanner™, to energy procurement services for negotiating contracts and stabilizing customers' energy budgets.

Our holistic approach to energy and utility resource solutions ensures end-to-end technical guidance, from project inception to continued **Operations & Maintenance (O&M)** of systems. Ameresco understands that a well-designed and properly executed O&M program is a crucial element in the equipment performance and maintenance required to realize all possible energy and utility resource savings.

With over 1,500 employees, Ameresco's staff manages and conducts its audits, project development, project and construction management, and measurement and verification using **in-house resources**. In a collaborative approach with the City of Columbia, Ameresco will establish subcontractor alliances as needed. We look favorably to contractors that have had positive experiences with the City, as such, Ameresco will establish a prequalified list of local subcontractors and vendors in collaboration with the City and designed to have the maximum benefit to the community.

Mr. Dana Dunn, Senior Account Manager, will serve as the City's Project Administrator and Primary Point of Contact from initiation of the pilot project through completion of installation and commissioning. Additional key individuals serving a prominent role at have been identified in Personnel Expertise (Exhibit C). These key individuals will be led by Mr. Dunn to ensure that all aspects of the program are aligned with the identified goals and objectives and completed to the City's satisfaction.

While Mr. Dunn will act as the primary point of contact throughout the program, Ameresco will also provide the City a single point of contact for onsite construction activities. To ensure the success of a project, Ameresco utilizes Program Management processes and tools to maintain quality while staying on budget. Tools include detailed project work plan(s), communication, documentation, reporting, cost and schedule tracking, design control, and adherence to our quality control process.

We understand that systematic processes and procedures are necessary for timely project completion and assuring the viability of long-term performance. Part of our successful program includes effective communicating throughout every step of the process. This takes the form in both meetings to review, collaborate and evaluate the design for efficiency, constructability, and economic efficiency.

Additional personnel required for the project will be existing Ameresco shared resources. Examples include Ameresco's professionals dedicated to supply chain and purchasing, project and material logistics, finance, measurement and verification, and marketing.

Offeror's Business Unit

Provide a description of the offeror's business unit dedicated to implementing Energy Savings Performance Contracting projects.

Since our inception over 24 years ago, Ameresco's only business has been energy, and the execution of performance-based energy solutions is the core function supported by our dedicated company of professionals. As such, **every team member is a dedicated to energy and utility resource conservation**. Of Ameresco's over 1,500 employees, job classifications are comprised of the following:

- Engineering 23%
- Project Management and Safety 18%
- Post-Construction (M&V and O&M) 18%
- Administrative (Finance, HR, IT, Legal) 16%
- Sales 13%
- Technology and Consulting 8%
- Other 4%

Our team of experts will develop and deliver custom solutions that meet the unique energy conservation, economic, operational, and sustainability goals of the City of Columbia.

Exhibit B. Experience

The offeror should provide information related to previous and current services/contracts of the offeror or any proposed subcontractor where performance was similar to the required services of this RFP. The information may be shown on Exhibit B or in a similar manner.

Current/Prior Experience

The following projects have been selected to highlight Ameresco's experience and offerings similar to the required services contemplated as part of the City's RFP.

- City of Boulder, CO
- City and County of Denver, CO
- City of Mankato, MN
- City of Missoula, MT
- City of Plainview, TX
- City of South Bend, IN
- City of Wichita Falls, TX
- Hamilton County, OH
- United Government of Wyandotte County and Kansas City, KS
- U.S. General Services Administration (GSA)

Additional information for any project referenced herein will gladly be furnished upon request.

| 1 | Offeror Name or Subcontractor Name: Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of Boulder, CO**
Address of Reference Company/Client:	1777 Broadway Boulder, CO 80302
Reference Contact Person Name, Phone #, and E-mail Address:	Michele Crane, Facilities Chief Architect P. 303.441.4275 E. cranem@bouldercolorado.gov
Title/Name of Service/Contract	City of Boulder Master Agreement for As-Needed Energy Performance Contracting (ESPC) Services; City of Boulder Facilities Master Plan
Dates of Project Initiation and Project Completion:	Master Agreement (ESPC): Sep 2016 – Dec 2021 Brenton Building: Apr 2017 – May 2018 63rd Street WWTP Solar: Mar 2018 – Jul 2018 Boulder Public Library: Oct 2018 – Jul 2020 Citywide Exterior Lighting: Apr 2018 – Oct 2018 Citywide Interior Lighting: Jul 2021 – Apr 2023 Capital Planning: Feb 2020 – Sep 2020 Asset Planner® SaaS: July 2020 – June 2025 Facilities Master Plan: Feb 2021 – Sep 2022 Sustainable Deconstruction: Nov 2019 – Jun 2021; Jun 2022 – Aug 2023
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	**Energy Performance Contracting Measures** Ameresco's ongoing relationship with the City of Boulder has been the product of numerous successful endeavors, all working towards a common goal. Ameresco was selected by the City of Boulder in the Spring of 2016 as their long-term energy partner. At the time, the City had recently passed numerous citywide energy codes as well as long-term energy commitments and found Ameresco to be the most qualified comprehensive energy solutions provider to tackle the numerous goals and commitments.

Since being selected, Ameresco has developed successful projects yielding fruitful financial returns, but also a streamlined approach to achieving the expressed goals. Projects have included new HVAC systems, energy recovery ventilation systems, building automation systems, window and roof replacements, and LED lighting upgrades and lighting controls throughout City buildings, as well sustainable interior and exterior deconstruction across six facilities, including the 63rd Street Wastewater Treatment Plant.

In addition, Ameresco also implemented the largest single solar photovoltaic array owned by the City of Boulder at the 63rd Street Water Treatment Plant. This 1.6 MW project, along with a previously installed smaller array, account for roughly 60% of the energy consumed at the plant.

> "Ameresco was commissioned to construct a 1.6MWdc ground mount solar PV system at the City of Boulder's 63rd Street Wastewater Treatment Plant. This project presented numerous challenges such as relocating established wildlife on the property, future-proofing the solar development to account for upcoming expansions of the plant itself, working with Xcel Energy to secure solar incentives which improved the ROI of the project, and working within a short construction timeline – the project was completed in less than two months. **To date, the project is exceeding expectations, has withstood extreme weather, and resulted in the water treatment plant reducing its annual energy consumption by roughly half of its original utility baseline.**"
>
> *Douglas Sullivan, Utilities Principal Engineer*





Capital Planning, AssetPlanner Software-as-a-Service and Facilities Master Plan

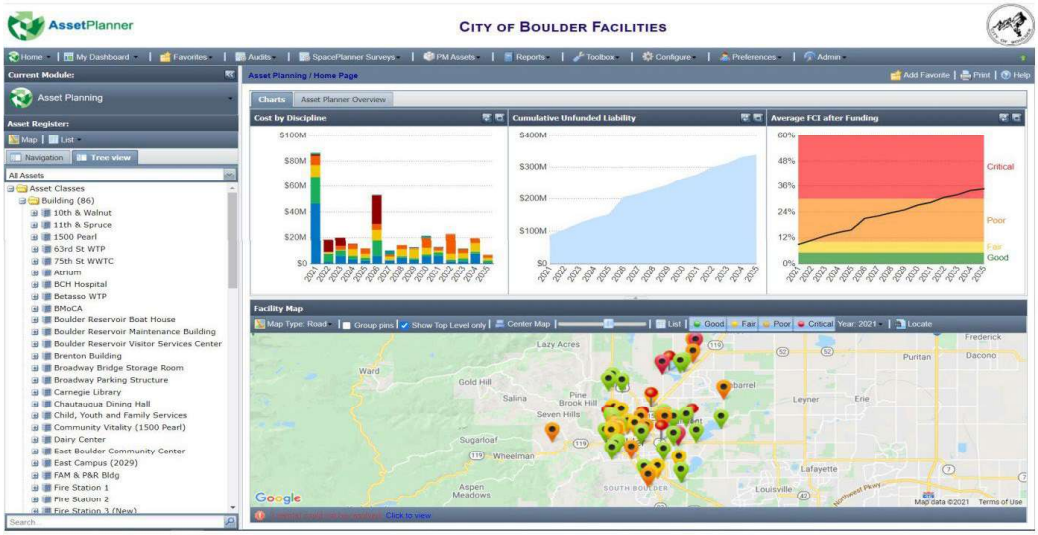
The City of Boulder's Climate Action Plan calls for an 80% reduction in emissions from City buildings by 2030. Further, it strives to enable Boulder to become a net-zero city by 2035 and a carbon-positive city by 2040.

These ambitious targets required a Facilities Master Plan (FMP) to align with these goals and address the City's aging building portfolio. Partnering with Ameresco, the City set out to quantify and baseline building performance in terms of environmental sustainability, social responsibility, and financial stewardship – three pillars of asset management.

Enterprise Asset Management & Planning

The City of Boulder engaged with Ameresco to establish a long-term capital plan and quantify the deferred maintenance of their facilities portfolio, comprised of 75 facilities and ~1.8 million ft^2 of gross floor area. Utilizing the AssetPlanner® software solution, Ameresco developed capital lifecycle needs, analyzed operational expenditures over a three-year period, and calculated the total cost of ownership for each of the City's facilities. Ameresco's comprehensive needs analysis was a key component of Boulder's acclaimed FMP. Sustainability Advisory and Master Capital Planning helped provide the financial and environmental baseline for scenario modeling and analysis; where various strategies were modeled against a "do nothing" scenario to communicate impact

and alignment to City goals. Another key activity of the FMP involved portfolio tiering – a decision development model that incorporates objective scoring and tiering of facilities against six guiding principles to prioritize them for strategic direction.



Sustainable Deconstruction





Another component of the City of Boulder's climate action plan includes being a national example of preservation of embodied energy through adaptive reuse. The City's sustainable deconstruction ordinance requires the diversion of 75% of the materials generated from deconstruction, by weight, from the landfill. As part of a redevelopment project, the City purchased a former hospital building site which was set for deconstruction.

Partnering with Ameresco, the City's zero waste team worked together on waste diversion to recycle lighting and plumbing fixture, carpet squares, doors, windows, and eWaste such as computer boards. Other items such as pumps and electrical equipment went out for auction for direct reuse. The steel from the deconstruction will be reused to help build a new fire station and other projects in Boulder.

Additionally, the team went beyond the ordinance requirements by compacting and reusing the mortar and concrete which doesn't waste the past carbon energy or "embodied carbon" – CO_2 or greenhouse gas emissions associated with the construction, maintenance, renovation, and end-of-life of a building.

By the end of the project, it is estimated that the percentage of waste diversion reached nearly 90%.

Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Rob Sevier, Senior Account Executive; John O'Herron, Director – Business Development; Erin Ells, Senior Project Development Engineer; Scott Faller, Director – Operations; Graham Maxwell, Senior Director – Energy and Climate; Jay Fleishman, Senior Vice President – Engineering; Scott Logan, Project Manager; Thomas Bane, Manager – Construction; Greg Studier, Senior M&V Engineer; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 2 | **Offeror Name or Subcontractor Name:** Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City and County of Denver, CO**
Address of Reference Company/Client:	201 W. Colfax Avenue, Unit 1110 Denver, CO 80202
Reference Contact Person Name, Phone #, and E-mail Address:	Tom Ochtera, Energy Manager P. 720.913.5708 E. Thomas.Ochtera@denvergov.org
Title/Name of Service/Contract	Phase I: Energy Performance Agreement (preceded by Investment Grade Audit Agreement) Phase II: Energy Performance Agreement (preceded by Investment Grade Audit Agreement) Phase III: Investment Grade Audit Agreement
Dates of Project Initiation and Project Completion:	Phase I: Dec 2015 – Mar 2017 Phase II: Jan 2020 – Nov 2022 Phase III: Mar 2024 – Dec 2024
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	**Phase I** Ameresco partnered with the Strategic Initiatives Division of General Services and with funding provided by Denver's Environmental Health Department, to identify and implement an energy performance contract (EPC) with the City and County of Denver. Ameresco was pre-qualified by the Colorado Energy Office and Denver selected the energy service provider for the City's first-ever EPC.   Beginning construction in January 2016, Denver's EPC included a total of 88 energy efficiency improvements to 14 of the City's most energy intensive buildings, including four recreation centers, four libraries, three fire stations, and the 911 Call Center. The project identified and targeted some of the City's largest energy consumers for efficiency upgrades. Measures included: • Interior and Exterior Lighting Retrofits • Lighting Controls • Energy Management Control System Upgrades • Pump Improvements • Pipe and Equipment Insulation • Pool Covers • Vending Machine Controls • Transport Gas • Building Envelope Measures • Education Program and Live Energy Monitoring

	Through these improvements, the City will save over $2.4 million in the first 15 years. **Phase II** Beginning first with an Investment Grade Audit of 22 library and recreation center facilities comprising over 525,000 ft^2, Phase II included interior and exterior lighting upgrades, as well as the installation of a motorized reel and cable systems to deploy and retract new fabric pool covers by the push of a button at the Washington Parks and Recreation Center. Additionally, an energy information system (EIS) was installed for real-time electricity and natural gas metering monitoring under Ameresco's AssetPlanner Energy & Sustainability Module that will allow the City to:   • Track energy performance over time, including demand interval data. • Benchmark against industry targets. • Identify savings opportunities and develop accurate reporting. • Create consumption baselines and cost avoidance reports using built-in weather normalization. • Assess greenhouse gas emissions and calculate the carbon footprint of assets. **Phase III** Most recently, Ameresco was selected for a Phase III initiative to perform investment grade audits across several parks and recreation, golf, and public safety facilities comprising approximately 2 million square feet.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Rob Sevier, Senior Account Executive; John O'Herron, Director – Business Development; Erin Ells, Project Development Engineer; Scott Faller, Director – Operations; Jay Fleishman, Senior Vice President – Engineering; Joe Brajdich, Senior Project Manager; Mitch Boatman, Senior Project Manager; Thomas Bane, Manager – Project Management; Greg Studier, Senior M&V Engineer; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 3 | **Offeror Name or Subcontractor Name:** Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of Mankato, MN**
Address of Reference Company/Client:	501 S. Victory Drive Mankato, MN 56001
Reference Contact Person Name, Phone #, and E-mail Address:	Jeffrey Johnson, PE, Public Works Director P. 507.387.8640 E. jjohnson@mankatomn.gov
Title/Name of Service/Contract	Energy Services Agreement First Amendment to the Energy Services Agreement
Dates of Project Initiation and Project Completion:	Phase I: Mar 2017 – Feb 2018 Phase I Amendment: Dec 2017 – Feb 2019
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	The City of Mankato partnered with Ameresco, Inc. to implement a strategic plan to maximize sustainable energy reduction savings within the framework of the City's desired payback term. Ameresco identified a self-funding Scope of Work which generates cost savings benefits, reduces operating costs, and minimizes impending capital improvement expenditures. Phase I improvements were implemented throughout the City at government facilities, public works, water and wastewater treatment plants, the airport terminal and hangars, several parks and parking facilities, and streetlighting infrastructure. Measures included: • Facility LED Lighting Upgrades, including at the Mayo Clinic Health System Event Center (formerly Verizon Center) • LED Streetlights • Water Conservation • Building Envelope Improvements • Mechanical Insulation Improvements • Building Automation Improvements • Boiler Replacement As a result of the successful Phase I project, an Amendment to the original contract was issued to implement several improvements at the Civic Center. Measures included new air cooled chiller, boiler plant upgrades, arena space dehumidification, arena air handler upgrades, isolation doors, and building automation system upgrades.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Eric Laumeyer, Senior Business Manager; Kent Wolf, Senior Account Executive; John O'Herron, Director – Business Development; Marc Retish, Senior Business Manager – Asset Management; Scott Faller, Director – Operations; Jay Fleishman, Senior Vice President – Engineering; Thomas Bane, Manager – Project Management; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight







| 4 | **Offeror Name or Subcontractor Name:** Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of Missoula, MT**
Address of Reference Company/Client:	435 Ryman Street Missoula, MT 59802
Reference Contact Person Name, Phone #, and E-mail Address:	Ross Mollenjauer, PE, P. 406.552.6764 E. mollenhauerr@ci.missoula.mt.us
Title/Name of Service/Contract	City of Missoula Solar Energy Agreement
Dates of Project Initiation and Project Completion:	May 2022 – March 2028
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	Ameresco has been assisting the City of Missoula with plans for meeting their 100% clean electricity goal. Recently, Ameresco completed a solar PV array at the City's wastewater treatment plant. The project presented several challenges, most notably: • Missoula was interested in third-party ownership arrangements which allow them to benefit from the renewable energy without having to invest capital for construction. • Missoula was interested in a ground mounted system, but the installation site had waste concrete and rebar buried just inches below the soil. • Missoula wanted to maximize the solar production potential for the site far exceeding the utility's 50 kW AC net metering cap.   Ameresco first had to study relevant legislation to ensure third-party ownership via a solar energy agreement was feasible in Montana, then we worked with our subcontracting partner to design geo-ballasted, non-penetrating ground mount racking to accommodate the unique site conditions, and finally, we carefully studied the facility's interval demand data to maximize the size of the solar array while not exporting power to the grid. The final design was a 545 kW DC behind the meter, non-export solar PV array. The project went live in March 2023 and will be operated under a 25-year solar energy agreement. Ameresco and the City hope this project will serve as an example for other Montana communities and we continue working together to help move the City towards carbon neutrality by 2025 and 100% clean electricity by 2030.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Matt Thompson, Senior Account Executive; Brian Solan, Director – Business Development; Tim Farkas, Director – Finance; Jay Fleishman, Senior Vice President – Engineering; Marcus Eidal, Construction Manager; Natasha Coats, Senior Project Manager; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 5 | **Offeror Name or Subcontractor Name:** Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of Plainview, TX**
Address of Reference Company/Client:	202 W. 5th Street Plainview, TX 79072
Reference Contact Person Name, Phone #, and E-mail Address:	Neil Weems, Director of Public Works P. 806.296.1125 E. nweems@plainviewtx.org
Title/Name of Service/Contract	City of Plainview ESCO and AMI Project
Dates of Project Initiation and Project Completion:	May 2023 – Sep 2024
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	The City of Plainview entered into a Project Development Agreement in September 2022 and was subsequently issued a Notice to Proceed granted in May 2023 to implement a citywide advanced metering project, as well as several energy upgrades throughout City facilities.  **Water Meter Replacement & Advanced Metering Infrastructure** The City selected Ameresco to implement a citywide replacement of 7,725 water meters and advanced metering infrastructure (AMI) solution. Additionally, Ameresco is replacing all meter boxes and installing 21 new meter vaults for various meters 3" and larger. As part of the project, Ameresco will setup, install, and integrate all software and associated data with the City's billing software including the new AclaraOne AMI software and VertexOne's WaterSmart customer portal.  Selected in May 2024, the City's Water Meter Project was recently presented the 2024 American Public Works Association – Texas Chapter (TX-APWA) Project of the Year for Environment Award, in the projects of $5 million to $25 million category, at the TX-APWA Annual Conference. The award, which recognizes excellence in public works projects, is given to projects that have a positive impact on the community. The selection criteria included good construction management techniques, safety performance, community relations, environmental protection, unusual accomplishments under adverse conditions, and the use of alternative materials, practices, or funding that demonstrate a commitment to sustainability, climate change, and resiliency. This award is a prestigious recognition of the hard work and dedication of the City of Plainview and Ameresco, as well as the commitment to improving the lives of the Plainview community.  **Facility Measures** In addition to the water meter placement and AMI project, Ameresco is providing interior and exterior LED lighting retrofits for 258 fixtures and HVAC upgrades,

	consisting of seven AC split systems and two evaporative coolers at the Plainview Country Club. In Year 1, the project is expected to provide $3,096 in energy savings, $185,565 in water and sewer revenue increase from new meters, and operational savings totaling approximately $124,000 ($40,000 for hardware and $84,000 from no longer manually reading water meters).
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Chad Nobles, Senior Metering Infrastructure Account Executive; Vince Drieling, Vice President – Business Development; Aaron Stone, Project Development Engineer; Angela Hedgecock, Project Development Engineer; Jay Fleishman, Senior Vice President – Engineering; Garrett Luther, Senior Project Manager; Russell Kennedy, Director of Construction; Travis Prill, Senior Measurement and Verification Engineer; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight.

| 6 | Offeror Name or Subcontractor Name: Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of South Bend, IN**
Address of Reference Company/Client:	120 S. Dr. Martin Luther King Jr. Boulevard South Bend, IN 46601
Reference Contact Person Name, Phone #, and E-mail Address:	Eric Horvath, Public Works Director P. 574.235.9251 E. ehorvath@southbendin.gov
Title/Name of Service/Contract	Phase I: Century Convention Center ESPC and Solar Phase II: Morris Performing Arts Center ESPC
Dates of Project Initiation and Project Completion:	Phase I: Apr 2015 – Oct 2016 Phase II: Dec 2021 – Feb 2023
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	**Phase I** In March 2015, the City of South Bend selected Ameresco to implement several improvements to the 225,000 ft^2 Century Center Convention Center aimed at reducing energy costs and helping market the 38-year-old building to a wider array of clients.  "One of several vendors to bid on the project, **Ameresco was chosen because of its experience working with local governments**", said Leanna Belew, the convention center's general manager. *South Bend Tribune, March 2, 2015* Measures implemented as part of this project included: • Lighting Replacements and Upgrades • HVAC System and Controls Upgrades • Ceiling Tile Replacements

	• Roofing Replacement • Installation of Solar PV and Public Display Showing Current and Historic Solar Production **Phase II** The City of South Bend again engaged Ameresco to implement a Phase II project at the historic Morris Performing Arts Center and Palais Royale Event Center. This significant project is aimed at improving attendee and performer comfort while also delivering energy savings through major mechanical, HVAC, and lighting upgrades.  Measures for this phase included: • Boiler and Pump Replacement • HVAC System Replacements and Upgrades • Heat Pump Controls Upgrades • New Building Automation System • Plumbing Fixture Replacement • Roofing Replacement • Fire Alarm System Replacement • LED Lighting Upgrades "Ameresco has proven to be an excellent partner in the extensive mechanical, lighting and roofing project and the **team has gone above and beyond** to ensure that our needs were met in these distinct and important spaces to our City." *Aaron Perri, Executive Director, South Bend Venues, Parks & Arts*
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Mark Heirbrandt, Senior Account Executive; Steve Taggart, Vice President; Tim Farkas, Director – Finance; Bradley Driver, Senior Project Developer; Phillip Kruer, Senior Project Development Engineer; Dave Shu, Project Development Engineer; Brian Roskens, Manager – Project Development; Garyne Evans, Senior Director – Engineering; Jay Fleishman, Senior Vice President – Engineering; Zaki Mafraji, Manager – Project Management; Brian Cunningham, Director – Construction; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 7 | Offeror Name or Subcontractor Name: Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**City of Wichita Falls, TX**
Address of Reference Company/Client:	1300 7th Street, Room 102 Wichita Falls, TX 76301
Reference Contact Person Name, Phone #, and E-mail Address:	Blake Jurecek, Assistant City Manager P. 940.761.7404 E. blake.jurecek@wichitafallstx.gov
Title/Name of Service/Contract	Phase I: City of Wichita Falls AMI System Installation and Water Meter Replacement Phase II: City of Wichita Falls Streetlighting Performance Contract
Dates of Project Initiation and Project Completion:	Phase I: Feb 2016 – Jun 2018 Phase II: Jul 2018 – Aug 2019
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	Committed to making environmentally responsible infrastructure improvements and cost-saving benefits for their residents, the City of Wichita Falls partnered with Ameresco on two phases of water and energy infrastructure and conservation projects. By retrofitting and replacing energy, water, and lighting system equipment, the City was able to increase revenue and operational efficiencies while reducing operations and maintenance (O&M) costs and electricity consumption.  **Phase I** Following a collaborative evaluation of four different AMI systems and water metering technologies with the City, Ameresco installed a turnkey fixed-based advanced metering infrastructure (AMI) system and replaced positive displacement meters with smart water meters throughout the City. The project replaced 33,249 water meters and rebuilt 189 existing water meters. The Sensus FlexNet system was ultimately selected by the City based on its unique compatibility with the City's existing infrastructure and licensed frequency to mitigate the risk of potential RF interference. Ameresco has continued to support the City, when requested, during the performance period. This includes assisting with adding additional large meters and helping get meters replaced timely under warranty. **Phase II** Following the successful Phase I project, Phase II included the streetlighting replacement of approximately 5,500 existing fixtures with energy efficient LED fixtures. Due to the nature of the photocells installed, this project positions the City as "smart city ready" if the City desires to incorporate smart city applications in the future by connecting to these new photocells. Further, with the 3000K and 4000K fixtures installed as part of this project, the City adheres to International Dark-Sky Association recommendations, as well as American Medical Association (AMA) recommendations for appropriate lighting levels in a municipality; thus, bringing additional value to Wichita Falls residents for years to come. 

Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Billy McCord, Senior Business Development Manager; Chad Nobles, Senior Metering Infrastructure Account Executive; Vince Drieling, Vice President – Business Development; Tim Farkas, Director – Finance; Subroto Gunawan, Senior Project Development Engineer; Dennis Scanlon, Manager – Project Development Engineering; Travis Prill, Senior Measurement and Verification Engineer; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 8 | Offeror Name or Subcontractor Name: Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**Hamilton County, OH**
Address of Reference Company/Client:	138 E. Court Street Cincinnati, OH 45202
Reference Contact Person Name, Phone #, and E-mail Address:	Jeff Aluotto, County Administrator P. 513.946.4436 E. jeff.aluotto@hamilton-co.org
Title/Name of Service/Contract	Hamilton County Multi-Phase ESPC
Dates of Project Initiation and Project Completion:	Phase 1 & 1A: Dec 2011 – Aug 2014 Phase 2: May 2012 – Aug 2015 Phase 4: Feb 2014 – Aug 2016 Phase 5: Aug 2017 – April 2019 Phase 6: Nov 2020 – Jun 2024 Phase 7 & 7A: April 2021 – July 2021 Phase 8: Aug 2022 – Jun 2024 Phase 9: Aug 2024 (in development) Phase 10: Jun 2024 – Jul 2025
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	For over a decade, Ameresco has partnered with Hamilton County, Ohio to provide almost $80 million in guaranteed energy performance contracting projects. Over seven phases of work have been performed, which can be broadly grouped as services at 19 county buildings, the Paycor Stadium (formerly Paul Brown Stadium), and the Great American Ballpark. In phases 1, 1A, 2, 6, and 8, energy conservation measures were installed at numerous sites including the Todd B. Portune Center for County Government, Alms & Doepke Building, William Howard Taft Law Center, County Courthouse, Justice Center, Clerk of Courts, Coroner's Facility, Sherriff's Patrol Headquarters, Communications Building, Public Works Garage, and parking garages. Phases 4, 5, 7, and 7A provided Paycor Stadium, the Great American Ballpark, Hall of Fame, Team Store, and parking garages with significant upgrades. These phases included natural gas-fired boiler plants and piping, building insulation, high-bay destratification fans, kitchen hood demand control ventilation, multiple HVAC control system upgrades, and LED field lights and RGBA colored lights at the stadium.

Phase 1 & 1A



Ameresco quickly and efficiently implemented over $4.2 million in energy efficiency upgrades at six major County facilities and one parking garage utilizing EECBG funds and local utility rebates to cover most of the cost.

Measures included lighting system improvements, building automation and controls upgrades, heat pump replacement, HVAC upgrades, and water conservation measures.

Phase 2



This phase of the project included eight smaller facilities and completed basic energy upgrades for all facilities managed by the County Facilities department. Additionally, the Hamilton County Sherriff's Patrol Headquarters had been plagued by comfort issues due to existing design issues with the HVAC systems throughout the building. Ameresco was able to implement HVAC and building automation system upgrades to improve occupant comfort and minimize the impact on facility utility consumption.

Phase 4



Ameresco installed multiple system upgrades and a state-of-the-art lighting control and monitoring system to alleviate temperature control problems and enhance lighting at the Paycor Stadium, home of the Cincinnati Bengals. The infrastructure upgrades improved the overall experience for fans and athletes while providing a more comfortable environment for utilization of the stadium for non-game events.

Ameresco installed energy efficient equipment and multiple HVAC control system upgrades to the East and West club areas. The upgrades included replacing over 20,000 existing light fixtures and the installation of LED tech sports field lights, as well as a new state-of-the-art DMX lighting control and monitoring system to improve lighting conditions while reducing energy costs.

This budget-neutral project provided significant cost savings from energy efficient upgrades to help improve stadium and field conditions. The newly installed LED field lighting system provides the stadium with high quality, consistent lighting levels, while the heating system measures help maintain temperature control in the club areas.

Phase 5



Ameresco worked with Hamilton County and the Cincinnati Reds' administration and staff to develop solutions to elevate the field lighting quality and fan experience of Great American Ballpark. The project provided substantial operational savings for the stadium, and the budget-neutral energy-saving measures resulted in tax-payer relief of over $434,000 annually.

Significant infrastructure upgrades were made to enhance the ballpark's lighting, HVAC, and plumbing systems. Through

	Ameresco's AssetPlanner® platform, 48 submeters were installed to analyze multiple commodities in real time and during peak use of the stadium. The savings were tracked through the measurement and verification phase to provide an accurate comparison of the stadium performance with respect to its weather-normalized baseline. The installed measures will position the County to consider future funding needs by forecasting infrastructure improvements at the facility. This can be accomplished primarily by leveraging energy and operational savings and reducing existing lease required annual payments. **Phase 6** One of the largest project phases to date, Phase 6 was motivated by the desire to convert the interior T8 fluorescent lighting installed nearly 10 years earlier in Phases 1, 1A, and 2 to new LED lighting technology. The savings were used to provide critical, capital-intensive HVAC equipment and system improvements at the Todd B. Portune Center for County Government (former Administration Building) and the Justice Center. **Phase 7 & 7A** Ameresco installed 22,306 LED field lighting and RGBA colored lighting fixtures at the Paycor Stadium. This ECM was originally approved in the Phase 5 project with the LED field lighting at Great American Ballpark but was removed from the scope soon after contract execution. This allowed the work to be implemented via a change-order to add the scope back to the contract. **Phase 8** Originally developed as part of Phase 6, due to a proposed remodel of the entire facility, the Alms & Doepke building was removed prior to contract execution. This facility was added back in later as Phase 8 upon completion of the building remodel design, so that Ameresco could coordinate the lighting and HVAC control upgrades prior to interior remodeling work. **Phases 9** A Phase 9 project to replace two steam boilers with the new 2500 MBH modular condensing hot water boilers including the installation of heat exchanger, conversion of AHU-1/1A chilled water piping to dual temperature, and the replacement of one air handling unit steam heating coil with hot water heating coil and the replacement of two chillers with modular chillers is currently in development and expected to begin in August. **Phases 10** In June, Phase 10construction will begin on several energy and utility conservation measures to be implemented at Paycor Stadium. Construction of these measures is expected to be completed in July 2025.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Steve Taggart, Vice President; Tim Farkas, Director – Finance; Bradley Driver, Senior Project Developer; Phillip Kruer, Senior Project Development Engineer; Garyne Evans, Senior Director – Development Engineering; ay Fleishman, Senior Vice President – Engineering; Kevin Ryan, Project Manager; Tom Rowan, Director – Construction; Richard McDonald, Commissioning and Controls Specialist; Greg Studier, Measurement and Verification Engineer; Dave Spurrier, Measurement and Verification Engineer; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight

| 9 | Offeror Name or Subcontractor Name: Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**Unified Government of Wyandotte County and Kansas City, KS**
Address of Reference Company/Client:	710 N. 7th Street Kansas City, KS 66101
Reference Contact Person Name, Phone #, and E-mail Address:	Greg Wooton, Buildings Manager P. 913.573.5336 E. gwooton@wycokck.org
Title/Name of Service/Contract	Professional Services Agreement
Dates of Project Initiation and Project Completion:	Phases (Work Orders) 1 – 8: Sep 2020 – June 2024
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	Ameresco was selected in 2018, following a competitive process, to be the Unified Government of Wyandotte County and Kansas City's (WyCoKCK) Energy Partner to identify and complete several projects, issued as work orders under a Professional Services Agreement. Work orders include turnkey design and implementation of improvement measures, and long-term guarantee administration, where applicable. To date, WyCoKCK has engaged Ameresco to perform work under eight separate phases of work. Projects have included a remodel of the Health Department building comprising cooling tower, DDC controls, roofing, and building envelope measures, as well as HVAC upgrades and the installation of bipolar ionization throughout in various buildings and park facilities. Additionally, Ameresco served as the General Contractor to manage the renovation of the historic eight-story Kansas Municipal Courthouse in downtown Kansas City. Ameresco performed a portfolio tiering study designed to segment the City's buildings for strategic actions to prioritize future investments. Strategies included Targeted Improvements (i.e., LED lighting upgrades); Deep Retrofits (i.e., efficiency upgrades, ESPC); Strategic Disposition (i.e., run to failure, sell, consolidate); and Build New. It was critical for the City to look comprehensively and holistically at their building stock, build an objective scoring system for baselining and benchmarking the financial, operational, environmental, and social considerations, and to ensure that they did not continue putting 'good money after bad money' when it came to building renewal. The success of these programs required engagement across all City departments to ensure that building scoring and ranking was reflective of all stakeholder inputs. In May 2024, Ameresco was awarded an additional phase for the installation of various facility renewal and energy improvement measures at the Armoudale, Beatrice Lee, Eisenhower, and Parkwood community centers, and Kensington Gym Arts and Crafts Center.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Scott Faller, Director – Operations; Gary Crabtree, Senior Project Development Engineer; Graham Maxwell, Senior Director – Energy and Climate; Jay Fleishman, Senior Vice President – Engineering; Louis Maltezos, Executive Oversight; Dana Dunn, Senior Account Executive; John O'Herron, Director – Business Development; Steve Taggart, Vice President

| 10 | **Offeror Name or Subcontractor Name:** Ameresco, Inc.

Reference Information (Current/Prior Services Performed for):	
Name of Reference Company/Client:	**U.S. General Services Administration (GSA)**
Address of Reference Company/Client:	1800 F Street NW Washington, District of Columbia 20405
Reference Contact Person Name, Phone #, and E-mail Address:	Patrick Chapman, Senior Contracting Officer P. 817.978.7012 E. patrick.chapman@gsa.gov
Title/Name of Service/Contract	GSA Region 7 UESC with OGE
Dates of Project Initiation and Project Completion:	Aug 2020 – Mar 2022
If service/contract has terminated, specify reason:	Not applicable.
Description of Services Performed, such as: ✓ What the subcontractor did ✓ How the subcontractor did it ✓ Results ✓ Additional Detail	  This project demonstrates Ameresco's capability to deliver deep energy savings in a Utility Energy Service Contract (UESC) project at multiple fully occupied GSA facilities, including historic courthouses, using grid-interactive efficient building (GEB) technologies. Ameresco designed and implemented a comprehensive UESC project for GSA five Federal buildings, comprising nearly 1.1 million square feet in Oklahoma City, OK and Muskogee, OK in partnership with OG&E, the serving utility. This was the first GSA project designed to achieve GEB objectives and scope included several GEB technologies to maximize load flexibility and efficiency. Two of the buildings are listed on the National Register of Historic Places and all facilities remained occupied during construction. Ameresco secured an Assisting Federal Facilities with Energy Conservation Technologies (AFFECT) grant to fund resilience improvements and reduce the Government's total project cost. Buildings as part of this project comprised the Oklahoma City Post Office and Court House, Holloway Courthouse, Oklahoma City Federal Building, Oklahoma City Murrah Federal Parking Garage, and Ed Edmondson U.S. Courthouse. Measures included: • Heating and Cooling Systems • New VFDs • Metering and Submetering • Building Automation System Upgrades, Including New Advanced Control Strategies • LED Lighting and Lighting Controls • Building Envelope Upgrades • 300 kW Fixed-Tilt Solar PV Array • 250 kW/500 kWh Battery Energy Storage (BESS) with Microgrid Control System (MCS) • Energy-Efficiency Transformers Replacements • Smart Irrigation Controls

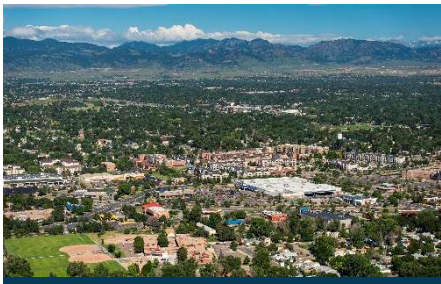
	The BESS and MCS enhance the energy security of the courthouses and garage by allowing the PV system to operate in island mode, powering critical daytime loads during a utility outage. The system generates cost savings during typical parallel operation with the utility by automatically dispatching the solar PV and managing the charge/discharge cycles of the BESS to reduce peak load. It also provides resilience by enabling islanding of the solar PV during utility outages, which reduces the need for emergency generator diesel fuel during extended emergencies. The MCS and BESS also enable the site to participate in GEB strategies such as demand response and load shifting, with the capability to adjust real and reactive power. This project achieved a 41.1% EUI reduction and Year 1 verified savings achieved 103.6% of Ameresco's savings guarantee. The guarantee term is 22 years.
Offeror personnel Assigned to Service/Contract (include all key personnel and identify role):	Nicole Bulgarino, Project Executive; Mark Mullins, Lead Engineer; Zeshawn Ahmad, Construction Director; Josh Fortman, Measurement and Verification

Investment Grade Audit Pricing Approach

Please describe you firm's approach to pricing an Investment Grade Audit for the City and how it is handled if the City decides it is not in the best interest to move forward once the audit is complete.

Ameresco will work with City staff to understand the specific goals and objectives of the program, including fiscal, operational, sustainability, and social objectives. In this way, the final audit scope will be designed to directly align with the City's goals. Ameresco's approach to pricing the Investment Grade Audit (IGA) for the City of Columbia allows for flexibility and can be established either as a price per square foot ($/ft^2) for buildings or as a fixed total price based the overall audit scope.

Because of our upfront diligence, as well as established milestone check-ins with the City throughout the audit to calibrate and align potential recommendations, the majority of IGAs developed by Ameresco result in project implementation. That said, should the City decide not to move forward, Ameresco would submit a bill to the City for the pre-negotiated audit breakage fee.



Project Spotlight:
City of Arvada, Colorado

Completed in 2021, Ameresco partnered with the City of Arvada to implement energy and water upgrades throughout the City. Measures included interior, exterior and street light LED retrofits; HVAC and boiler upgrades; controls update; water efficiency; building envelope improvements; and solar photovoltaic installation. Additionally, Ameresco worked to optimize the City's electric tariff and gas procurement.

Project Experience Summary

The offeror should copy and complete the form below and provide a project experience summary for five (5) energy savings performance contracts implemented with municipalities.

| 1 | City and County of Denver, CO

Project Data and References	
Project Name	City and County of Denver Phase I Energy Performance Agreement
Facility Type and Use	Municipal Facilities including Police District, Recreation Centers, Libraries, Fire Stations, 911 Call Center
Project Size: -Number of Buildings -Total Square Footage	14 of the City's Most Energy Intensive Buildings 272,891 Ft^2
Types of Measures	• Interior and Exterior Lighting Retrofits • Lighting Controls • Energy Management Control System (EMCS) Upgrades • Pump Improvements • Pipe and Equipment Insulation • Pool Covers • Vending Machine Controls • Transport Gas • Building Envelope Measures • Education Program and Live Energy Monitoring
Project Cost: Installed Project Costs	$1,992,641
Project Cost: Financed Amount	$2,258,407
Guaranteed Annual Savings ($)	$122,377 (Year 1)
Financing/Funding Source	Tax-Exempt Lease Purchase
Project Schedule: -Construction Start and End Dates -Guarantee Period Start and End Dates Describe if project was completed on schedule or delayed	Jan 2016 – Mar 2017 Apr 2017 – Mar 2020 All projects were completed on schedule.
Measurement and Verification Methods	International Measurement and Verification Protocol (IPMVP) Option A: Lighting, Pump Improvement, Swimming Pool Cover Measures. IPMVP Option D: EMCS. For all other measures, savings were agreed upon in the contract; accordingly, no M&V activities were performed.
Project Personnel: List all ESCO personnel associated with this project (limit to those who may be assigned to a project) and their roles and responsibilities (only list those who may be assigned to a project).	John O'Herron, Director – Business Development; Tim Farkas, Director – Finance; Erin Ells, Project Development Engineer; Scott Faller, Director – Operations; Jay Fleishman, Senior Vice President – Engineering; Joe Brajdich, Senior Project Manager; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight
Contact Information: Current phone and email address of owner representatives you worked with.	Tom Ochtera, Energy Manager P. 720.913.5708 E. Thomas.Ochtera@denvergov.org

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh	963,850	1,027,375	1,047,699	1,047		
Electric Demand	kW	1,563	1,893	1,893	1,893		
Natural Gas	Therms	42,998	47,638	47,935	47,935		
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water	kGal	80	86	86	86		
Other (Utility)	$	99,007	128,893	133,405	138,074		
Material	$						
Maintenance Contracts	$						
Other (O&M)	$	23,370	26,818	27,756	28,728		
TOTAL	**$**	**122,377**	**155,711**	**161,161**	**166,802**		

| 2 | City of Mankato, MN

Project Data and References	
Project Name	City of Mankato Energy Savings Performance Contract ("Phase I") and Amendment to Energy Services Agreement
Facility Type and Use	Municipal Facilities including Public Works, Water and Wastewater Treatment Plants, Airport Terminal and Hangars, Parks and Support Buildings, Fire Stations, Parking Garages, and Streetlight Infrastructure The Phase I Amendment added the Mankato Civic Center.
Project Size: -Number of Buildings -Total Square Footage	 26 Facilities and Metered Streetlight Infrastructure 1,020,266 Ft^2
Types of Measures	**Phase I** • Facility LED Lighting Upgrades • LED Streetlights • Water Conservation • Building Envelope Improvements • Mechanical Insulation Improvements • Building Automation Improvements • Boiler Replacement at Intergovernmental Center **Amendment** • New Air Cooled Chiller • Boiler Plant Upgrades • Arena Space Dehumidification • Arena Air Handler Upgrades • Isolation Doors • Building Automation System Upgrades
Project Cost: Installed Project Costs	$7,127,106 Phase I: $4,617,006; Phase I Amendment: $2,510,100
Project Cost: Financed Amount	Phase I: Not applicable.

	Amendment: Not applicable.
Guaranteed Annual Savings ($)	Phase I: $257,729 (Year 1) Amendment: $69,593 (Year 1)
Financing/Funding Source	Phase I: Owner-Funded via Bond Amendment: Owner-Funded via Bond
Project Schedule: -Construction Start and End Dates -Guarantee Period Start and End Dates Describe if project was completed on schedule or delayed	**Construction:** Phase I: Mar 2017 – Feb 2018 Amendment: Dec 2017 – Feb 2018 **Guarantee Period:** Phase I: Mar 2018 – Feb 2020* Amendment: Mar 2019 – Feb 2021** **Schedule:** All projects were completed on schedule
Measurement and Verification Methods	Phase I: International Measurement and Verification Protocol (IPMVP) Option A: Facility and Street Lighting, Water Conservation Measures. For all other measures, savings were agreed upon in the contract; accordingly, no M&V activities were performed. Phase I Amendment: U.S. DOE Federal Energy Management Program (FEMP) M&V Guidelines Version 4.0
Project Personnel: List all ESCO personnel associated with this project (limit to those who may be assigned to a project) and their roles and responsibilities (only list those who may be assigned to a project).	John O'Herron, Director – Business Development; Scott Faller, Director – Operations; Marc Retish, Senior Business Manager – Asset Management; Jay Fleishman, Senior Vice President – Engineering; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight
Contact Information: Current phone and email address of owner representatives you worked with.	Jeffrey Johnson, PE, Public Works Director P. 507.387.8640 E. jjohnson@mankatomn.gov

Phase I

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh	2,284,334	2,418,839	2,441,884			
Electric Demand	kW	4,224	4,481	4,481			
Natural Gas	Therms	36,402	36,775	36,775			
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water	kGal	253	318	318			
Other (Utility)	$	215,316	230,356	237,267			
Material	$						
Maintenance Contracts	$						
Other (Operational)	$	42,413	42,413	43,561			
TOTAL	**$**	**257,729**	**272,769**	**280,828**			

*Following the delivery of the Year 1 and Year 2 reports, the City elected to discontinue Measurement and Verification Services, stating "*The City of Mankato accepts that the Guaranteed Savings will be deemed achieved for the balance of the Guarantee Period and no further M&V services will be performed.*" [Jim Tatge, Facilities Project Coordinator, City of Mankato]

Phase I Amendment

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh	338,854	355,478				
Electric Demand	kW						
Natural Gas	Therms	14,382	14,382				

**Like Phase I, the City discontinued Measurement and Verification activities following the delivery of the Year 2 report, confident that savings would persist.

Fuel Oil	Gal		
Steam			
Fuel Oil	Gal		
Water	kGal		
Other (Utility)	$	29,737	29,758
Material	$		
Maintenance Contracts	$		
Other (Operational)	$	39,806	39,806
TOTAL	**$**	**69,543**	**69,564**

| 3 | City of South Bend, IN

Project Data and References	
Project Name	Century Convention Center ESPC and Solar
Facility Type and Use	Convention Center
Project Size: -Number of Buildings -Total Square Footage	 1 Facility 225,000 Ft^2
Types of Measures	• Lighting Replacements and Upgrades • HVAC System and Controls Upgrades • Ceiling Tile Replacements • Roofing Replacement • Installation of Solar PV and Public Display Showing Current and Historic Solar Production As a result of the successful Phase I project, a Phase II contract was implemented in December 2021 to perform energy upgrades at the Morris Performance Arts Center. Measures included boiler and pump replacement; HVAC system replacements and upgrades; heat pump controls upgrades; new building automation system; plumbing fixture replacements; roofing replacement; fire alarm system replacement; and LED lighting upgrades.
Project Cost: Installed Project Costs	$4,936,784
Project Cost: Financed Amount	$4,936,784
Guaranteed Annual Savings ($)	$453,441 (Year 1)
Financing/Funding Source	Tax-Exempt Lease Purchase
Project Schedule: -Construction Start and End Dates -Guarantee Period Start and End Dates Describe if project was completed on schedule or delayed	 Apr 2015 – Oct 2016 Nov 2016 – Oct 2031 All projects were complete on schedule.
Measurement and Verification Methods	International Measurement and Verification Protocol (IPMVP) Option A: Lighting Replacements and Upgrades, HVAC System and Controls Upgrades, and Solar PV Measures. For all other measures, savings were agreed upon in the contract; accordingly, no M&V activities were performed.

Project Personnel: List all ESCO personnel associated with this project (limit to those who may be assigned to a project) and their roles and responsibilities (only list those who may be assigned to a project).	Steve Taggart, Vice President; Tim Farkas, Director – Finance; Jay Fleishman, Senior Vice President – Engineering; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight
Contact Information: Current phone and email address of owner representatives you worked with.	Eric Horvath, Public Works Director P. 574.235.9251 E. ehorvath@southbendin.gov

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh	1,062,226	1,173,938	1,173,938	1,173,938	1,173,938	1,173,938
Electric Demand	kW						
Natural Gas	Therms	638	638	638	638	638	638
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water	kGal						
Other (Utility)	$	84,004	95,899	95,899	98,776	101,739	104,792
Material	$						
Maintenance Contracts	$						
Other (Operational)	$	6,500	6,500	6,630	6,763	6,898	7,036
Other (Capital Cost Avoidance)	$	362,936	362,936	370,195	377,599	385,151	392,854
TOTAL	**$**	**453,441**	**465,335**	**472,724**	**483,137**	**493,788**	**504,681**

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 6	Achieved Savings Year 7	Achieved Savings Year 8	Achieved Savings Year 9	Achieved Savings Year 10
Electricity	kWh	1,062,226	1,173,938	1,173,938			
Electric Demand	kW						
Natural Gas	Therms	638	638	638			
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water	kGal						
Other (Utility)	$	84,004	97,334	100,245			
Material	$						
Maintenance Contracts	$						
Other (Operational)	$	6,500	7,177	7,320			
Other (Capital Cost Avoidance)	$	362,936	400,711	408,725			
TOTAL	**$**	**453,441**	**505,223**	**516,291**			

| 4 | City of Wichita Falls, TX

Project Data and References	
Project Name	Phase I: City of Wichita Falls AMI System Installation and Water Meter Replacement Phase II: City of Wichita Falls Streetlighting Retrofits
Facility Type and Use	Municipal Water and Streetlighting Infrastructure
Project Size: -Number of Buildings -Total Square Footage	Phase I: 33,249 Water Meters Phase II: 5,500 Streetlights
Types of Measures	Water Meter Replacement and Advanced Metering Infrastructure (AMI) LED Streetlighting
Project Cost: Installed Project Costs	Phase I: $15,884,487 Phase II: $2,880,784
Project Cost: Financed Amount	Phase I: $16,561,360 Phase II: $2,895,784
Guaranteed Annual Savings ($)	Phase I: For water distribution AMI projects, cost savings comes from reduced inaccuracies in meter readings as well as from reduced errors in billings. There are additional cost savings from reduced manual meter reading (meter reader labor and vehicle use) and from reduced life cycle replacement costs of the new meters. Ameresco does not guarantee revenue increase from replacing water meters. Rather, we guarantee that the new water meter average accuracy is at least 98.5 percent. Phase II: 146,297 (Year 1)
Financing/Funding Source	Phase I: Tax-Exempt Lease Purchase Phase II: Qualified Energy Conservation Bonds
Project Schedule: -Construction Start and End Dates -Guarantee Period Start and End Dates Describe if project was completed on schedule or delayed	**Construction:** Phase I: Feb 2016 – Jun 2018 Phase II: Jul 2018 – Aug 2019 **Guarantee Period:** Phase I: Jul 2018 – Jun 2038 Phase II: Sep 2019 – Aug 2034 **Schedule:** All projects were completed on schedule.
Measurement and Verification Methods	Phase I: Ameresco used IPMVP Option A for the water meter AMI upgrade. The average existing water meter accuracy was measured from a random, statistical sample of existing meters. Phase II: IPMVP Option A
Project Personnel: List all ESCO personnel associated with this project (limit to those who may be assigned to a project) and their roles and responsibilities (only list those who may be assigned to a project).	Chad Nobles, Senior Metering Infrastructure Account Executive; Tim Farkas, Director – Finance; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight
Contact Information: Current phone and email address of owner representatives you worked with.	Blake Jurecek, Assistant City Manager P. 940.761.7404 E. blake.jurecek@wichitafallstx.gov

AMI System Installation and Water Meter Replacement							
Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh						
Electric Demand	kW						
Natural Gas	Therms						
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water							
Other							
Material	$						
Maintenance Contracts	$						
Other (see above)	$	1,074,688	1,454,809	1,498,453	1,543,406		
TOTAL	**$**	**1,074,688**	**1,454,809**	**1,498,453**	**1,543,406**		

Streetlighting Retrofit							
Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh						
Electric Demand	kW						
Natural Gas	Therms						
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water							
Other (Utility)	$	146,297	168,496	209,640	215,921	222,417	
Material	$						
Maintenance Contracts	$						
Other	$						
TOTAL	**$**	**146,297**	**168,496**	**209,640**	**215,921**	**222,417**	

| 5 | City of Casa Grande, AZ

Project Data and References	
Project Name	City of Casa Grande, AZ Phase I
Facility Type and Use	Library, Police and Fire Stations, Recreational Facilities, Airport, Senior Center, and Office Buildings
Project Size: -Number of Buildings -Total Square Footage	 20 Sites 235,000 Ft^2
Types of Measures	• Lighting System Improvements • HVAC Replacements and Controls Retrofits • Programmable Thermostats • Retrocommissioning

	• Window Tinting • Computer Power Management • Water Conservation • Nitrogen Tire Filling Stations • Water Heaters Following the success of Phase I, Ameresco was selected to implement Phase II and Phase III solar projects comprising 1.46 MW solar photovoltaic installations across seven City sites. The combined 1.46 MW projects reduced the City's utility costs by nearly $341,000 per year. Of note is that the **solar projects were procured under a guaranteed energy cost savings contract**, funded via a tax-exempt lease purchase agreements. Phase IV of this partnership consisted of an LED streetlighting retrofit of 3,876 fixtures spanning 70,189 acres. For this project, a full GIS audit was performed, followed by photometric design for appropriate light levels. Because the light quality from the new fixtures is over 250 percent better than the previous high-pressure sodium (HPS) streetlights, 65 percent of light was removed from the atmosphere. The project savings will amount to more than $3 million over the 15-year period. Additional details for subsequent phases will gladly be furnished upon request. *Phase II Solar:* *$3,297,600* *Phase III Solar:* *$1,037,500* *Phase IV Streetlighting:* *$1,551,797*
Project Cost: Installed Project Costs	$2,649,675
Project Cost: Financed Amount	$2,738,311
Guaranteed Annual Savings ($)	$181,858 (Year 1)
Financing/Funding Source	Taxable Lease Purchase Financing through Qualified Energy Conservation Bonds (QECBs)
Project Schedule: -Construction Start and End Dates -Guarantee Period Start and End Dates Describe if project was completed on schedule or delayed	Dec 2011 – Dec 2012 Jan 2013 – Dec 2027 All projects were completed on schedule.
Measurement and Verification Methods	Ameresco used a combination of IPMVP Option A and stipulated savings for the lighting retrofits and HVAC Controls. Other ECMs such as vending machine controls, computer power management, water conservation measures, retro-commissioning, and nitrogen tire fill stations were stipulated.
Project Personnel: List all ESCO personnel associated with this project (limit to those who may be assigned to a project) and their roles and responsibilities (only list those who may be assigned to a project).	Tim Farkas, Director – Finance; Jared Hughes, Manager – Performance Assurance; Louis Maltezos, Executive Oversight
Contact Information: Current phone and email address of owner representatives you worked with.	Manuel Hernandez, Public Works P. 520.471.8625 E. manuel.hernandez@casagrandeaz.gov

Commodity	Units	Guaranteed Annual Savings	Achieved Savings Year 1	Achieved Savings Year 2	Achieved Savings Year 3	Achieved Savings Year 4	Achieved Savings Year 5
Electricity	kWh	1,546,528	1,646,818	1,677,682	1,677,682	1,677,682	1,677,682
Electric Demand	kW	144					144
Natural Gas	Therms	1,712	1,712	1,768	1,768	1,768	1,768
Fuel Oil	Gal						
Steam							
Fuel Oil	Gal						
Water	kGal	314	314	314	314	314	314
Other (Utility)	$	181,858	195,046	208,649	214,830	221,752	219,527
Material	$						
Maintenance Contracts	$						
Other (Nitrogen Tires)	$						8,225
TOTAL	**$**	**181,858**	**195,046**	**208,649**	**214,830**	**221,752**	**227,752**

Units	Achieved Savings Year 6	Achieved Savings Year 7	Achieved Savings Year 8	Achieved Savings Year 9	Achieved Savings Year 10	Achieved Savings Year 11	Achieved Savings Year 12	Achieved Savings Year 13
kWh	1,677,682	1,677,682	1,677,682	1,677,682	1,677,682	1,677,682		
kW	144	144	144	144	144	144		
Therms	1,768	1,768	1,768	1,768	1,768	1,768		
Gal								
Gal								
kGal	314	314	314	314	314	314		
Utility $	226,112	232,895	239,882	247,079	254,491	262,126		
$								
$								
(Nitrogen Tires) $	8,390	8,390	8,729	8,982	9,082	9,263		
TOTAL $	**234,502**	**241,453**	**248,611**	**255,982**	**263,573**	**271,389**		

Savings Shortfall

In addition to the references above, please provide an example of a project where a savings guarantee was not met and the steps taken by the ESCO. If no shortfall has taken place within the history of the ESCO, please provide a written statement signed by an officer of the company stating that no shortfall has taken place.

Over the past 24 years, Ameresco has experienced savings shortfalls. While shortfalls do not happen often, they do occur and by upholding our guarantees, we have found that it strengthens our relationships with our customers.

A shortfall occurred at the City of Casa Grande, one of our multi-phase client references who we continue to maintain a strong and successful relationship with. During the first year of Casa Grande's Phase III solar operation, production fell short of the guaranteed value by approximately $6,000. Ameresco compensated the City for this shortfall against annual service costs, per their request. The second year of production was above the guaranteed value and is projected to continue providing electricity above the guaranteed amount. Ameresco went on to perform another phase of solar as well as a citywide LED streetlighting project.

At Prairie View A&M University, a $51,748 shortfall in the Year 1 energy savings was largely due to the central utility plant (CUP) being controlled manually by facility personnel instead of allowing the installed systems to regulate CUP operations automatically per the design of the project. Deficiencies of installed metrology equipment, the introduction of a new chiller outside of Ameresco's scope of work, and a higher than designed chilled water setpoint also contributed to the deficit.

Ameresco provided additional training to the maintenance staff and re-commissioned the CUP, referencing project recommended parameters, which accounted for an energy savings surplus of $53,049 in the Year 2 performance guarantee period.

Prairie View A&M University and Ameresco agreed to credit the Year 2 M&V fee of $41,674 to the Year 1 shortfall of $51,748; therefore, no M&V fees were paid for Year 2 services. The remainder of the Year 1 shortfall of $10,074 will either be credited to the Year 3 M&V fee or Ameresco will remit a check to the University, at their discretion.

Bottom line, when shortfall occurs on a project, our engineers will evaluate the measure to determine why the measure is not performing as expected. If the shortfall occurred due to a defect with the way the measure is installed or is operating, we will repair the defect at Ameresco's cost and compensate the customer for that years' savings shortfall. If the shortfall is going to continue to reoccur due to a mistake in calculating the energy savings or misapplication of a particular technology, Ameresco may decide to install additional energy conservation measures at Ameresco's cost to produce the guaranteed energy savings.

Responding ESCO

All project experience summaries must be for the "responding ESCO" operating under its existing name or subsidiary and must be for the "responding ESCO" as a firm. Project experience summaries will be for the firm as a whole, not for an individual.

Ameresco has no parent or affiliate subsidiary. Accordingly, all project summaries contained within this Proposal are representative of Ameresco's experience as the "responding ESCO" and not that of any individual.

Exhibit C. Personnel Expertise

As a company whose core business is solely focused on developing and implementing comprehensive energy and utility resource conservation and renewable energy generation projects, Ameresco has the in-house personnel to develop innovative energy and utility resource projects of nearly any size or scope. **Every Ameresco team member is experienced and dedicated to these projects.**

As necessary and/or required, the team will draw upon the experience and expertise of the over 1,500 Ameresco energy professionals located throughout approximately 60 offices, with the City's approval.

- Regional Leadership
- Business Development/Account Management
- Energy, Utility Resource, and Renewable Energy Engineers
- Pre-Construction and Construction Project Management
- Renewable Energy Operations
- Post-Construction Energy Management and M&V Specialists
- Marketing and Communications
- Administrative Support and Contract Management

Ameresco staff manages and conducts its audits, project development, project/construction management, and measurement and verification using in-house resources. In a collaborative approach with the City, Ameresco will establish subcontractor alliances on a case-by-case basis. This process keeps us vendor neutral and ensures that we can meet the financial, operational, utilization, and other goals identified by the City. At all stages of the project, a direct Ameresco employee will be responsible for management and oversight of:

- Proposal and/or Preliminary Energy & Utility Assessment
- Investment Grade Audit
- Engineering and design
- Project and construction management
- Finance
- Training and commissioning
- Measurement and verification
- Operations and maintenance

Ameresco has assembled an experienced team to develop a high quality, comprehensive energy and utility resource audit and subsequently implement a comprehensive energy project for the City. Subcontractors will be selected in accordance with Ameresco's subcontractor prequalification process, with the City's approval, and with a focus on maximizing local labor utilization.

To provide a visual representation of the Key Personnel identified and who would be directly engaged in a resultant project with the City, an organizational chart follows. The qualifications and experience of each Key Personnel are shown in Exhibit C, in the format requested in the City's RFP 91/2023. Full resumes for Executive Management will gladly be furnished upon request.

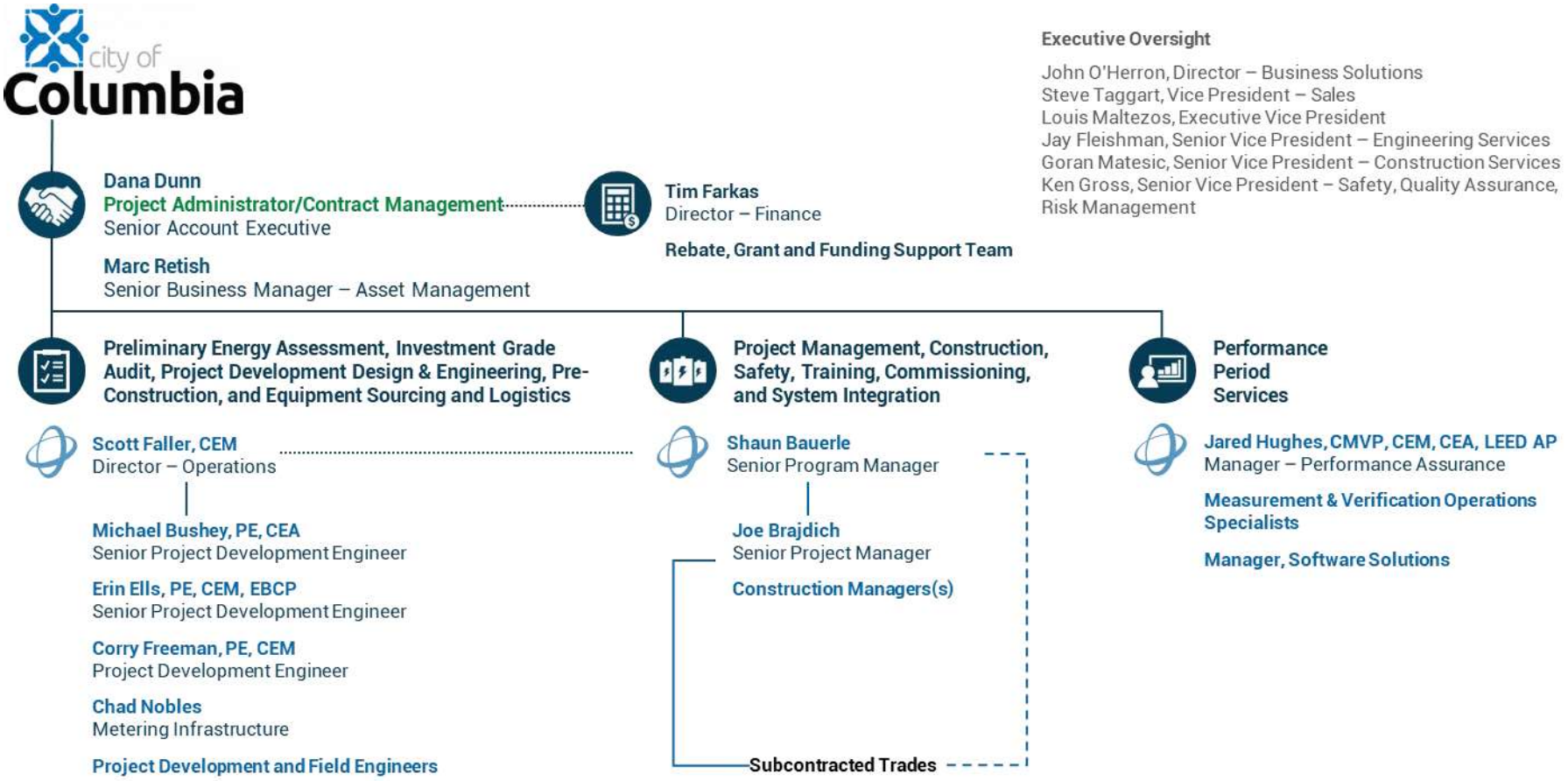


Figure C.1. City of Columbia Key Personnel

Exhibit C

The offeror should provide the information requested on Exhibit C for each key person proposed to provide the services required herein. The offeror may also submit resumes for such key personnel.

The information should identify any relevant qualifications and experience of the person in performing services similar to the services required herein.

EXPERTISE OF KEY PERSONNEL

(Copy and complete this table for each key person proposed)

Title of Position: Senior Account Executive	
Name of Person:	**Dana Dunn**
Educational Degree (s): include college or university, major, and dates	BS, Management & Marketing, Park University, 1993
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Not applicable.
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	20
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Dunn is a Senior Account Executive employed by Ameresco, Inc. He has been with the company since 2022.
Describe this person's responsibilities over the past 12 months.	Mr. Dunn supports our client relationships, working with them to assess risk, identify opportunities, and build valuable programs aligned to their corporate objectives and organizational needs.
Previous employer(s), positions, and Dates	• Constellation Software, Inc., Director of Business Development, 2019-2021 • P1 Group, Inc., Director of Business Development, 2013-2018 • Energy Consultants LLC, Owner, 2007-2012

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Dunn will be the primary point of contact and will ensure the City's objectives are met. He will leverage his expertise to ensure excellence throughout the entire project lifecycle and work closely with customer stakeholders, our internal subject matter experts, and business unit leaders.

Title of Position: Senior Business Manager	
Name of Person:	**Marc Retish**
Educational Degree (s): include college or university, major, and dates	BA, History, University of Wisconsin – Madison, 1990
License(s)/Certification(s), #(s), expiration date(s), if applicable:	N/A
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	24
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Retish is a Senior Business Manager – Asset Management. He has been with the company since 2010.
Describe this person's responsibilities over the past 12 months.	Mr. Retish leverages his experience in the energy, facilities management, and software business in a multitude of sectors to develop millions of dollars in projects for customers. He develops specific proposals while managing multiple national accounts.
Previous employer(s), positions, and Dates	• NorthWrite, Director of Business Development, 2000-2010

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Retish will collaborate closely with engineering and operational groups to develop asset management solutions based on the City's goals.

Title of Position: Director – Business Development	
Name of Person:	**John O'Herron, CEM**
Educational Degree (s): include college or university, major, and dates	MBA, Ottawa University, 2010 BBA, Marketing & Management, Texas Christian University, 1999
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Certified Energy Manager
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	22
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. O'Herron is a Director – Business Development employed by Ameresco, Inc. He has been with the company since 2023.
Describe this person's responsibilities over the past 12 months.	Mr. O'Herron oversees sales activities and is responsible for executing the company's growth strategies. He brings comprehensive experience working closely with project development, implementation, and finance while ensuring all possible resources are available to meet our clients' high standards.
Previous employer(s), positions, and Dates	• Noresco, Regional Sales Manager, 2020-2022 • Schneider Electric, Regional Director – Energy and Sustainability Services, 2011-2017 / 2019-2020 • Engie Services, Director of Sales, 2017-2019 • Johnson Controls, Inc., Area Manager – Public Sector Solutions, 2009-2011 • Chevron Energy Solutions, Business Development Manager, 2006-2009

Staffing Methodology

Describe the person's planned duties/role proposed herein:	As Director – Business Development, Mr. O'Herron provides a functional oversight role, providing technical and business support as needed.

Title of Position: Director of Finance	
Name of Person:	**Tim Farkas**
Educational Degree (s): include college or university, major, and dates	MBA, Finance, University of Nevada – Las Vegas, 2011 BS, Finance & Secondary Accounting, University of Oregon, 1995
License(s)/Certification(s), #(s), expiration date(s), if applicable:	N/A
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	28
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Farkas is a Director of Finance employed by Ameresco, Inc. He has been with the company since 2010.
Describe this person's responsibilities over the past 12 months.	Mr. Farkas, a former public finance banker, is responsible for providing structured financing for new projects and is experienced at managing financing processes for energy efficiency and renewable energy projects for municipal, higher education, school districts, healthcare, and commercial clients.
Previous employer(s), positions, and Dates	• Independent Energy Finance Consultant, 2010-2012 • Nevada State Bank Public Finance, Assistant Vice President, 2005-2010 • Harris Bretall Sullivan and Smith LLC, Senior Associate Portfolio Manager, 2000-2004 • Seton Smoke Capital Management, Portfolio Administration, 1997-2000

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Farkas is responsible for providing structured financing for new projects and is experienced at managing financing processes for energy efficiency and renewable energy projects. Additionally, he will work with our in-house rebates, grant, and funding professionals to ensure all available funding is leveraged.

Title of Position: Director of Operations	
Name of Person:	**Scott Faller, CEM**
Educational Degree (s): include college or university, major, and dates	AAS, Mechanical Design, St. Louis Technical College, 180
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Certified Energy Manager
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	44
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Faller is a Director of Operations employed by Ameresco, Inc. He has been with the company since 1999.
Describe this person's responsibilities over the past 12 months.	Mr. Faller assures excellent customer communications; management of all contractors, suppliers, and vendors; and development of and adherence to project schedules and timelines. He assesses facility needs and designs preliminary solutions with preliminary costs and savings for client review and approval.
Previous employer(s), positions, and Dates	• Air Masters, Inc., Senior Project Development Engineer, 1997-1999 • Various Design and Mechanical Contracting Firms, Mechanical Systems Designer / Project Manager / Estimator, 1980-1996

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Faller will oversee all aspects of the engineering and quality project installation resulting in complete customer satisfaction.

Title of Position: Senior Project Development Engineer	
Name of Person:	**Michael Bushey, PE, CEA**
Educational Degree (s): include college or university, major, and dates	BS, Mechanical Engineering, University of Minnesota – Duluth, 2009
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Licensed Professional Engineer (MN Lic. No/ 52277) Certified Energy Auditor
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	14
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Bushey is a Senior Project Development Engineer employed by Ameresco, Inc. He has been with the company since 2023.
Describe this person's responsibilities over the past 12 months.	Mr. Bushey uncovers energy efficiency, energy conservation, and renewable energy opportunities to improve facility operations and reduce ongoing operating and energy costs. His responsibilities include energy modeling, cost and savings calculations, bid solicitation, and report development.
Previous employer(s), positions, and Dates	• Department of Defense, General Engineer, 2019-2022 • Energy Systems Group, Project Development Engineer, 2010-2019

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Bushey will provide energy modeling, cost and savings calculations, bid solicitation, and report development.

Title of Position: Senior Project Development Engineer	
Name of Person:	**Erin Ells, PE, CEM, EBCP**
Educational Degree (s): include college or university, major, and dates	MS, Mechanical Engineering, University of Colorado, 2003 BS, Aerospace Engineering, University of Michigan, 1995
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Licensed Professional Engineer (CO Lic. No. 36619; NE Lic. No. E-17875; KS Lic. No. 28570; ND Lic. No. PE-29219; **MO Lic. No. PE-2021040852**) Certified Energy Manager Existing Building Commissioning Professional
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	29
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Ells is a Senior Project Development Engineer employed by Ameresco, Inc. He has been with the company since 2016.
Describe this person's responsibilities over the past 12 months.	Mr. Ells uncovers energy efficiency, energy conservation, and renewable energy opportunities to improve facility operations and reduce ongoing operating and energy costs. His responsibilities include energy modeling, cost and savings calculations, bid solicitation, and report development.
Previous employer(s), positions, and Dates	• Apollo Solutions Group, Project Development Engineer, 2014-2016 • Johnson Controls, Project Development Engineer, 2007-2014 • Belfay Engineering, Senior Mechanical Engineer, 2003-2007 • Altair Energy, Solar Engineer, 1999-2002 • Lockheed Martin, Test Engineer, 1995-1998

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Ells will provide energy modeling, cost and savings calculations, bid solicitation, and report development.

Title of Position: Senior Project Development Engineer	
Name of Person:	**Corry Freeman, PE, CEM**
Educational Degree (s): include college or university, major, and dates	BS, Mechanical Engineering, University of Minnesota – Twin Cities, 2007
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Licensed Professional Engineer (MN Lic. No. 50415; ND Lic. No. PE-27725; SD Lic. No. 14073) Certified Energy Manager
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	19
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Freeman is a Senior Project Development Engineer employed by Ameresco, Inc. He has been with the company since 2016.
Describe this person's responsibilities over the past 12 months.	Mr. Freeman uncovers energy efficiency, energy conservation, and renewable energy opportunities to improve facility operations and reduce ongoing operating and energy costs. His responsibilities include energy modeling, cost and savings calculations, bid solicitation, and report development.
Previous employer(s), positions, and Dates	• Franklin Energy Services, Energy Engineer, 2015-2016 • AMEC, Mechanical Engineer, 20007-2015 • Minnesota Dept. of Commerce, Renewable Energy Intern, 2005-2007

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Freeman will provide energy modeling, cost and savings calculations, bid solicitation, and report development.

Title of Position: Senior Metering Infrastructure Account Executive	
Name of Person:	**Chad Nobles**
Educational Degree (s): include college or university, major, and dates	BS, Industrial Distribution, Texas A&M University, 1996
License(s)/Certification(s), #(s), expiration date(s), if applicable:	N/A
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	27
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Nobles is a Senior Account Executive and Metering Infrastructure expert employed by Ameresco, Inc. He has been with the company since 2019.
Describe this person's responsibilities over the past 12 months.	Mr. Nobles focuses on infrastructure renewal and modernization projects within the public sector. His responsibilities include development, management, and supervision of overall project concepts.
Previous employer(s), positions, and Dates	• Siemens Industry, Inc., Senior Account Executive, 2005-2019 • Siemens Building Technologies, Account Executive, 2002-2005 • Invensys, Sales Representative – Building Automation, 2000-2002 • Ryan Herco Products, Outside Sales, 1997-2000

Staffing Methodology

Describe the person's planned duties/role proposed herein:	An expert in advanced metering infrastructure, Mr. Nobles will support the team in the identification and implementation of metering solutions, should they be desired by the City.

Title of Position: Senior Project Manager	
Name of Person:	**Shaun Bauerle**
Educational Degree (s): include college or university, major, and dates	BS, Construction Engineering, Southern Illinois University, 2001
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Associate Constructor, American Institute of Constructors Daikin Certification
Specialized Training Completed.	VRV Training & Commissioning, 8 hours VRV Service & Troubleshooting, 16 hours OSHA 10-hour
# of years' experience in area of service proposed to provide:	23
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Bauerle is a Senior Project Manager employed by Ameresco, Inc. He has been with the company since 2009.
Describe this person's responsibilities over the past 12 months.	Mr. Bauerle assures the successful installation of all facility solutions developed and works with all contractors, suppliers, and vendors. His responsibilities include design and development, construction management, estimating, value engineering, cost control, client relationships, and ongoing project monitoring.
Previous employer(s), positions, and Dates	• S.M. Wilson & Company, Project Estimator / Project Manager, 2006-2009 • McCarthy Building Companies, Lead Estimator, 2001-2006

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Baurle oversees all aspects of the execution of the construction, including bidding, material procurement, subcontract execution, project scheduling and cost, risk, and safety management. He is responsible for managing subcontractors, assisting engineering and sales with performance contract execution, and ensuring field-engineering standards for the development and implementation of energy and water measures.

Title of Position: Senior Project Manager	
Name of Person:	**Joe Brajdich**
Educational Degree (s): include college or university, major, and dates	BS, Construction Management, University of Minnesota, 1976
License(s)/Certification(s), #(s), expiration date(s), if applicable:	N/A
Specialized Training Completed.	OSHA 40-hour OSHA 10-hour Safety and Project Management Seminars
# of years' experience in area of service proposed to provide:	48
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Brajdich is a Senior Project Manager employed by Ameresco, Inc. He has been with the company since 2003.
Describe this person's responsibilities over the past 12 months.	Mr. Brajdich assures the successful installation of all facility solutions developed and works with all contractors, suppliers, and vendors. He manages customer communications; all contractors, suppliers, and vendors; development of and adherence to project schedules and timelines; and all aspects of a quality project installation resulting in the highest levels of customer satisfaction.
Previous employer(s), positions, and Dates	• Lockheed Martin, Construction Engineer, 2002-2003 • Graycor Constructors, Senior Project Manager, 1998-2002 • J.S. Alberici, Project Engineer / Project Manager, 1985-1997 • Geo. Koch Sons, Inc., Project Engineer, 1976-1985

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Brajdich manages all aspects of the execution of the construction, including bidding, material procurement, subcontract execution, project scheduling and cost, risk, and safety management. He is responsible for managing subcontractors, assisting engineering and sales with performance contract execution, and ensuring field-engineering standards for the development and implementation of energy and water measures.

Title of Position: Manager – Performance Assurance	
Name of Person:	**Jared Hughes, CMVP, CEM, CEA, LEED AP**
Educational Degree (s): include college or university, major, and dates	MS, Data Analytics, Northern Illinois University, 2022 BS, Construction Management, Missouri State University, 2008
License(s)/Certification(s), #(s), expiration date(s), if applicable:	Certified M&V Professional Certified Energy Manager Certified Energy Auditor LEED Accredited Professional
Specialized Training Completed.	N/A
# of years' experience in area of service proposed to provide:	17
Describe person's relationship to offeror. If employee, # of years. If subcontractor, describe other/past working relationships	Mr. Hughes is a Manager – Performance Assurance employed by Ameresco, Inc. He has been with the company since 2012.
Describe this person's responsibilities over the past 12 months.	Mr. Hughes creates M&V plans for projects, performs risk reviews of energy calculations and energy models, ensures energy conservation strategies are implemented properly, and collects and analyzes data to verify that the savings targets are exceeded. He also assists with development of M&V commissioning, pre-installation documentation, and oversees annual M&V inspections and reports.
Previous employer(s), positions, and Dates	• CTS Group, Measurement & Verification Specialist, 2009-2012 • Schneider Electric Energy Solutions, Project Development Engineer, 2008-2009

Staffing Methodology

Describe the person's planned duties/role proposed herein:	Mr. Hughes will manage and support with development of M&V commissioning, pre-installation documentation, and annual M&V inspections and reports.

Personnel Qualifications

If personnel are not yet hired, the offeror should provide detailed descriptions of the required employment qualifications; and detailed job descriptions of the position to be filled, including the type of person proposed to be hired.

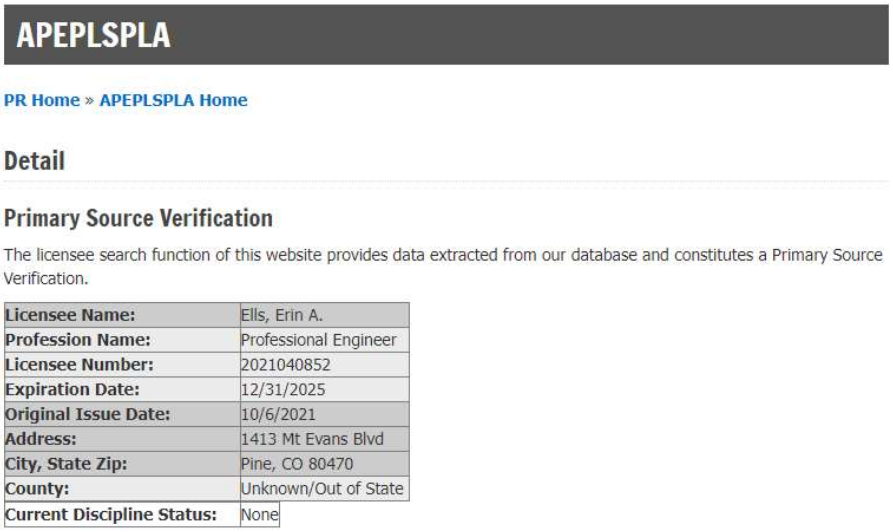
As noted earlier in Personnel Expertise (Exhibit C), Ameresco has assembled an experienced team to develop a high quality, comprehensive energy and utility resource audit and subsequently implement a comprehensive energy project for the City and does not anticipate the need to add personnel to support a project with the City. Subcontractors will be selected in accordance with Ameresco's subcontractor prequalification process, with the City's approval, and with a focus on maximizing local labor utilization.

Licenses

The offeror should submit a copy of all licenses and/or certifications, related to the performance of the services required herein that are held by the personnel proposed to provide such services. If not submitted with the proposal, the City of Columbia reserves the right to request and obtain a copy of any license or certification required to perform the defined services prior to contract award.

The Missouri Professional Engineer license for Key Personnel identified on the preceding pages are shown below.

- Erin A. Ells
  License No. 2021040852
  Expiration: 12/31/25



APEPLSPLA

PR Home » APEPLSPLA Home

Detail

Primary Source Verification

The licensee search function of this website provides data extracted from our database and constitutes a Primary Source Verification.

Licensee Name:	Ells, Erin A.
Profession Name:	Professional Engineer
Licensee Number:	2021040852
Expiration Date:	12/31/2025
Original Issue Date:	10/6/2021
Address:	1413 Mt Evans Blvd
City, State Zip:	Pine, CO 80470
County:	Unknown/Out of State
Current Discipline Status:	None

City of Columbia, MO
Proposal for Professional Services:
Energy & Utility Resource Conservation Program Services
(Solicitation No.: Request for Proposal (RFP) 91/2023)

Method of Performance

Method of Performance



Exhibit D. Work to be Performed

Methodology and Approach

Describe your firm's methodology of developing and implementing comprehensive energy efficiency and conservation programs and projects for the City. Address in detail the following key components, if provided by your firm or team, and how you would approach each one:

- *Facility and infrastructure surveys*
- *Energy modeling and analysis*
- *Project development*
- *Non-construction related energy conservation strategies*
- *Engineering and design*
- *Subcontractor bidding and selection process*
- *Construction and project management*
- *Commissioning*
- *Training*
- *Safety and quality program*
- *Measurement and verification of results*
- *Guarantee of savings*
- *Ongoing capital planning and asset management.*

While the basic concept of an energy efficiency and conservation program is the same from one company to another, an individual approach to the evaluation, engineering, equipment selection, installation, and many other factors differ markedly and can have a major impact on the returns on investment. Ameresco's approach to developing a project can be summed up in three words: **comprehensive, collaborative, and customized**.

We work collaboratively with our customers to determine the best methodology to upgrading their infrastructure, ensuring the consideration of all solutions, and keeping each customer's unique operational and financial goals at the forefront. This typically begins with energy and utility resource analyses to identify areas of deferred maintenance and opportunities for infrastructure upgrades. Projects incorporate innovative technology and techniques, customized to improve the efficiency of major building systems, water and wastewater treatment plants, or other infrastructure. Efficiency measures and upgrades often include lighting, water, heating, ventilation, cooling, building envelope, smart meters, and controls. If desired by the customer, we right-fit distributed generation solutions to balance or offset reliance on the grid and increase benefits of renewable energy and advanced energy management.

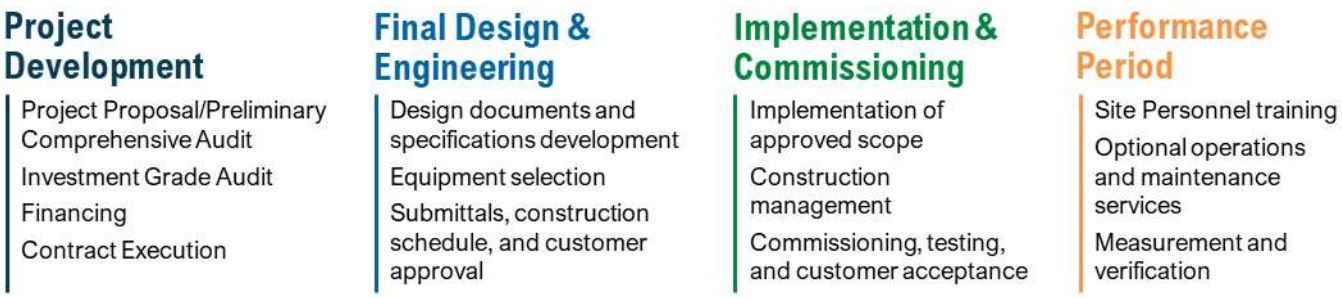


Figure D.1. Comprehensive Approach

Phase I: Project Development

Step 1: Needs Identification (Proposal and/or Preliminary Energy & Utility Assessment)

At project inception, Ameresco will partner with the City's staff to understand the specific goals and objectives of the program, including fiscal, operational, sustainability, and social purposes that are most fundamentally driving the program. The final project will then be developed with the specific goals and priorities as the forefront of the design and implementation processes. In this way, the mutually agreed upon solution will most effectively maximize value to ensure that the greatest reduction of utility, operating, and maintenance costs are achieved in the long-term.

Step 2: Field Data Acquisition (Proposal and/or Preliminary Energy & Utility Assessment)

Once project goals are thoroughly understood, Ameresco engineers gather data on utility rates, historical consumption, and facilities and infrastructure. Engineers review all information and begin to document our assumptions and understanding of building condition, operations, and performance. Further, we leverage our proprietary tools to model lifecycles for building systems and liaise with key facility stakeholders to validate our assumptions and identify any knowledge gaps, resulting in bespoke reports and dashboards for analysis. This unique data development process allows Ameresco to quickly gain insights as to which buildings present opportunities to adapt and modernize through various energy and utility resource conservation measures (ECMs) and facility improvement measures (FIMs) and provides insight into the greatest energy, utility resource, and cost savings opportunities. Engineers contributing to the Preliminary Energy & Utility Assessment will also be assigned to complete the Investment Grade Audit (IGA). To gain an accurate picture of existing conditions, Ameresco will:

- Perform onsite surveys with in-house project designers and engineer(s). Our staff members hold all the appropriate industry credentials, including PEs, CEMs, CEAs, CLEPs, among others
- Interview facility/maintenance director and staff, administration, and any other stakeholders
- Understand commitment to the ENERGY STAR program and other environmental metrics, so that these efforts can be included in the final project (if applicable)
- Analyze recent utility data to evaluate operation schedules, utility demand and usage, rate structures, and areas of excessive energy and/or utility resource use
- Review recent operational and capital expenditures to determine areas that may require further investigation
- Understand the City's perspective on current carbon footprint and the potential value of reducing and tracking of its current and future carbon emissions
- Update and/or review any previous utility audits or feasibility studies recently conducted by/for the City
- Review as-built drawings for existing buildings
- Analyze any available submeter data

Step 3: Energy and Utility Resource Analysis Costing and ECM/FIM Definition

At the end of this task, Ameresco will have identified which sites have the largest opportunity for energy efficiency based on benchmarking across multiple performance metrics. We will have synthesized all data and information gathered through field data acquisition and individual ECMs/FIMs are specified. The savings potential of each ECM/FIM is determined, and preliminary and utility resource energy baselines are established.

In a parallel effort, the cost estimating for all the identified ECMs/FIMs is begun using a combination of contractor quotes and pricing databases. The ECMs/FIMs are then subjected to further analysis, resulting in conceptual design, firm savings, and implementation price. The individuals involved in the data gathering and evaluations perform most of the analyses. Ameresco's in-house Senior Project Managers (SPMs) are also heavily involved in the cost estimating. The task of verifying and approving project implementation costs at this project development stage will typically be the responsibility of Ameresco's Director of Construction.

Step 4: Financial Modeling

The financial analysis will incorporate the cost and savings developed in the third step into the appropriate financial model(s) for the project. These models incorporate requests from the City and applicable interest rates and terms to produce a financial scenario that supports the required investment and debt service.

Step 5: Investment Grade Audit

While the goal of the Preliminary Energy & Utility Assessment is to identify the potential opportunity and the ability to finance an Energy Savings Performance Contract (ESPC), the IGA serves to more firmly define the scope of work and final cost. The IGA is equivalent to an ASHRAE Level 3 Audit and is a much deeper dive into the costs and savings associated with the project to ensure that Ameresco has an accurate and complete understanding of all the impacts associated with the project.

Step 6: Permanent Financing

Ameresco does not make money on financing – our financing approach is agnostic (like our technical/engineering approach), and the cost of financing services is included in our overhead. Ameresco's finance team works throughout the IGA process to facilitate an easy transition from audit to construction with minimal lag time and disruption. Based on the City's needs and objectives, a selection will be made from a variety of financing options that will be supported by Ameresco's savings guarantee, ensuring that payments will be made from the savings of the project.

Step 7: Contract Execution

During this step, the final IGA report is presented to the City. This report will include a detailed description of the scope of work, energy calculations, measurement and verification (M&V) protocols, financing terms and conditions, and areas to be upgraded. The resultant Energy Services Agreement will ensure that the systems will be upgraded, and sustainability goals advanced. The guaranteed energy savings will pay for the project, reduce operating costs, and allow the City to allocate more of its finite resources towards other priorities.

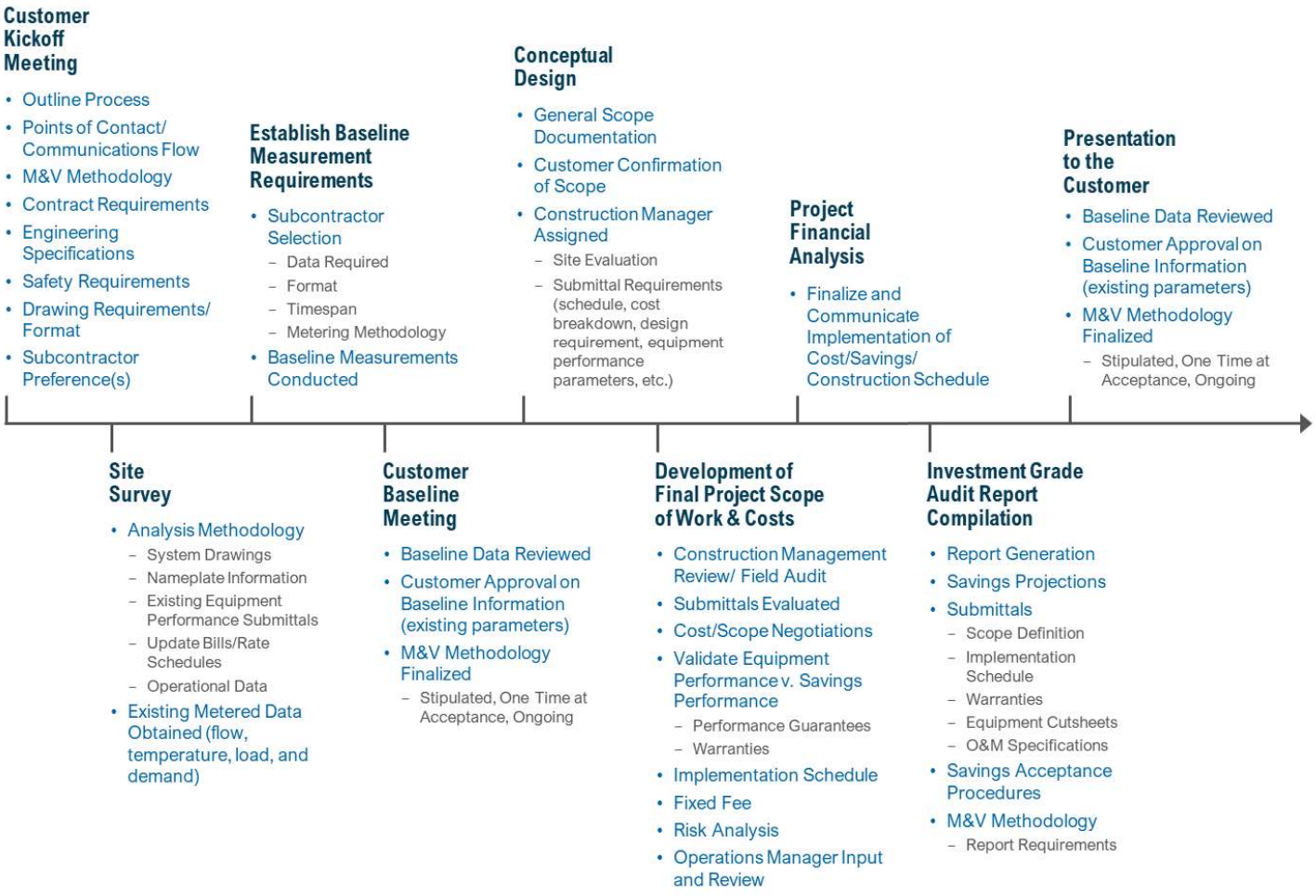


Figure D.2. Investment Grade Audit Report Delivery Process

Project Spotlight: City of Selah, Washington

The City of Selah, a small community in central Washington, had been frustrated for over a year trying to use traditional contracting to replace a single failed blower at their wastewater treatment plant. After learning about the opportunities available by utilizing an Energy Savings Performance Contract (ESPC), the City engaged Ameresco to develop a solution for their blower, as well as audit all City facilities to uncover additional savings opportunities.

Ameresco developed a comprehensive infrastructure project to provide critical upgrades for multiple systems at the plant, including lift pumps and motors, lagoon mixers, an aeration blower, and discharge pressure gauges. Additionally, interior and exterior lighting upgrades were implemented at City facilities, as well as a City-wide LED street lighting retrofit.





Phase II: Final Design and Engineering

Step 1: Detailed ECM/FIM Design

At this step, Ameresco's experienced project developers will complete the conceptual designs. Ameresco's engineering team will be in charge of the design and engineering work and will ensure that any intermediate design submittals are prepared for the City's review in a timely fashion.

Step 2: Equipment Specification

The final equipment selections, subject to the City's approval, will ensure that the guaranteed equipment performance and savings/revenue will be achieved and sustained for the full contract term.

Step 3: Submittals, Construction Schedule, City Approval

Following the City's final review and approval of submittals, the submittals will become formal project documents. The equipment and materials will be installed in accordance with these plans, drawings, schedules, and specifications. All submittals are prepared by Ameresco's professional engineering staff or reviewed if consultants supplemented the firm's in-house resources. A construction schedule will also be included in the submittals.

Phase III: Implementation & Commissioning

Step 1: Implementation, City Coordination, Pre-Construction Meetings

Once the City has reviewed and approved all the final submittals and issued a Notice to Proceed, pre-construction meetings can be held. At these meetings, site personnel and Ameresco's SPM will confirm all the details needed to ensure smooth implementation of the improvements at each facility including all site safety, security, background checks, and badging requirements.

The SPM is responsible for the successful construction of the project, on schedule and within budget. Two critical roles that Ameresco's SPM fulfills are customer service and quality assurance. This staff member will ensure a smooth and well-coordinated implementation that minimizes any impact on the City's personnel, operating mission, and building constituents.

As is standard practice in all Ameresco's construction efforts, the SPM reports directly to Ameresco's Director of Construction, who retains ultimate responsibility for all implementation period activities. These activities include, but are not limited to, oversight of procurement and subcontracting, construction budgets and cost control, installation progress, completion, training, commissioning, project close, and ensuring a smooth transition into the long-term performance period.

Step 2: Equipment Procurement

The procurement process begins as soon as Ameresco has received the Notice to Proceed. Any equipment and materials that Ameresco will furnish for installation will be purchased in a timely manner to be available for the coordinated construction efforts. The SPM will be responsible for procurement logistics to ensure that all the equipment and materials meet contract specifications and that procurement is accomplished in the most cost-effective manner possible. Ameresco is not bound by low-bid requirements; therefore, equipment can be acquired that provides the best value while meeting guaranteed performance levels. Competitive procurement solicitations are the favored and typical means of ensuring cost-effectiveness while maintaining best value.

An additional key benefit of Ameresco's **independent position in this marketplace** is that we have no pull-through product or service goals, and we have no larger manufacturing or service-providing corporation influencing our offering. Technology and products are recommended based on their ability to best meet the needs of our customers for the lowest possible cost. Ameresco casts a wide net to national and local suppliers and contractors for all goods and services and works directly with several major manufacturers. Ameresco will confer with the City, and pricing will be compared with what the City is accustomed to paying for all similar goods and services.

Step 3: Subcontract Solicitations/Executions

The primary focus is on the proven track record and capabilities of the firms hired to perform work throughout a City's facilities, whether it is installation labor only or complete turnkey service. Ameresco facilitates a competitive process by issuing detailed scopes of work as Request for Proposals (RFPs) for each ECM/FIM. Low-bid is not necessarily the deciding factor in Ameresco's selection and award process, as subcontractors are chosen based on a holistic evaluation of their ability to add value and enhance the service provided to the City. That said, Ameresco will ensure that everything is fairly bid and seek feedback from the City on their preferences based on the bid results and respondent reputations. All subcontractors must be able to accomplish the specified work on time within the budget, while meeting all established utilization goals and while maintaining appropriate state licenses.

Ameresco's success depends upon timely, professional quality workmanship performed by qualified subcontractors who are proficient in the specific technology. In addition to price and technical proficiency, a premium is placed on the ability of the contractor to work cooperatively in a non-disruptive fashion within occupied City facilities and sites. To this end, it is generally beneficial to engage local subcontractors who have a proven track record of success in similar facilities, and an established relationship with the facility personnel. Ameresco looks favorably to contractors that have had positive experience with the City. During the design phase, Ameresco will establish a prequalified list of local subcontractors and vendors in collaboration with the City's staff and in accordance with the following criteria.

Local Involvement

Ameresco believes that community-wide, comprehensive energy and utility resource conservation projects provide the greatest benefit in terms of cost and utility savings, as well as sustainability, greenhouse gas reduction, and social responsibility. Our projects most often encompass numerous facilities with diverse stakeholder groups requiring multi-jurisdictional support, approval, and collaboration.

Our projects are structured to benefit the broader communities which our customer's service. **We are committed to utilizing the maximum amount of local labor and vendors to bring the greatest value to the wider community.** Local contractors and vendors have a vested interest in the success of the project, relationships that can be leveraged in its support, and an intimate knowledge of the context in which they are working.

Step 4: ECM/FIM Construction

Two critical responsibilities that the Senior Project Manager assumes are quality assurance and customer satisfaction. To fulfill the quality assurance responsibilities, Ameresco's SPM must ensure that equipment and materials meet the contract specifications and all work is accomplished in a timely and professional manner. To fulfill the service responsibilities, Ameresco's SPM will oversee all subcontractor and supply vendor activities to ensure minimal disruption. He will also serve as the

primary point of contact throughout the implementation phase. All issues or concerns that arise will be addressed immediately and resolved to the City's satisfaction. Any support that Ameresco's SPM requires to accomplish this level of service will be readily available, and efforts can be supplemented as needed from the reservoir of nationwide talent on Ameresco's staff.

Commitment to Project Safety

Ameresco's SPM also serves as the project safety officer and is responsible for a safe environment for all tradesmen and facility occupants. This staff member will oversee construction-related activities to ensure compliance with all applicable OSHA, state and local codes and regulations.

All phases of project design, implementation, and long-term performance monitoring and O&M services are achieved with safety as our number one focus. No financial goal, work task, customer deliverable, or schedule demand is worth an injury or environmental compromise. It is the responsibility of every Ameresco employee, supplier, contractor, partner, and vendor to always strive and on every work assignment to work safely and in an environmentally responsible fashion. In fact, Ameresco considers good health, safety, and environmental performance as a fundamental element of providing industry-leading comprehensive energy solutions on behalf of our customers.

To these ends, Ameresco is committed to meeting or exceeding 100 percent compliance to all established safety and health regulations, zero accidents, and maintaining a safe and healthy work environment. We currently have implemented policies, procedures, training, and self-assessments to ensure compliance with the following federal regulations, in addition to any site-, City-, and/or jurisdictional-specific requirements.

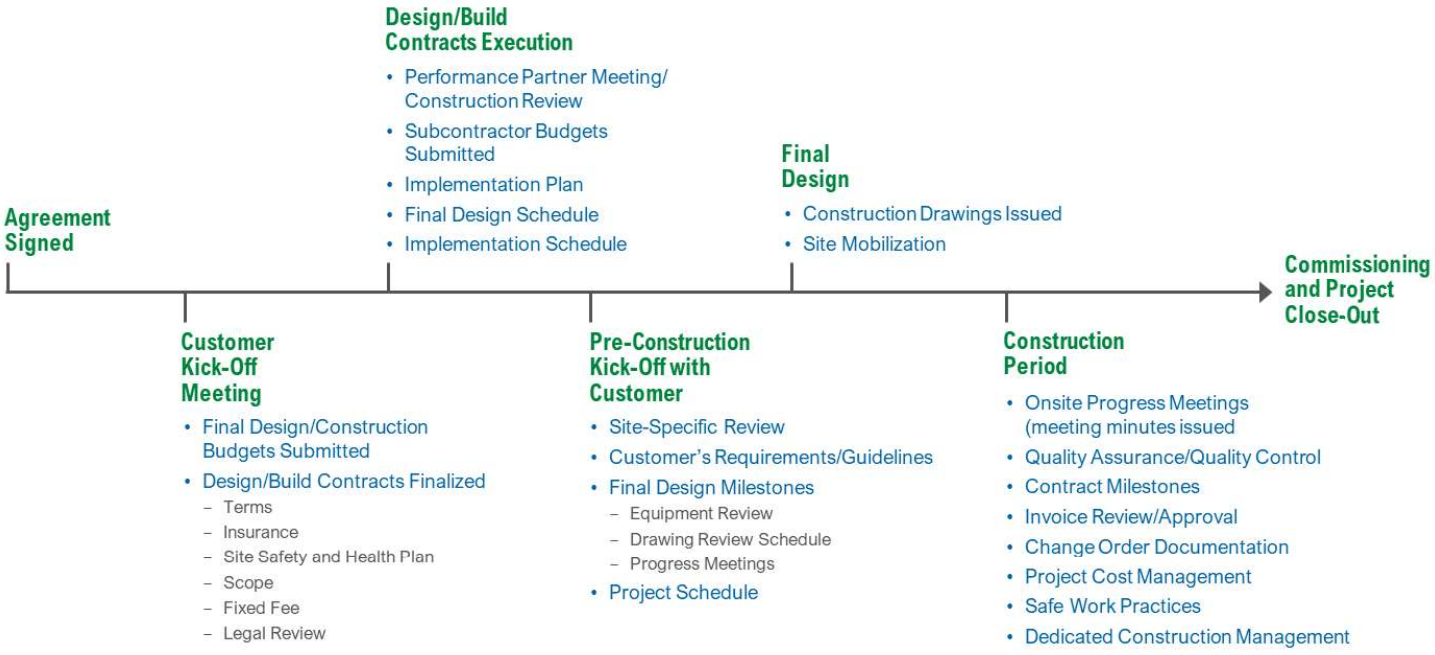


Figure D.3. Construction Implementation Process

Step 5: Commissioning, Testing, City Acceptance

When the installation of an ECM/FIM, a whole facility, or logical grouping of ECMs/FIMs is completed satisfactorily, Ameresco's staff and the installation contractor will commission and test the systems in accordance with the detailed plan described in the ECM/FIM write-ups in the detailed IGA. The development and design engineering staff responsible for the conception and finalization of these measures will also assist in the commissioning phase. The City's facilities and maintenance staff will be invited to the commissioning events to ensure their complete understanding of the new equipment and recently installed systems. Ameresco's operations manager will also be intimately involved in this process as part of his responsibility for long-term measurement and verification (M&V) activities.



A significant amount of responsibility is placed upon Ameresco's SPM. For that reason, the individuals who perform these services for Ameresco are extremely experienced and selected for projects based upon their unique skillsets and bases of operations. They are appropriately vested with a corresponding level of authority to control the project's progress and all related activities and provided with all the support that is required to successfully accomplish their tasks.

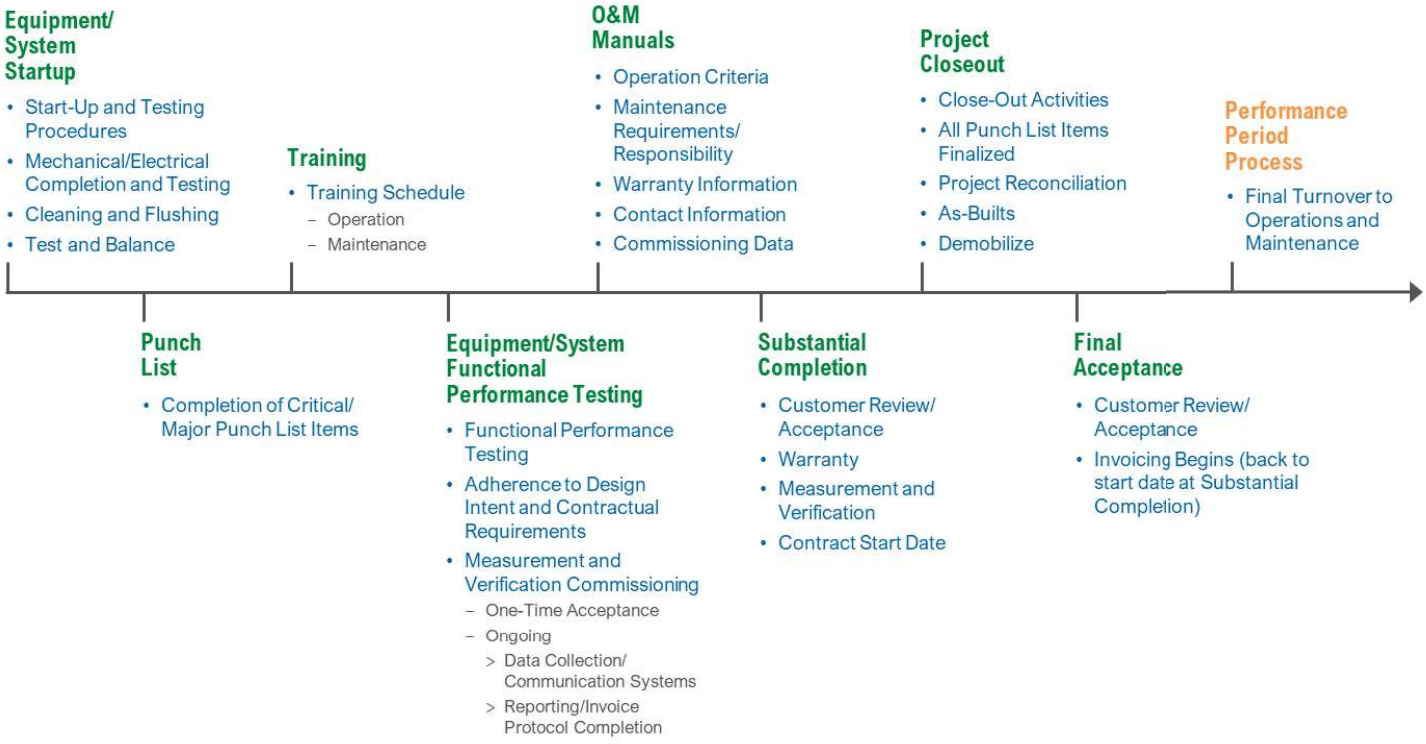


Figure D.4. Commissioning and Project Close-Out Process

Phase IV. Performance Period

Long-term measurement and verification (M&V) services and annual reconciliation of performance and savings will be carried out in accordance with the site-specific M&V plan. The M&V plan presented in the IGA will be written in accordance with the International Performance Measurement & Verification Protocol (IPMVP).

All specific protocols must be explained to and accepted by the City before project construction can begin. The M&V plan will be developed mutually with the City during the IGA and will be fully documented prior to the start of construction.

Measurement and Verification

Ameresco's M&V methodology is incorporated throughout each phase of our **Comprehensive Project Approach**. During project development, Ameresco will assign an M&V specialist who will be responsible for ensuring the correct data has been collected and mutually agreed upon to develop the baseline energy and operational costs. The M&V specialist will also be involved in the implementation and commissioning stages of the project to ensure that the post-retrofit measurements and metering are installed properly, and that the data is collected in a thorough and efficient manner. Ameresco's direct employees will perform this service in its entirety.

Ameresco will coauthor the development of a detailed and comprehensive M&V plan with the City, including ongoing monitoring, to ensure actual savings are attained. This is a critical element of the performance contract because it provides the basis for the energy savings guarantee and debt-service payment. The specific M&V Plan will be submitted with the final IGA and will be included as a schedule in the Energy Services Agreement. All specific protocols must be explained to, and accepted by, the City before project construction can begin. M&V involves two essential components:

1. Verifying the ability of the project to generate all the projected and/or guaranteed savings
2. Measuring actual, periodic performance of the project against established baseline(s)

While there are a variety of ways to accomplish the two primary M&V tasks, a critical prerequisite is to establish the baseline(s). These baselines are developed from a rigorously derived end-use analyses, onsite measurements, and historical energy consumption data. Techniques range from stipulating all factors affecting ECM/FIM performance to installing extensive, highly accurate metering systems. When deciding the appropriate level of sophistication for a plan, factors such as complexity of the measure, expected magnitude of savings from the measure, and the City's aversion to risk all affect the decision.

The general approach to determining energy savings in these plans involves comparing the energy use associated with a facility or certain energy consuming systems within a facility before installation of the ECM/FIM (baseline) and after installation of the ECM/FIM (post-installation).

Energy Savings = (Baseline Energy Use) – (Post Installation Energy Use)

Although the specific algorithms vary from measure to measure, they can all be broken down into usage before and after the installation of the energy savings measure. Sometimes the baseline usage is fixed, while in other cases the baseline is calculated based on the post-installation usage; it depends on the specific plan used to verify the performance of the measure. To aid agencies in gaining an understanding of M&V, the IPMVP was established. The IPMVP has four options (A, B, C, and D) which meet the needs of a wide range of ECMs/FIMs and provide industry-approved procedures for

baseline development and post-retrofit M&V. These options are flexible and reflect the considerations previously mentioned.

City Training

Training of the City's staff who will be involved in the long-term operation of the new equipment and systems is of paramount importance. A strong focus on energy savings strategies and maintenance schedules will be provided to those individuals. Because the SPM will be familiar with the newly installed equipment and systems, as well as the site's facilities and personnel, this staff member is the most appropriate candidate to supervise training efforts. By providing training in the proper O&M of the newly installed ECMs/FIMs, both Ameresco and the City are assured of sustained performance of the equipment and persistence of energy and utility resource savings.

Training typically commences during the commissioning phase when staff will first become acquainted with the new equipment and systems. Training will be conducted in a classroom setting and documented on video to train new staff or provide refresher courses for existing employees. The basic format includes an introduction to the overall installation, so that all staff members understand the benefits of the equipment and systems. Each ECM/FIM will be explained in detail, including how to operate, maintain and troubleshoot, as well as any possible interactions with existing equipment. Documentation will include review of O&M manuals, drawings, and equipment specification literature. A hands-on approach will be encouraged to facilitate understanding of all presented material. The training will emphasize the essential role that equipment users and operators play in energy conservation, as poorly maintained equipment will not perform as efficiently as possible, as well as experience more frequent breakdowns and a shortened useful service life.

Ameresco will make provisions with the City to conduct training sessions at remote sites if needed. Informal training can also be provided throughout the contract term and may be accomplished in conjunction with an O&M contract.

Optional Operation & Maintenance Services

The City shall retain full and complete authority over its equipment and facilities during the contract term. Therefore, the City may choose to perform the O&M internally and/or have the O&M performed by others at their discretion, provided all maintenance procedures meet or exceed the standards set forth in the contract. These standards shall be clear, concise, and thoroughly documented as part of the training. O&M manuals will be submitted to the City facility(ies) upon commencement of the performance period services. If the City deems it appropriate to accomplish the required O&M through a third party, these standards shall serve as a minimum level of service.



At the City's discretion, Ameresco can offer a comprehensive O&M service plan in the final contract. This O&M plan will help to ensure that energy savings are maintained over the term of the contract and extend the useful life of installed equipment. Responsibility for managing this ongoing service will be assigned to Ameresco's Manager of Measurement and Verification supported by local management and qualified service providers to assure responsiveness. These firms will be mutually selected with the City based on reputation, qualifications, and ability to respond to scheduled and emergency service calls within required time periods.

Ongoing Planning and Asset Management

Ameresco's AssetPlanner is an industry leading and powerful Asset Management Software Solution **designed by infrastructure managers for infrastructure managers**, with the result being a straightforward and easy to use platform that provides robust reporting and analytical tools for innovative decision support. Our software solution provides customers the capability to organize their risk management criteria associated with their infrastructure and to identify the most important renewal and replacement projects.

AssetPlanner is a relational database that seamlessly integrates information from three key work areas that aides in decision development:

- **Capital Planning:** Data Development, Needs Assessment, Capital Plan and Budgeting, Project Scheduling, and Implementation
- **Maintenance Management:** Workflow Process, Preventive Maintenance, Demand Maintenance Service Request, Execute Work
- **Energy Management:** Data Development, Analyze and Benchmark, Energy Management Plan, Project Scheduling, and Implementation

Our internal asset management experts helps customers to develop strategies to manage the funding gaps associated with aging infrastructure by reviewing reviews key risk management criteria to identify and prioritize the most important renewal and replacement projects. The program provides valuable data to help decision-makers define long-term capital planning strategies that leverage available funds to maximize project value by incorporating state-of-the-art business processes designed to manage current capital costs and predict the future capital needs.

Best Value/Cost

Describe how the ESCO provides the greatest value for the investment made by the City. Provide cost factors to provide the required service. For example cost per square foot of evaluated facility, number of meters in utility system, price per kilowatt hour of renewable energy system, etc.

As noted in Exhibit B, Investment Grade Audit Pricing Approach, Ameresco's approach to pricing the Investment Grade Audit (IGA) for the City of Columbia allows for flexibility and can be established either as a price per square foot ($/ft^2) for buildings or as a fixed total price based the overall audit scope.

Ameresco proposes a $0.09 per square foot cost for facilities evaluated during an Investment Grade Audit, **inclusive of energy and utility resource conservation as well as renewable opportunities at each site**. For any future standalone renewable energy development, as well as water and electric infrastructure, Ameresco will collaborate with the City to provide a fixed price for the scope that aligns with the overall scope and goals established by the City.

When auditing water metering infrastructure for example, for small 5/8"x3/4", 1", and 1.5" water meters, Ameresco typically randomly selects the appropriate number of meters by sample set to achieve the confidence factor required in accordance with AWWA guidelines. In most cases, utilities prefer a 90% confidence level which accounts to approximately 68 to 70 meters being tested. The meters will be removed from service, sent to a third-party testing lab for testing following American Water Works Association (AWWA) guidelines, and returned to the customer. New meters are installed in place of the test meters. Average accuracy for the low flow, mid flow, and high flow will be aggregated assuming a

15 percent / 70 percent / 15 percent usage in each range to establish baseline efficiency.

Typically for 2" meters, we will review past consumption data, discuss historical and current testing procedures done by City staff, and then determine appropriate number of meters to test and field survey. Meter less than 2" in size are typically pulled from the field randomly with statistical significance, replaced with new meters, and the existing meters tested at a certified third-party testing lab to determine the accuracy of the meter population. Because we understand that testing these intermediate meters can be costly, we will discuss in detail the cost versus benefit analysis to ensure we are doing what is best for the taxpayers. Additionally, we will survey 2" meters to determine right type, application, and to obtain field lay lengths so we can provide the most accurate scope of work that will result in the overall best value to the city.

Generally, the same concept used for 2" meters is also applied to meters 3" and larger. These meters are always treated individually account-by-account and decisions are made whether to test those meters in situ considering the individual installation conditions such as, test ports, bypass, customer interruption implications, etc. As part of our process, we take pictures and measurements of each large meter and discuss the scope of work on a meter by meter basis with appropriate city staff to ensure we have the right meter, vault, and ancillary equipment in place to achieve the desired outcome for that meter location.

- Ameresco follows the *AWWA M6 Manual* for meter testing procedures and the *AWWA M22 Manual* for meter sizing.
- Ameresco requires third-party laboratory testing to be ISO/IEC 17025 accredited.
- For large meter data logging and testing, Ameresco uses multiple certified vendors and equipment to perform field testing on site to obtain the most accurate account by account testing data for that specific location.

Field testing for large meters is performed in accordance with the AWWA M6 Manual on test equipment that meets the National Institute of Standards (NIST) for accuracy and calibration.

Like our auditing approach, the key to providing the **Best Value** to our customers comes directly from **full transparency in our pricing approach**. Prior to contract development, Ameresco and the City of Columbia will agree on various categories of services to be provided and a markup percentage for said services (i.e., Engineering, Construction Management, Commissioning, Profit, etc.). Then, all of our subcontractor pricing will be shared directly with the City of Columbia on the individual subcontractor letterhead. This process ensures total transparency in the pricing structure and has been very well received by large and complex entities both around the country and in the State of Missouri.

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Per Department of Energy data, Ameresco has guaranteed more savings to the federal government per dollar invested than any other energy services company. We have successfully analyzed, recommended, and installed utility cost reduction measures, from a single building to more than 160 buildings, ranging in value from $1 million to $195 million, with financing terms of 7 to 23 years.

Complete Range of Energy/Utility Services and Capabilities

List the complete range of energy/utility services and capabilities the ESCO offers: such as building/facility energy analysis, engineering, design, installation, water/wastewater treatment equipment analysis, utility metering, commissioning, monitoring and performance verification, and related training.

Also noted in Offeror Information (Exhibit A), with over $14 billion in successfully completed energy projects for government entities throughout North America, including cities and counties, federal government, K-12 public and private schools, higher education institutions, state agencies, healthcare agencies, commercial and industrial clients, and non-profit organizations, **Ameresco is a leading provider of energy and utility resource services with one of the largest portfolios of government customers in the industry.** Our customers appreciate that all decisions are made locally – this ensures an attention to detail and commitment from our executive leadership and all employees, which ultimately results in successful and timely project completion and more financial savings for our customers.

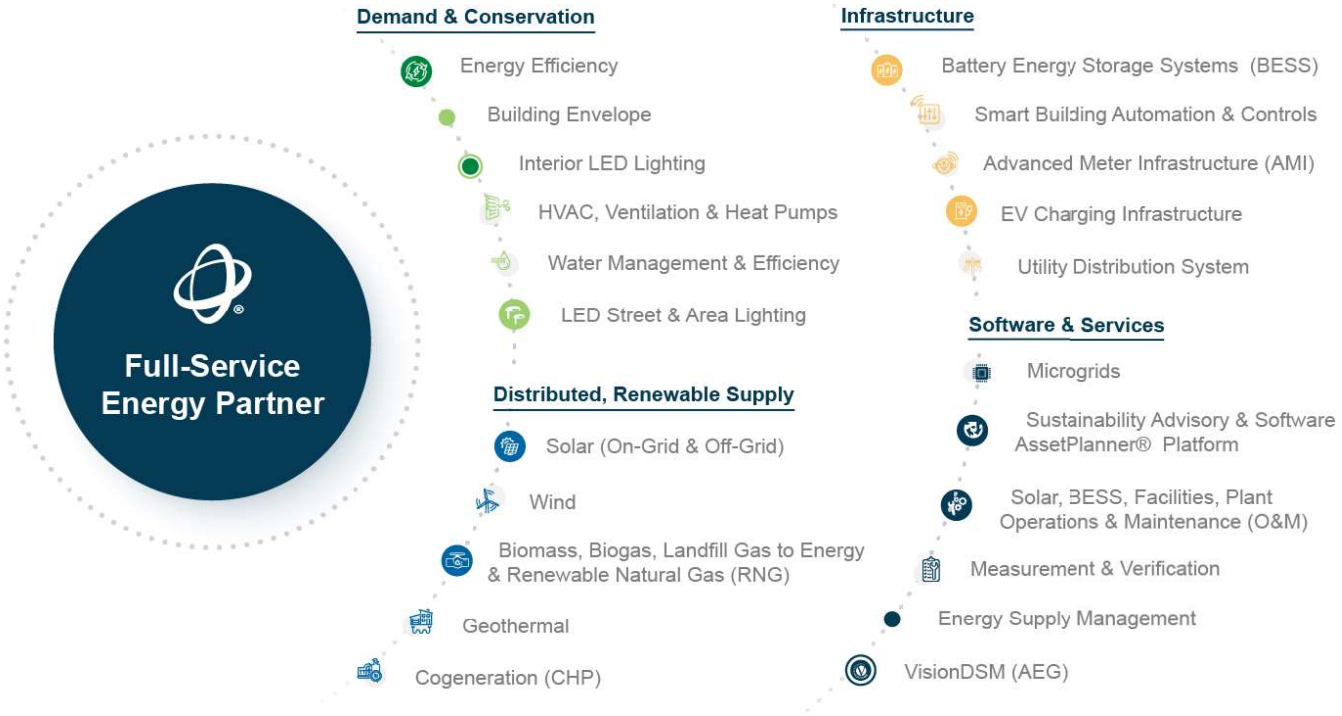


Figure D.5. Ameresco Advanced Technology Portfolio

Consumption-Side Services

Ameresco provides all the services required to develop and deliver utility and operational cost reductions on the consumption side of the meter. We have built our services to provide solutions that optimize energy and operational systems while reducing costs.

Auditing

After gaining a comprehensive understanding of the City's unique goals and objectives during a Preliminary Energy & Utility Assessment, Ameresco will conduct a Investment Grade Audit to analyze current resource consumption and identify the project's scope of work and delivered cost. Ameresco will spend considerable time working to assess the City's needs and understand how its resources are

expended before specific ECMs/FIMs are identified and further developed.

Design, Engineering, and Equipment Selection

Ameresco's project developers and engineers perform the preliminary and final design, equipment selection, and project costing for all FIMs, including any renewable energy components that may be included in the final project. This process will be transparent to the City, as a direct Ameresco employee will be the contact point throughout the entire process.

Construction Management

As with the design and auditing stages, a direct Ameresco staff member manages project implementation. Energy projects require a special skill set to construct FIMs in a manner that will result in the optimum savings. A lead project manager and several construction managers (depending on the project size, duration, and complexity) will manage the implementation of the work. In all cases, the project manager will be the primary point of contact between the City and Ameresco.



Project Spotlight: State of New Hampshire

In partnership with the State of NH, Ameresco implemented an energy conservation project across 21 facilities in the Seacoast region, an area that stretches 13 miles along the shoreline of the Atlantic Ocean and is home to historical landmarks and tourist attractions featuring the area's natural resources. Energy efficiency measures and upgrades will generate annual energy savings of $4 million and will offset approximately 659 metric tons of carbon per year.

Monitoring

During the project development phase, Ameresco will assign a measurement and verification (M&V) specialist to the project who will be responsible for ensuring the correct data has been collected and mutually agreed upon to develop the baseline energy and operational costs. The M&V specialist will also be involved in the implementation and commissioning stages of the project to ensure that the post-retrofit measurements and metering are installed properly, and that the data is collected in a thorough and efficient manner. Ameresco's direct employees will perform this service in its entirety.

Operations & Maintenance Services

While customers typically have appropriate staff to perform the operations and maintenance (O&M) of the installed FIMs, Ameresco can provide O&M services as a part of any project, if desired. An Ameresco employee will manage the service contract and will use direct employees or subcontractors to perform the work, depending on the scope of the services required.

Training

A strong focus on energy savings strategies and system O&M is a key to a successful project. Ameresco will work with the appropriate staff members (typically facilities staff) to provide information, training, and oversight necessary to effectively operate the newly installed systems. The project manager will assemble the O&M documentation in a training manual and conduct the training in a way that is most appropriate to the specific FIMs installed.

Financing

Ameresco has **sourced and raised more than $5.5 billion of project financing assistance over the past 24 years**, from various lending sources including John Hancock, Bayerische Landesbank, Bank of America, Capital One, Chase Bank, Crews and Associates, Union Bank, and several other financial institutions. Using existing cash resources, cash flows from Ameresco's operating activities, and access

to credit through multiple lending relationships, Ameresco has the resources necessary to develop, implement, and finance many of our customers' projects.

Ameresco's technology and vendor neutral approach flows through to our financing and allows for multiple options. Ameresco's finance professionals have years of experience assisting customers identify the most cost-effective financing mechanisms for implementing a wide array of energy projects.

Supply-Side Services

Ameresco offers a full range of services on the supply side of the utility meter to ensure that our customers have options for distributed generation assets and to ensure that utilities are procured at the lowest cost available in the marketplace over the long-term.

As an industry leader in developing supply-side energy solutions including solar photovoltaics (PV) and thermal, battery storage, microgrid, landfill-gas-to energy, biomass, biogas, geothermal, and cogeneration, Ameresco delivers timely and cost-effective projects that support our customers' financial, energy production, redundancy, reliability, and conservation goals.

Resiliency Solutions

Ameresco can retrofit existing facilities for greater efficiency and resiliency, by developing a comprehensive energy management system utilizing renewable energy sources. Leaders in large corporations, government agencies, and other organizations face numerous challenges in running their day-to-day operations. Disturbances to the grid have grown in the past two decades due to weather, physical attacks, vandalism, cyberattacks, and equipment malfunctions. Continued aging of grid infrastructure compounded by a lack of investment in a new system will only lead to greater more frequent power interruptions. Moreover, climate change will certainly increase the risks faced by organizations as major weather events become stronger and more frequent. A lack in resilient infrastructure can have catastrophic impacts on the operations and core mission of leading organizations.

Modern renewable energy systems decrease energy risk and provide higher levels of energy security. Organizations that are proactive about resiliency can better meet their organizational priorities by mitigating and managing risk as well as support energy management and climate commitments. By moving away from exclusive reliance on grid power and toward distributed generation, organizations can exert greater control over their energy costs and create a hedge against fluctuations in energy prices.





Project Spotlight: Austin Energy Domain District Cooling Plant

Austin Energy serves residents in Austin, Travis, and Williamson Counties. Austin Energy's district cooling plant installs and maintains the piping and heat exchangers that distribute chilled water from its plant to individual buildings via a network of underground pipes.

Ameresco performed a comprehensive audit and identified energy savings measures at the Domain District Cooling Plant. The $5.3 million project included the installation of a new 24,000-ton-hour chilled water storage system large enough to shift a major portion of the chilled water load from on-peak to off-peak over a four-hour period. The upgraded system is comprised of a 2.4 million (gallon) concrete thermal energy storage (TES) tank, 92 feet in diameter by 48 feet in height. The new energy management system was upgraded to control and monitor the new TES system along with upgrades to the existing plant controls. In addition, all domestic water closets, showerheads, and faucet aerators were replaced with more efficient fixtures.

Renewable Energy

Solar energy, a great option for organizations seeking to control energy costs and meet sustainability goals, is one of the most efficient and popular forms of renewable energy in the world today. At a time when organizations aim to build more robust, resilient, and secure energy infrastructure, solar power paired with batteries and energy storage can set a City apart. Ameresco continues to find creative and innovative ways of using solar and storage for onsite resiliency as well as for grid benefits when sold to grid operators.

Ameresco's renewable energy team provides the experience and expertise needed to design systems that meet the local utility companies' technological requirements (e.g., site interconnection regulations and equipment specifications), as well as any requirements established by the agencies providing additional rebates or incentives.

Landfill Gas Utilization

Ameresco has built more landfill gas (LFG) projects in the Western United States than any developer. Over the past two decades, Ameresco has engineered, constructed, and/or provided guaranteed services for nearly 40 operating biogas projects throughout the United States. As every project and every customer is unique, we have worked cooperatively with landfill owners to determine the exact technical solution and project structure focused on delivering goal-oriented results.



Figure D.6. Ameresco's Biogas Portfolio

Along with our impressive RNG operating and in-development projects, Ameresco has one of the nation's largest LFG-to-electricity portfolios. Ameresco has been very successful in bringing projects online in a quick and cost-effective manner, with or without tax credits, in a way that promotes and enhances environmental protections and emissions reductions. Our project success is due to our corporate philosophy that no benefits are realized – not by the project partners, the community, or the environment – from an idle project. Ameresco has rescued and resurrected several projects that were abandoned by other developers, developed challenging projects that required a little more innovation and thought, and we have taken on projects that were undesirable to other project developers because of size or location. As a result, our project portfolio is diverse – large and small, direct use (including RNG) and electric generation, with different end users, and project configurations. The common thread among all these projects is that the Ameresco team was able to find a way to overcome project development barriers to complete projects and realize significant emissions reductions.

Commodity Procurement

Ameresco assists customers in developing and executing strategies that lower annual costs of electricity and natural gas, manage price risk, and simplify energy procurement. We analyze the utility portfolio, including facility consumption data, existing contracts, wholesale markets, and rates/tariffs to identify the best combination of physical energy supply at the optimal pricing structure.

Rate Analysis & Negotiation

Using our understanding of tariffs, rate structures, and energy systems, we can reduce the cost of energy by identifying where a more beneficial rate is available, leveraging advantage of economic development riders, and recommending adjustments in the way utility services are purchased, received, or used.

Energy Price Risk Management

Volatility in prices for natural gas is a growing concern. By hedging this exposure, Ameresco can assist customers gain budget stability and predictability. Ameresco offers hedging strategies that integrate fixed price, basis, and swing exposure mitigation. We execute hedge transactions at the best market prices.

Energy Information & Asset Sustainability

The Ameresco Asset Sustainability program helps customers develop strategies to manage the funding gaps associated with aging infrastructure. Asset Sustainability reviews key risk management criteria to identify and prioritize the most important renewal and replacement projects. The program provides valuable data to help decision-makers define long-term capital planning strategies which leverage available funds to maximize project value.

The Asset Sustainability approach incorporates state-of-the-art business processes designed to manage current capital costs and predict the future capital needs for multi-facility public and private property owners, including states, counties and municipalities; higher education institutions; K-12 schools; public housing authorities; healthcare; and commercial customers.

Our experienced team provides Advisory Services in capital planning and optimization of infrastructure portfolios that help address the growing gap between increasing capital needs and expected budgets. ASG also provides software solutions through Ameresco's **proprietary AssetPlanner™ Software Suite** that combines strategic capital planning with tactical maintenance management and proactive energy management.

Typical Measures Evaluated by Ameresco

Table D.1 provides an overview of the typical FIMs and energy supply solutions that Ameresco explores during the Investment Grade Audit phase and which we would evaluate for the City. Firm-wide, Ameresco has delivered all these measures during the past five years alone.

Table D.1. Typical ECMs and FIMs Evaluated by Ameresco

Typical Energy Efficiency Measures	
Reduce Operating Hours, Temperature, and Humidity Set Points	
ECM/FIM 1	Reduce Operating Hours for Space Heating and Cooling Systems
ECM/FIM 2	Reduce Operating Hours for Ventilation Systems
ECM/FIM 3	Reduce Operating Hours for Water Heating Systems
ECM/FIM 4	Reduce Operating Hours for Lighting Systems
ECM/FIM 5	Reduce Operating Hours for Escalators and Elevators
ECM/FIM 6	Reduce Operating Hours for Equipment and Machines
ECM/FIM 7	Maintain Heating/Cooling Temperatures at Optimal Set Points
ECM/FIM 8	Maintain Humidification and Dehumidification Set Points
ECM/FIM 9	Modify Heating/Cooling Set Points During Unoccupied Periods

Table D.1. Typical ECMs and FIMs Evaluated by Ameresco

Typical Energy Efficiency Measures	
Reduce Heat Conduction through Ceilings, Roofs, Walls, and Floors	
ECM/FIM 10	Insulate Ceilings and Roofs
ECM/FIM 11	Ceilings and Roofs Vapor Barriers
ECM/FIM 12	Reflective Roof Services
ECM/FIM 13	Insulate Walls
ECM/FIM 14	Wall Vapor Barriers
ECM/FIM 15	Insulate Floors
Fenestration Improvements – Reduce Heat Conduction and Long-Wave Radiation	
ECM/FIM 16	Storm Windows/Multiple-Glazed Windows
ECM/FIM 17	Movable Windows
ECM/FIM 18	Operable Windows
Fenestration Improvements – Control Solar Heat Gain	
ECM/FIM 19	Exterior Shading Improvements
ECM/FIM 20	Interior Shading Improvements
ECM/FIM 21	Tinted or Reflective Glazing/Films
ECM/FIM 22	Plant Shade Trees
Reduce Outside Air Infiltration	
ECM/FIM 23	Seal Vertical Shafts and Stairways
ECM/FIM 24	Caulk and Weather-Strip Doors and Windows
ECM/FIM 25	Install Revolving Doors or Construct Vestibules
Electric to Fossil Fuel Conversions	
ECM/FIM 26	Convert Electric Domestic Hot Water System to Fossil Fuel Fired or Heat Pump
ECM/FIM 27	Convert Electric Heating System to Fossil Fuel Fired Hot Water or Infrared
Improve Ventilation Efficiency	
ECM/FIM 28	Improve Ventilation Efficiency while Maintaining or Improving Indoor Air Quality
ECM/FIM 29	Reduce the Generation of Indoor Pollutants
ECM/FIM 30	Air-to-Air Heat Exchangers
ECM/FIM 31	Air Cleaners
ECM/FIM 32	Local Ventilation Systems
Chiller Efficiency Improvements	
ECM/FIM 33	Clean Fouled Evaporator and Condenser Surfaces
ECM/FIM 34	Raise Evaporator or Lower Condenser Water Temperature
ECM/FIM 35	Isolate Off-Line Chillers and Cooling Towers
ECM/FIM 36	Install Evaporative-Cooled or Water-Cooled Condensers
Cooling Systems Efficiency Improvements	
ECM/FIM 37	Economizer Cooling Systems
ECM/FIM 38	Evaporative Cooling Systems
ECM/FIM 39	Desiccant Cooling Systems
ECM/FIM 40	Cooling Tower Cooling Systems
ECM/FIM 41	Roof-Spray Cooling Systems
ECM/FIM 42	Create Air Movement with Fans
ECM/FIM 43	Exhaust Hot Air from Attics and Other Conditioned Spaces
Air Conditioner or Heat Pump Efficiency Improvements	
ECM/FIM 44	Clean Air Filters
ECM/FIM 45	Add-On Heat Pumps
ECM/FIM 46	Ground or Ground-Water Source Heat Pump

Table D.1. Typical ECMs and FIMs Evaluated by Ameresco

Typical Energy Efficiency Measures	
Boiler or Furnace Efficiency Improvements	
ECM/FIM 47	Clean Fouled Boiler Surfaces
ECM/FIM 48	Repair Improper Flue Draft
ECM/FIM 49	Repair Air Leaks
ECM/FIM 50	Boiler Flue Gas Analyzers
ECM/FIM 51	Preheat Combustion Air, Feed Water or Fuel Oil with Reclaimed Waste Heat
ECM/FIM 52	Isolate Off-Line Boilers
ECM/FIM 53	Automatic Vent Dampers
ECM/FIM 54	Automatic Boiler Blow-Down Control
ECM/FIM 55	Pulse or Condensing Boilers/Furnaces
ECM/FIM 56	Air-Atomizing Burners (for Oil-Fired Systems)
ECM/FIM 57	Low Excess-Air Burners (for Oil-Fired Systems)
ECM/FIM 58	Use Modular Units
Reduce Supply Air Energy Requirements	
ECM/FIM 59	Install Variable Air Volume Systems
ECM/FIM 60	Reset Supply Air Temperatures
ECM/FIM 61	Reset Hot/Chilled Water Temperatures
Reduce Distribution System Energy Losses	
ECM/FIM 62	Repair Ducting and Piping Leaks
ECM/FIM 63	Repair, Replace and/or Maintain Steam Traps
ECM/FIM 64	Insulate Ducts
ECM/FIM 65	Insulate HVAC System Pipes
Reduce System Flow Rates	
ECM/FIM 66	Reduce Air Flow Rates in Ducts
ECM/FIM 67	Reduce Water or Steam Flow Rates in Pipes
Reduce Steam Resistance	
ECM/FIM 68	Clean Air Filters in Ducts
ECM/FIM 69	Remove Scale from Water and Steam Pipes
ECM/FIM 70	Rebalance Piping Systems
ECM/FIM 71	Rebalance Air Duct Systems
ECM/FIM 72	Design Air Duct Systems to Reduce Flow Resistance
ECM/FIM 73	Install Booster Pumps
Reduce Hot Water Loads	
ECM/FIM 74	Reduce Hot Water Consumption
ECM/FIM 75	Lower Hot Water Temperatures
ECM/FIM 76	Preheat Feed Water with Reclaimed Waste Heat
Reduce Hot Water System Losses	
ECM/FIM 77	Insulate Hot Water Pipes
ECM/FIM 78	Insulate Water Storage Tanks
Water Heating Systems Efficiency Improvements	
ECM/FIM 79	Decentralized Water Heaters
ECM/FIM 80	Reduce Water Heater Size as Appropriate
ECM/FIM 81	Heat Pump Water Heaters
ECM/FIM 82	Heat Water with Solar Energy
Reduce Electric Illumination Requirements	
ECM/FIM 83	Clean and Maintain Lighting Systems
ECM/FIM 84	Reduce Illumination Levels to Illuminating Engineering Society Standards

Table D.1. Typical ECMs and FIMs Evaluated by Ameresco

Typical Energy Efficiency Measures	
ECM/FIM 85	Reduce Operating Hours (Occupancy-Sensing/Ambient Light Controls)
ECM/FIM 86	Optimize Task Lighting
Lighting Systems Efficiency Improvements	
ECM/FIM 87	High-Efficiency, Electronic Fluorescent Lighting or LED Lighting as Appropriate
ECM/FIM 88	LED, High or Low-Pressure Sodium Lighting as Appropriate
ECM/FIM 89	LED or High Efficiency Pulse-Start Metal Halide Lighting as Appropriate
ECM/FIM 90	High-Efficiency Fluorescent/LED Lighting Systems
ECM/FIM 91	Replace Incandescent/Quartz Lighting with Fluorescent/LED Lighting Systems
Ambient Lighting (Daylight Harvesting)	
ECM/FIM 92	Dimming Controls for Ambient Lighting
ECM/FIM 93	Photoelectric Controls for Exterior Lighting
ECM/FIM 94	Installation of Web-Based Lighting Automation Systems
ECM/FIM 95	Baseline Lighting Level and Demand Response Capabilities / Control
Reduce Power System Losses	
ECM/FIM 96	Power Factor Improvement
ECM/FIM 97	Energy-Efficient Transformers
Energy-Efficient Motors	
ECM/FIM 98	Replace Oversized Motors
ECM/FIM 99	High-Efficiency Motors
ECM/FIM 100	Variable Speed Motors/Drives
Reduce Peak Power Demand	
ECM/FIM 101	Demand Response/Load-Shedding Strategies
ECM/FIM 102	Cogeneration Systems
ECM/FIM 103	Thermal Storage Systems
Energy Management Systems	
ECM/FIM 104	Temperature Setup/Setback Control System
ECM/FIM 105	Time-of-Day Control System
ECM/FIM 106	Duty-Cycling Control System
ECM/FIM 107	Supply Air Temperature Reset Control System
ECM/FIM 108	Hot/Chilled Water Supply Temperature Reset Control System
ECM/FIM 109	Ventilation Purging Control System
ECM/FIM 110	Economizer Cooling Control System
ECM/FIM 111	Demand Limiting Control System
Miscellaneous – Heat Reclaim Systems	
ECM/FIM 112	Double-Bundle Chillers
ECM/FIM 113	Reclaim Heat from Boiler Blow Down
ECM/FIM 114	Reclaim Incinerator Heat
ECM/FIM 115	Reclaim Combustion Flue Heat
ECM/FIM 116	Water-Loop Heat Pump System
ECM/FIM 117	Reclaim Prime Mover Heat
ECM/FIM 118	Piggyback Absorption Systems
ECM/FIM 119	Recover Light System Heat
ECM/FIM 120	Reclaim Refrigerator Hot Gas Heat
ECM/FIM 121	Reclaim Steam Condensate Heat
ECM/FIM 122	Reclaim Wastewater Heat

Table D.1. Typical ECMs and FIMs Evaluated by Ameresco

Typical Energy Efficiency Measures	
Miscellaneous – Wastewater Treatment Systems	
ECM/FIM 123	Aeration Blowers Variable Frequency Drives
ECM/FIM 124	Pumping Systems Variable Frequency Drives
ECM/FIM 125	Coarse Bubble Diffusion to Fine Bubble Diffusion
ECM/FIM 126	Methane Capture from Waste Digestion to Create Renewable Natural Gas
ECM/FIM 127	Onsite Chlorine Generation
Miscellaneous – Appliances	
ECM/FIM 128	Energy-Efficient Appliances
ECM/FIM 129	Convert Electric Dryers to Natural Gas
Utility Infrastructure	
ECM/FIM 130	Automatic Meter Reading (Water/Electric/Gas)
ECM/FIM 131	Advanced Metering Infrastructure (Water/Electric/Gas)
ECM/FIM 132	Leak Detection
ECM/FIM 133	Transmission and Distribution System Improvements
Renewable Energy Generation	
ECM/FIM 134	Solar Photovoltaics / Thermal
ECM/FIM 135	Battery Energy Storage System
ECM/FIM 136	Biomass
ECM/FIM 137	Biogas (from WWTPs or from Landfills)
ECM/FIM 138	Wind
ECM/FIM 139	Geothermal
ECM/FIM 140	Ground Source Heat Pump
ECM/FIM 141	Landfill Gas to Energy
ECM/FIM 142	Microgrid
Domestic Water Conservation	
WCM 1	Low Flow Shower Heads and Aerator
WCM 2	Low Flow/Dual Flush Toilets, Low Flow/Ultra Low Flow Urinals
WCM 3	Irrigation System Controls (Schedule, Weather and Evapotranspiration Strategies)
WCM 4	Reverse Osmosis Water Demineralizing Systems
WCM 5	Replace Once-Through Cooling with Cooling Towers

LED Streetlighting

Ameresco is a national leader in citywide streetlight conversion projects. Ameresco implemented one of the first citywide light-emitting diode (LED) streetlight projects in the United States for the City of Longview, WA in 2010. As part of this project, Ameresco helped to secure a $500,000 state energy efficiency grant and $400,000 in utility incentives and worked with City's serving electric utility to add LED luminaires to their streetlight tariff.

In March 2017, the City of Chicago announced Ameresco as the selected vendor for its $160 million Chicago Smart Lighting Project, which is the largest LED streetlight retrofit project in the United States. Ameresco converted over 275,000 streetlights to LED, installing a citywide umbrella network to monitor and control the streetlights and provide an on-ramp to other smart city applications, as well as making infrastructure stabilization repairs. Additionally, Ameresco completed a $26.8 million streetlight conversion of over 92,000 fixtures with the City of Phoenix.

In July 2022, Ameresco announced its partnership with the City of Memphis and Memphis Light, Gas and Water (MLGW) to lead a comprehensive LED streetlighting, controls, and networking project designed to reduce energy costs citywide and enhance operations and maintenance capabilities with the upgrade of more 77,000 fixtures. Completed in 2024, the project was recently awarded the 2024 Smart 20 Award for Transformative City Infrastructure at the Annual Smart Cities Connect Conference.



Ameresco joined Mayor Jim Strickland of the City of Memphis, and J.T. Young, CEO of Memphis Light, Gas and Water to announce our partnership to upgrade nearly 80,000 citywide streetlights to energy-efficient, long-lasting LED technology. We are excited about our role in providing the city with state-of-the-art solutions that will greatly reduce light pollution and ensure a cleaner, safer, and healthier future for all Memphis residents.

To see Before and After footage of the Memphis street and area lighting upgrades, visit https://www.ameresco.com/portfolio-item/video-memphis-led-streetlight-upgrade/.



Municipal Water Efficiency

Ameresco has developed or is currently developing smart / automatic metering projects with many local governments. Ameresco's delivery team is focused on providing municipal utility customers with non-revenue water reduction projects to conserve important resources, which becomes particularly important during times of growing water shortages.

Many utility companies are focusing their attention, time, and resources on improving operational efficiencies. The growing variety and availability of flow measurement technologies more accurately measures consumption, especially in low flow ranges, is making this more attainable. Integrated leak detection systems take accountability a step further, working in parallel, these technologies reduce the cost of operating and maintaining distribution infrastructure and data collection, as well as the associated variable production costs for chemically treating and pumping clean, safe drinking water to citizens.

Municipal utility projects reduce operations and maintenance expenses through improved labor costs. These projects also increase billable water and corresponding sewer revenues through the installation of more accurate meters.

Wastewater Treatment

Wastewater treatment plants often account for 30 to 50 percent of a city's electric bill, which provide an excellent opportunity for energy savings. Pumps, motors, and blowers are often good candidates for replacement. Because aeration could account for over 50 percent of the energy used by wastewater plants, converting mechanical aerators to diffused aeration can be beneficial. Where diffusers are already in place, updating existing equipment with automatic dissolved oxygen controls is often a good measure. Depending on the size of the plant; methane gas can be used to create energy for larger plants if the plants have existing anaerobic digesters.



Project Spotlight: City of Dallas Water Utilities

In November 2008, the City of Dallas entered into a 20-year lease agreement with Ameresco for the development of a 4.2 MW CHP plant at the Southside Wastewater Treatment Plant. Ameresco designed, permitted, constructed, owns, and currently operates and maintains the CHP plant. In addition to an annual savings of $1.5 million, this project provides the City with a source of clean energy and aids the City in meeting State legislation calling for reduced energy consumption and utilization of renewable energy.

City of Phoenix 91st Avenue Wastewater Treatment Plant, AZ. Ameresco designed, built, owns, operates, and maintains (DBOOM) the largest wastewater treatment biogas-to-renewable natural gas (RNG) facility of its kind in the United States. Using innovative energy technologies, Ameresco processes raw biogas generated at the 91st Avenue Wastewater Treatment Plant into RNG suitable for injection into the nation's high-pressure natural gas pipeline. The RNG is sold on the open market as vehicle fuel under the EPA's Renewable Fuel Standard Program.

City of Troutdale, OR. The City of Troutdale, Oregon partnered with Ameresco for a $2.2 million turnkey ESPC project to complete upgrades throughout its 20-year old wastewater treatment plant. Improvement measures included replacing the aeration basin blower; installing ultra-fine bubble diffusers; upgrading the UV disinfection system; installing new HVAC controls; and retrofitting lighting fixtures with LEDs. The new effluent water distribution piping was designed to reuse water from the effluent well, reducing the plant's need for potable water. These improvements alleviate the risk associated with aging equipment, while reducing the annual energy, gas, and water costs to the City.

Completed Contracts to End of Performance Guarantee Term

Provide examples of customers who have completed a performance contract to the end of the term performance guarantee and give results on actual dollar savings achieved.

In 2009, Ameresco was contracted by the Commonwealth of Kentucky to implement a $2.9 million energy and utility conservation project at the Kentucky Horse Park (KHP). Projects included an extensive inflow and infiltration project at KHP, benefitting the park as well as the Lexington Fayette Urban County Government sewer district through the repair of the sanitary sewer manholes and repair or replacement of the sewer piping; solar tracking skylights; upgrades to the existing swimming pool; solar-powered trash compaction; and solar domestic water heating systems.

Guaranteed Annual Savings ($)	Achieved Savings Year 1 ($)	Achieved Savings Year 2 ($)	Achieved Savings Year 3 ($)	Achieved Savings Year 4 ($)	Achieved Savings Year 5 ($)	Achieved Savings Year 6 ($)	Achieved Savings Year 7 ($)	Achieved Savings Year 8 ($)	Achieved Savings Year 9 ($)	Achieved Savings Year 10 ($)
334,439	361,886	381,931	368,161	437,142	397,073	365,449	361,184	367,593	360,188	394,938

Of note, the Project Experience Summary section provides guarantee data for the City of Casa Grande (currently in Year 12) and City of South Bend (currently in Year 8).

Willingness to Include Other Manufacturers' Products

Describe your willingness to include other manufacturers' products.

- *Identify and describe any business associations with equipment manufacturers or suppliers that might be specified for this project.*
- *Provide five (5) project examples where you have installed or integrated other manufacturers' products.*

As an American-owned Energy Service Company (ESCO), Ameresco is unique in that we are both **vendor neutral** and **technology agnostic** across all product/service lines and **independent of any parent company** or other competing lines of business. Ameresco is neither affiliated with nor a subsidiary of any equipment or system manufacturers. Thus, our energy and utility resource projects are never influenced by the sale of equipment or systems. This major difference between us and ESCO's that are really product manufactures, allows us to provide the best product and solution to meet your challenges without the influence of selling you a specific product we manufacture.

Ameresco has worked with all the major manufacturers. Our objective approach and deep bench of technical expertise enables Ameresco to present a comprehensive portfolio of innovative energy and infrastructure solutions to our customers. Our designs and services are based only on our customer needs. We deploy best-in-class solutions with no technical or vendor bias.

Ameresco has a dedicated supply chain team and established national buying agreements with several major manufacturers to ensure that our customers receive the highest quality products, at the lowest possible equipment cost available in the marketplace, with expedited lead times to acquire. Accordingly, **every project implemented by Ameresco has installed or integrated other manufacturers' products.**

Project Locations

Provide the location(s) where this project will be managed and ESCO's division headquarters.

The project with the City of Columbia will be managed from our Chicago office located at 10 S. LaSalle Street, Suite 3450, Chicago, IL 60603. As noted previously, while Ameresco does not have specific divisions and every employee is focused on energy and utility resource conservation, the Chicago office also serves as Ameresco's regional headquarters.

Major Utility Conservation Project Experience

Offeror's should identify their experience and proposals to perform analysis, design engineering, preparation of engineering plans and specifications, installation, commissioning, monitoring and verification of savings, and management of a major utility conservation project that has involved Energy Conservation Measures (ECM) and Facility Improvement Measures (FIM) which address facility components and utility infrastructure applications.

As a full service, turnkey provider, Ameresco has performed the perform analysis, design engineering, preparation of engineering plans and specifications, installation, commissioning, monitoring and verification of savings, and management for nearly all the projects both referenced and highlighted throughout this proposal.

In addition to the projects listed herein, an excellent example of large scale facility and utility infrastructure conservation has been provided on the following page. Additional projects, including those with utility customers, will gladly be furnished upon request.







Joint Base San Antonio

In October 2018, Ameresco was awarded a contract by the Defense Logistics Agency Energy (DLAE) to implement an energy resilient infrastructure project at Joint Base San Antonio (JBSA) that included **energy efficiency and reliability upgrades to 900 buildings across five military installations**. The DLAE awarded the contract to Ameresco under a self-funding ESPC that will provide work to all areas of JBSA including Lackland Air Force Base, Fort Sam Houston, Randolph Air Force Base, Kelly Field Annex, Camp Bullis, and Medina Annex.

More than 14.7 million square feet of buildings received energy and water conservation upgrades designed to reduce energy consumption in the buildings by 24 percent annually. The ESPC provided for HVAC management control systems, over 2 million gallons of thermal energy storage, more than 140,000 LED lighting systems, and building envelope improvements.

To support critical energy loads for mission assurance, Ameresco installed new onsite distributed energy assets capable of islanding from the electric utility, including a combined heat and power (CHP) system comprised of nine microturbines for a total capacity of 585 kW, 4 MW of natural gas fired standby generation, and an 11.7 MW ground mount solar photovoltaic (PV) array at the Security Hill Landfill at Lackland Air Force Base and over 5 MW of roof-mount PV at Fort Sam Houston .

The microgrid consists of a diverse portfolio of assets that allow for uninterrupted off-grid operations to ensure the continuity JBSA's mission. The microgrid control system can provide off-grid operation of the solar PV generation while leveraging the integrated use of 4 MW/8 MWh of battery energy storage and 4 MW of gas fired generators to provide sustained electrical supply to critical buildings during the event of a utility outage or grid disruption.

The ESPC is guaranteed to provide $8.7 million in annual energy savings to JBSA. Ameresco will provide ongoing O&M services in support of the new energy systems.

Training

The offeror should provide a description of the ESCO's proposals and experience related to training facility occupants and maintenance workers in energy and water conservation awareness.

Technical Training

In addition to the training outlined in the City Training section on the preceding pages, Ameresco realizes that all installed equipment must be reliable, durable, and properly maintained. Even the most efficient systems would not perform properly unless they are properly integrated with the existing infrastructure, and the best installations can cause problems if not carefully coordinated with ongoing maintenance practices. Therefore, one of the most important initial steps in the process is proper training.

To achieve a successful energy efficiency project, facilities personnel must be motivated to integrate energy and water-efficient performance into their daily routine. Ameresco works closely with facility personnel and trains them to understand that their efforts keep the equipment performing efficiently and effectively, and that their observations can be important indicators of where and when waste is occurring. Ameresco will properly and thoroughly train designated personnel on all installed measures.

Successful training would ensure that energy savings are realized, and customer guarantees are met.

Non-Technical Training

Everyone who works for or within a facility can have an impact on the level of success of an energy conservation program. Therefore, training should be offered to the broadest possible range of facility groups and building occupants to the fullest extent possible. The following describes some of the types of non-technical training programs typically considered:

- **Energy Policy Development:** Ameresco works with its customers to evaluate the need for a facility-wide energy policy. A well-defined and effective energy policy provides goals, objectives, and management direction and leadership for all energy or sustainability-related activities and initiatives.
- **Occupant Awareness Program:** Ameresco can work with the City to implement an outreach and awareness program to educate employees and citizens about the energy and utility resource projects being conducted. Messaging will highlight the importance of conservation, as well as how building users and members of the public (as applicable) can contribute to the success of the project.

Outreach

Ameresco has assisted clients with the organization of project dedications, groundbreaking ceremonies, and ribbon cuttings; creation and/or dissemination of press releases and case studies; educational presentations; tours and award submissions and presentations.



Ameresco team members engaging the community and answering sustainability questions at **City of Phoenix Earth Day Event**

Throughout the project's different phases, Ameresco's diverse team members – account managers, engineers, project managers, and subcontractors – are happy to be examples of individuals working in the clean energy economy by participating in events around the community, such as Earth Day activities, local energy expositions, and school and community events.

Ameresco also provides a comprehensive marketing program to showcase the vision, leadership, and environmental stewardship of our customers. Outreach activities, at the City's discretion, can include:

- **Marketing:** Promote the City's efforts via various media outlets; dedication and press events; and tradeshows.
- **Media Relations:** Generate positive press coverage and goodwill in local, regional, and national media through articles, interviews, and press releases.
- **Community Affairs:** Generate community support for energy conservation and renewable energy and communicate the City's overall commitment and environmental achievements.
- **Awards:** Submit relevant projects for high profile awards.
- **Case Studies:** Draft case studies and project fact sheets that communicate the City's commitment and promote their environmental achievements.

Exhibit G. Sample Work

The offeror should provide a sample Investment Grade Energy Audit including energy savings data.

A sample Investment Grade Audit completed for the City of Bend, Oregon has been uploaded to the City's E-Bidding site as a separate attachment entitled "AMERESCO_City of Columbia RFP 91/2023_Exhibit G.pdf".

Ameresco analyzed a wide range of facility improvements for the City of Bend such as HVAC system replacements; direct digital controls (DDC) installation and optimization for HVAC systems; variable flow pumping and fan systems; domestic water heating systems; domestic plumbing systems; wastewater system efficiency improvements and high-level innovative revenue strategies; lighting systems; solar photovoltaic (PV) systems; in-line hydroelectric turbines; building envelope improvements, including roofing; and citywide streetlighting conversion to light emitting diode (LED) fixtures.

Ameresco utilized a total systems evaluation approach, meaning each building system was monitored with data logging equipment and uploaded to our computer models to predict baseline energy use by system. Calibrated power meters, motor state loggers, temperature thermistors, occupancy sensors, photosensors, and electric current meters were deployed to obtain high-accurate data.

The total for the recommended measures was estimated to be $3,857,605. After $255,467 in incentives/grants, the amount of the final project would be $3,639,827. The project was delivered below budget and Ameresco facilitated a higher value of utility incentives, bringing the final payback well below the original estimate of 17 years.

City of Columbia, MO
Proposal for Professional Services:
Energy & Utility Resource Conservation Program Services
(Solicitation No.: Request for Proposal (RFP) 91/2023)

Miscellaneous Submittal Information

Miscellaneous Submittal Information



The following information, as requested in the City of Columbia's Request for Proposal (RFP) 91/2023), has been provided herein:

- **Affidavit of Work Authorization and Documentation:** Exhibit E, Business Entity Certification, Enrollment Documentation, and Affidavit of Work Authorization
- **Exhibit F, Miscellaneous Information**

Ameresco is prepared to provide all **Business Compliance** documentation upon request by the City of Columbia Purchasing Division.

EXHIBIT E

NOTICE TO OFFERORS

Sections 285.525 To 285.550 RSMo.

Pursuant to section 285.530 (1) RSMo., No business entity or employer shall knowingly employ, hire for employment, or continue to employ an unauthorized alien to perform work within the State of Missouri.

As a condition for the award of any contract or grant in excess of five thousand dollars by the state or by any political subdivision of the state to a business entity, or for any business entity receiving a state-administered or subsidized tax credit, tax abatement, or loan from the state, the business entity shall, by sworn affidavit and provision of documentation, affirm its enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services. Every such business entity shall sign an affidavit affirming that it does not knowingly employ any person who is an unauthorized alien in connection with the contracted services. {RSMo 285.530 (2)}

An Employer may enroll and participate in a federal work authorization program and shall verify the employment eligibility of every employee in the employer's hire whose employment commences after the employer enrolls in a federal work authorization program. **The E-verify system issues a Memorandum of Understanding once enrollment is complete; the City of Columbia requires a copy of this document be attached to the Work Authorization Affidavit.** The employer shall retain a copy of the dated verification report received from the federal government. Any business entity that participates in such program shall have an affirmative defense that such business entity has not violated subsection 1 of this section. {RSMo 285.530 (4)}

For offerors that are not already enrolled and participating in a federal work authorization program, E-Verify is an example of this type of program. Information regarding E-Verify is available at: http://www.dhs.gov/e-verify

EXHIBIT E, Continued
CITY OF COLUMBIA, MISSOURI
WORK AUTHORIZATION AFFIDAVIT
PURSUANT TO 285.530 RSMo
(FOR ALL BIDS IN EXCESS OF $5,000.00)

County of Cook)
)SS.
State of Illinois)

My name is Jay Fleishman. I am an authorized agent of Ameresco, Inc. (Bidder). This business is enrolled and participates in a federal work authorization program for all employees working in connection with services provided to the City of Columbia. This business does not knowingly employ any person who is an unauthorized alien in connection with the services being provided. **Documentation of participation in a federal work authorization program is attached to this affidavit.**

Furthermore, all subcontractors working on this contract shall affirmatively state in writing in their contacts that they are not in violation of Section 285.530.1 RSMo and shall not thereafter be in violation. Alternatively, a subcontractor may submit a sworn affidavit under penalty of perjury that all employees are lawfully present in the United States.

Affiant

Jay Fleishman
Printed Name

Personally appeared before me, a Notary Public, within and for the County of Cook, ~~Missouri~~ Illinois, State of ~~Missouri~~, the person whose signature appears above, PERSONALLY AND KNOWN TO ME AND ACKNOWLEDGED, that signed the foregoing Affidavit for the purposes therein stated.

Subscribed and sworn to me this 31st day of MAY, 2024.
My Commission expires MAY 3, 2026.

(Notary Public)

MARY KATHLEEN BURNS
OFFICIAL SEAL
Notary Public, State of Illinois
My Commission Expires
May 03, 2026

EXHIBIT F

MISCELLANEOUS INFORMATION

Employee/Conflict of Interest:

Offerors who are elected or appointed officials or employees of the City of Columbia or any political subdivision thereof, serving in an executive or administrative capacity, must comply with sections 105.450 to 105.458, RSMo, regarding conflict of interest. If the offeror or any owner of the offeror's organization is currently an elected or appointed official or an employee of the City of Columbia or any political subdivision thereof, please provide the following information:	
Name and title of elected or appointed official or employee of the City of Columbia or any political subdivision thereof:	N/A
If employee of the City of Columbia or political subdivision thereof, provide name of City or political subdivision where employed:	N/A
Percentage of ownership interest in offeror's organization held by elected or appointed official or employee of the City of Columbia or political subdivision thereof:	N/A _____%

Registration of Business Name (if applicable) with the Missouri Secretary of State

The offeror should indicate the offeror's charter number and company name with the Missouri Secretary of State. Additionally, the offeror should provide proof of the offeror's good standing status with the Missouri Secretary of State. If the offeror is exempt from registering with the Missouri Secretary of State pursuant to section 351.572, RSMo., identify the specific section of 351.572 RSMo., which supports the exemption.

F00538015 ***Charter Number (if applicable)***	Ameresco, Inc. ***Company Name***
If exempt from registering with the Missouri Secretary of State pursuant to section 351.572 RSMo., identify the section of 351.572 to support the exemption:	

City of Columbia, MO
Proposal for Professional Services:
Energy & Utility Resource Conservation Program Services
(Solicitation No.: Request for Proposal (RFP) 91/2023)

Appendix A. City of Columbia Facility Observations

Appendix A. City of Columbia Facility Observations

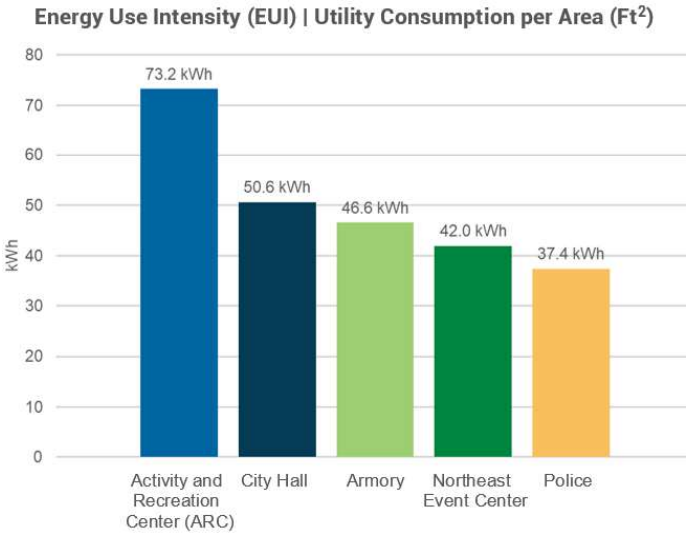


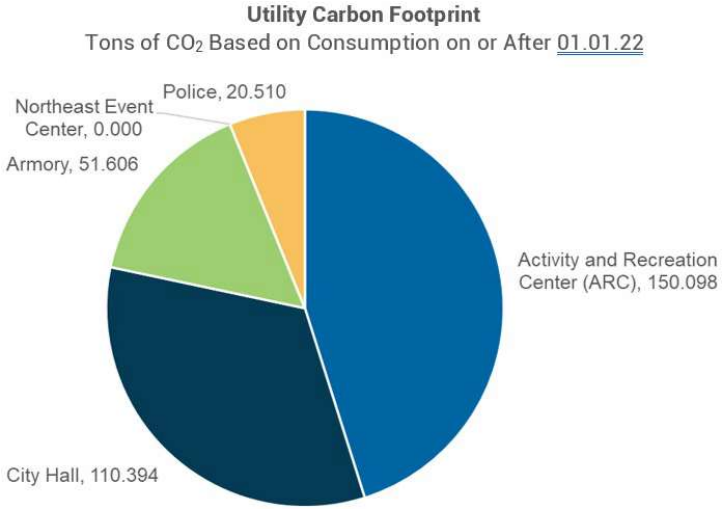
As the facilities identified in the City of Columbia's Request for Proposal 91/2023 are open to the public, Ameresco took the opportunity to walk the facilities and make casual observations regarding the condition of the buildings, as well as provide potential energy and utility resource conservation measures that may be considered. This is not an in-depth analysis, nor should these observations be considered completely accurate, they are simply observations from a brief walk of each facility.

Utility Analysis

To provide greater insight into the performance of the five facilities, we utilized Ameresco's propriety AssetPlanner software to benchmark the energy use intensity (EUI) of the facilities using the data provided by the City in its Request for Proposal. EUI is a measure of the energy efficiency of a building. It is calculated by dividing the total energy consumed by a building in a year by its total floor area. A lower EUI indicates better energy efficiency. EUI is commonly used to compare the energy efficiency of different buildings or to track changes in the energy performance of a single building over time.

Benchmarking analysis is used to rank and prioritize buildings with highest potential for energy usage and cost reductions. Benchmarking also helps to understand the root cause, or the challenges associated with energy performance within your buildings. While there are several other performance standards that contribute to a true facility benchmark, calculating, tracking, and disclosing your building's EUI is increasingly becoming mandatory. An example of this can be seen in the US, where many of the country's cities and states have implemented energy benchmarking and disclosure policies requiring building owners to report their energy usage and EUI. Even some green building certification programs, such as LEED and ENERGY STAR, require EUI to be calculated as part of their certification process.





Energy Star Portfolio Manager
CBEC Data 2018

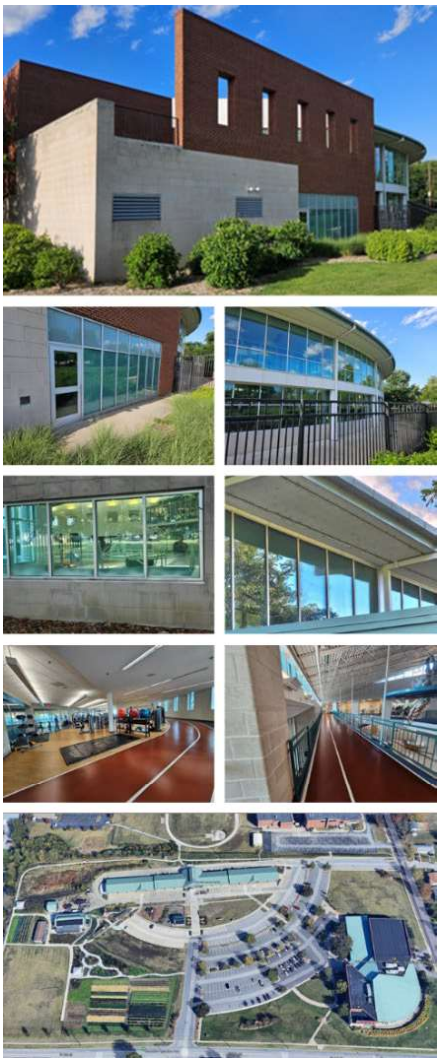
Building Type	Building Name	Median Site EUI (kBtu/sf)	Actual kBtu/sf
Entertainment/Public Assembly, Recreation, FitnessCenter/Pool	ARC	50.8	73.2
Entertainment/Public Assembly, Recreation, Gym	Armory	50.8	46.6
Public Service, Police	Police	63.5	37.4
Office, Office	City Hall	52.9	50.6
Entertainment/Public Assembly, Recreation, Indoor Arena	Northeast Event Center	56.2	42

Based upon the utility bills and square footage provided as part of the RFP, we compared the City's buildings against the Energy Star Portfolio Manager performance data. Four of your five buildings are performing at or under the national average for similar buildings. As illustrated, the Activity and Recreation Center is consuming roughly 40% energy than comparable facilities across the country.

Approaching these facilities with a deep energy retrofit and supplementing with renewables will not only reduce the City's EUI's portfolio-wide but will also reduce your dependance on offsite produced power.

General Observations

Activity and Recreation Center (ARC)



This facility was constructed in 2000 and encompasses roughly 73,000 square feet. The mechanical equipment for heating, cooling, and pool dehumidification installed on the roof appears to be original to the construction. Following that same assumption, the boilers for building heat are likely the same vintage.

Replacing the existing equipment with new will garner an approximate 10% to 20% increase in efficiency to that piece of equipment. In addition, this will remediate refrigerant that has been phased out in the cooling equipment in the facility.

The possibility exists to convert the facility from a traditional boiler/chiller/direct expansion (DX) heating and cooling system to a ground source heat pump system. There is ample acreage to install wells to support the thermal dissipation from the system. The heat rejected from the system could be harvested to offset some of the heat gains required to heat the pool. To supplement the pool heating requirements, solar thermal could be incorporated to complete the heat requirements of the pool. There have been recent advances in geothermal technology that reduce the number of bores and as a result, a reduction in overall cost to install. There are also significant incentives associated with the Inflation Reduction Act (IRA) that will further reduce the overall cost of construction.

Though the internal lighting has been upgraded to LED, a redesign of the lighting could result in reasonable reduction in overall lighting energy consumption. Case in point, the fitness room lighting could be redesigned, and overall fixture counts reduced. Numerous other areas within the facility could benefit from this same approach.

The building envelope shows signs of age. Several aluminum window heads (trim pieces) have become dislodged from their assemblies. Several areas around the perimeter of the building have soffits that have separated from the vents leading to open gaps that can allow vermin infiltration. The structural steel top plates on exterior walls above the windows show signs of moisture infiltration and corrosion. This has led to rust stains on the aluminum mullions, rails, and aluminum building panels. The architect specified an unusual running bond for the limestone block used in the construction of several areas of the facility. This close stepped bond is a weaker bond for the masonry than a traditional stretch or Flemish bond. As a result, numerous settling issues were observed. Moisture is getting behind the block causing efflorescence and mortar joint failure. In one case, it appears water froze in the mortar joint causing the block to spaul. Attempts were made to seal the masonry joints with caulk but those are also failing. A portion of the project budget should be set aside to perform routine tuckpointing on the facility to prevent further water infiltration.

The pool is a popular attraction for the community. Operating a facility like this is an expensive proposition. Considering that the cost of chemical treatment is rising, water evaporation should be a

concern. A liquid pool cover could be deployed to reduce the overall costs of chemicals and water through evaporation.

Beyond solar thermal, solar photovoltaic (PV) could be deployed at this facility. There is ample roof and ground space to accommodate a large collection system. If desired, a solar canopy over the parking lot could be implemented. In addition, electric vehicle (EV) charging stations could be added for the convenience of the community.

The Armory







Built in 1938, the facility was renovated in 2000. The facility is roughly 21,000 square feet in size. The mechanical equipment appears to be of the 2000 vintage and is past end of life expectancies.

The split, engaged, Tuscan column at the main entry appears to have moisture infiltration as evidenced by the peeling paint. The source of the moisture infiltration should be investigated.

It appears that the EPDM roofing, where it terminates from the barrel roof to the three-story building has lost adhesion. Below the termination bar, the EPDM has ballooned and appears to be at risk of failure.

City Hall





This facility consists of two buildings that encompass roughly 120,000 square feet of space. The former hotel building was built in 1917 and is on the National Historic Register of Historic Places. To the east is an addition that was constructed between 2008 and 2011.

Historic aerial photos date the initial commissioning of the mechanical equipment to around 2010. This has the equipment's age at 14 years, roughly at or near the end of useful life for most commercial heating and cooling equipment. The refrigerant used in these machines has likely been phased out and will only become more expensive to maintain when failures occur. Replacing this equipment will garner a roughly 10% to 20% gain in efficiency of this gear.

The back side of the historic building, above the drive-up window, shows signs of water infiltration behind the brick. Large sections of brick show efflorescence and dozens of bricks have spauled.

Police Department

The original Police and Fire Department building was constructed in 1932. There have been numerous renovations over the decades. The facility is roughly 47,000 square feet in size including the parking garage.

The facility has nearly floor to ceiling glazing sections on the 7th Street side of the building. The lintels supporting the brick above the windows are showing signs of fatigue. Water has infiltrated between the brick and angle iron causing the angle iron to rust and expand. This is pushing down in the top frame of the glazing, causing it to bow. Additionally, several windows on the East Walnut Street side of the

building are experiencing lintel failures as well. These lintels should be removed and replaced as they are the sole structural support of the brick above.









In the alley between Police and adjacent building, there appears to be a buried fuel oil tank. Based on the age of the vent fitting, this tank appears to be decades old. Buried fuel oil tanks are an environmental liability and should be decommissioned and removed.

Based upon data provided, the Police Department has not yet had their lighting retrofit to LED. There is also an odd high pressure sodium cobra head or two lighting the alleyway behind the building. These should all be retrofit to new technology.

Information provided about the HVAC system states that the Police Department is fed from a multizone air handling unit (AHU) with electric heat and DX cooling. There are numerous other systems that appear to supplement heating and cooling needs within the facility. As part of the Investment Grade Audit, the systems should be analyzed to determine if efficiencies can be gained by combining several of the systems together into a central system. The existing pneumatic controls should be replaced with a building automation system. This will allow administrative areas that operate at normal business hours to be set back afterhours, saving energy.

Upon inspecting the brick façade of the building, we noticed several areas of concern regarding tuckpointing. Though not severe, money from the budget should be allocated to provide tuckpointing in limited areas around the building. The caulk at expansion joints and window caulk are showing signs of age and should be addressed also.

The existing three-story section of the facility does not have expansion joints for the brick façade. As evidenced in the picture to the above right, there is a crack that has developed where an expansion joint should have been installed. The brick has pushed together and begun spauling. This should be addressed to prevent further damage to the façade of the building.

Northeast Event Center

The Northeast Event Center was taken over by the City of Columbia in approximately 2019 from Boone County. This facility has hosted the Boone County Fair, which is the oldest fair west of the Mississippi and dates to 1835. The main facility (Coliseum) was constructed in the 1980's with the other buildings that followed.











Based upon observations, building exterior lighting has not been retrofit to LED. Street and field lighting are old technology. In addition, the interior lighting also appears to be old technology.

The main facility (Coliseum) appears to be heated only by horizontal, natural gas fired, AHUs and has several split systems that are at end of life. These should be replaced with high efficiency heat pumps.

The perimeter of each building has heavy weed growth making the facility look unkempt and less desirable for potential event renters. A

two-foot border of landscaping with fabric mat below will not only make the facility more attractive but reduce overall lawn maintenance requirements. The gravel roads between the buildings have grass and weed infestation that need to be addressed before the base road is lost.

Several locations around the perimeters of the buildings are showing signs of rusting or damage due to vehicles hitting them. These areas are allowing moisture and vermin infiltration into the building and should be addressed. In addition, clogged and damaged gutters are leading to overflows that are eroding of the soils on the perimeter of the buildings. The gutters should be cleaned, and the soils and grass restored.

Considering the City of Columbia's commitment to this facility, air conditioning the Coliseum would make it a more attractive rental property and would help revitalize the event grounds drawing more visitors and revenue. The property is prime for a geothermal heating and cooling system as well as a large-scale solar array.

Potential Measures for Consideration

Based on Ameresco's cursory facility observations, the following potential energy and utility resource conservation measures should be considered. A more thorough investigation as part of the Investment Grade Audit will evaluate the technological and economic feasibility of various energy and utility resource conservation measures (ECMs) and facility improvement measures (FIMs) and provide insight into the greatest energy, utility resource, and cost savings opportunities.

- LED Lighting where not Previously Replaced
- enVerid Filtration to Reduce Outdoor Air
- Highest Efficiency HVAC Equipment
  - Boilers, Chillers, DX Rooftops,
  - Air to Air Heat Pump Equipment, where applicable
- Heat Pump Domestic Water Heating
- Liquid Pool Cover
- Control Upgrades (Police has pneumatics)
- Retrocommissioning of Systems and Controls that Remain
- Large Scale Ground Source Heat Pumps (ARC)
- Renewables
  - Solar Photovoltaic
    - Roof Mount (City Hall, Armory)
    - Ground Mount (NE Event Center, ARC)
    - Parking Canopy (ARC, Police)
  - Roof Mount Solar Thermal (ARC)
  - Battery Energy Storage System (City Hall, ARC (high demand charges))
  - Landfill Gas Reclamation (City Landfill)
- Building Envelope
  - Roofing where applicable

  - Increased Insulation Thickness
- Tuckpointing (City Hall (historic building), Police, ARC)
- Soffit Repairs (ARC)

Fybar Parking Systems

With the growth and popularity of The District, parking downtown can sometimes be problematic. Finding a prime, open parking space is typically on top of every driver's list. This is not an uncommon issue in cities across the nation. As downtown areas become revitalized and more popular, managing parking has become an issue. When most metered parking spaces are filled, this leads visitors to circle endlessly in their vehicles until a space frees up.

Although parking fees are not a major revenue stream for the city, they do help pay for critical city services for the community. The typical city sees parking violation capture rates in the single digits. This can be attributed to meter attendants circling their meter inventory looking for expired meters and issuing violations.

These are two distinct but connected issues that can be effectively dealt with by an integrated parking system. By placing parking sensors in each space that the city controls, visitors can open an app (application) on their smart phone, find an open space and pay for the space at the same time. Beyond the immediate benefit of upfront payment, this also dramatically reduces the amount of carbon emissions from the vehicles utilizing this technology.

There are various other benefits to the system. Meter attendants can be notified of space expiration complete with time overages. Further, anonymous data collected from the system can be utilized to analyze parking habits, identify problem areas where little parking is available, and alert the meter attendants where the highest concentration of violations are occurring in real time, allowing them to concentrate their efforts more effectively.

The additional revenue generated by this system provides a relatively short return on investment of 7 to 10 years depending on the city's aggression of enforcement. Couple this with the overall reduction in carbon emissions, and it can be a big win for the City.

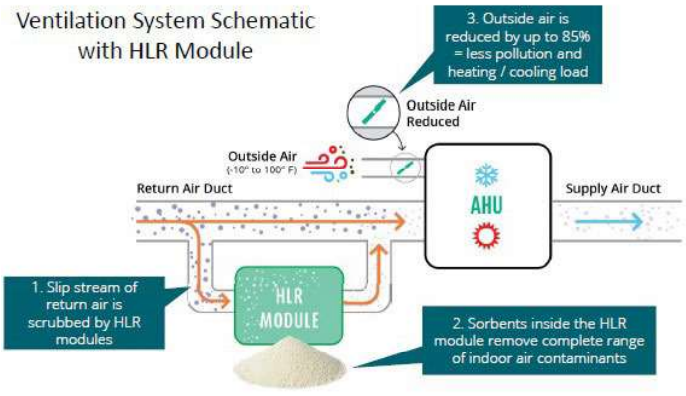
https://www.discoverthedistrict.com/parking

https://www.discoverthedistrict.com/facts-figures-1

Filtration Systems

Utilizing sorbent ventilation technology, Ameresco is able to reduce outdoor ventilation air by up to 85%. Ventilation air can represent up to 30% of an HVAC system's operating cost. Using ASHRAE approved calculation methods, a filtration system could be deployed across all City properties and systems.

The reduction in treated outside air allows a downsizing of the existing systems, translating to reduced energy consumed and greenhouse gasses emitted.



Solar Photovoltaic

To provide a visual representation of the solar opportunity identified at a preliminary level, Ameresco modeled potential applications for each applicable site.

Activity and Recreation Center



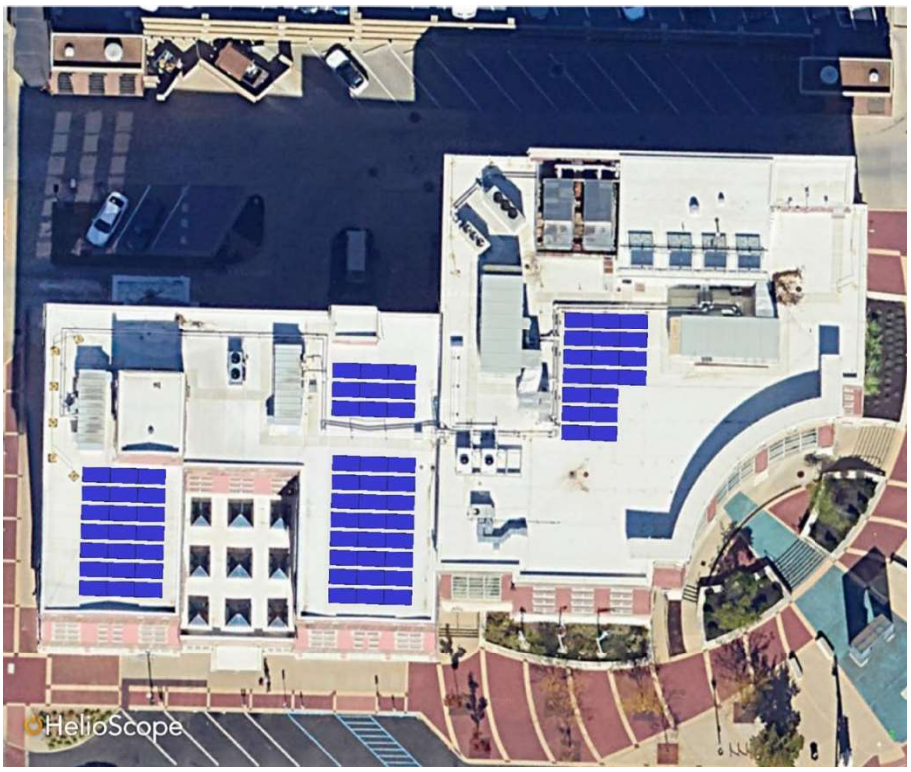
System Size: 2.1 MW-DC

Armory



System Size: 401 kW-DC

City Hall



System Size: 48.6 kW-DC

Northeast Event Center



System Size: 11.1 MW-DC

Ameresco, Inc.

10 S. LaSalle Street, Suite 3450

Chicago, IL 60603

City of Columbia Primary Point of Contact

Dana Dunn

Senior Account Executive

T: 314 325 6048

E: ddunn@ameresco.com

© 2024 Ameresco, Inc. Ameresco and the Ameresco logo, the orb symbol and the tagline. "Green. Clean. Sustainable." are registered in the U.S. Patent and Trademark Office. All rights reserved.