9/29/2023

Winter Park Events Center

ASHRAE Level II Energy Audit

15 lightyears
Energy Testing | Solar Power | Green Certification

TLC ENGINEERING SOLUTIONS

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Executive Summary

TLC Engineering Solutions (TLC) performed an ASHRAE Level 2 facility energy audit of the Winter Park Library and Events Center as a part of its contract with the City of Winter Park.

This report is related to the energy-consuming systems only and is intended to fulfill the requirements of an ASHRAE Level 2 Energy Audit, per the guidelines set forth by the ASHRAE document "Procedures for Commercial Building Energy Audits." The purpose was to observe existing conditions and gather information that would enable TLC to render an opinion concerning conditions or deficiencies that could affect efficient use of this facility, and to identify potential areas for improvement. Neither the field visits nor this report is intended to uncover hidden defects or the presence of hazardous materials.

TLC reviewed the original design drawings dated October 22, 2019, current utility bills from January 2022 through December 2022, subsequent project documentation, and visited the site in January 2023 in order to review the mechanical and electrical equipment, the HVAC and lighting controls systems, and observe each space type and its general energy use intensity. During this time, selected trends were viewed through the Building Automation System (BAS) and extensive photo documentation of the conditions of the facility were obtained. Several of the photographs are included in Appendix C of this report, and the reader is encouraged to thoroughly review the photographs and descriptions, as they are intended to support and supplement the observations described herein.

After the time on site, TLC developed energy saving spreadsheets to assist with the analysis of recommended Energy Conservation Measures (ECM's) and evaluated all BAS trends. The combination of all the walkthrough and post-walkthrough activities led to the development of the Energy Conservation Measures (ECM's) list. The following table summarizes the recommended ECM's for the Winter Park Events Center. A complete description and analysis of each ECM can be found later in this report.

Project Information & Contacts

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General Facility Description

The Winter Park Events Center is a 2-story event space of approximately 17,500 SF that went into service in December 2021. Below is an aerial view of the building.

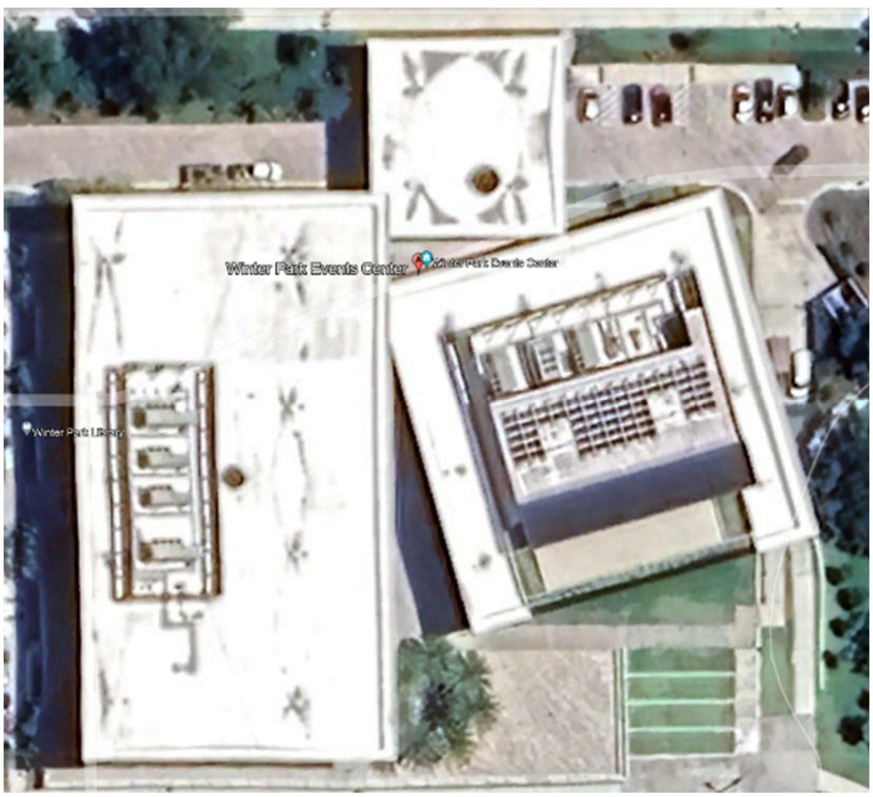


Figure 1: Aerial View of the Winter Park Events Center

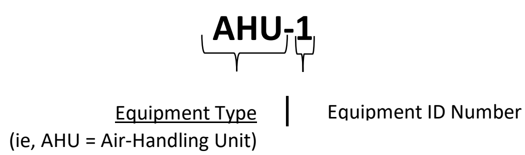
The side view of the building can be seen on the cover of this document. The following is a floor-by-floor general description of the building areas. The first level hosts the main events hall, support office spaces, and kitchen. The second level hosts a junior ballroom, storage, and various support spaces.

Mechanical Systems

The Winter Park Events Center features a new mechanical system with all new equipment. Overall, the building utilizes packaged rooftop air handling units, a makeup air handling unit, exhaust fans, and direct expansion (DX) split systems. Mechanical system information came from a combination of resources, including information gathered during TLC's audit walk-through of the building and building automation system review, final design drawings provided by the Winter Park Events Center (dated October 22, 2019). The below breakdown of the mechanical systems and areas they serve is TLC's best attempt to consolidate all avenues of information into one master list.

Equipment Naming Convention

The general naming convention used on the mechanical drawings is shown below. Please note, this convention applies to most of the equipment, but not all equipment.



Packaged Rooftop Units

Air conditioning for the majority of the Events Center is provided by three (3) packaged direct-expansion (DX) rooftop air handling units. Two units serve one half of the main ballroom each, while the third serves the core of the building and other meeting rooms and support spaces. Each unit is equipped with a variable frequency drive (VFD) to allow supply air to modulate based on changing load conditions, as well as staged and modulating compressors to control cooling capacity. Additionally, each unit is provided with an energy recovery wheel, to provide increased performance and efficiency.

Exhaust Fans

Exhaust fans were observed on the rooftop, providing general exhaust for the kitchen, restrooms and janitor's closets located within the Events Center. Additionally, the elevator equipment space is provided with exhaust via a dedicated fan.

Split Systems

Several spaces within the Events Center are conditioned via standalone DX split air conditioning systems. These units are cooling-only and provide temperature control in spaces such as electrical and telecom rooms.

Building Controls

The building is currently controlled by a centralized Building Automation System (BAS) utilizing Direct Digital Controls (DDC). The BAS allows for monitoring, scheduling and setpoint adjustment of the different HVAC systems. The BAS is a Trane Tracer Ensemble system with graphics for the major pieces of equipment. It was observed during the onsite audits that exhaust fans are manually set to run at all times.

Lighting Systems

Interior lighting throughout the facility is provided predominantly via light-emitting diode (LED) technology. Exterior lighting was observed to be always on, including during the day when it is not needed.

Domestic Water Fixture (Plumbing) Systems

The building is served by one (1) gas-fired water heater. The water heater is located on the first floor and provides hot water to restrooms and sinks located throughout the building. The water heater has 60-gallon storage capacity with a 12,000 Btu/h heating capacity.

Lavatory fixtures include motion sensors and low operating flows to reduce water consumption onsite.

Building Envelope

The building envelope systems were newly installed during the construction of the building in 2020-2021. The building enclosure was designed with materials meant to blend with the surrounding area, while maintaining a focus on efficiency and resilience. As the building was designed and constructed with sustainability in mind, and the building has not been in operation for very long. There were no opportunities for improvement related to the building envelope.

Key Operating Parameters

The building currently operates 24/7 with no setback programmed into the BAS.

Site Visit

The site was audited by TLC engineers with support from 15 Lightyears in early January, 2023. A full evaluation of existing energy consuming systems, compliant with ASHRAE Standard 211-2019 was performed. During the audit, TLC personnel were escorted by the City of Winter Park Facilities manager, Leif Bouffard. During the site observation, the audit team asked questions about the conditions onsite that have caused concerns or issues in the past, as well as insight into the maintenance practices and priorities of the facilities management team.

Utility Analysis

Historical Utility Data

The campus is currently provided with electric, gas, and water utilities. Electrical utility consumption values were provided for the months of December 2021 through June 2023. The electric utility data for the Library and Event Center are on the same meter, so it was divided up by a ratio of square footage to allocation a portion to the Event Center. Upon creating the utility profile for the building, concerns appeared regarding the peak in consumption for the month of February 2022. No explanation was provided for this spike; therefore, it was concluded that it could've been due to an extraordinary event during which occupancy increased significantly. Disregarding the spike, the consumption profile takes on an expected pattern, where values increase in the warmer months due to cooling needs. No specific costs or utility bills were provided, but a blended rate for kWh savings was determined based on the published rates for consumption and demand. Calculation of the blended utility rate takes into account the non-fixed costs associated with electrical utilities use by the facility, including fuel charges, per-kWh cost, demand charges, etc. Table 3 details the components of the blended rate calculation.

Table 1: Annual Baseline Energy Consumption

Utility	Total
Annual Electrical Consumption (kWh)	514,552
Annual Electrical Cost	-

The following graph and table show the total consumption and demand per monthly billing period for electricity.

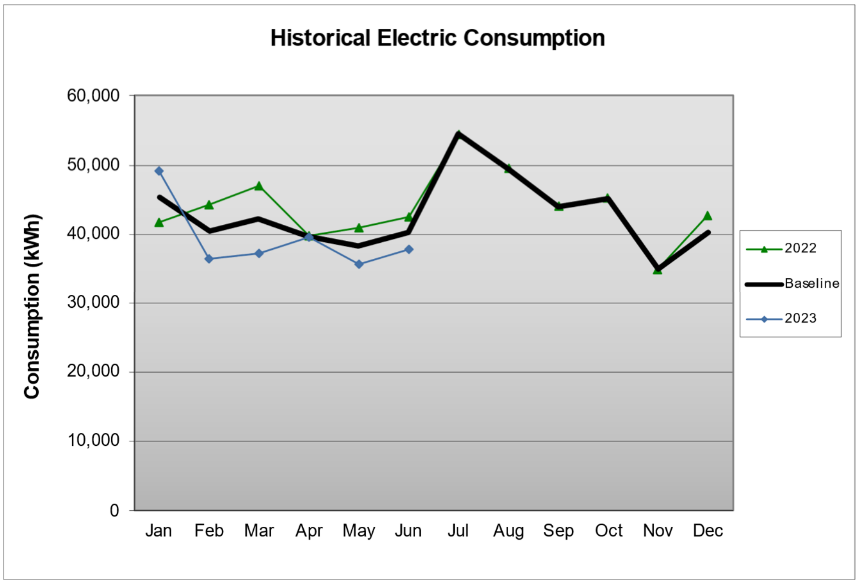


Figure 2: Event Center Electric Consumption

Table 2: Event Center Electricity Consumption Data

Date	Consumption (kWh)	Demand (kW)
Dec-21	37,951	93.3656
Jan-22	41,742	94.0373
Feb-22	87,185	96.3882
Mar-22	47,267	98.7391
Apr-22	40,156	106.799
May-22	41,289	106.799
Jun-22	42,998	106.799
Jul-22	54,942	106.799
Aug-22	50,136	106.799
Sep-22	44,921	106.934
Oct-22	45,993	106.799
Nov-22	35,708	106.799
Dec-22	42,078	106.934
Jan-23	49,168	106.934
Feb-23	36,406	106.799
Mar-23	37,279	106.934
Apr-23	39,563	106.934
May-23	35,600	106.799
Jun-23	37,749	106.799

Benchmarking

TLC compared energy consumption for the Events Center using common benchmarks to gauge how the site compares to similar ones both regionally and nationally, principally through the use of Energy Star Portfolio Manager. The building's Energy Use Intensity (EUI), which is used by energy engineers to determine overall energy consumption to a common unit of measure, was compared to other similar buildings throughout the United States. The Energy Use Intensity measures annual consumption of electricity per square foot, in kBTU/sf/year.

These benchmarks were developed by the Department of Energy and are based on feedback from building operators all over the country. Using the utility billing information and observing the system operation allows the energy profiles to be broken down to greater detail. The facility was modeled in Portfolio Manager as a Public Assembly building.

The historical energy consumption was entered into Portfolio Manager. Based on most recent 12-months of utility data, the chart below compares the Winter Park Events Center to the average energy use intensity (EUI) of similar buildings in Energy Star's database.

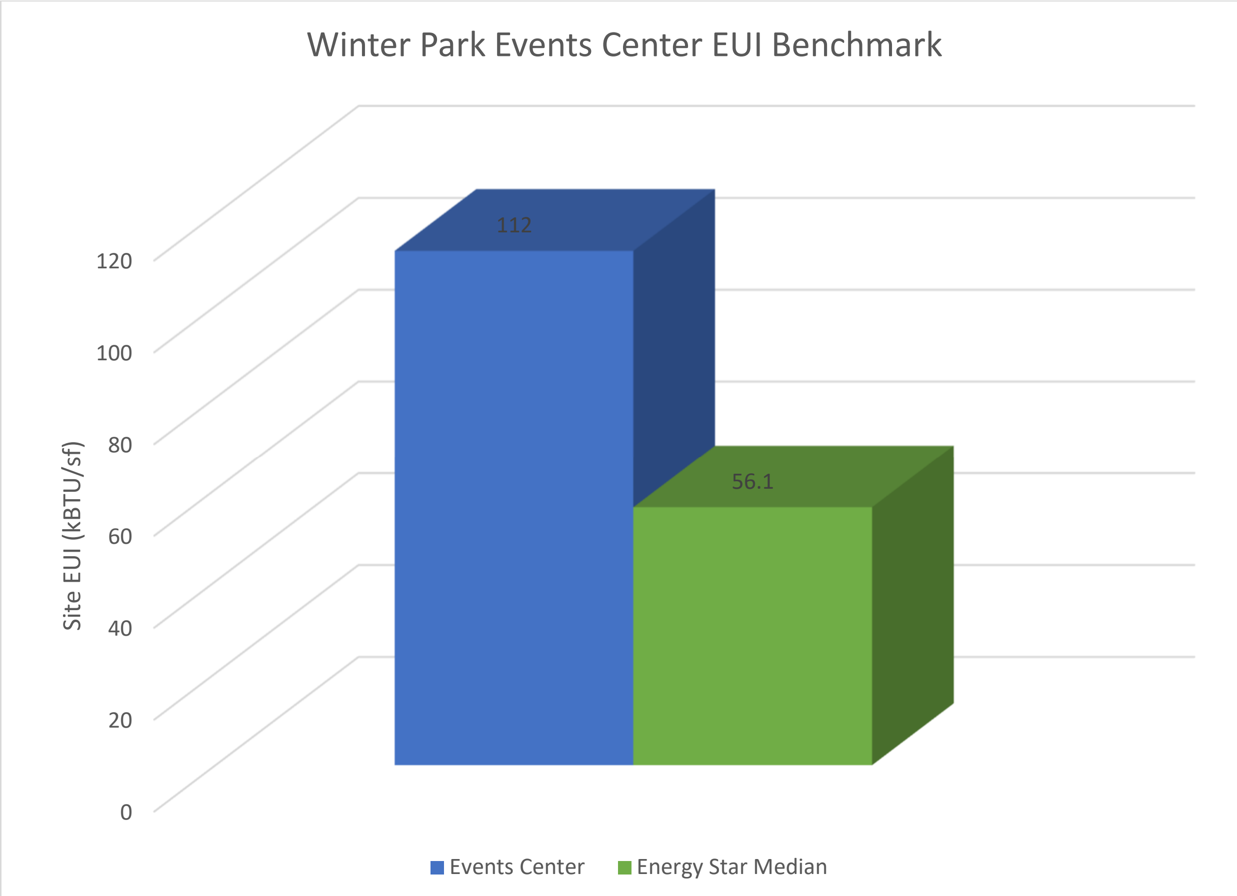


Figure 3: Events Center Energy Performance Comparison

The calculated site energy use intensity – the amount of electricity consumed onsite per square foot of building area – of the Events Center of 112 kBTU per square foot is approximately 99.6 percent higher than the baseline comparison value of 56.1 kBTU per square foot. This comparison, while valid, can be misleading as it is dependent upon the feedback of building owners and operators for the previous year, and does not account for the specific usage of the building. For example, other buildings in the same category may be smaller in size or less densely occupied during events. The energy conservation measures detailed later in this report are intended to improve the EUI of the building.

Utility Rate Analysis

The building is provided with electricity by the City of Winter Park (CoWP), following their Rate Schedule GSD-1, General Service – Demand. The utility rate charges shown below were used to calculate the costs associated with the provided consumption and demand. Energy savings calculated for this building have been assigned a blended rate of $0.0994/kWh, which is the calculated blended rate not including fixed customer charges.

Table 3: Utility Rate Schedule

Description	Charge
Demand Charge	$5.05 per kW of billing demand
Energy Charge	$0.04216 per kWh
Fuel Cost Recovery Factor	$0.02281 per kWh
Gross Receipts Tax	2.5641%
Franchise Fee	6.00%
Electric Utility Tax	10.00%
EL State Sales Tax (Commercial Only)	7.45% (First $5,000)
EL State Sales Tax (Commercial Only)	6.95% (Over $5,000)

Average Rates

As noted above, a blended cost per kWh has been calculated from the rate schedule. Savings for this building have been calculated using the blended rate. The following table details the average rate over the period of analysis.

Table 4: Average Utility Rate

Utility	Average
Electricity	$0.0994/kWh

Energy Saving Opportunities

The operation and condition of equipment at the Event Center is typically in fair condition given the age of the equipment. There are some controls sequences and conditions within the building systems that were observed to be opportunities to save energy. The following table summarizes the recommended ECMs for this facility that should be considered for future projects.

Table 5: ECM Summary

Energy Savings Measure	kWh Savings	Total $ Savings	Cost $	Payback
AHU Controls Optimization	7,558	$751	$600	0.8
Building Controls	11,509	$1,144	$2,400	2.1
Exterior Lighting Controls	1,183	$118	$990	8.4
Total	**20,250**	**$2,013**	**$3,990**	**2.0**

AHU Controls Optimization

General Description

This measure proposes to install or update the controls on the packaged rooftop units. Over time, the control sequences for HVAC equipment such as roof top units will be modified from its original intent. It is also common for the building operation requirements to change, or for manual overrides to be put in place. These changes can result in HVAC systems consuming excess energy and not meeting their original design intent. By optimizing the controls, the HVAC systems can either be returned to their original design intent or can be optimized further than originally intended due to changes to the building operational needs.

Site Specifics

The Events Center building HVAC systems are currently in good condition but are not operating in an optimized manner, impacting their capacity to optimally control temperatures, pressure, and humidity in the building.

This measure proposes to balance the airflows for the AHUs and exhaust fans to their original design airflows. This will result in the building being positively pressurized, which has the benefit of reducing infiltration, improving thermal comfort, and saving energy.

Building Controls

General Description

The scope for this ECM involves optimizing the building HVAC controls through one or multiple controls strategies. For this project, the controls strategy recommended would be occupancy scheduling with setback temperatures.

Consistent occupied and unoccupied temperature settings will be implemented based on the building type and their needs. Occupied schedules for the HVAC controls will be set up to dictate the hours when the building is considered occupied versus unoccupied. Whenever a building enters unoccupied mode, the building HVAC controls will utilize the unoccupied settings in lieu of the occupied settings.

Site Specifics

The building is currently scheduled to run 24/7 in its BAS system. Given the use and schedule of the facility, it is not likely to require occupied conditioning for this extended period of time constantly. For setback hours, it is suggested to setback to unoccupied setpoints from 2am to 6am at a minimum. Due to the nature of the facility as an Events Center available for reservation, it is understood that the hours of operation may be inconstant; however, it is recommended to implement a schedule to allow reduced HVAC operation, with the option to provide an "exception" in the BAS if events should fall out of the scheduled occupied hours. HVAC controls will be given setback temperature settings to use during unoccupied conditions for this measure. Operating portions of the building at setback temperatures will result in energy savings due to the HVAC systems not having to work as hard to condition these areas when unoccupied.

Exterior Lighting Controls

General Description

This measure encompasses the installation of various lighting controls such as remote wireless controllers, dimming modules, and exterior photocells. Light fixtures within the existing system currently lack such controls options and are controlled only by manual on-off switches or simple timers. These methods are less efficient and may regularly allow conditions for lighting energy to be wasted running at their full output levels or during daylight outdoors. New lighting controls systems will be implemented for exterior areas. These changes allow for more efficient usage of light fixtures.

Site Specifics

For the Events Center, there is an opportunity for lighting controls optimization as the existing exterior lighting fixtures have been observed to be always operating. Lighting controls will be provided for the exterior lighting so that they only operate during the night. Note that lighting controls may come with some annual maintenance savings. Because the burn hours will be reduced, the fixtures will not burn out as quickly and will not be replaced as often. No maintenance savings are included in the calculations at this time but may be calculated in a future phase of the project.

Facility Improvement Measures

TLC identified additional Facility Improvement Measures (FIM) that do not provide energy savings but should be addressed. By implementing the recommended FIM, the facility will experience improved equipment reliability, increased thermal comfort for occupants, and be able to operate as originally designed.

AHU Controls

Further controls optimization opportunities were identified for the AHUs serving the building. RTU-5 was observed to not have its powered exhaust functioning and not pulling enough exhaust air from the spaces it serves. By not exhausting the air at a rate in balance with the supply air of a space, inadequate exhaust can lead to higher concentrations of CO_2 and other indoor air contaminants as well as additional build up of heat from internal heating loads. The City should continue to monitor the operation of equipment and HVAC controls to ensure proper operation. If consistent issues are noted, investigation through a retro-commissioning effort by a third-party engineer or commissioning authority is recommended to optimize performance of the building systems.

Calculation Methodology – Spreadsheet System Models

Savings for this report were evaluated using spreadsheet building models for the lighting and HVAC systems. The methodologies used for each measure are described separately in this section. Industry Standard methods of evaluation were used and are detailed in this section. Additionally, assumptions made to calculate the energy savings are detailed.

AHU Controls

Savings for this measure have been based on reducing the amount of infiltration into the building. The following table shows the major inputs used in the calculation of savings for this measure.

Table 1: RTU Controls Major Inputs

Input Name	Bldg./Area Affected	Input Value	Basis of Input
Infiltration Reduction	Entire Building	1,626 cfm	Comparison of current building air balance to design air balance
Heating Efficiency	RTU-5 thru 7	1.0 COP	Electric strip heat
Cooling Efficiency	RTU-5 thru 7	0.89 kW/ton	Manufacturer info and typical degradation
Cooling Setpoint/Setback	RTU-5 thru 7	72°F/80°F	Engineering judgment
Heating Setpoint/Setback	RTU-5 thru 7	70°F/60°F	Engineering judgment
Controls Occ. Schedule	RTU-5 thru 7	6am - 2am daily	Engineering judgment

Calculations:

Savings for this measure were based on calculating the heating and cooling energy due to the infiltration air that would be eliminated because of this measure. For each hour of the year, the outside air temperature was compared to the setpoints and balance points to determine whether the building HVAC equipment was in cooling, heating, economizer, or drift mode. The amount of infiltration reduction for each hour was determined based on the existing infiltration, reduction percentage, and the building schedule.

The energy savings for each hour were calculated with the following formulas. The cooling equation was only used for hours that the equipment was in "cooling" mode, while the heating equation was only used for hours that the equipment was in "heating" mode. There were no savings for hours when the equipment was in "economizer" or "drift" mode.

$$Cooling\ Savings = \frac{1.08 \times Airflow \times \Delta T \times Efficiency}{12000 \times Sensible\ Heat\ Ratio}$$

$$Heating\ Savings = \frac{1.08 \times Airflow \times \Delta T}{Efficiency}$$

In the formulas above, the cooling savings were in kWh and the heating savings were in BTU. The airflow was the infiltration reduction in CFM and ΔT was the difference in the outside air temperature and the cooling setpoints or heating balance points, depending on the calculation. The cooling efficiency was in kW/ton and the heating efficiency was a percentage. The heating savings were then converted to either kWh for electrically heated systems or therms for fuel-fired equipment.

Building Controls

Savings for this measure have been based on a reduction in cooling energy due to setting back non-critical portions of the building that are not always occupied. The following table shows the major inputs used in the calculation of savings for this measure.

Table 2: Controls Optimization Major Inputs

Input Name	Bldg./Area Affected	Input Value	Basis of Input
% Cooling Energy Reduction	Entire building	10%	Engineering judgment

Calculations:

Savings for this measure were based on calculating the annual cooling energy and saving a percentage of it. The existing annual cooling energy was calculated from the electric utility baseline as the sum of all the electrical consumption for each month exceeding the lowest month's consumption. The following formula was used to calculate existing annual cooling energy.

$$Existing\ Cooling\ kWh = Annual\ Total\ kWh - (12 \times Baseload\ Month\ kWh)$$

Exterior Lighting Controls

Savings for this measure have been based on a reduction in the burn hours of exterior lighting fixtures. The following table shows the major inputs used in the calculation of savings for this measure.

Table 3: Exterior Lighting Controls Major Inputs

Input Name	Bldg./Area Affected	Input Value	Basis of Input
Number of Fixtures	Fixture Type "WE"	12	As-built drawings
Fixture Wattage	Fixture Type "WE"	23 W	As-built drawings
Existing Burn Hours	Fixture Type "WE"	8,760 Hrs	Lights always on
Proposed Burn Hours	Fixture Type "WE"	4,380 Hrs	Lights on at night only

Calculations:

Savings for this measure were comprised of energy savings. The energy savings were the difference in the existing and proposed kWh for the exterior lighting fixtures at the building. The energy usage in kWh for a particular light fixture was calculated using the following formula:

$$Energy\ Usage = \frac{Burn\ Hours \times Fixture\ Wattage}{1{,}000}$$

In the formula above, burn hours represents the annual hours that the light fixture was estimated to be energized.

Appendix A – Lighting Line by Line

The following table shows a listing of all recorded fixtures in the building. This is not a comprehensive list of all fixtures but details a good representation. This includes only permanent fixtures and does not include any construction lighting.

ID CODE	DESCRIPTION	MAKE/MODEL	EQUIVALENT MAKE/MODEL	VOLTAGE	TYPE	VA	COMMENTS	FIXTURE WATTAGE*	TOTAL QUANTITY
A2	2x4 RECESSED TRIPLE GASKETED LENSED LED TROFFER WITH .125" LENS, FLUSH STEEL WHITE DOOR, 4200 LM, 82+ CRI, 3500K, INVERTED LENS	METALUX 24GR-LD5-42-FA-A125-INV-UNV-L835-CD1-G2-UNV	COLUMBIA LIT, PHILIPS 2TG SERIES, LITHONIA	277 V	LED 3500 K	30 VA		27	**11**
A2E	SAME AS TYPE "A2" WITH 90 MINUTE BATTERY PACK	METALUX 24GR-LD5-42-FA-A125-INV-UNV-L835-CD1-G2-UNV	COLUMBIA LIT, PHILIPS 2TG SERIES, LITHONIA	277 V	LED 3500 K	30 VA		27	**5**
A3	2x4 LED TROFFER WITH .125 LENS	METALUX XP2GVA332277SO	COLUMBIA LIT, PHILIPS, LITHONIA	277 V	LED 3500 K	96 VA		86.4	**4**
A3E	2x4 LED TROFFER WITH .125 LENS SAME AS TPYE "A3" WITH 90 MINUTE BATTERY PACK	METALUX XP2GVA332277SO	COLUMBIA LIT, PHILIPS, LITHONIA	277 V	LED 3500 K	96 VA		86.4	**4**
BE	SURFACE MOUNT HORIZONTAL LED CYLINDER WITH 90 MINUATE BATTERY PACK	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	PRES LTR	277 V	LED 3000 K	20 VA		18	**2**
J	4' LED STRIP FIXTURE	Alphalite ILL-4H(32S)/840	COLUMBIA MPS4, DAYBRITE FSSEZ, SLG TS	277 V	LED 4000 K	25 VA		22.5	**3**
JE	SAME AS TYPE "J" WITH 90 MINUTE BATTERY PACK	Alphalite ILL-4H(32S)/840-EM1400	COLUMBIA MPS4, DAYBRITE FSSEZ, SLG TS	277 V	LED 4000 K	25 VA		22.5	**5**
QE	LINEAR LED WALL MOUNTED FIXTURE, WITH 90 MINUTE BATTERY PACK	METALUX 4SWLED-LD4-60HL-LW-UNV-L835-CD2-SVPD2-U	COLUMBIA MPS4, HEW SLF, LITHONIA	277 V	LED 4000 K	40 VA		36	**4**
TC/TCE	PENDENT MOUNT DIRECT/INDIRECT LINEAR FIXTURE (TCE type with Emergency Battery Pack)	Pinnacle EX3DI-A-BW-830(MOD 60% output)-830-**-mounting U-OL2-1-**(finish)	LITECON	277 V	LED 3000 K	100 VA		90	**9**
TD	HORIZONTAL DOWNLIGHT	Spectrum Lighting SR3MOXT10LDS101/RA3F30KMDMWSO	FUSION ER3, QUANTALIGHT RL3A	277 V	LED 3000 K	20 VA		18	**56**
TDE	SAME AS TYPE "TD" WITH 90 MINUTE BATTERY PACK	Spectrum Lighting SR3MOXT10LDS101/RA3F30KMDMWSO EM	FUSION ER3, QUANTALIGHT RL3A	277 V	LED 3000 K	20 VA		18	**33**
TF	REGRESSED LINEAR PERIMETER LED FIXTURE	Pinnacle EVL-830-continuous-SF(S)-U-OL1-1-**-W	PRULITE BOI	277 V	LED 3000 K	100 VA		90	**11**

ID CODE	DESCRIPTION	MAKE/MODEL	EQUIVALENT MAKE/MODEL	VOLTAGE	TYPE	VA	COMMENTS	FIXTURE WATTAGE*	TOTAL QUANTITY
TG	RECESSED SNAP IN LED LIGHT MODULE MOUNTED IN HANDRAIL, STATIC WHITE, 75 DEGREE HYPERBOLIC DISTRIBUTION, POLYCARBONATE LENS, FLAT FACE WITH COUNTERBORE FOR FLUSH FINISH, BLACK FINISH, STAINLESS STEEL, 90 LUMENS PER MODULE	ALPHABET ZETA750 SNAP HYP #750S-30K-HYP-PC-FF-BLACK FINISH		277 V	LED 3000 K	50 VA	PROVIDE DETAILED FABRICATION DRAWINGS WITH SUBMITTAL. JUNCTION BOXES SHOWN ON PLAN FOR CONNECTION TO POWER SUPPLY ABOVE ACCESSIBLE CEILING.	45	**4**
TH	SAME AS TYPE TA-1 WITH WIDE BEAM SPREAD	LF Illumination LANIE TRA20B-M-19C-9230-V-DMU-BB OPT-TRA20B-P-DFL	ELITE LTG ET, 1101SWHC-1101F264WU, MAXILUME HH4ADJ PH60-218Q-G24q-2-SG-WW-EB-UNV HH6PL-2X18-E-MVOLT-6507-SHZ-WH	277 V	LED 3000 K	36 VA	PROVIDE DETAILED FABRICATION DRAWINGS WITH SUBMITTAL	32.4	**9**
THE	SAME AS TYPE TA-1 WITH WIDE BEAM SPREAD	LF Illumination LANIE TRA20B-M-19C-9230-V-DMU-BB OPT-TRA20B-P-DFL	ELITE LTG ET, 1101SWHC-1101F264WU PH60-218Q-G24q-2-SG-WW-EB-UNV HH6PL-2X18-E-MVOLT-6507-SHZ-WH	277 V	LED 3000 K	36 VA	PROVIDE DETAILED FABRICATION DRAWINGS WITH SUBMITTAL	32.4	**4**
TP	LOW PROFILE LINEAR LED COVE LIGHT IN CONTINUOUS RUN, EXTRUDED ALUMINUM HOUSING, SATIN ANODIZED FINISH, 1-1/4"W x 1-1/2"H, 60 DEG OPTIC, SWIVEL MOUNT, 80+ CRI, 200 LM/FT, 0-10V DIMMING	Electrix L140-05-(length per plan)-W3-60C-S	ELITE LTG 1-LSC1, ECOSENSE LTG SCD	277 V	LED 3000 K	700 VA	PROVIDE DETAILED FABRICATION DRAWINGS WITH SUBMITTAL.	630	**1**
TQ/TQE	4" ROUND DEEP LED DOWNLIGHT, 3000 LM, ADJUSTABLE TO 30 DEG, XICATO LED MODULE, 41 DEG OPTIC	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	ELITE LTG HH4, MAXILUME HH4ADJ	277 V	LED 3000 K	35 VA	MOUNTED ON DOMED CEILING AND AIMED STRAIGHT DOWN TO FINISHED FLOOR	31.5	**127**
TQ-1/TQ-1E	HORIZONTAL DOWNLIGHT	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	ELITE LTG HH4	277 V	LED 3000 K	35 VA	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	31.5	**21**
TQ-2/TQ-2E	HORIZONTAL DOWNLIGHT	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	ELITE LTG HH4	277 V	LED 3000 K	35 VA	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	31.5	**4**
TR	HORIZONTAL DOWNLIGHT	Spectrum Lighting SR3MOXT10LDS101/RA3F30KMDMWSOWL	PRES LTR, FUSION ER3	277 V	LED 3000 K	20 VA	Spectrum Lighting SR3MOXT10LDS101/RA3F30KMDMWSOWL	18	**18**

ID CODE	DESCRIPTION	MAKE/MODEL	EQUIVALENT MAKE/MODEL	VOLTAGE	TYPE	VA	COMMENTS	FIXTURE WATTAGE*	TOTAL QUANTITY
TY	IN-GRADE LED ADJUSTABLE UP LIGHT	Vista Pro 1185-COLOR-WF-30-C-MV-AX-010-M34-TO15-LSF	KIM LTV, HYDREL M94	277 V	LED 3000 K	20 VA	Vista Pro 1185-COLOR-WF-30-C-MV-AX-010-M34-TO15-LSF	18	**2**
TZ	HORIZONTAL DOWNLIGHT, WET LISTED, ADJUSTABLE	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	ELITE LTG HH4, QUANTALIGHT RL4A	277 V	LED 3000 K	20 VA	Spectrum Lighting SR4MOXT30LDS101/RDA4F30KWDMWSO	18	**38**
VE	LINEAR LED WALL MOUNTED FIXTURE, WITH 90 MINUTE BATTERY PACK	METALUX 4VT2-LD5-4-FR50-277-EL10W-L840-WL	COLUMBIA, HEW SLF, SLG LTG VTC	277 V	LED 4000 K	30 VA		27	**4**
WE	EXTERIOR WALL PACK, ROUND REVEALS, ELECTRONIC LED DRIVER, TYPE III DISTRIBUTION WITH BACK LIGHT CONTROL, BLACK FINISH, WITH 90 MINUTE BATTERY PACK	COOPER INDUSTRIES INVUE ENV-E01-LED-E1-BL3-BK-BBB	ALL CY1, SLG LTG WFM	277 V	LED 4000 K	25 VA	MOUNT AT 7'-0" AFF	22.5	**12**
X1	RECESSED EDGE LIT LED EXIT SIGN, CEILLING MOUNTED, GREEN LETTERS, CLEAR/MIRROR BACKGROUND AND SINGLE/DOUBLE FACE, WITH 90 MINUTE BATTERY PACK	EMERGI-LITE LSNX-4*-N-G-**-***	MULE/ORL PVT, BEGHELLI, LITHONIA		LED	1 VA	REFER TO PLANS FOR FACES (*) AND CHEVRONS (***), ** PROVIDE CLEAR WITH SINGLE FACE AND MIRROR WITH DOUBLE FACE	0.9	**14**
X2	WALL MOUNTED EDGE LIT LED EXIT SIGN FIXTURE, GREEN LETTERS, CLEAR/MIRROR BACKGROUND AND SINGLE/DOUBLE FACE, WITH 90 MINUTE BATTERY PACK	EMERGI-LITE LXN-*-N-G-**-***-C	MULE/ORL PVT, BEGHELLI, LITHONIA		LED	1 VA	REFER TO PLANS FOR FACES (*) AND CHEVRONS (***), ** PROVIDE CLEAR WITH SINGLE FACE AND MIRROR WITH DOUBLE FACE	0.9	**4**
X3	WALL MOUNTED WET LISTED LED EXIT SIGN FIXTURE, GREEN LETTERS, WITH 90 MINUTE BATTERY PACK	EMERGI-LITE *-SVXN-1-G-4X	MULE/ORL PVT, BEGHELLI, LITHONIA	277 V	LED	2 VA	* FINISH BY ARCHITECT	1.8	**2**

*-Fixture Wattage assumes 90% efficiency of VA for wattage

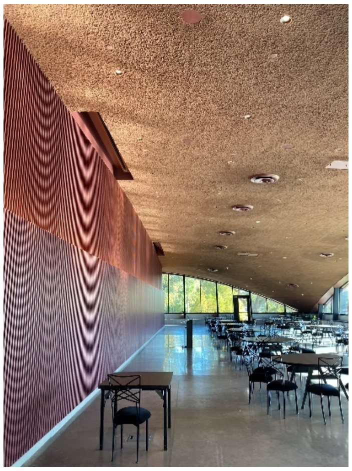
Appendix B – Mechanical Equipment

The following table shows a listing of all recorded major equipment in the building.

Type	Equip	Location Served	Tag	Capacity	Units	Make	Model	Serial Number	Year
Rooftop Unit	Packaged DX RTU	Event Center Core Area	RTU-5	55.0	Tons	Trane	OANG055C3-D0B100000-T1AN00001-31D0000J0	OA306149-1-1	2021
Rooftop Unit	Packaged DX RTU	Event Center Ballroom East	RTU-6	20.0	Tons	Trane	OAKD240A4-D1B400JN-D3D00AP7HE2C45E0B5A0	OA306149-2-1	2021
Rooftop Unit	Packaged DX RTU	Event Center Ballroom West	RTU-7	20.0	Tons	Trane	OAKD240A4-D1B400JN-D3D00AP7HE2C45E0B5A0	-	2021
Make-Up Air Unit	Make-Up Air Unit	2nd Floor South	MAU-1	22.0	Tons	Trane	OAKD264A4-D0B400JR-00000AL7HE2C45E0B5A0	OA305959-4-1	2020
Exhaust Fan	EF	1 Floor North Electrical Room	EF-1	1/6	HP	Greenheck	G-103HP-VG-4-X	17344319	2020
Exhaust Fan	EF	1 Floor North Electrical Room	EF-1	1/6	HP	Greenheck	G-103HP-VG-4-X	17344319	2020
Exhaust Fan	EF	Elev. Machine Room	EF-8	1/3	HP	Greenheck	G-143-VG-5-X	17340323	2020
Water Heater	Gas Fired Water Heater	Fire Riser Room	UH-1	400.0	Gallons	AO Smith	DEN-52 110	17344497	2020
Condensing Unit	SSCU	Main Electrical 2.109	SSCU-2	2	Tons	Mitsubishi Electric	PUY-A24NHA7	Condensing Unit	2020

Type	Equip	Location Served	Tag	Capacity	Units	Make	Model	Serial Number	Year
Condensing Unit	SSCU	Telecom 2.108	SSCU-3	1.5	Tons	Mitsubishi Electric	PUY-A18NKA7	0ZU17730A	2020

Appendix C – Site Walkthrough Photos



C-1: Event Ballroom (1)

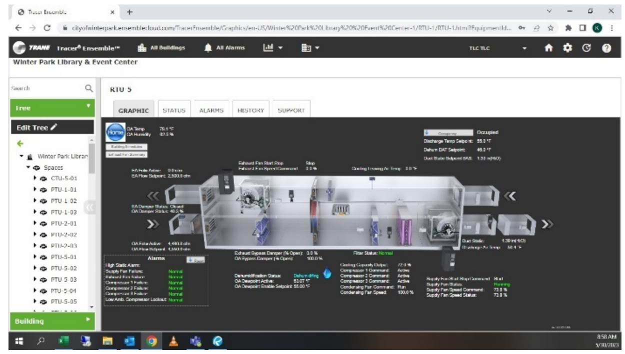
C-2: Meeting Room

C-3: Event Ballroom (2)

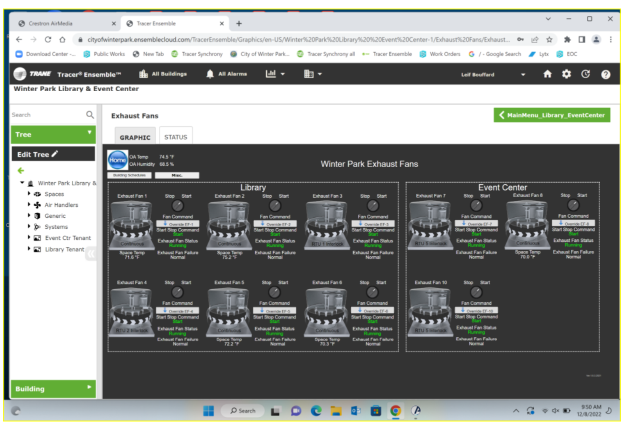
C-4: Kitchen Area

	
C-5: RTU-5	C-6: RTU-6
	
C-7: RTU Cooling Coil (Typical of 3)	C-8: RTU Filter and Energy Recovery Wheel Section

C-9: RTU Filter Detail



C-10: RTU-5 BAS Graphics



C-11: Winter Park Library and Events Center Exhaust Fans BAS Screen

C-12: Split System Condensing Unit SSCU-3

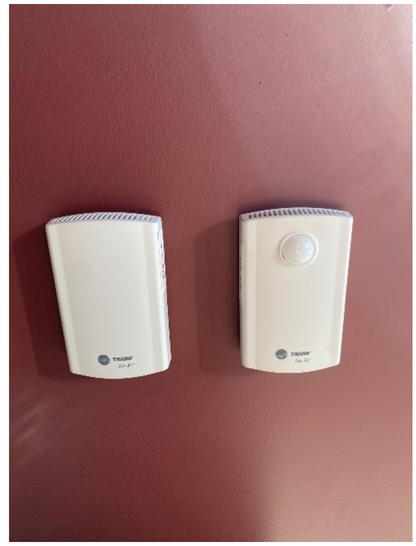
C-13: SSCU-3 Nameplate

C-14: Exhaust Fan EF-8

C-15: Make-Up Air Unit (MAU-1)

C-16: Kitchen vent hood controls

C-17: RTU Temperature Sensor/Thermostat

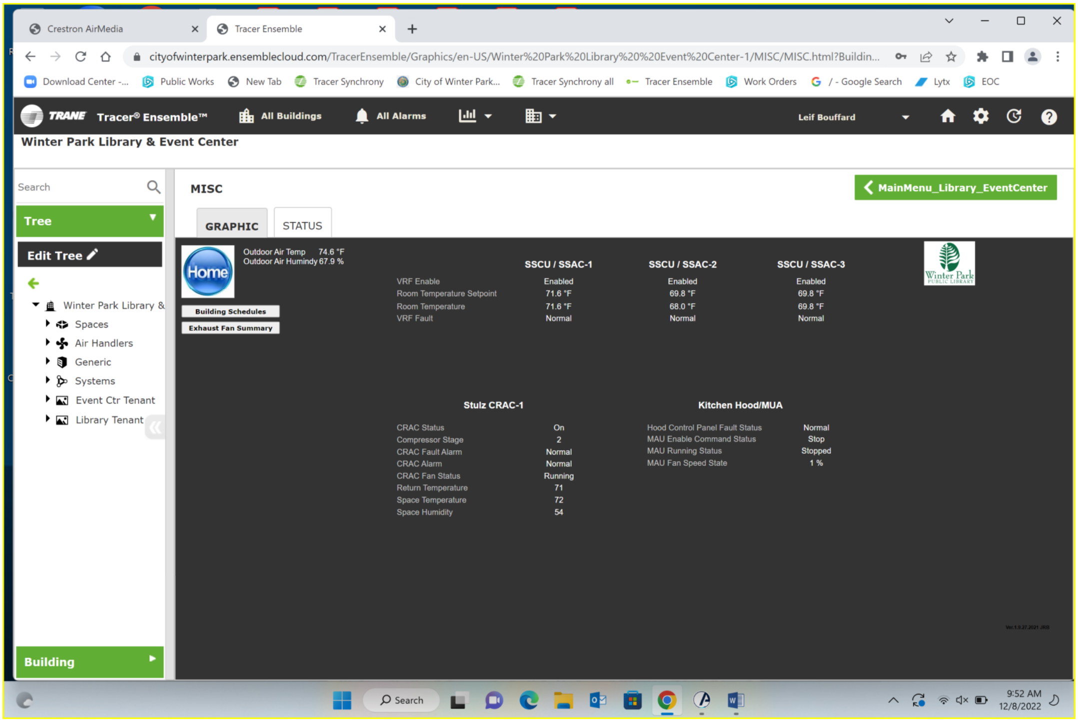


C-18: Temperature and CO2 Sensors

C-19: Domestic Hot Water Heater

C-20: Water Heater Controls Screen

 C-21: Exhaust Fan for Kitchen	 C-22: Nameplate for Kitchen Exhaust
 C-23: Electrical Meter Readings	 C-24: VFD Controlling RTU



C-25: SSAC and CRAC Unit BAS Summary