Investment Grade Audit

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Coachella Valley Mosquito Vector Control District

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1.0 Executive Summary

1.1 PROJECT OVERVIEW

Centrica Business Solutions Inc. is pleased to provide this Investment Grade Audit for Coachella Velley Mosquito Vector Control District (CVMVCD). The following report identifies, documents, and presents a full complement of infrastructure improvements and cost reduction strategies for the district office.

The support received from numerous representatives of CVMVCD during the IGA has been greatly appreciated, and Centrica looks forward to expanding its partnership with the district by implementing the Facility Improvement Measures (FIM) described in the report through an Energy Performance Contract Agreement.

This report provides the scope of work, energy savings estimates, cost proposal for infrastructure improvements, and cost reduction strategies at the district's facility.

Centrica Business Solutions will complete the scope of work described in this proposal for an installed cost of **$2,262,765**. The Investment Tax Credit (ITC) for the solar installation in the scope of this project is **$585,485**. Thus, the project cost to the District after Federal incentives is $1,677,280.

1.2 SUMMARY OF PROPOSED FACILITY IMPROVEMENT MEASURES (FIMS)

Centrica Business Solutions conducted a Preliminary Feasibility Assessment (PFA) to document the potential energy savings and budgetary costs. The Facility Improvement Measures (FIMs) identified in the PFA were evaluated in detail during the IGA and the FIMs shown in *Table 1* were selected by CVMVCD for implementation.

Table 1 provides savings, implementation price, and utility incentives for the recommended FIMs.

Table 1 – Summary of Recommended Facility Improvement Measures

FIM Name	Annual Utility Savings ($/yr)	Annual Repair & Replacement Savings ($/yr)	FIM Cost	ITC
FIM 1 – Lighting Upgrades	$12,166	$3,268	$230,003	$0
FIM 2 – HVAC BMS Upgrade	$5,574	$0	$193,566	$0
FIM 3 – New Solar PV Installation	$37,348	$0	$1,127,823	$383,460
FIM 4 – Existing Solar PV Replacement	$16,988	$0	$711,373	$202,025
TOTAL	**$72,076**	**$3,268**	**$2,262,765**	**$585,485**

1.3 PROJECT GUIDELINES AND GOALS

Centrica Business Solutions has worked with the following objectives in mind for the CVMVCD Facilities:

- Reduce energy costs for the district's facility.
- Maintain or improve existing environment within each facility.
- Provide and improve operational control of the district's equipment and systems.

Additional benefits to CVMVCD will include:

- Work performed under a normal, properly planned and executed schedule and not under an emergency situation.
- Guarantees quality engineering, construction and long-term performance under a turnkey approach along with the support of Centrica's engineering team and field technicians.
- Portion of project will be offset by ITC of $585,485

1.4 ENVIRONMENTAL BENEFITS

In addition to reducing energy consumption, these facility improvements give CVMVCD the opportunity to reduce its carbon footprint, reducing harmful environmental impacts. The positive impact this project will have on the environment is quantifiable. Most of the energy generated by power plants in the United States comes from burning fossil fuels. By reducing energy consumption, fewer fossil fuels are consumed which means less pollution. For the Indio area, the project will reduce greenhouse gases by about:

- 303 metric tons CO2e each year

Figure 1 illustrates the reduction in greenhouse gases each year in terms of equivalencies of familiar items.

Figure 1 - Greenhouse Reduction Equivalencies

42 VEHICLES OFF THE ROAD

395 ACRES OF CARBON SEQUESTERED BY TREES

CO_2 EMISSIONS FROM 35 HOMES

1.5 OTHER MEASURES CONSIDERED BUT NOT RECOMMENDED

Five FIMs were evaluated during the IGA that did not meet the goals of the District. These items were presented during a scope review session and removed from consideration for the reasons described in *Table 2*.

Table 2 – FIMs Investigated but not Recommended

Potential FIM	Description	Reason Not Recommended
Battery Storage	Install on site battery storage for emergency back up in the event of grid blackouts to provide resiliency for the emergency operations staff.	Battery storage for the purpose of resiliency have no payback for their investment and are not financially viable.
Inverter only replacement for existing solar	Replace and move inverters for the 2009 solar system that aren't operating correctly.	After thorough investigation of the existing solar inverters, it became clear that a full system replacement was needed. The current system does not meet electrical code, and the cost of bringing the system up to current regulations is comparable to a full system replacement. Further, a full system replacement qualifies for a Federal tax incentive (ITC) and new warranties will ensure long system life.
HVAC Unit Replacement	Replace 6 aging package units across the facility's buildings with new higher efficiency in kind units.	CVMVCD CVMVCD has recently replaced numerous units due to unit failure. To expedite needed replacements, it was decided to use other District contractors for this work.
EV Charger Installation	Install a single EV charging station and the infrastructure to install the future 14 stations that would fully support an EV fleet change over.	Currently, the district does not see the benefit of this FIM with the unknowns on implementation of the CARB initiative. This FIM shall be considered at a later date.
Utility Upgrade	Replace the incoming service utility transformer and switchgear to allow for a high capacity of power to be delivered to the site and	EV charger scope has been removed from this project and the District does not require additional electrical service capacity.

	facilitate the increased demand of EV charging.	

2.0 Facility Description

Centrica Business Solution's Engineers audited the CVMVCD site and summarized the buildings in *Table 3*. The total square footage of the sites audited is about 34,200 ft^2.

Table 3 – CVMVCD Buildings

Facility	Address	Square Footage
Administration Building (Admin)	43-420 Trader Pl., Indio, CA 92201	5,300 sq ft^2
Operations	43-420 Trader Pl., Indio, CA 92201	8,700 sq ft^2
Cold Storage	43-420 Trader Pl., Indio, CA 92201	3,900 sq ft^2
Mobile Equipment	43-420 Trader Pl., Indio, CA 92201	4,500 sq ft^2
Laboratory	43-420 Trader Pl., Indio, CA 92201	6,400 sq ft^2
Tank Storage	43-420 Trader Pl., Indio, CA 92201	5,400 sq ft^2

ADMINISTRATION BUILDING

The admin building is a single-story building located at the front of the CVMVCD complex. It houses the offices of key personnel as well as the facilities reception and check in desk. The CVMVCD board meeting room is located inside this building and occupies approximately one third of the buildings floor space. The complex's break room is also located here.

OPERATIONS

The operations building is located directly south of the admin building, also at the front of the complex. This building includes the offices for the CVMVCD facility. The electrical room for this building and other buildings on site is attached to this location. This electrical room is where the existing solar system interconnects to.

COLD STORAGE

This building holds the cold storage warehouse where temperature sensitive materials are stored.

MOBILE EQUIPMENT

The mobile equipment shop is where CVMVCD technicians maintain and repair equipment and vehicles used in the flied by the staff.

LABORATORY

The laboratory is where CVMVCD conducts research and breeds mosquitos for the district. This building also contains the refrigerated storage for their experiments and mosquitos. These are the walk-in freezer and deep freeze units which are crucial to the facility's daily operations. The laboratory building also houses office spaces for staff as well as the location of the Building Management System (BMS).

TANK STORAGE

This building is a large warehouse for storage of CVMVCD equipment used out in the field.

3.0 Utility Usage Overview

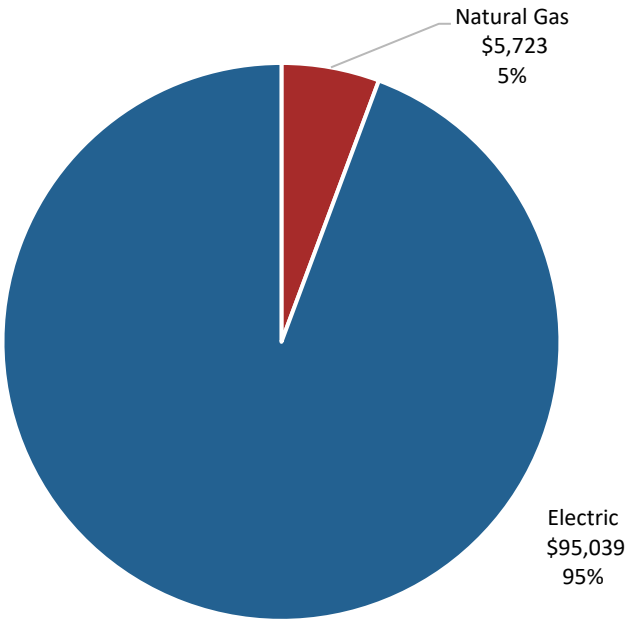
3.1 UTILITY USAGE AND COST SUMMARY

CVMVCD currently spends $100,762 annually on utilities for the district Complex. *Table 4* and *Figure 2* summarize the energy cost allocated to electricity and natural gas consumption for the buildings included in the IGA for the baseline period (May 2022 – April 2023) for electricity and (March 2023 – February 2024) for natural gas. *Figure 2* indicates that electricity accounts for the majority (95%) of the district's utility costs.

Table 4 – Annual Utility Usage & Cost Summary

Electricity		Natural Gas	
kWh/yr	$/yr	Therm/yr	$/yr
570,940	$95,039	3,366	$5,723

Figure 2 – Annual Utility Costs



3.2 UTILITY RATE REVIEW

The energy sources for the buildings reviewed at the district were electricity and natural gas. Below are the utilities for electricity and natural gas providing service to the site.

- Electrical Provider: Imperial Irrigation District
- Natural Gas Provider: SoCal Gas

To determine the cost savings potential for a reduction in energy usage, the incremental cost of the utilities was determined. Electricity and natural gas costs are determined using bills from the baseline period of May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. The rates used to calculate savings are summarized in *Table 5*.

Table 5 – Utility Rates Summary

Meter	Electricity ($/kWh)	Natural Gas ($/therm)
Lab Meter (5DY3B-203687)	$0.1688	N/A
Net Meter (5DY3BPV-200024)	$0.1624	N/A
Gas Meter (16293456)	N/A	$1.70

3.3 BASELINE ANNUAL ENERGY USAGE

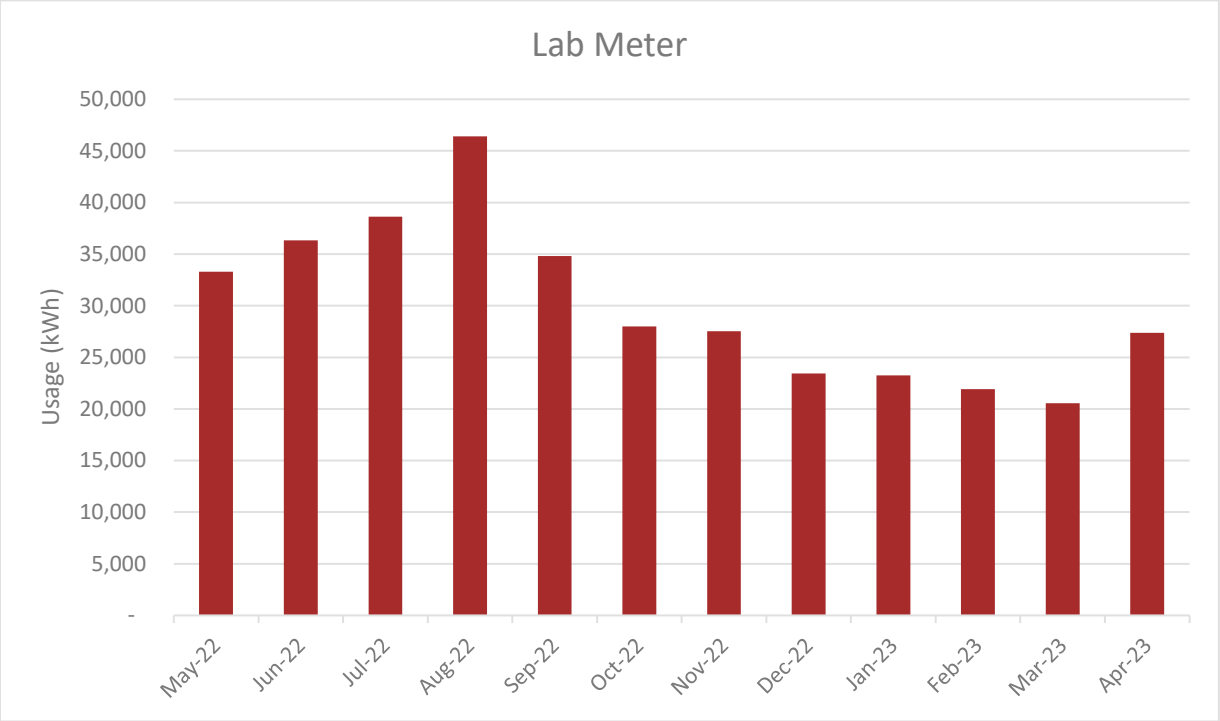
This section summarizes the baseline period energy usage for the CVMVCD facility. *Table 6* presents a summary of the utility consumption for each meter by energy source for the baseline year May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. A summary of the baseline period usage and cost data are provided in *Appendix A*.

Table 6 – Baseline Utility Usage Summary

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (therm/yr)	Annual Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500	N/A	$61,034
Net Meter (5DY3BPV-200024)	209,440	N/A	$34,005
Gas Meter	N/A	3,366	$5,723
Total	**570,940**	**3,366**	**$100,762**

Figures 3 and *4* display the monthly utility usage for electricity and natural gas during the baseline period May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. Annual usage and cost data for energy is provided in *Appendix A* in tabular form.

Figure 3 – Baseline Electrical Usage



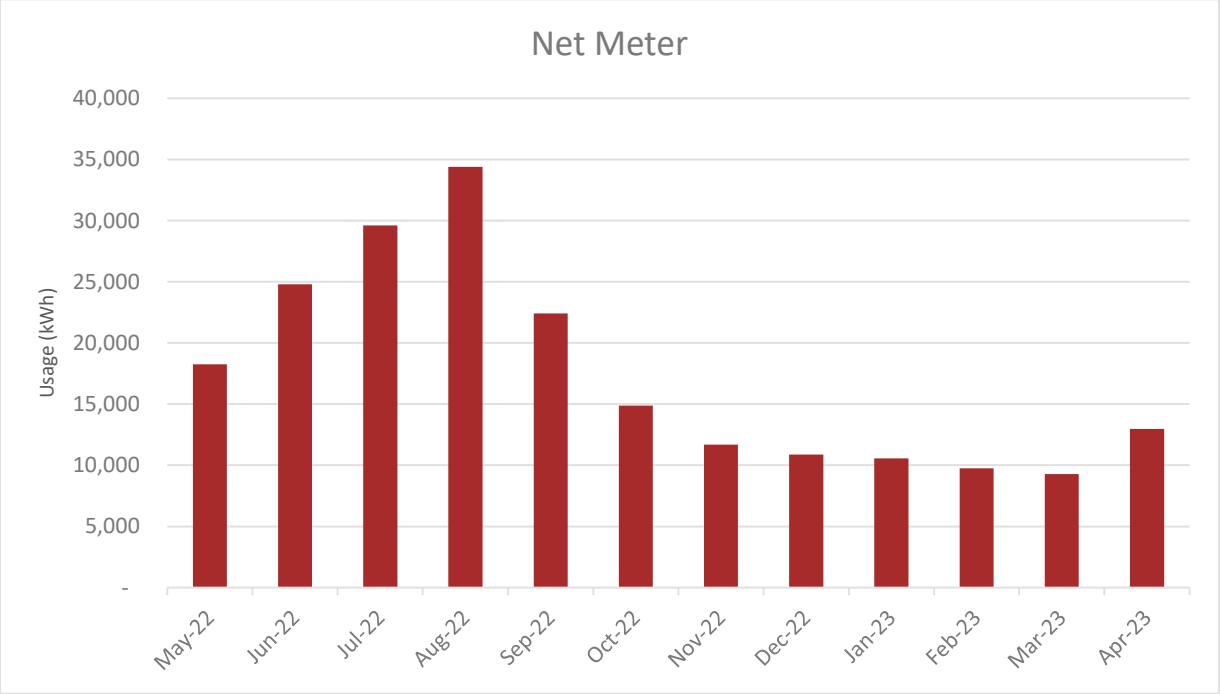
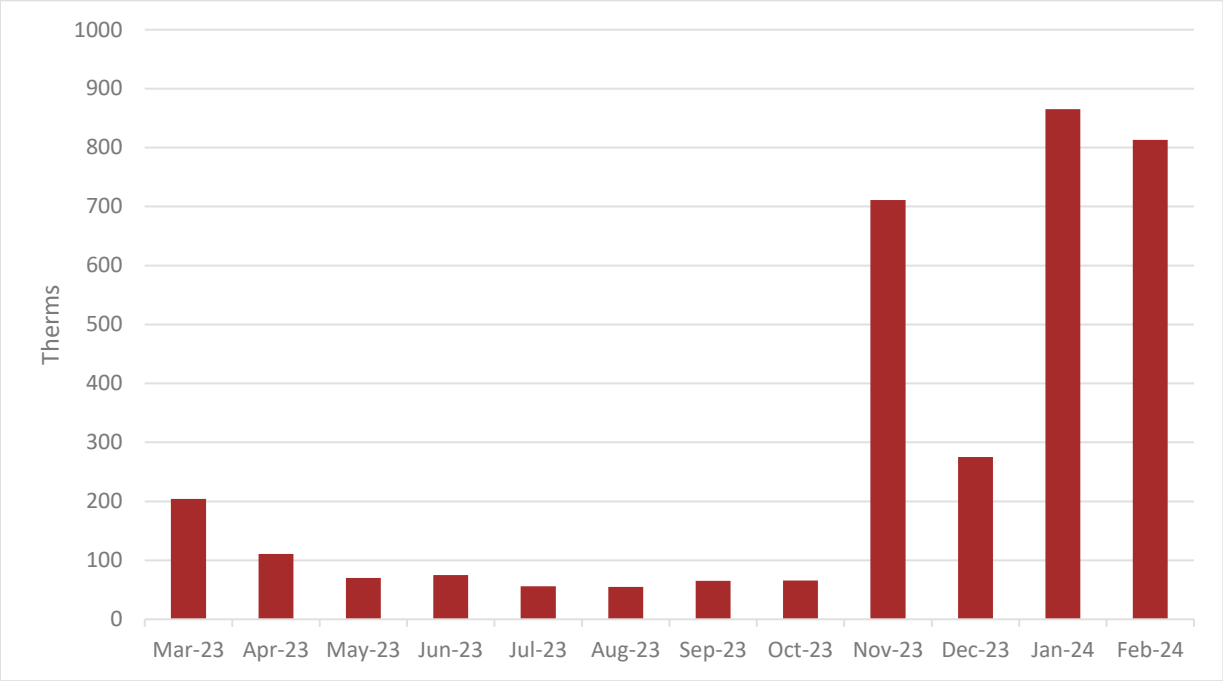


Figure 4 – Baseline Natural Gas Usage



3.4 RECONCILIATION OF USAGE TO BASELINE

The data used for the energy baseline have been reviewed and no unusual findings were present. The meter readings were based on actual readings during the baseline period stated above.

3.5 UTILITY BENCHMARKING – ENERGY UTILIZATION INDEX

The Energy Utilization Index (EUI) provides a summary of a building's energy intensity. Tracking EUI over time provides insight into the energy usage behavior at this facility. *Table 7* summarizes the annual average energy usage and energy intensity for the baseline period.

Table 7 – Average Energy Intensity Summary

Facility	Square Footage	Annual Energy Usage (kBtu/yr)	EUI (kBtu/ft2)
Laboratory	6,400	1,233,489	192.7
Offices	27,800	1,051,159	37.8
TOTAL	**34,200**	**2,284,649**	**66.8**

4.0 Facility Improvement Measures (FIMs)

4.1 FIM #1: LIGHTING UPGRADES

Annual Cost Savings	Implementation Cost	Incentive/Rebate
$15,435	$230,003	N/A

FACILITIES AFFECTED

- Admin Building
- Cold Storage
- Laboratory Building
- Mobile Equipment
- Operations Building
- Tank Storage
- Carports
- Parking Lots

OBSERVATION

A detailed audit of the existing lighting was conducted at the above facilities including interior and exterior lighting. While on site, Centrica Business Solutions noticed a mix of lighting technologies including fluorescent, incandescent, and some LED lighting. A detailed space-by-space audit outlining the existing conditions is provided in *Appendix C*.

RECOMMENDATION

Centrica Business Solutions will replace the existing fluorescent and incandescent lighting with LED lighting technology. *Table 8* and *Table 9* provides a summary of the lighting upgrades by fixture type. Detailed summaries of the lighting upgrades and counts for each fixture type and space-by-space detail are provided in *Appendix C*.

Table 8 – Interior Lighting Fixture Upgrades Summary

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Lobby, Halls, Rooms	Fluorescent, Incandescent, and Electroluminescent Emergency EXIT/bug-eye	10	4	New LED EXIT and emergency bug-eye
	Restroom, Storage	Fluorescent Wrap fixtures (4ft)	10	9	New 4' Wrap luminaires
	Restroom, Storage	Fluorescent Wrap fixtures (8ft)	8	3	New 8' Wrap luminaires
	Lobby, Halls, Rooms	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	9	18	Retrofit troffer kit
	Restroom	Cove over sink (4' Fluorescent strips)	8	2	Retrofit 4' 2-bar kits
	Boardroom	Fluorescent Pendant Strips	15	20	Rebuild w/ 2x4'tube + driver
	Network Comm room	4' Strip fixture	8	1	Retrofit strip kit
	Lobby	Fluorescent 8" diameter recessed can	22	12	Replace with LED recessed can kit
	Boardroom, MPR	Fluorescent 6" diameter recessed can	10	22	Replace with LED recessed can kit
	Boardroom	Fluorescent 6" diameter recessed can	15	10	Replace with LED recessed can kit
Cold Storage	Storage	Electroluminescent EXIT signs	10	2	New EXIT, requires new wiring, proper disposal
	Storage	Metal Halide EXIT signs	10	1	New EXIT signs
	Storage	Fluorescent 4' Vaportight on jack-chain	14	2	New LED vaportight
	Storage	Fluorescent 8' Strips on jack-chain	14	6	New LED strip luminaires
Laboratory	Entry, Halls, Open areas	Fluorescent EXIT signs	8	7	New EXIT sings
	Mechanical room	Incandescent 2' Wrap fixture	8	1	New LED Wrap luminaire
	Mechanical, Storage	Fluorescent 4' Strip fixture	8	6	New LED strip luminaires
	Offices, Halls, Lab Spaces	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	8	60	Retrofit troffer kit
	Lab rooms	Fluorescent 4' Vaportight fixtures	8	20	Retrofit 4' 2-bar kits
	Rooms, Halls	Fluorescent 6" diameter recessed can	8	11	Replace with LED recessed can kit
Mobile Equipment	Restroom	Fluorescent 4' Wrap fixture	8	1	New LED Wrap luminaire
	Electrical Room	Fluorescent 4' Strip fixture on jack-chain	14	4	New LED strip luminaires
	Offices, Shower/Locker	Fluorescent Troffers on T-bar ceiling	8	5	Retrofit troffer kit
	Work Bays	Fluorescent 8' Strips on jack-chain	14	8	New LED strip luminaires
Operations	Halls, Rooms	Electroluminescent and Fluorescent Emergency EXIT signs	10	9	New LED EXIT signs
	Offices, Storage	Fluorescent Wrap fixtures (4ft)	10	23	New 4' Wrap luminaires
	Restrooms	Fluorescent Wrap fixtures (8ft)	8	4	New 8' Wrap luminaires
	Offices, Halls	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	8	26	Retrofit troffer kit

	Restrooms, Storage	Fluorescent and Incandescent 4' Strip fixtures (various)	8	16	Retrofit 4' 2-bar kits
	Janitor, Electrical room	Fluorescent 4' Strip fixtures	10	4	Retrofit strip kit
	Restroom, Halls	Fluorescent 8" diameter recessed can	8	6	Replace with LED recessed can kit
Storage (tank)	Bay	Electroluminescent Emergency EXIT signs	10	3	New EXIT, requires new wiring
	Bay	Incandescent Emergency bug-eye	10	2	New LED emergency bug-eye
	Bay	Fluorescent High-Bay (6xCFL) pendant (2')	13	13	New LED High-Bay
	Storage	Fluorescent 4' Wrap fixture	8	6	New LED Wrap luminaire
	Electrical Room	Fluorescent 4' Strip fixture	8	1	Retrofit strip kit

Table 9 – Exterior Lighting Fixture Upgrades Summary

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Building Perimeter	Fluorescent 6" diameter recessed can	22	2	Replace with LED recessed can kit
Mobile Equipment	Building Perimeter	Metal Halide Wallpack	12	3	Replace with LED wallpack
	Canopy area	Fluorescent 4' Vaportight on jack-chain	15	6	Replace with LED vaportight
Cold Storage	Building Perimeter	Metal Halide Wallpack	14	6	Replace with LED wallpack
	Canopy area	Fluorescent 4' Vaportight on jack-chain	10	14	Replace with LED vaportight
Storage (tank)	Building Perimeter	Fluorescent Wallpack	10	2	Replace with LED wallpack
	over Sink area	Metal Halide and High Pressure Sodium 4' Vaportight wall-mount	6	2	Replace with LED vaportight
Laboratory	Building Perimeter	Fluorescent wall-mount disk	12	13	Replace with LED wall-mount luminaire
	Building Perimeter	Fluorescent 6" diameter recessed can	11	6	Replace with LED recessed can kit
Operations	Building Perimeter	Metal Halide Wallpack	8	5	Replace with LED wallpack
	Building Perimeter	Fluorescent 6" diameter recessed can	7	1	Replace with LED recessed can kit
Carports	Carport Perimeter	Metal Halide Wallpack	8	19	Replace with LED wallpack
	Carport Canopy	Fluorescent 4' Vaportight wall-mount	10	47	Replace with LED vaportight
Parking	Pole, 12-foot	High Pressure Sodium Pole fixture	12	7	Replace with LED Pole luminaire

SAVINGS SUMMARY

Savings associated with replacing the lighting systems are associated with the reduction in wattage of the existing fixtures to more efficient units (e.g., LED lighting) and through the use of improved lighting controls. Savings for lighting measures are based on three components:

- Energy savings associated with a reduction in lamp/fixture power and controls.
- Reduction in lamp heat and corresponding HVAC energy usage.
- Reduction in operating costs associated with the increased life of new LED lighting.

Detailed savings calculations are provided in *Appendix C*. For each building, the lighting energy savings for retrofits are based on the following calculation:

*Energy Savings (kWh/yr) = (kWbefore - kWafter) * Operating Hours*

The existing and retrofit wattages are based on each fixture type. The hours of operation were determined by using average historical data from similar facility use cases. The fixture type and use case were determined by a Centrica lighting engineer during the IGA phase.

The annual operating cost savings are based on the replacement costs for ballasts and lamps as shown in the equation below.

Replacement Cost Savings = Quantity x Unit Annual Cost per Item

BASELINE USAGE AND COST

The energy baseline for this FIM is defined as the existing annual electric energy usage and costs for lighting at the facilities as shown in the table below. This includes the interactive energy savings with HVAC. The cost and savings were calculated using the rates stated above in the Utility Rate Review section.

Lighting Electrical Consumption (kWh/yr)	Lighting Electrical Annual Cost ($/yr)
125,191	$20,541

POST RETROFIT ENERGY USE AND COST

The projected energy use and cost for this FIM are shown in the table below.

Lighting Electrical Consumption (kWh/yr)	Lighting Electrical Annual Cost ($/yr)
42,682	$7,022

The savings are the difference between the Baseline and the Post Retrofit energy usage and cost. The guaranteed savings are the savings gained through this FIM multiplied by a factor of 90%. In addition to the lighting savings, energy savings associated with a reduction in HVAC are shown as “HVAC Interactive” savings. This is associated with the lower heat output of the LED lamps and a reduction in cooling required as a result. The Annual Replacement savings are a result of the longer life of the LED

lamps (10+ years) as compared to the existing lamps. The guaranteed savings are summarized in the table that follows.

Guaranteed Lighting Electrical Consumption Savings (kWh/yr)	Guaranteed Lighting Electrical Annual Cost Savings ($/yr)	HVAC Interactive Annual Consumption Savings (kWh/yr)	HVAC Interactive Annual Cost Savings ($/yr)	Annual Replacement Cost Savings ($/yr)	Total Annual Cost Saving ($/yr)
72,253	$11,838	2,005	$329	$3,268	$15,434

UTILITY INCENTIVES

There are no utility incentives for this FIM.

4.2 FIM #2: HVAC BMS UPGRADE

Annual Cost Savings	Implementation Cost	Incentive/Rebate
$5,575	$193,566	N/A

FACILITIES AFFECTED

This FIM will be completed at the following facilities:

- Admin Building
- Operations Building
- Tank Storage
- Mobile Equipment
- Laboratory
- Cold Storage

OBSERVATION

CVMVCD uses a Johnson Controls BMS to monitor and maintain temperature control for the laboratory facility. This system does not have the desired capabilities to meet CVMVCD needs because of age and an unresponsive service contractor. This control system is also limited to the laboratory building. For these reasons a BMS upgrade and complete facility integration are being recommended.

RECOMMENDATION

Centrica recommends replacing the existing Laboratory Building Management System (BMS) with a new, open-source, BMS from Distech Controls. This will give CVMVCD better control over the facility's environment and have significantly improved controls contractor response time for service calls. This solution also integrates environmental controls of all buildings on site, providing a centralized control system for the entire complex. Below is a table summarizing the proposed upgrades.

Building Name	Equipment	Proposed Action
Lab	AHU 1 & 2	New DDC controls and wiring
Lab	Heating Hot Water System	New DDC controls and wiring
Lab	Chilled Water System	New DDC controls and wiring
Lab	Fan Coil Units	New DDC controls and wiring
Lab	Exhaust Fan	New DDC controls and wiring
Lab	Mini Splits	New BACnet thermostat and I/O device in field
Lab	Thermo Scientific Freezer (-80 freezer)	New BACnet thermostat, alarm contacts, and wiring to central switch
Lab	Phoenix Lab Controls	New BMS server and wiring to existing Phoenix Controls
Lab	Rearing Rooms (walk in freezer)	Temperature monitoring and alarming

Lab	Humidifier	New thermostat and humidity sensor connected to nearest DDC controls
Admin	AC units	New controller in units and new field device for monitoring
Operations	AC units	New controller in units and new field device for monitoring
Operations	Mini Splits	New BACnet thermostat and I/O device in field
Mobile Equipment	AC units	New controller in units and new field device for monitoring
Mobile Equipment	Swamp Coolers	New BACnet thermostat and I/O device in field
Mobile Equipment	Radiant Heaters	New BACnet thermostat and I/O device in field
Cold Storage	Fan Coil Unit	New BACnet thermostat and I/O device in field
Cold Storage	Bonn Fans	New BACnet thermostat and I/O device in field
Tank Storage	AC units	New controller in units and new field device for monitoring
Tank Storage	Swamp Cooler	New BACnet thermostat and I/O device in field

SAVINGS SUMMARY

Savings associated with upgrading the District's Building Management System are calculated using a spreadsheet model. The savings associated with this Fim come from temperature setpoint control, scheduling, and Variable Frequency Drive (VFD) programming. Details for each of these savings mechanisms are provided below:

Temperature Setpoint Control. The new BMS will control to the entire facility's HVAC network, where the current system only controls the laboratory. Savings associated with temperature setpoint control come from having direct control over the occupied and unoccupied temperature setpoints. This will ensure that each HVAC unit is operating efficiently and not excessively heating or cooling a space.

Scheduling. The savings associated with scheduling come from adjusting the unoccupied and occupied schedule across the facility. Some spaces currently have this capability while others do not. Savings will be seen from reducing the total hours in occupied mode, setting the units to unoccupied at 4pm rather than 5pm.

VFD Programming. VFD's will allow the fans in the laboratory air handler units (AHU's) to change their speed depending on the system load. The savings come from a reduction in power used by the fans.

BASELINE USAGE AND COST

The energy baseline for this FIM is defined as the existing annual electrical and gas usage for HVAC units and electrical usage of air handler fans. The electrical and gas rates used to calculate these savings are stated above in the Utility Rate Review section.

Baseline HVAC Usage and Cost

Meter	Electrical Consumption (kWh/yr)	Electrical Annual Cost ($/yr)	Natural Gas Consumption (therm/yr)	Natural Gas Annual Cost ($/yr)	Total Annual Cost
Laboratory	81,928	$13,832	1,282	$2,180	$16,012
Net Meter	140,738	$22,850	3,244	$5,515	$28,365

Baseline AHU Fan Motor Usage and Cost

Meter	Electrical Consumption (kWh/yr)	Electrical Annual Cost ($/yr)
Laboratory	43,564	$7,355

POST RETROFIT ENERGY USE AND COST SAVINGS

The post retrofit energy and cost savings guarantee 90% of the calculated savings. The HVAC savings assume an unoccupied schedule change in the laboratory and a schedule change for the Net Meter where equipment moves into unoccupied setpoints one (1) hour prior to the scheduled end of day at the facility. The fan VFD savings come from using only part of the fan motor's full power when full power is not needed. The setpoint and schedule changes are outlined below.

Adjustment Action	Baseline Settings	Post Installation Settings
Setpoint (Lab)	M-F: Occupied 5am – 5pm M-F: Unoccupied 6pm – 4am S,S: Unoccupied	M-F: Occupied 5am – 4pm M-F: Unoccupied 5pm – 4am S,S: Unoccupied
Schedule (Net Meter)	Occupied Cooling: 72° Occupied Heating: 72° Unoccupied Cooling: 72° Unoccupied Heating: 72°	Occupied Cooling: 72° Occupied Heating: 72° Unoccupied Cooling: 74° Unoccupied Heating: 68°

HVAC Usage and Cost Savings

Meter	Guaranteed Electrical Consumption Savings (kWh/yr)	Guaranteed Electrical Annual Cost Savings ($/yr)	Guaranteed Natural Gas Consumption Savings (therm/yr)	Guaranteed Natural Gas Annual Cost Savings ($/yr)	Guaranteed Total Annual Cost Saving ($/yr)
Laboratory	4,146	$699	458	$777	$1,476
Net Meter	888	$144	(5)	($7)	$137

AHU Fan Motor Usage and Cost Savings

Meter	Guaranteed Electrical Consumption Savings (kWh/yr)	Guaranteed Electrical Cost Savings ($/yr)
Laboratory	23,466	$3,962

UTILITY INCENTIVES

No incentives are available for this measure.

4.3 FIM #3: NEW SOLAR PV INSTALLATION

Solar System	Annual Cost Savings	Implementation Cost	Incentive/Rebate
New System (LAB) 210.1 kW Roof Mount	$37,347	$1,127,823	$383,460

FACILITIES AFFECTED

This FIM will be completed at the following meters:

- Lab Meter (5DY3B-203687)

OBSERVATION

The CVMVCD complex has two (2) incoming services on site. One is the Net Meter (Meter number 5DY3BPV-200024) and the other is the lab meter (Meter number 5DY3B-203687). The meter this FIM will focus on is the Lab Meter where the new solar installation is planned to interconnect to. The lab meter has no existing solar associated with it, meaning that the usage can be offset by a new solar construction.

RECOMMENDATION

Centrica recommends the installation of a new solar system for CVMVCD to offset grid usage at the Lab Meter. This system will offset 90% of the usage at the Lab meter. The system will be installed on existing carports across the facility. The size and expected annual production are outlined below.

Meter	Description	Size	Production (kWh/yr)
Lab Meter (5DY3B-203687)	Roof Mounted Solar	210.1 kW DC	326,235

SAVINGS SUMMARY

Savings from solar PV systems comes from two places. The first is using power generated during the day to provide electricity to the facility while the solar panels are producing. The second place that savings come from are Net Billing credits. How these savings affect the district are outlined below.

Solar Generation: The proposed solar system will offset a majority of the CVMVCD electrical consumption on site. While the panels are producing, they will supply power to the facility rather than pulling power from the grid. The savings for this part of the solar system is the reduction in grid usage.

Net Billing Credits: During the peak production times in the middle of the day the solar system will produce more energy than the site uses. This excess energy is sent back onto the grid to be consumed by other IID customers. Every kilowatt-hour pushed onto the grid this way is credited back to the district further reducing CVMVCD's utility bill cost.

BASELINE USAGE AND COST

These baselines are the total usage and cost at this utility meter based off the utility bills.

Meter	Baseline Electric Usage (kWh/yr)	Baseline Electric Usage Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500	$64,605

ON-SITE ENERGY PRODUCTION AND COST SAVINGS

The guaranteed production and cost savings are 90% of the calculated new production, including a 2% solar degradation factor for year 1.

Meter	Guaranteed Solar Production (kWh/yr)	Guaranteed Cost Savings ($/yr)
Lab Meter (5DY3B-203687)	287,739	$37,347

UTILITY INCENTIVES

Centrica Business Solutions anticipates an Investment Tax Credit (ITC) of 34%. This comes from the standard ITC with an additional adder for CVMVCD being in a low-income community.

4.4 FIM #4: EXISTING SOLAR PV REPLACEMENT

Solar System	Annual Cost Savings	Implementation Cost	Incentive/Rebate
Existing System 168.5 kW Roof Mount	$16,987	$711,373	$202,025

FACILITIES AFFECTED

This FIM will be completed at the following meters:

- Net Meter (5DY3BPV-200024)

OBSERVATION

The CVMVCD complex has two (2) incoming services on site. One is the Net Meter (Meter number 5DY3BPV-200024) and the other is the lab meter (Meter number 5DY3B-203687). The Net Meter has 2 existing solar systems connected to it. One system that was installed in 2006 and had an inverter replacement approximately 8 years ago, and another system that was installed in 2009 which is in a state of disrepair. The opportunity for the Net Meter is to replace the existing 2009 system with a brand new one that will offset the full usage of this meter.

RECOMMENDATION

Centrica recommends the installation of a new solar system for CVMVCD to offset grid usage at the Net Meter. The Net Meter, because it already has solar installations interconnected to it, is being looked at as a system replacement. Initially Centrica's intent was to replace inverters to get the existing system back up to full functionality. After a more in-depth inspection of the system during IGA, it was determined that it would be more cost effective to remove and replace the 2009 system. This was the decision based on factors such as the desire to relocate the existing inverters, unknown solar panel and conductor conditions requiring extensive testing to troubleshoot, and the fact that a new installation would be eligible for the ITC. These factors combined made the price difference between the two solutions negligible, but the new system will have a 12 year product warrantee and a 30 year production lifetime. The other system currently installed, the 2006 system, is producing the expected amount of power and had its' inverters replaced less than 10 years ago. This led Centrica to determine that this system was not in need of a repair or replacement and should be looked at again in a couple years when it starts to fail. The system size and expected production are detailed in the table below.

Meter	Description	Size	Production (kWh/yr)
Net Meter (5DY3BPV-200024)	Roof Mounted Solar	168.5 kW DC	254,873

SAVINGS SUMMARY

Savings from solar PV systems comes from two places. The first is using power generated during the day to provide electricity to the facility while the solar panels are producing. The second place that savings come from are Net Billing credits. How these savings affect the district are outlined below.

Solar Generation: The proposed solar system will offset a majority of the CVMVCD electrical consumption on site. While the panels are producing, they will supply power to the facility rather than pulling power from the grid. The savings for this part of the solar system is the reduction in grid usage.

Net Billing Credits: During the peak production times in the middle of the day the solar system will produce more energy than the site uses. This excess energy is sent back onto the grid to be consumed by other IID customers. Every kilowatt-hour pushed onto the grid this way is credited back to the district further reducing CVMVCD's utility bill cost.

CVMVCD currently has two solar systems on site interconnected to the Net meter. These solar systems were installed in 2006 and 2009. The 2009 system has been identified as having major problems with its' current functionality. Based on Centrica's investigation into these systems as well as monitoring data provided by CVMVCD the following PV system productions were determined.

System	2023 Production (kWh)
2006	41,500
2009	64,390
Total	105,890

From the utility bills provided 18,240 kWh was back fed to the grid. This means that 87,650 kWh of the solar produced was used on site. This number was used to determine the baseline usage of the site in the following table.

BASELINE USAGE AND COST

These baselines are the total usage and cost at this utility meter based off the utility bills.

Meter	Baseline Electric Usage (kWh/yr)	Baseline Electric Usage Cost ($/yr)	Solar Production Used on site (kWh)	Total Usage (kWh)
Net Meter (5DY3BPV-200024)	209,440	$34,005	87,650	297,090

ON-SITE ENERGY PRODUCTION AND COST SAVINGS

The projected energy use and cost savings for this FIM are shown in the table below. For the Net Meter, Centrica is replacing an existing solar system. The existing solar system has a small amount of production, so the savings are the new systems production in excess of the existing system. The new guaranteed production and cost savings are 90% of the calculated new production, including a 2% solar degradation factor for year 1.

Meter	Solar Production (kWh/yr)	New Production (kWh/yr)	Guaranteed New Production (kWh/yr)	Guaranteed Cost Savings ($/yr)
Net Meter (5DY3BPV-200024)	254,873	190,483	168,006	$16,987

UTILITY INCENTIVES

Centrica Business Solutions anticipates an Investment Tax Credit (ITC) of 34%. This comes from the standard ITC with an additional adder for CVMVCD being in a low-income community.

5.0 Summary

5.1 FINANCIAL SUMMARY

Centrica Business Solutions will complete improvements valued at $2,262,765. In addition, the District shall receive a Federal Tax incentive of $585,485. *Table 11* provides an overview of the project costs and savings.

Table 11 – Cost and Savings Summary

Project Total Investment	$2,262,765
Investment Tax Credit (ITC)	$585,485
Net Project Cost	**$1,677,280**
Year 1 Electric Savings	$71,306
Year 1 Natural Gas Savings	$770
Year 1 Repair and Replacement Savings	$3,268
Year 1 Total Savings	**$75,344**

5.2 PROJECT MANAGEMENT AND SCHEDULE

Michel Maxsom, Project Manager, at Centrica Business Solutions will have the overall responsibility for managing and executing the construction phase of this project. A detailed Work Breakdown Schedule will be provided as part of the Project Management Plan presented during the construction phase.

Appendix A – Baseline Utility Data

Baseline Year (June 2018 – May 2019) Usage Summary by Building

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (therms/yr)	Annual Utility Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500		$61,034
Net Meter (5DY3BPV-200024)	209,440		$34,005
Gas Meter		3,366	$5,723
Total	**570,940**	**3,366**	**$100,762**

Baseline Year (May 2022 – April 2023) Monthly Usage Summary For Electricity

LAB METER (5DY3B-203687)

Electric		
Month	**kWh**	**Cost ($)**
May	33,280	$4,973.84
Jun	36,320	$5,424.23
Jul	38,640	$5,767.93
Aug	46,400	$7,489.19
Sept	34,800	$6,272.71
Oct	28,000	$5,073.81
Nov	27,520	$4,987.57
Dec	23,440	$3,881.47
Jan	23,260	$4,810.65
Feb	21,920	$3,804.66
Mar	20,560	$3,571.28
Apr	27,360	$4,976.71
Total	**361,500**	**$61,034.05**

Baseline Year (May 2022 – April 2023) Monthly Usage Summary For Electricity

NET METER (5DY3BPV-200024)

Electric		
Month	**kWh**	**Cost ($)**
May	18,240	$2,702.35
Jun	24,800	$3,749.75
Jul	29,600	$4,406.45
Aug	34,400	$5,388.72
Sept	22,400	$4,094.86
Oct	14,880	$2,785.30
Nov	11,680	$1,945.99
Dec	10,880	$1,820.32
Jan	10,560	$2,001.73
Feb	9,760	$1,475.28
Mar	9,280	$1,382.13
Apr	12,960	$2,252.54
Total	**209,440**	**$34,005.2**

Baseline Year (March 2023 – February 2024) Monthly Usage Summary For Natural Gas

GAS METER (16293456)

Natural Gas		
Month	**therm**	**Cost ($)**
Mar	204	$409.11
Apr	111	$209.81
May	70	$133.46
Jun	75	$144.31
Jul	56	$114.65
Aug	55	$118.66
Sept	65	$135.60
Oct	66	$127.62
Nov	711	$1,169.35
Dec	275	$521.45
Jan	865	$1,338.21
Feb	813	$1,300.29
Total	**3,366**	**$5,722.52**

Appendix B – FIM Calculations

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FIM 2A: HVAC BMS Upgrade – Schedule Adjustment

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: schedule adjustment from 5am - 5pm M-F occupied time to 5am - 4pm M-F occupied

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Cooling Load, MBtu/yr	1,395,748	1,385,961	9,787	
Heating Load, MBtu/yr	259,544	259,942	-398	
Cooling Energy, kWh/yr	140,738	139,751	987	0.7%
Cooling Energy Cost	$22,850/yr	$22,690/yr	$160/yr	
Heating Energy, therms/yr	3,244	3,249	-5	-0.2%
Heating Energy Cost	$5,515/yr	$5,524/yr	-$9/yr	
Total Energy Cost	$28,365/yr	$28,214/yr	$151/yr	0.5%

INPUTS	
Fuel Billing Unit	therm
Fuel Cost per Billing Unit	$1.7001
Fuel Cost per Therm	$1.7001
Electric Energy Cost	$0.1624/kWh
Wall Area Per Floor	18,928 ft²
Window Area Per Floor	997 ft²
Roof Area	27,800 ft²
No. of Floors	1
Total Floor Area	27,800 ft²
Total Envelope Area	47,725 ft²
Window U factor	0.5500 Btu/(h·ft²·°F)
Wall U factor	0.0600 Btu/(h·ft²·°F)
Roof U factor	0.0300 Btu/(h·ft²·°F)
Overall U Value	**0.0528 Btu/(h·ft²·°F)**

Infiltration Rate Per Env. Area	0.120 cfm/ft²
Air Infiltration & Leakage Volume	5,727 cfm

Supply Air Flow Rate	26,125 cfm
Outside Air Flow Rate	5,225 cfm
Return Air Flow Rate	20,900 cfm

Cooling Conversion Factor	12 MBtu/h per ton
Heating Btu Conversion Factor	100,000
Heating Btu Conversion Unit	MBtu/therm
Sensible Heat Conversion Factor	1.080 Btu/(h·cfm·°F)

Overall Heating System Efficiency	80.0%
Chiller Efficiency	1.21 kW/ton

UNITS CHART				
Mcf	1,030,000 Btu/Mcf	MBtu/Mcf	1,030 MBtu/Mcf	10.30 therm/Mcf
ccf	103,000 Btu/ccf	MBtu/ccf	103.0 MBtu/ccf	1.03 therm/ccf
cf	1,030 Btu/cf	MBtu/cf	1.030 MBtu/cf	0.0103 therm/cf
therm	100,000 Btu/therm	MBtu/therm	100 MBtu/therm	1 therm
MBtu	1,000 Btu/MBtu	Btu/MBtu	1 MBtu	0.010 therm/MBtu
MMBtu	1,000,000 Btu/MMBtu	MBtu/MMBtu	1,000 MBtu/MMBtu	10 therm/MMBtu
gal (LP Gas)	91,500 Btu/gal	MBtu/gal	91.5 MBtu/gal	0.9150 therm/gal
gal (Fuel Oil #2)	139,000 Btu/gal	MBtu/gal	139 MBtu/gal	1.3900 therm/gal
lbm (Steam)	975 Btu/lbm	MBtu/lbm	0.975 MBtu/lbm	0.00975 therm/lbm
kWh	3,412 Btu/kWh	MBtu/kWh	3.412 MBtu/kWh	0.03412 therm/kWh

Baseline Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Baseline Occ Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	6.5°F	67.5°F	22.72 Btu/lbm d.a.
Baseline UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	5.0°F	69.0°F	23.43 Btu/lbm d.a.
Baseline Occ Heating Temperature	72.0°F			6.5°F	65.5°F	
Baseline UnOcc Heating Temperature	72.0°F			5.0°F	67.0°F	

Proposed Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Proposed Occ Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	6.5°F	67.5°F	22.72 Btu/lbm d.a.
Proposed UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	5.0°F	69.0°F	23.43 Btu/lbm d.a.
Proposed Occ Heating Temperature	72.0°F			6.5°F	65.5°F	
Proposed UnOcc Heating Temperature	72.0°F			5.0°F	67.0°F	

FORMULAS

Sensible Heat Conversion Factor = Dry Air Density × Specific Heat of Dry Air × 60 min/h = 0.075 lbm/ft³ × 0.24 Btu/(lbm·°F) × 60 min/h = 1.08 Btu/(h·cfm·°F)
Overall U Factor [Btu/(h·ft²·°F)] = [(Window U factor × Window Area) + (Wall U factor × Wall Area) + (Roof U factor × Roof Area)] ÷ Total Envelope Area
Infiltration Rate (cfm) = Total Envelope Area × Infiltration & Leakage Rate per Envelope Area
Cooling Balance Point = Cooling Temperature - Internal Gains from Solar, Equipment, and Persons
Heating Balance Point = Heating Temperature - Internal Gains from Solar, Equipment, and Persons

Cooling Load Calculations - Calculated for Each Cooling Bin
Cooling occurs when the Outside Air Temperature is ABOVE the Cooling Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Cooling Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Sensible Heat Ratio = [Specific Heat of Dry Air × (OA Temperature - Cooling Balance Point)] ÷ (Enthalpy of Air at OAT - Enthalpy of Air at Cooling Balance Point and Room Relative Humidity)
Cooling Conduction Load (MBtu/yr) = Overall U Factor × Area × [(OA Temperature - Cooling Balance Point) × Hours in Bin] ÷ 1,000 Btu/MBtu
Cooling Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (OA Temperature - Cooling Balance Point) × Hours in Bin ÷ (Sensible Heat Ratio × 1,000 Btu/MBtu)
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × [(Mixed Air Temperature - Cooling Balance Point) ÷ Sensible Heat Ratio + Cooling Internal Gain] × Hours in Bin × 1,000 Btu/MBtu when OA Temperature is ABOVE the Cooling Balance Point
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × Cooling Internal Gain × Hours in Bin ÷ 1,000 Btu/MBtu when OA Temperature is AT OR BELOW the Cooling Balance Point

Heating Load Calculations - Calculated for Each Heating Bin
Heating occurs when the Outside Air Temperature is BELOW the Heating Balance Point
For Ventilation, Heating occurs when the Mixed Air Temperature is BELOW the Heating Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Heating Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Heating Conduction Load (MBtu/yr) = Overall U Factor × Area × [(Heating Balance Point - OA Temperature) × Hours in Bin] ÷ 1,000 Btu/MBtu
Heating Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (Heating Balance Point - OA Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu
Heating Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × (Heating Balance Point - Heating Mixed Air Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu

Baseline Cooling Load = Baseline Cooling Conduction Load + Baseline Cooling Infiltration Load + Baseline Cooling Ventilation Load
Proposed Cooling Load = Proposed Cooling Conduction Load + Proposed Cooling Infiltration Load + Proposed Cooling Ventilation Load
Baseline Cooling Energy = (Baseline Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Proposed Cooling Energy = (Proposed Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Baseline Heating Load = Baseline Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Proposed Heating Load = Proposed Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Baseline Heating Energy = Baseline Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)
Proposed Heating Energy = Proposed Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)

Baseline Occupied Energy Load Calculations

OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	24 h	39.4 Btu/lbm	76.50°F	0.647	2,719 MBtu	0 MBtu	10,318 MBtu	0 MBtu	2,763 MBtu	0 MBtu
107.5°F	149 h	36.4 Btu/lbm	75.50°F	0.702	15,007 MBtu	0 MBtu	52,538 MBtu	0 MBtu	15,052 MBtu	0 MBtu
102.5°F	235 h	34.3 Btu/lbm	74.50°F	0.725	20,711 MBtu	0 MBtu	70,144 MBtu	0 MBtu	21,419 MBtu	0 MBtu
97.5°F	223 h	32.6 Btu/lbm	73.50°F	0.729	16,846 MBtu	0 MBtu	56,792 MBtu	0 MBtu	18,542 MBtu	0 MBtu
92.5°F	170 h	31.3 Btu/lbm	72.50°F	0.699	10,702 MBtu	0 MBtu	37,599 MBtu	0 MBtu	13,096 MBtu	0 MBtu
87.5°F	308 h	28.9 Btu/lbm	71.50°F	0.776	15,511 MBtu	0 MBtu	49,070 MBtu	0 MBtu	20,251 MBtu	0 MBtu
82.5°F	329 h	27.0 Btu/lbm	70.50°F	0.841	12,426 MBtu	0 MBtu	36,306 MBtu	0 MBtu	18,692 MBtu	0 MBtu
77.5°F	301 h	25.2 Btu/lbm	69.50°F	0.967	7,579 MBtu	0 MBtu	19,253 MBtu	0 MBtu	14,553 MBtu	0 MBtu
72.5°F	294 h	23.9 Btu/lbm	68.50°F	1.015	3,702 MBtu	0 MBtu	8,956 MBtu	0 MBtu	12,418 MBtu	0 MBtu
67.5°F	307 h	21.8 Btu/lbm	65.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	11,260 MBtu	0 MBtu
62.5°F	323 h	20.0 Btu/lbm	64.90°F	0.000	0 MBtu	2,440 MBtu	0 MBtu	5,993 MBtu	0 MBtu	1,094 MBtu
57.5°F	211 h	18.9 Btu/lbm	63.90°F	0.000	0 MBtu	4,250 MBtu	0 MBtu	10,441 MBtu	0 MBtu	1,905 MBtu
52.5°F	142 h	17.5 Btu/lbm	62.90°F	0.000	0 MBtu	4,648 MBtu	0 MBtu	11,418 MBtu	0 MBtu	2,083 MBtu
47.5°F	69 h	15.0 Btu/lbm	61.90°F	0.000	0 MBtu	3,127 MBtu	0 MBtu	7,682 MBtu	0 MBtu	1,402 MBtu
42.5°F	33 h	13.3 Btu/lbm	60.90°F	0.000	0 MBtu	1,911 MBtu	0 MBtu	4,695 MBtu	0 MBtu	857 MBtu
37.5°F	2 h	12.2 Btu/lbm	59.90°F	0.000	0 MBtu	141 MBtu	0 MBtu	346 MBtu	0 MBtu	63 MBtu
32.5°F			58.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			57.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			56.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			55.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			54.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			53.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			52.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			51.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			50.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			49.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
SUBTOTALS	**3,120 h/yr**				**105,203 MBtu/yr**	**16,518 MBtu/yr**	**340,978 MBtu/yr**	**40,575 MBtu/yr**	**148,046 MBtu/yr**	**7,404 MBtu/yr**

Baseline Unoccupied Energy Load Calculations

OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	9 h	37.3 Btu/lbm	77.70°F	0.753	986 MBtu	0 MBtu	3,217 MBtu	0 MBtu	841 MBtu	0 MBtu
107.5°F	148 h	37.0 Btu/lbm	76.70°F	0.681	14,348 MBtu	0 MBtu	51,755 MBtu	0 MBtu	13,619 MBtu	0 MBtu
102.5°F	214 h	35.8 Btu/lbm	75.70°F	0.650	18,052 MBtu	0 MBtu	68,216 MBtu	0 MBtu	18,485 MBtu	0 MBtu
97.5°F	305 h	33.9 Btu/lbm	74.70°F	0.653	21,888 MBtu	0 MBtu	82,290 MBtu	0 MBtu	23,621 MBtu	0 MBtu
92.5°F	283 h	32.7 Btu/lbm	73.70°F	0.608	16,746 MBtu	0 MBtu	67,602 MBtu	0 MBtu	20,320 MBtu	0 MBtu
87.5°F	493 h	30.9 Btu/lbm	72.70°F	0.594	22,966 MBtu	0 MBtu	94,896 MBtu	0 MBtu	31,225 MBtu	0 MBtu
82.5°F	574 h	28.5 Btu/lbm	71.70°F	0.639	19,512 MBtu	0 MBtu	74,985 MBtu	0 MBtu	29,877 MBtu	0 MBtu
77.5°F	516 h	26.5 Btu/lbm	70.70°F	0.665	11,044 MBtu	0 MBtu	40,812 MBtu	0 MBtu	22,006 MBtu	0 MBtu
72.5°F	484 h	24.4 Btu/lbm	69.70°F	0.867	4,266 MBtu	0 MBtu	12,087 MBtu	0 MBtu	15,861 MBtu	0 MBtu
67.5°F	601 h	22.5 Btu/lbm	67.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
62.5°F	771 h	20.7 Btu/lbm	66.10°F	0.000	0 MBtu	8,736 MBtu	0 MBtu	21,459 MBtu	0 MBtu	3,916 MBtu
57.5°F	587 h	19.0 Btu/lbm	65.10°F	0.000	0 MBtu	14,042 MBtu	0 MBtu	34,492 MBtu	0 MBtu	6,294 MBtu
52.5°F	443 h	17.1 Btu/lbm	64.10°F	0.000	0 MBtu	16,175 MBtu	0 MBtu	39,730 MBtu	0 MBtu	7,249 MBtu
47.5°F	166 h	15.1 Btu/lbm	63.10°F	0.000	0 MBtu	8,151 MBtu	0 MBtu	20,021 MBtu	0 MBtu	3,653 MBtu
42.5°F	45 h	13.1 Btu/lbm	62.10°F	0.000	0 MBtu	2,776 MBtu	0 MBtu	6,819 MBtu	0 MBtu	1,244 MBtu
37.5°F	1 h	12.2 Btu/lbm	61.10°F	0.000	0 MBtu	74 MBtu	0 MBtu	182 MBtu	0 MBtu	33 MBtu
32.5°F			60.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			59.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			58.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			57.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			56.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			55.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			54.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			53.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			52.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			51.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,640 h/yr**				**129,807 MBtu/yr**	**49,954 MBtu/yr**	**495,859 MBtu/yr**	**122,704 MBtu/yr**	**175,855 MBtu/yr**	**22,389 MBtu/yr**

Total Baseline Energy Load Calculations (Occupied and UnOccupied)

OA Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				3,705 MBtu	0 MBtu	13,535 MBtu	0 MBtu	3,604 MBtu	0 MBtu
107.5°F	297 h				29,355 MBtu	0 MBtu	104,293 MBtu	0 MBtu	28,671 MBtu	0 MBtu
102.5°F	449 h				38,763 MBtu	0 MBtu	138,360 MBtu	0 MBtu	39,904 MBtu	0 MBtu
97.5°F	526 h				38,734 MBtu	0 MBtu	139,082 MBtu	0 MBtu	42,163 MBtu	0 MBtu
92.5°F	453 h				27,448 MBtu	0 MBtu	105,201 MBtu	0 MBtu	33,416 MBtu	0 MBtu
87.5°F	801 h				38,477 MBtu	0 MBtu	143,967 MBtu	0 MBtu	51,476 MBtu	0 MBtu
82.5°F	903 h				31,939 MBtu	0 MBtu	111,291 MBtu	0 MBtu	48,570 MBtu	0 MBtu
77.5°F	817 h				18,623 MBtu	0 MBtu	60,065 MBtu	0 MBtu	36,559 MBtu	0 MBtu
72.5°F	778 h				7,967 MBtu	0 MBtu	21,043 MBtu	0 MBtu	28,279 MBtu	0 MBtu
67.5°F	908 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	11,260 MBtu	0 MBtu
62.5°F	1,094 h				0 MBtu	11,176 MBtu	0 MBtu	27,453 MBtu	0 MBtu	5,009 MBtu
57.5°F	798 h				0 MBtu	18,292 MBtu	0 MBtu	44,932 MBtu	0 MBtu	8,199 MBtu
52.5°F	585 h				0 MBtu	20,823 MBtu	0 MBtu	51,148 MBtu	0 MBtu	9,333 MBtu
47.5°F	235 h				0 MBtu	11,278 MBtu	0 MBtu	27,703 MBtu	0 MBtu	5,055 MBtu
42.5°F	78 h				0 MBtu	4,687 MBtu	0 MBtu	11,514 MBtu	0 MBtu	2,101 MBtu
37.5°F	3 h				0 MBtu	215 MBtu	0 MBtu	529 MBtu	0 MBtu	96 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**235,010 MBtu/yr**	**66,472 MBtu/yr**	**836,837 MBtu/yr**	**163,279 MBtu/yr**	**323,901 MBtu/yr**	**29,793 MBtu/yr**

Investment Grade Audit

Proposed Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	16 h	39.8 Btu/lbm	76.50°F	0.632	1,813 MBtu	0 MBtu	7,044 MBtu	0 MBtu	1,872 MBtu	0 MBtu
107.5°F	120 h	36.3 Btu/lbm	75.50°F	0.707	12,087 MBtu	0 MBtu	42,003 MBtu	0 MBtu	12,066 MBtu	0 MBtu
102.5°F	197 h	34.2 Btu/lbm	74.50°F	0.732	17,362 MBtu	0 MBtu	58,294 MBtu	0 MBtu	17,862 MBtu	0 MBtu
97.5°F	203 h	32.6 Btu/lbm	73.50°F	0.729	15,335 MBtu	0 MBtu	51,699 MBtu	0 MBtu	16,879 MBtu	0 MBtu
92.5°F	158 h	31.4 Btu/lbm	72.50°F	0.691	9,946 MBtu	0 MBtu	35,352 MBtu	0 MBtu	12,246 MBtu	0 MBtu
87.5°F	282 h	29.0 Btu/lbm	71.50°F	0.764	14,202 MBtu	0 MBtu	45,655 MBtu	0 MBtu	18,674 MBtu	0 MBtu
82.5°F	302 h	27.1 Btu/lbm	70.50°F	0.822	11,407 MBtu	0 MBtu	34,105 MBtu	0 MBtu	17,300 MBtu	0 MBtu
77.5°F	279 h	25.4 Btu/lbm	69.50°F	0.895	7,025 MBtu	0 MBtu	19,284 MBtu	0 MBtu	13,752 MBtu	0 MBtu
72.5°F	267 h	24.0 Btu/lbm	68.50°F	0.936	3,362 MBtu	0 MBtu	8,821 MBtu	0 MBtu	11,403 MBtu	0 MBtu
67.5°F	283 h	21.8 Btu/lbm	65.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	10,380 MBtu	0 MBtu
62.5°F	301 h	20.0 Btu/lbm	64.90°F	0.000	0 MBtu	2,274 MBtu	0 MBtu	5,585 MBtu	0 MBtu	1,019 MBtu
57.5°F	206 h	18.9 Btu/lbm	63.90°F	0.000	0 MBtu	4,150 MBtu	0 MBtu	10,193 MBtu	0 MBtu	1,860 MBtu
52.5°F	142 h	17.5 Btu/lbm	62.90°F	0.000	0 MBtu	4,648 MBtu	0 MBtu	11,418 MBtu	0 MBtu	2,083 MBtu
47.5°F	69 h	15.0 Btu/lbm	61.90°F	0.000	0 MBtu	3,127 MBtu	0 MBtu	7,682 MBtu	0 MBtu	1,402 MBtu
42.5°F	33 h	13.3 Btu/lbm	60.90°F	0.000	0 MBtu	1,911 MBtu	0 MBtu	4,695 MBtu	0 MBtu	857 MBtu
37.5°F	2 h	12.2 Btu/lbm	59.90°F	0.000	0 MBtu	141 MBtu	0 MBtu	346 MBtu	0 MBtu	63 MBtu
32.5°F			58.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			57.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			56.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			55.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			54.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			53.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			52.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			51.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			50.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			49.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**2,860 h/yr**				**92,538 MBtu/yr**	**16,251 MBtu/yr**	**302,258 MBtu/yr**	**39,919 MBtu/yr**	**132,435 MBtu/yr**	**7,284 MBtu/yr**

Proposed Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	17 h	37.9 Btu/lbm	77.70°F	0.722	1,862 MBtu	0 MBtu	6,339 MBtu	0 MBtu	1,636 MBtu	0 MBtu
107.5°F	177 h	37.0 Btu/lbm	76.70°F	0.681	17,159 MBtu	0 MBtu	61,896 MBtu	0 MBtu	16,288 MBtu	0 MBtu
102.5°F	252 h	35.5 Btu/lbm	75.70°F	0.666	21,257 MBtu	0 MBtu	78,381 MBtu	0 MBtu	21,412 MBtu	0 MBtu
97.5°F	325 h	33.8 Btu/lbm	74.70°F	0.660	23,323 MBtu	0 MBtu	86,848 MBtu	0 MBtu	25,017 MBtu	0 MBtu
92.5°F	295 h	32.5 Btu/lbm	73.70°F	0.622	17,456 MBtu	0 MBtu	68,948 MBtu	0 MBtu	20,904 MBtu	0 MBtu
87.5°F	519 h	30.7 Btu/lbm	72.70°F	0.611	24,177 MBtu	0 MBtu	97,226 MBtu	0 MBtu	32,384 MBtu	0 MBtu
82.5°F	601 h	28.4 Btu/lbm	71.70°F	0.652	20,430 MBtu	0 MBtu	76,963 MBtu	0 MBtu	31,000 MBtu	0 MBtu
77.5°F	538 h	26.4 Btu/lbm	70.70°F	0.687	11,515 MBtu	0 MBtu	41,165 MBtu	0 MBtu	22,691 MBtu	0 MBtu
72.5°F	511 h	24.3 Btu/lbm	69.70°F	0.967	4,503 MBtu	0 MBtu	11,444 MBtu	0 MBtu	16,506 MBtu	0 MBtu
67.5°F	625 h	22.4 Btu/lbm	67.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
62.5°F	793 h	20.7 Btu/lbm	66.10°F	0.000	0 MBtu	8,986 MBtu	0 MBtu	22,072 MBtu	0 MBtu	4,027 MBtu
57.5°F	592 h	19.0 Btu/lbm	65.10°F	0.000	0 MBtu	14,161 MBtu	0 MBtu	34,785 MBtu	0 MBtu	6,347 MBtu
52.5°F	443 h	17.1 Btu/lbm	64.10°F	0.000	0 MBtu	16,175 MBtu	0 MBtu	39,730 MBtu	0 MBtu	7,249 MBtu
47.5°F	166 h	15.1 Btu/lbm	63.10°F	0.000	0 MBtu	8,151 MBtu	0 MBtu	20,021 MBtu	0 MBtu	3,653 MBtu
42.5°F	45 h	13.1 Btu/lbm	62.10°F	0.000	0 MBtu	2,776 MBtu	0 MBtu	6,819 MBtu	0 MBtu	1,244 MBtu
37.5°F	1 h	12.2 Btu/lbm	61.10°F	0.000	0 MBtu	74 MBtu	0 MBtu	182 MBtu	0 MBtu	33 MBtu
32.5°F			60.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			59.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			58.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			57.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			56.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			55.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			54.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			53.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			52.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			51.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,900 h/yr**				**141,683 MBtu/yr**	**50,323 MBtu/yr**	**529,210 MBtu/yr**	**123,610 MBtu/yr**	**187,838 MBtu/yr**	**22,555 MBtu/yr**

Total Proposed Energy Load Calculations (Occupied and UnOccupied)										
OA Bin Avg Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				3,675 MBtu	0 MBtu	13,383 MBtu	0 MBtu	3,508 MBtu	0 MBtu
107.5°F	297 h				29,246 MBtu	0 MBtu	103,899 MBtu	0 MBtu	28,354 MBtu	0 MBtu
102.5°F	449 h				38,619 MBtu	0 MBtu	136,675 MBtu	0 MBtu	39,275 MBtu	0 MBtu
97.5°F	528 h				38,658 MBtu	0 MBtu	138,547 MBtu	0 MBtu	41,896 MBtu	0 MBtu
92.5°F	453 h				27,402 MBtu	0 MBtu	104,300 MBtu	0 MBtu	33,150 MBtu	0 MBtu
87.5°F	801 h				38,379 MBtu	0 MBtu	142,881 MBtu	0 MBtu	51,058 MBtu	0 MBtu
82.5°F	903 h				31,837 MBtu	0 MBtu	111,068 MBtu	0 MBtu	48,300 MBtu	0 MBtu
77.5°F	817 h				18,540 MBtu	0 MBtu	60,450 MBtu	0 MBtu	36,443 MBtu	0 MBtu
72.5°F	778 h				7,865 MBtu	0 MBtu	20,265 MBtu	0 MBtu	27,909 MBtu	0 MBtu
67.5°F	908 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	10,380 MBtu	0 MBtu
62.5°F	1,094 h				0 MBtu	11,259 MBtu	0 MBtu	27,657 MBtu	0 MBtu	5,046 MBtu
57.5°F	798 h				0 MBtu	18,311 MBtu	0 MBtu	44,978 MBtu	0 MBtu	8,207 MBtu
52.5°F	585 h				0 MBtu	20,823 MBtu	0 MBtu	51,148 MBtu	0 MBtu	9,333 MBtu
47.5°F	235 h				0 MBtu	11,278 MBtu	0 MBtu	27,703 MBtu	0 MBtu	5,055 MBtu
42.5°F	78 h				0 MBtu	4,687 MBtu	0 MBtu	11,514 MBtu	0 MBtu	2,101 MBtu
37.5°F	3 h				0 MBtu	215 MBtu	0 MBtu	529 MBtu	0 MBtu	96 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**234,221 MBtu/yr**	**66,574 MBtu/yr**	**831,468 MBtu/yr**	**163,529 MBtu/yr**	**320,272 MBtu/yr**	**29,839 MBtu/yr**

Investment Grade Audit

FIM 2B: HVAC BMS Upgrade – Setpoint Adjustment

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: Setpoint adjustement on unoccupied hours to reduce utility usage.

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Cooling Load, MBtu/yr	1,156,635	1,091,596	65,039	
Heating Load, MBtu/yr	102,597	61,938	40,659	
Cooling Energy, kWh/yr	81,928	77,321	4,607	5.6%
Cooling Energy Cost	$13,832/yr	$13,055/yr	$777/yr	
Heating Energy, therms/yr	1,282	774	508	39.6%
Heating Energy Cost	$2,180/yr	$1,316/yr	$864/yr	
Total Energy Cost	$16,012/yr	$14,371/yr	$1,641/yr	10.2%

INPUTS	
Fuel Billing Unit	therm
Fuel Cost per Billing Unit	$1.7001
Fuel Cost per Therm	$1.7001
Electric Energy Cost	$0.1688/kWh
Wall Area Per Floor	4,993 ft²
Window Area Per Floor	263 ft²
Roof Area	6,400 ft²
No. of Floors	1
Total Floor Area	6,400 ft²
Total Envelope Area	11,656 ft²
Window U factor	0.5500 Btu/(h·ft²·°F)
Wall U factor	0.0625 Btu/(h·ft²·°F)
Roof U factor	0.0300 Btu/(h·ft²·°F)
Overall U Value	**0.0557 Btu/(h·ft²·°F)**

Infiltration Rate Per Env. Area	0.200 cfm/ft²
Air Infiltration & Leakage Volume	2,331 cfm

Supply Air Flow Rate	7,650 cfm
Outside Air Flow Rate	3,650 cfm
Return Air Flow Rate	4,000 cfm

Cooling Conversion Factor	12 MBtu/h per ton
Heating Btu Conversion Factor	100,000
Heating Btu Conversion Unit	MBtu/therm
Sensible Heat Conversion Factor	1.080 Btu/(h·cfm·°F)

Overall Heating System Efficiency	80.0%
Chiller Efficiency	0.85 kW/ton

UNITS CHART				
Mcf	1,030,000 Btu/Mcf	MBtu/Mcf	1,030 MBtu/Mcf	10.30 therm/Mcf
ccf	103,000 Btu/ccf	MBtu/ccf	103.0 MBtu/ccf	1.03 therm/ccf
cf	1,030 Btu/cf	MBtu/cf	1.030 MBtu/cf	0.0103 therm/cf
therm	100,000 Btu/therm	MBtu/therm	100 MBtu/therm	1 therm
MBtu	1,000 Btu/MBtu	Btu/MBtu	1 MBtu	0.010 therm/MBtu
MMBtu	1,000,000 Btu/MMBtu	MBtu/MMBtu	1,000 MBtu/MMBtu	10 therm/MMBtu
gal (LP Gas)	91,500 Btu/gal	MBtu/gal	91.5 MBtu/gal	0.9150 therm/gal
gal (Fuel Oil #2)	139,000 Btu/gal	MBtu/gal	139 MBtu/gal	1.3900 therm/gal
lbm (Steam)	975 Btu/lbm	MBtu/lbm	0.975 MBtu/lbm	0.00975 therm/lbm
kWh	3,412 Btu/kWh	MBtu/kWh	3.412 MBtu/kWh	0.03412 therm/kWh

Baseline Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Baseline Occ Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	12.0°F	60.0°F	19.39 Btu/lbm d.a.
Baseline UnOcc Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	7.0°F	65.0°F	21.57 Btu/lbm d.a.
Baseline Occ Heating Temperature	72.0°F			12.0°F	60.0°F	
Baseline UnOcc Heating Temperature	72.0°F			7.0°F	65.0°F	

Proposed Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Proposed Occ Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	12.0°F	60.0°F	19.39 Btu/lbm d.a.
Proposed UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	7.0°F	67.0°F	22.48 Btu/lbm d.a.
Proposed Occ Heating Temperature	72.0°F			12.0°F	60.0°F	
Proposed UnOcc Heating Temperature	68.0°F			7.0°F	61.0°F	

FORMULAS

Sensible Heat Conversion Factor = Dry Air Density × Specific Heat of Dry Air × 60 min/h = 0.075 lbm/ft³ × 0.24 Btu/(lbm·°F) × 60 min/h = 1.08 Btu/(h·cfm·°F)
Overall U Factor [Btu/(h·ft²·°F)] = [(Window U factor × Window Area) + (Wall U factor × Wall Area) + (Roof U factor × Roof Area)] ÷ Total Envelope Area
Infiltration Rate (cfm) = Total Envelope Area × Infiltration & Leakage Rate per Envelope Area
Cooling Balance Point = Cooling Temperature - Internal Gains from Solar, Equipment, and Persons
Heating Balance Point = Heating Temperature - Internal Gains from Solar, Equipment, and Persons

Cooling Load Calculations - Calculated for Each Cooling Bin
Cooling occurs when the Outside Air Temperature is ABOVE the Cooling Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Cooling Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Sensible Heat Ratio = [Specific Heat of Dry Air × (OA Temperature - Cooling Balance Point)] ÷ (Enthalpy of Air at OAT - Enthalpy of Air at Cooling Balance Point and Room Relative Humidity)
Cooling Conduction Load (MBtu/yr) = Overall U Factor × Area × [(OA Temperature - Cooling Balance Point) × Hours in Bin] ÷ 1,000 Btu/MBtu
Cooling Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (OA Temperature - Cooling Balance Point) × Hours in Bin ÷ (Sensible Heat Ratio × 1,000 Btu/MBtu)
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × [(Mixed Air Temperature - Cooling Balance Point) ÷ Sensible Heat Ratio + Cooling Internal Gain] × Hours in Bin × 1,000 Btu/MBtu when OA Temperature is ABOVE the Cooling Balance Point
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × Cooling Internal Gain × Hours in Bin ÷ 1,000 Btu/MBtu when OA Temperature is AT OR BELOW the Cooling Balance Point

Heating Load Calculations - Calculated for Each Heating Bin
Heating occurs when the Outside Air Temperature is BELOW the Heating Balance Point
For Ventilation, Heating occurs when the Mixed Air Temperature is BELOW the Heating Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Heating Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Heating Conduction Load (MBtu/yr) = Overall U Factor × Area × [(Heating Balance Point - OA Temperature) × Hours in Bin] ÷ 1,000 Btu/MBtu
Heating Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (Heating Balance Point - OA Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu
Heating Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × (Heating Balance Point - Heating Mixed Air Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu

Baseline Cooling Load = Baseline Cooling Conduction Load + Baseline Cooling Infiltration Load + Baseline Cooling Ventilation Load
Proposed Cooling Load = Proposed Cooling Conduction Load + Proposed Cooling Infiltration Load + Proposed Cooling Ventilation Load
Baseline Cooling Energy = (Baseline Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Proposed Cooling Energy = (Proposed Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Baseline Heating Load = Baseline Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Proposed Heating Load = Proposed Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Baseline Heating Energy = Baseline Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)
Proposed Heating Energy = Proposed Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)

Baseline Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	28 h	39.4 Btu/lbm	85.05°F	0.630	954 MBtu	0 MBtu	5,879 MBtu	0 MBtu	5,716 MBtu	0 MBtu
107.5°F	193 h	36.6 Btu/lbm	82.66°F	0.662	5,947 MBtu	0 MBtu	34,852 MBtu	0 MBtu	35,166 MBtu	0 MBtu
102.5°F	300 h	34.4 Btu/lbm	80.28°F	0.679	8,271 MBtu	0 MBtu	47,251 MBtu	0 MBtu	49,490 MBtu	0 MBtu
97.5°F	274 h	32.6 Btu/lbm	77.89°F	0.681	6,666 MBtu	0 MBtu	37,982 MBtu	0 MBtu	41,335 MBtu	0 MBtu
92.5°F	190 h	31.2 Btu/lbm	75.51°F	0.660	4,006 MBtu	0 MBtu	23,547 MBtu	0 MBtu	26,579 MBtu	0 MBtu
87.5°F	288 h	28.3 Btu/lbm	73.12°F	0.740	5,138 MBtu	0 MBtu	26,931 MBtu	0 MBtu	33,742 MBtu	0 MBtu
82.5°F	299 h	26.3 Btu/lbm	70.74°F	0.781	4,364 MBtu	0 MBtu	21,687 MBtu	0 MBtu	30,345 MBtu	0 MBtu
77.5°F	252 h	24.5 Btu/lbm	68.35°F	0.821	2,861 MBtu	0 MBtu	13,519 MBtu	0 MBtu	22,020 MBtu	0 MBtu
72.5°F	264 h	23.2 Btu/lbm	65.96°F	0.787	2,141 MBtu	0 MBtu	10,563 MBtu	0 MBtu	20,379 MBtu	0 MBtu
67.5°F	290 h	21.4 Btu/lbm	63.58°F	0.894	1,411 MBtu	0 MBtu	6,127 MBtu	0 MBtu	18,295 MBtu	0 MBtu
62.5°F	302 h	19.5 Btu/lbm	61.19°F	5.263	490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	122 h	18.3 Btu/lbm	58.81°F	0.000	0 MBtu	198 MBtu	0 MBtu	768 MBtu	0 MBtu	574 MBtu
52.5°F	41 h	16.5 Btu/lbm	56.42°F	0.000	0 MBtu	199 MBtu	0 MBtu	774 MBtu	0 MBtu	578 MBtu
47.5°F	13 h	14.4 Btu/lbm	54.04°F	0.000	0 MBtu	105 MBtu	0 MBtu	409 MBtu	0 MBtu	306 MBtu
42.5°F	4 h	13.4 Btu/lbm	51.65°F	0.000	0 MBtu	45 MBtu	0 MBtu	176 MBtu	0 MBtu	132 MBtu
37.5°F			49.26°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
32.5°F			46.88°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			44.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			42.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			39.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			37.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			34.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			32.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			30.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			27.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			25.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
SUBTOTALS	**2,860 h/yr**				**42,247 MBtu/yr**	**548 MBtu/yr**	**228,699 MBtu/yr**	**2,127 MBtu/yr**	**297,623 MBtu/yr**	**1,589 MBtu/yr**

Baseline Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	5 h	35.5 Btu/lbm	87.66°F	0.818	154 MBtu	0 MBtu	731 MBtu	0 MBtu	684 MBtu	0 MBtu
107.5°F	104 h	36.9 Btu/lbm	85.28°F	0.665	2,867 MBtu	0 MBtu	16,729 MBtu	0 MBtu	15,367 MBtu	0 MBtu
102.5°F	149 h	36.1 Btu/lbm	82.89°F	0.619	3,625 MBtu	0 MBtu	22,718 MBtu	0 MBtu	21,083 MBtu	0 MBtu
97.5°F	254 h	34.1 Btu/lbm	80.51°F	0.622	5,355 MBtu	0 MBtu	33,398 MBtu	0 MBtu	31,958 MBtu	0 MBtu
92.5°F	263 h	32.8 Btu/lbm	78.12°F	0.588	4,692 MBtu	0 MBtu	30,994 MBtu	0 MBtu	30,411 MBtu	0 MBtu
87.5°F	513 h	31.1 Btu/lbm	75.74°F	0.566	7,488 MBtu	0 MBtu	51,308 MBtu	0 MBtu	52,485 MBtu	0 MBtu
82.5°F	604 h	28.8 Btu/lbm	73.35°F	0.581	6,857 MBtu	0 MBtu	45,836 MBtu	0 MBtu	50,908 MBtu	0 MBtu
77.5°F	568 h	26.8 Btu/lbm	70.96°F	0.573	4,582 MBtu	0 MBtu	31,022 MBtu	0 MBtu	38,766 MBtu	0 MBtu
72.5°F	514 h	24.8 Btu/lbm	68.58°F	0.557	2,501 MBtu	0 MBtu	17,438 MBtu	0 MBtu	27,219 MBtu	0 MBtu
67.5°F	618 h	22.7 Btu/lbm	66.19°F	0.529	1,002 MBtu	0 MBtu	7,352 MBtu	0 MBtu	22,545 MBtu	0 MBtu
62.5°F	792 h	20.9 Btu/lbm	63.81°F	0.000	0 MBtu	1,284 MBtu	0 MBtu	4,985 MBtu	0 MBtu	3,724 MBtu
57.5°F	676 h	19.1 Btu/lbm	61.42°F	0.000	0 MBtu	3,289 MBtu	0 MBtu	12,765 MBtu	0 MBtu	9,536 MBtu
52.5°F	544 h	17.3 Btu/lbm	59.04°F	0.000	0 MBtu	4,411 MBtu	0 MBtu	17,120 MBtu	0 MBtu	12,790 MBtu
47.5°F	222 h	15.1 Btu/lbm	56.65°F	0.000	0 MBtu	2,520 MBtu	0 MBtu	9,781 MBtu	0 MBtu	7,307 MBtu
42.5°F	74 h	13.1 Btu/lbm	54.26°F	0.000	0 MBtu	1,080 MBtu	0 MBtu	4,192 MBtu	0 MBtu	3,132 MBtu
37.5°F	3 h	12.2 Btu/lbm	51.88°F	0.000	0 MBtu	54 MBtu	0 MBtu	208 MBtu	0 MBtu	155 MBtu
32.5°F			49.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			47.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			44.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			42.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			39.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			37.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			35.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			32.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			30.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			28.02°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,900 h/yr**				**39,122 MBtu/yr**	**12,639 MBtu/yr**	**257,526 MBtu/yr**	**49,051 MBtu/yr**	**291,417 MBtu/yr**	**36,643 MBtu/yr**

Total Baseline Energy Load Calculations (Occupied and UnOccupied)										
OA Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				1,108 MBtu	0 MBtu	6,610 MBtu	0 MBtu	6,400 MBtu	0 MBtu
107.5°F	297 h				8,814 MBtu	0 MBtu	51,582 MBtu	0 MBtu	50,533 MBtu	0 MBtu
102.5°F	449 h				11,896 MBtu	0 MBtu	69,969 MBtu	0 MBtu	70,572 MBtu	0 MBtu
97.5°F	528 h				12,021 MBtu	0 MBtu	71,380 MBtu	0 MBtu	73,294 MBtu	0 MBtu
92.5°F	453 h				8,698 MBtu	0 MBtu	54,542 MBtu	0 MBtu	56,990 MBtu	0 MBtu
87.5°F	801 h				12,626 MBtu	0 MBtu	78,239 MBtu	0 MBtu	86,227 MBtu	0 MBtu
82.5°F	903 h				11,221 MBtu	0 MBtu	67,523 MBtu	0 MBtu	81,253 MBtu	0 MBtu
77.5°F	817 h				7,442 MBtu	0 MBtu	44,542 MBtu	0 MBtu	60,786 MBtu	0 MBtu
72.5°F	778 h				4,642 MBtu	0 MBtu	28,001 MBtu	0 MBtu	47,589 MBtu	0 MBtu
67.5°F	908 h				2,413 MBtu	0 MBtu	13,479 MBtu	0 MBtu	40,840 MBtu	0 MBtu
62.5°F	1,094 h				490 MBtu	1,284 MBtu	361 MBtu	4,985 MBtu	14,556 MBtu	3,724 MBtu
57.5°F	798 h				0 MBtu	3,487 MBtu	0 MBtu	13,533 MBtu	0 MBtu	10,109 MBtu
52.5°F	585 h				0 MBtu	4,611 MBtu	0 MBtu	17,895 MBtu	0 MBtu	13,368 MBtu
47.5°F	235 h				0 MBtu	2,626 MBtu	0 MBtu	10,190 MBtu	0 MBtu	7,613 MBtu
42.5°F	78 h				0 MBtu	1,126 MBtu	0 MBtu	4,368 MBtu	0 MBtu	3,263 MBtu
37.5°F	3 h				0 MBtu	54 MBtu	0 MBtu	208 MBtu	0 MBtu	155 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**81,370 MBtu/yr**	**13,187 MBtu/yr**	**486,225 MBtu/yr**	**51,178 MBtu/yr**	**589,040 MBtu/yr**	**38,232 MBtu/yr**

Proposed Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	28 h	39.4 Btu/lbm	85.05°F	0.630	954 MBtu	0 MBtu	5,879 MBtu	0 MBtu	5,716 MBtu	0 MBtu
107.5°F	193 h	36.6 Btu/lbm	82.66°F	0.662	5,947 MBtu	0 MBtu	34,852 MBtu	0 MBtu	35,166 MBtu	0 MBtu
102.5°F	300 h	34.4 Btu/lbm	80.28°F	0.679	8,271 MBtu	0 MBtu	47,251 MBtu	0 MBtu	49,490 MBtu	0 MBtu
97.5°F	274 h	32.6 Btu/lbm	77.89°F	0.681	6,666 MBtu	0 MBtu	37,982 MBtu	0 MBtu	41,335 MBtu	0 MBtu
92.5°F	190 h	31.2 Btu/lbm	75.51°F	0.660	4,006 MBtu	0 MBtu	23,547 MBtu	0 MBtu	26,579 MBtu	0 MBtu
87.5°F	288 h	28.3 Btu/lbm	73.12°F	0.740	5,138 MBtu	0 MBtu	26,931 MBtu	0 MBtu	33,742 MBtu	0 MBtu
82.5°F	299 h	26.3 Btu/lbm	70.74°F	0.781	4,364 MBtu	0 MBtu	21,687 MBtu	0 MBtu	30,345 MBtu	0 MBtu
77.5°F	252 h	24.5 Btu/lbm	68.35°F	0.821	2,861 MBtu	0 MBtu	13,519 MBtu	0 MBtu	22,020 MBtu	0 MBtu
72.5°F	264 h	23.2 Btu/lbm	65.96°F	0.787	2,141 MBtu	0 MBtu	10,563 MBtu	0 MBtu	20,379 MBtu	0 MBtu
67.5°F	290 h	21.4 Btu/lbm	63.58°F	0.894	1,411 MBtu	0 MBtu	6,127 MBtu	0 MBtu	18,295 MBtu	0 MBtu
62.5°F	302 h	19.5 Btu/lbm	61.19°F	5.263	490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	122 h	18.3 Btu/lbm	58.81°F	0.000	0 MBtu	198 MBtu	0 MBtu	768 MBtu	0 MBtu	574 MBtu
52.5°F	41 h	16.5 Btu/lbm	56.42°F	0.000	0 MBtu	199 MBtu	0 MBtu	774 MBtu	0 MBtu	578 MBtu
47.5°F	13 h	14.4 Btu/lbm	54.04°F	0.000	0 MBtu	105 MBtu	0 MBtu	409 MBtu	0 MBtu	306 MBtu
42.5°F	4 h	13.4 Btu/lbm	51.65°F	0.000	0 MBtu	45 MBtu	0 MBtu	176 MBtu	0 MBtu	132 MBtu
37.5°F	0 h	0.0 Btu/lbm	49.26°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
32.5°F	0 h	0.0 Btu/lbm	46.88°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h	0.0 Btu/lbm	44.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h	0.0 Btu/lbm	42.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h	0.0 Btu/lbm	39.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h	0.0 Btu/lbm	37.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h	0.0 Btu/lbm	34.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h	0.0 Btu/lbm	32.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h	0.0 Btu/lbm	30.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h	0.0 Btu/lbm	27.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h	0.0 Btu/lbm	25.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	2,860 h/yr				42,247 MBtu/yr	548 MBtu/yr	228,699 MBtu/yr	2,127 MBtu/yr	297,623 MBtu/yr	1,589 MBtu/yr

Proposed Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	5 h	35.5 Btu/lbm	88.71°F	0.839	148 MBtu	0 MBtu	683 MBtu	0 MBtu	648 MBtu	0 MBtu
107.5°F	104 h	36.9 Btu/lbm	86.32°F	0.674	2,732 MBtu	0 MBtu	15,728 MBtu	0 MBtu	14,619 MBtu	0 MBtu
102.5°F	149 h	36.1 Btu/lbm	83.94°F	0.626	3,431 MBtu	0 MBtu	21,283 MBtu	0 MBtu	20,011 MBtu	0 MBtu
97.5°F	254 h	34.1 Btu/lbm	81.55°F	0.630	5,026 MBtu	0 MBtu	30,952 MBtu	0 MBtu	30,131 MBtu	0 MBtu
92.5°F	263 h	32.8 Btu/lbm	79.17°F	0.593	4,351 MBtu	0 MBtu	28,462 MBtu	0 MBtu	28,519 MBtu	0 MBtu
87.5°F	513 h	31.1 Btu/lbm	76.78°F	0.571	6,822 MBtu	0 MBtu	46,368 MBtu	0 MBtu	48,794 MBtu	0 MBtu
82.5°F	604 h	28.8 Btu/lbm	74.40°F	0.589	6,073 MBtu	0 MBtu	40,019 MBtu	0 MBtu	46,563 MBtu	0 MBtu
77.5°F	565 h	26.8 Btu/lbm	72.01°F	0.584	3,848 MBtu	0 MBtu	25,581 MBtu	0 MBtu	34,701 MBtu	0 MBtu
72.5°F	514 h	24.8 Btu/lbm	69.62°F	0.570	1,834 MBtu	0 MBtu	12,488 MBtu	0 MBtu	23,512 MBtu	0 MBtu
67.5°F	618 h	22.7 Btu/lbm	67.24°F	0.556	200 MBtu	0 MBtu	1,400 MBtu	0 MBtu	18,099 MBtu	0 MBtu
62.5°F	792 h	20.9 Btu/lbm	61.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
57.5°F	676 h	19.1 Btu/lbm	59.33°F	0.000	0 MBtu	1,535 MBtu	0 MBtu	5,957 MBtu	0 MBtu	4,450 MBtu
52.5°F	544 h	17.3 Btu/lbm	56.94°F	0.000	0 MBtu	3,000 MBtu	0 MBtu	11,642 MBtu	0 MBtu	8,697 MBtu
47.5°F	222 h	15.1 Btu/lbm	54.56°F	0.000	0 MBtu	1,944 MBtu	0 MBtu	7,546 MBtu	0 MBtu	5,637 MBtu
42.5°F	74 h	13.1 Btu/lbm	52.17°F	0.000	0 MBtu	888 MBtu	0 MBtu	3,447 MBtu	0 MBtu	2,575 MBtu
37.5°F	3 h	12.2 Btu/lbm	49.79°F	0.000	0 MBtu	46 MBtu	0 MBtu	177 MBtu	0 MBtu	133 MBtu
32.5°F	0 h	0.0 Btu/lbm	47.40°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h	0.0 Btu/lbm	45.02°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h	0.0 Btu/lbm	42.63°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h	0.0 Btu/lbm	40.25°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h	0.0 Btu/lbm	37.86°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h	0.0 Btu/lbm	35.47°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h	0.0 Btu/lbm	33.09°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h	0.0 Btu/lbm	30.70°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h	0.0 Btu/lbm	28.32°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h	0.0 Btu/lbm	25.93°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	5,900 h/yr				34,466 MBtu/yr	7,413 MBtu/yr	222,963 MBtu/yr	28,768 MBtu/yr	265,598 MBtu/yr	21,491 MBtu/yr

Total Proposed Energy Load Calculations (Occupied and UnOccupied)										
OA Bin Avg Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				1,101 MBtu	0 MBtu	6,561 MBtu	0 MBtu	6,364 MBtu	0 MBtu
107.5°F	297 h				8,679 MBtu	0 MBtu	50,580 MBtu	0 MBtu	49,785 MBtu	0 MBtu
102.5°F	449 h				11,702 MBtu	0 MBtu	68,534 MBtu	0 MBtu	69,500 MBtu	0 MBtu
97.5°F	528 h				11,691 MBtu	0 MBtu	68,933 MBtu	0 MBtu	71,466 MBtu	0 MBtu
92.5°F	453 h				8,356 MBtu	0 MBtu	52,009 MBtu	0 MBtu	55,098 MBtu	0 MBtu
87.5°F	801 h				11,960 MBtu	0 MBtu	73,299 MBtu	0 MBtu	82,537 MBtu	0 MBtu
82.5°F	903 h				10,437 MBtu	0 MBtu	61,706 MBtu	0 MBtu	76,908 MBtu	0 MBtu
77.5°F	817 h				6,709 MBtu	0 MBtu	39,101 MBtu	0 MBtu	56,721 MBtu	0 MBtu
72.5°F	778 h				3,975 MBtu	0 MBtu	23,051 MBtu	0 MBtu	43,891 MBtu	0 MBtu
67.5°F	908 h				1,611 MBtu	0 MBtu	7,527 MBtu	0 MBtu	36,395 MBtu	0 MBtu
62.5°F	1,094 h				490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	798 h				0 MBtu	1,733 MBtu	0 MBtu	6,725 MBtu	0 MBtu	5,024 MBtu
52.5°F	585 h				0 MBtu	3,199 MBtu	0 MBtu	12,416 MBtu	0 MBtu	9,275 MBtu
47.5°F	235 h				0 MBtu	2,050 MBtu	0 MBtu	7,955 MBtu	0 MBtu	5,942 MBtu
42.5°F	78 h				0 MBtu	933 MBtu	0 MBtu	3,623 MBtu	0 MBtu	2,707 MBtu
37.5°F	3 h				0 MBtu	46 MBtu	0 MBtu	177 MBtu	0 MBtu	133 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	8,760 h/yr				76,713 MBtu/yr	7,961 MBtu/yr	451,663 MBtu/yr	30,896 MBtu/yr	563,220 MBtu/yr	23,081 MBtu/yr

Investment Grade Audit

FIM 2C: HVAC BMS Upgrade – Fan VFD Controls

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: Currently the AHU's on the lab building have no functional VFD's installed. Will integrate them into the BMS upgrade and reduce load based on demand.

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Electric Energy, kWh/yr	43,564	17,491	26,073	59.8%
Electric Energy Cost	$7,355/yr	$2,953/yr	$4,402/yr	

Unit Tag	Baseline Usage	Baseline Electric Cost	Proposed Usage	Proposed Electric Cost	Usage Savings	Electric Cost Savings
AHU-1	36,304 kWh/yr	$6,129/yr	14,575 kWh/yr	$2,461/yr	21,729 kWh/yr	$3,668/yr
AHU-2	7,260 kWh/yr	$1,226/yr	2,916 kWh/yr	$492/yr	4,344 kWh/yr	$734/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
TOTALS	43,564 kWh/yr	$7,355/yr	17,491 kWh/yr	$2,953/yr	26,073 kWh/yr	$4,402/yr

INPUTS	
Electric Energy Cost	$0.1688/kWh

Fan Description	Quantity of Fans	Motor Size	Motor Load Factor	Nameplate Motor Efficiency	Cooling "ON" Temperature	Cooling Max. Flow Temperature	Heating "ON" Temperature	Heating Max. Flow Temperature	Min. VFD Speed	Baseline Flow Control Method Code	Proposed Flow Control Method Code
AHU-1	1	5 hp	100%	90.0%	65.0˚F	90.0˚F	55.0˚F	30.0˚F	40%	1	7
AHU-2	1	1 hp	100%	90.0%	65.0˚F	90.0˚F	55.0˚F	30.0˚F	40%	1	7
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1
				90.0%	60.0˚F					1	1

Flow Control Method	Fan/Control	Q^3 Coefficient	Q^2 Coefficient	Q Coefficient	Y-intercept	Power Equation
1	Constant Volume	0	0	0	1	P = 100%
2	Discharge Damper for FC Fan	0	0.5	0.31	0.190667	$P = 0Q^3 + 0.5Q^2 + 0.31Q + 0.190667$
3	Discharge Damper for BC or AF Fan	0	-0.410714	1.178929	0.227143	$P = 0Q^3 + -0.410714Q^2 + 1.178929Q + 0.227143$
4	Inlet Vane for FC Fan	0	1.495671	-0.848139	0.339619	$P = 0Q^3 + 1.495671Q^2 + -0.848139Q + 0.339619$
5	Inlet Vane for BC or AF Fan	0	0.970238	-0.579167	0.584345	$P = 0Q^3 + 0.970238Q^2 + -0.579167Q + 0.584345$
6	Variable Pitch for Vane Axial Fan	0	1.6104	-0.9691	0.3544	$P = 0Q^3 + 1.6104Q^2 + -0.9691Q + 0.3544$
7	VFD on All Fan Types and Pumps	0	1.652597	-0.874784	0.219762	$P = 0Q^3 + 1.652597Q^2 + -0.874784Q + 0.219762$
8	MultiZone VAV VSD Fixed Static P	-0.0998	0.9506	0.147	0.0013	$P = -0.0998Q^3 + 0.9506Q^2 + 0.147Q + 0.0013$
9	MultiZone VAV VSD Static P Reset	0.9437	-0.0729	0.0881	0.04076	$P = 0.9437Q^3 + -0.0729Q^2 + 0.0881Q + 0.04076$
10	Centrifugal Pump w/ Throttle Valve	0	-0.18996	0.63701	0.55218	$P = 0Q^3 + -0.18996Q^2 + 0.63701Q + 0.55218$
11	User Defined 1 - Enter Coefficients	0	0.5625	0.0375	0.395	$P = 0Q^3 + 0.5625Q^2 + 0.0375Q + 0.395$
12	User Defined 2 - Enter %Pwr Below	0.4402	0.6419	-0.0872	0.0054	$P = 0.4402Q^3 + 0.6419Q^2 + -0.0872Q + 0.0054$

FORMULAS

Calculations for Each Temperature Bin

Fraction of Peak Cooling Load [Calculated for Each Cooling Bin] = (Cooling On Temperature - BIN OA Avg. Temperature) ÷ (Cooling On Temperature - Cooling Max Flow Design Temperature)
Fraction of Peak Heating Load [Calculated for Each Heating Bin] = (Heating On Temperature - BIN OA Avg. Temperature) ÷ (Heating On Temperature - Heating Max Flow Design Temperature)
Fraction of Total Flow = Maximum of the Fractions of Peak Heating and Peak Cooling Loads, Between the Limits of 100% Flow and the Minimum VFD Speed
Fraction of Baseline Power [For Selected Baseline Flow Control Method] = Q^3 Coefficient × (Fraction of Total Flow)^3 + Q^2 Coefficient × (Fraction of Total Flow)^2 + Q Coefficient × Fraction of Total Flow + Y-Intercept
Fraction of Proposed Power [For Each Bin for Selected Proposed Flow Control Method] = Q^3 Coefficient × (Fraction of Total Flow)^3 + Q^2 Coefficient × (Fraction of Total Flow)^2 + Q Coefficient × Fraction of Total Flow + Y-Intercept
Baseline Fan Load Per Fan (hp) = Fraction of Baseline Power × Motor Size × Motor Load Factor ÷ Motor Efficiency
Proposed Fan Load Per Fan (hp) = Fraction of Proposed Power × Motor Size × Motor Load Factor ÷ Motor Efficiency
Baseline Energy Usage (kWh) = Baseline Fan Load Per Fan × Qty of Fans × Hours in Bin × 0.746 kW/hp
Proposed Energy Usage (kWh) = Proposed Fan Load Per Fan × Qty of Fans × Hours in Bin × 0.746 kW/hp
Energy Savings (kWh) = Baseline Energy Usage - Proposed Energy Usage

Fan ID	OA Temp Bins	OA Avg. Temperature	Bin Hours	Fraction of Peak Cooling Load	Fraction of Peak Heating Load	Total % Flow	Baseline % Power	Baseline Fan Load Per Fan	Baseline Energy Usage	Proposed % Power	Proposed Fan Load per Fan	Proposed Energy Usage	Energy Savings
AHU-1	110 to 115	112.5˚F	33 h	190%	0%	100.0%	100.0%	5.56 hp	137 kWh	99.8%	5.54 hp	136 kWh	1 kWh
	105 to 110	107.5˚F	297 h	170%	0%	100.0%	100.0%	5.56 hp	1,231 kWh	99.8%	5.54 hp	1,228 kWh	3 kWh
	100 to 105	102.5˚F	449 h	150%	0%	100.0%	100.0%	5.56 hp	1,861 kWh	99.8%	5.54 hp	1,856 kWh	5 kWh
	95 to 100	97.5˚F	528 h	130%	0%	100.0%	100.0%	5.56 hp	2,188 kWh	99.8%	5.54 hp	2,183 kWh	5 kWh
	90 to 95	92.5˚F	453 h	110%	0%	100.0%	100.0%	5.56 hp	1,877 kWh	99.8%	5.54 hp	1,873 kWh	4 kWh
	85 to 90	87.5˚F	801 h	90%	0%	90.0%	100.0%	5.56 hp	3,320 kWh	77.1%	4.28 hp	2,560 kWh	760 kWh
	80 to 85	82.5˚F	903 h	70%	0%	70.0%	100.0%	5.56 hp	3,742 kWh	41.7%	2.32 hp	1,561 kWh	2,181 kWh
	75 to 80	77.5˚F	817 h	50%	0%	50.0%	100.0%	5.56 hp	3,386 kWh	19.6%	1.09 hp	662 kWh	2,724 kWh
	70 to 75	72.5˚F	778 h	30%	0%	40.0%	100.0%	5.56 hp	3,224 kWh	13.4%	0.75 hp	433 kWh	2,791 kWh
	65 to 70	67.5˚F	908 h	10%	0%	40.0%	100.0%	5.56 hp	3,763 kWh	13.4%	0.75 hp	505 kWh	3,258 kWh
	60 to 65	62.5˚F	1,094 h	0%	0%	40.0%	100.0%	5.56 hp	4,534 kWh	13.4%	0.75 hp	609 kWh	3,925 kWh
	55 to 60	57.5˚F	798 h	0%	0%	40.0%	100.0%	5.56 hp	3,307 kWh	13.4%	0.75 hp	444 kWh	2,863 kWh
	50 to 55	52.5˚F	585 h	0%	10%	40.0%	100.0%	5.56 hp	2,425 kWh	13.4%	0.75 hp	326 kWh	2,099 kWh
	45 to 50	47.5˚F	235 h	0%	30%	40.0%	100.0%	5.56 hp	974 kWh	13.4%	0.75 hp	131 kWh	843 kWh
	40 to 45	42.5˚F	78 h	0%	50%	50.0%	100.0%	5.56 hp	323 kWh	19.6%	1.09 hp	63 kWh	260 kWh
	35 to 40	37.5˚F	3 h	0%	70%	70.0%	100.0%	5.56 hp	12 kWh	41.7%	2.32 hp	5 kWh	7 kWh
	30 to 35	32.5˚F		0%	90%	90.0%	100.0%	5.56 hp	0 kWh	77.1%	4.28 hp	0 kWh	0 kWh
	25 to 30	27.5˚F		0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
SUBTOTALS FOR	AHU-1		8,760 h						36,304 kWh/yr			14,575 kWh/yr	21,729 kWh/yr
AHU-2	110 to 115	112.5˚F	33 h	190%	0%	100.0%	100.0%	1.11 hp	27 kWh	99.8%	1.11 hp	27 kWh	0 kWh
	105 to 110	107.5˚F	297 h	170%	0%	100.0%	100.0%	1.11 hp	246 kWh	99.8%	1.11 hp	246 kWh	0 kWh
	100 to 105	102.5˚F	449 h	150%	0%	100.0%	100.0%	1.11 hp	372 kWh	99.8%	1.11 hp	371 kWh	1 kWh
	95 to 100	97.5˚F	528 h	130%	0%	100.0%	100.0%	1.11 hp	438 kWh	99.8%	1.11 hp	437 kWh	1 kWh
	90 to 95	92.5˚F	453 h	110%	0%	100.0%	100.0%	1.11 hp	375 kWh	99.8%	1.11 hp	375 kWh	0 kWh
	85 to 90	87.5˚F	801 h	90%	0%	90.0%	100.0%	1.11 hp	664 kWh	77.1%	0.86 hp	512 kWh	152 kWh
	80 to 85	82.5˚F	903 h	70%	0%	70.0%	100.0%	1.11 hp	748 kWh	41.7%	0.46 hp	312 kWh	436 kWh
	75 to 80	77.5˚F	817 h	50%	0%	50.0%	100.0%	1.11 hp	677 kWh	19.6%	0.22 hp	132 kWh	545 kWh
	70 to 75	72.5˚F	778 h	30%	0%	40.0%	100.0%	1.11 hp	645 kWh	13.4%	0.15 hp	87 kWh	558 kWh
	65 to 70	67.5˚F	908 h	10%	0%	40.0%	100.0%	1.11 hp	753 kWh	13.4%	0.15 hp	101 kWh	652 kWh
	60 to 65	62.5˚F	1,094 h	0%	0%	40.0%	100.0%	1.11 hp	907 kWh	13.4%	0.15 hp	122 kWh	785 kWh
	55 to 60	57.5˚F	798 h	0%	0%	40.0%	100.0%	1.11 hp	661 kWh	13.4%	0.15 hp	89 kWh	572 kWh
	50 to 55	52.5˚F	585 h	0%	10%	40.0%	100.0%	1.11 hp	485 kWh	13.4%	0.15 hp	65 kWh	420 kWh
	45 to 50	47.5˚F	235 h	0%	30%	40.0%	100.0%	1.11 hp	195 kWh	13.4%	0.15 hp	26 kWh	169 kWh
	40 to 45	42.5˚F	78 h	0%	50%	50.0%	100.0%	1.11 hp	65 kWh	19.6%	0.22 hp	13 kWh	52 kWh
	35 to 40	37.5˚F	3 h	0%	70%	70.0%	100.0%	1.11 hp	2 kWh	41.7%	0.46 hp	1 kWh	1 kWh
	30 to 35	32.5˚F	0 h	0%	90%	90.0%	100.0%	1.11 hp	0 kWh	77.1%	0.86 hp	0 kWh	0 kWh
	25 to 30	27.5˚F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0˚F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0˚F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0˚F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0˚F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
SUBTOTALS FOR	AHU-2		8,760 h						7,260 kWh/yr			2,916 kWh/yr	4,344 kWh/yr

FIM 3: New Solar Installation for Lab Meter

(RMCP Bov 540) PFA CV Mosquito Coast (no utility upgrade) (5.8.24)

Coachella Valley Mosquito & Vector Control, 43420 Trader Pl, Indio CA 92201

Report

Project Name	Coachella Valley Mosquito & Vector Control
Project Address	43420 Trader Pl, Indio CA 92201
Prepared By	Derek Brosch derek.brosch@centrica.com

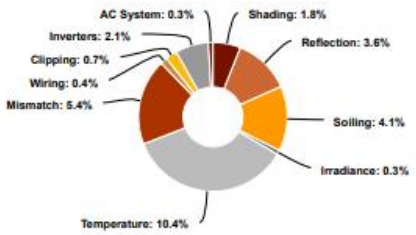
System Metrics

Design	(RMCP Bov 540) PFA CV Mosquito Coast (no utility upgrade) (5.8.24)
Module DC Nameplate	210.1 kW
Inverter AC Nameplate	197.0 kW Load Ratio: 1.07
Annual Production	326.2 MWh
Performance Ratio	74.2%
kWh/kWp	1,553.1
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)
Simulator Version	fb8d1addf1-a17db0e374-3b86ecbc4e-6ac4a3c4bd

Project Location

Monthly Production

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	2,096.3	
	POA Irradiance	2,092.4	-0.2%
	Shaded Irradiance	2,055.6	-1.8%
	Irradiance after Reflection	1,982.1	-3.6%
	Irradiance after Soiling	1,900.8	-4.1%
	Total Collector Irradiance	**1,900.4**	**0.0%**
Energy (kWh)	Nameplate	399,935.4	
	Output at Irradiance Levels	398,895.3	-0.3%
	Output at Cell Temperature Derate	357,543.4	-10.4%
	Output After Mismatch	338,058.0	-5.4%
	Optimal DC Output	336,608.5	-0.4%
	Constrained DC Output	334,161.4	-0.7%
	Inverter Output	327,182.3	-2.1%
	Energy to Grid	**326,235.5**	**-0.3%**
Temperature Metrics			
	Avg. Operating Ambient Temp		28.0 °C
	Avg. Operating Cell Temp		42.1 °C
Simulation Metrics			
	Operating Hours		4385
	Solved Hours		4385

Condition Set

Description	CBS Standard											
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	3	3	3	3	5	5	5	5	5	3	3	3
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Trackers	Maximum Angle			Backtracking								
	60°			Enabled								
Module Characterizations	Module			Uploaded By				Characterization				
	BVM7612M-540-H-HC-BF (1000V) (Boviet)			HelioScope				Spec Sheet Characterization, PAN				
Component Characterizations	Device						Uploaded By				Characterization	
	CPS SCA25KTL-DO-R/US-480 (Chint Power)						HelioScope				Spec Sheet	
	CPS SCA36KTL-DO/US-480 (2023) (CPS)						HelioScope				Spec Sheet	
	CPS SCA50KTL-DO/US-480 (2022) (CPS)						HelioScope				Spec Sheet	

Components

Component	Name	Count
Inverters	CPS SCA25KTL-DO-R/US-480 (Chint Power)	3 (75.0 kW)
Inverters	CPS SCA36KTL-DO/US-480 (2023) (CPS)	2 (72.0 kW)
Inverters	CPS SCA50KTL-DO/US-480 (2022) (CPS)	1 (50.0 kW)
AC Home Runs	1/0 AWG (Aluminum)	6 (4,828.0 ft)
Strings	10 AWG (Copper)	25 (1,479.8 ft)
Module	Boviet, BVM7612M-540-H-HC-BF (1000V) (540W)	389 (210.1 kW)

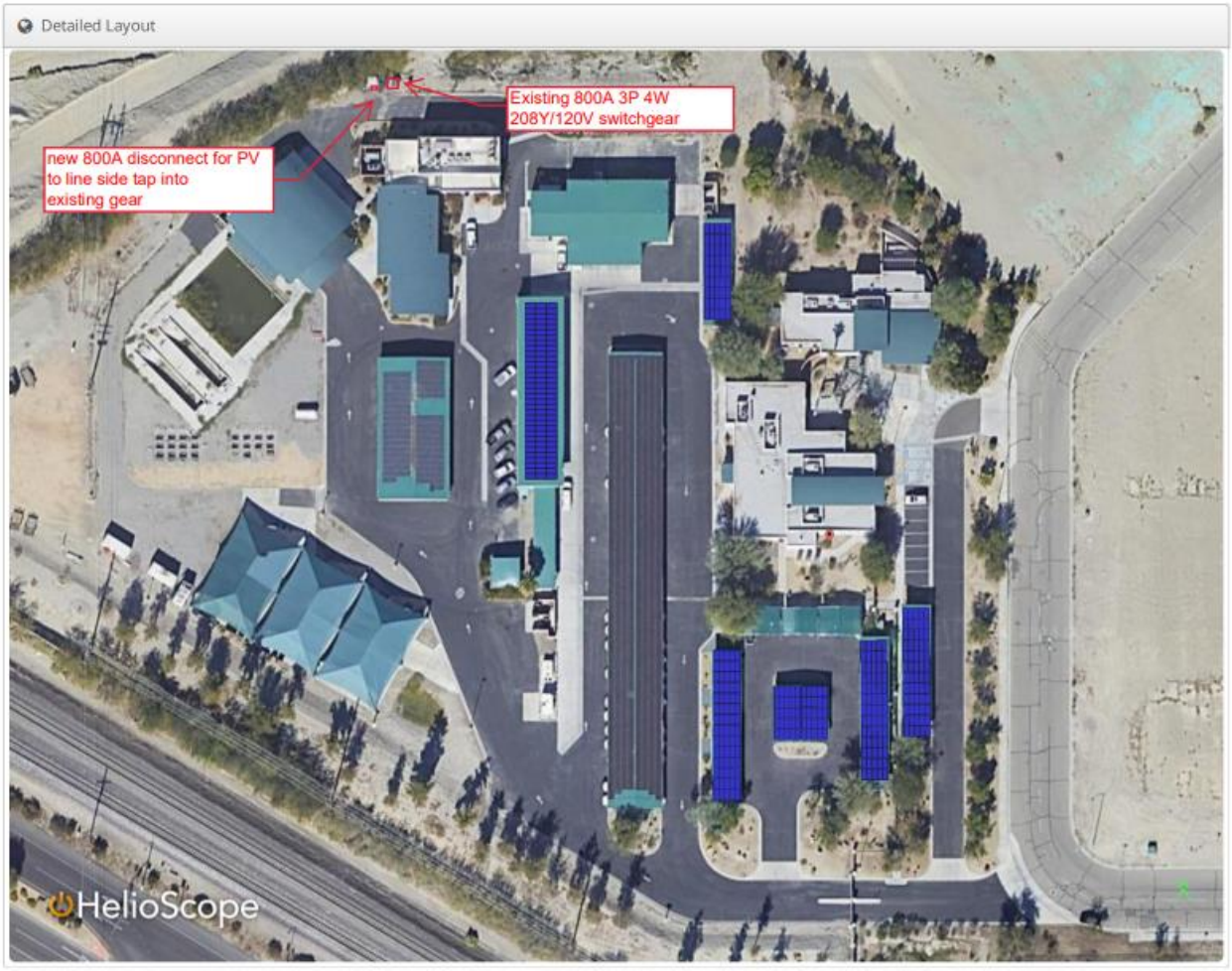
Investment Grade Audit

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	13-18	Along Racking
Wiring Zone 2	-	11-18	Along Racking
Wiring Zone 3	-	11-18	Along Racking
Wiring Zone 4	-	15-18	Along Racking
Wiring Zone 5	-	15-18	Along Racking
Wiring Zone 6	-	15-18	Along Racking
Wiring Zone 7	-	-	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Carport 1	Carport	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	70	70	37.8 kW
Carport 4	Carport	Landscape (Horizontal)	7°	89.53419°	0.1 ft	1x1	60	60	32.4 kW
Carport 3	Carport	Landscape (Horizontal)	7°	89.53419°	0.1 ft	1x1	65	65	35.1 kW
Carport 2-W	Carport	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	25	25	13.5 kW
Carport 2-E	Carport	Landscape (Horizontal)	7°	90.07407°	0.1 ft	1x1	25	25	13.5 kW
Carport 5	Carport	Landscape (Horizontal)	7°	90.07407°	0.1 ft	1x1	45	45	24.3 kW
Roof 1	Flush Mount	Portrait (Vertical)	7°	270°	0.1 ft	1x1	99	99	53.5 kW



Investment Grade Audit

FIM 4: Existing Solar Replacement for Net Meter

(CP Bov 540) PFA CV Mosquito Coast 2.13.24(240V) Coachella Valley Mosquito & Vector Control, 43420 Trader Pl, Indio CA 92201

Report

Project Name	Coachella Valley Mosquito & Vector Control
Project Address	43420 Trader Pl, Indio CA 92201
Prepared By	Derek Brosch derek.brosch@centrica.com

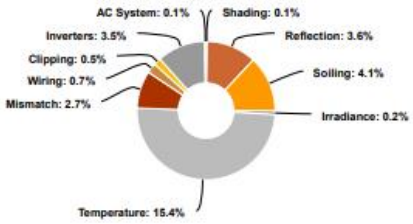
System Metrics

Design	(CP Bov 540) PFA CV Mosquito Coast 2.13.24(240V)
Module DC Nameplate	168.5 kW
Inverter AC Nameplate	119.9 kW Load Ratio: 1.41
Annual Production	254.9 MWh
Performance Ratio	72.3%
kWh/kWp	1,512.8
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)
Simulator Version	19628e094b-f6ad77da19-59dec14ede-01744ce7a4

Project Location

Monthly Production

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	2,096.3	
	POA Irradiance	2,092.7	-0.2%
	Shaded Irradiance	2,091.0	-0.1%
	Irradiance after Reflection	2,015.0	-3.6%
	Irradiance after Soiling	1,932.5	-4.1%
	Total Collector Irradiance	**1,932.5**	**0.0%**
Energy (kWh)	Nameplate	326,209.1	
	Output at Irradiance Levels	325,430.7	-0.2%
	Output at Cell Temperature Derate	275,230.1	-15.4%
	Output After Mismatch	267,736.7	-2.7%
	Optimal DC Output	265,781.4	-0.7%
	Constrained DC Output	264,396.1	-0.5%
	Inverter Output	255,141.1	-3.5%
	Energy to Grid	**254,873.8**	**-0.1%**
Temperature Metrics			
	Avg. Operating Ambient Temp		28.0 °C
	Avg. Operating Cell Temp		51.1 °C
Simulation Metrics			
	Operating Hours		4385
	Solved Hours		4385

Condition Set

Description	CBS Standard											
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	3	3	3	3	5	5	5	5	5	3	3	3
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Trackers	Maximum Angle	Backtracking										
	60°	Enabled										
Module Characterizations	Module	Uploaded By	Characterization									
	BVM7612M-540-H-HC-BF (1000V) (Boviet)	HelioScope	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Boy 7.7-US (208V) (SMA)	HelioScope	Spec Sheet									

Components

Component	Name	Count
Inverters	Sunny Boy 7.7-US (208V) (SMA)	18 (119.9 kW)
AC Home Runs	4 AWG (Aluminum)	9 (6,985.5 ft)
AC Home Runs	1/0 AWG (Aluminum)	9 (6,857.2 ft)
Strings	10 AWG (Copper)	36 (3,545.5 ft)
Module	Boviet, BVM7612M-540-H-HC-BF (1000V) (540W)	312 (168.5 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	7-11	Along Racking
Wiring Zone 2	-	7-11	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Carport W	Flush Mount	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	156	156	84.2 kW
Carport E	Flush Mount	Landscape (Horizontal)	7°	90°	0.1 ft	1x1	156	156	84.2 kW

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Appendix C – Lighting Survey and Savings Calculation

The lighting audit was completed by a Centrica Engineer during the IGA Audit. A visual inspection and documentation through pictures of all lighting fixtures in the facilities was completed to get accurate counts and types of each fixture. The following spreadsheets show the results of the audit as well as the proposed light fixture replacements and their calculated savings values.

					Pre-Install (Baseline)										Post-Install (Proposed)										Lighting Energy Savings	
Action #	Map Location #	Floor #	Building Name	Location Description	# of Baseline Fixtures	Pre Control Savings %	Pre Watts Per Fixture	Pre Watt per Fixture (Low)	Pre kW (high)	Peak kW Demand	Pre kW (Low)	Pre Hours of Annual Operation	Post Hours of Annual Operation (Low)	Pre kWh	Proposed # of Fixtures	Proposed Action Description	Additional Proposed Control Savings %	Proposed Watts per Fixture	Proposed Watts per Fixture (Low Mode)	Proposed kW (High)	Proposed kW Demand	Proposed kW (Low)	Proposed Hours of Annual Operation	Proposed Hours of Annual Operation (Low Mode)	Annual Proposed kWh	kW Demand Saved	kWh Saved
1	Admin	0	Admin	Lobby	12	0%	50	0	0.6	0.60	0.00	2,216	0	1,330	12	Retrofit w/ LED recessed can kit	30%	33	0	0.40	0.40	0.00	1,551	665	614	0.20	715
2	Admin	0	Admin	Lobby	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
3	Admin	0	Admin	Lobby	2	0%	85	0	0.17	0.17	0.00	2,216	0	377	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,551	665	96	0.11	281
4	Admin	0	Admin	RR-M	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Replace w/ new LED wrap luminaire	30%	26	0	0.05	0.05	0.00	1,551	665	79	0.07	182
5	Admin	0	Admin	RR-M	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Retrofit w/ LED bar kit	30%	22	0	0.02	0.02	0.00	1,551	665	34	0.04	97
6	Admin	0	Admin	RR-W	2	0%	112	0	0.224	0.22	0.00	2,216	0	496	2	Replace w/ new LED wrap luminaire	30%	50	0	0.10	0.10	0.00	1,551	665	155	0.12	341
7	Admin	0	Admin	RR-W	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,551	665	40	0.03	91
8	Admin	0	Admin	RR-W	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Retrofit w/ LED bar kit	30%	22	0	0.02	0.02	0.00	1,551	665	34	0.04	97
9	Admin	0	Admin	MPR	16	0%	50	0	0.8	0.80	0.00	2,216	0	1,773	16	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.35	0.35	0.00	2,216	0	780	0.45	993
10	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	166
11	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	166
12	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.02	136
13	Admin	0	Admin	>Storage	1	0%	112	0	0.112	0.11	0.00	521	0	58	1	Replace w/ new LED wrap luminaire	0%	50	0	0.05	0.05	0.00	521	0	26	0.06	32
14	Admin	0	Admin	>Janitor	1	0%	59	0	0.059	0.06	0.00	1,043	0	62	1	Replace w/ new LED wrap luminaire	0%	26	0	0.03	0.03	0.00	1,043	0	27	0.03	35
15	Admin	0	Admin	Boardroom	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.02	136
16	Admin	0	Admin	Boardroom	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
17	Admin	0	Admin	Boardroom	1	0%	85	0	0.085	0.09	0.00	2,216	0	188	1	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.03	0.03	0.00	2,216	0	69	0.05	120

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18	Admin	0	Admin	Boardroom	3	0%	85	0	0.255	0.26	0.00	2,216	0	565	3	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.09	0.09	0.00	2,216	0	206	0.16	359
19	Admin	0	Admin	Boardroom	8	0%	85	0	0.68	0.68	0.00	2,216	0	1,507	8	Retrofit w/ 2xLED tube and driver	0%	26	0	0.21	0.21	0.00	2,216	0	461	0.47	1,046
20	Admin	0	Admin	Boardroom	12	0%	85	0	1.02	1.02	0.00	2,216	0	2,260	12	Retrofit w/ 2xLED tube and driver	0%	26	0	0.31	0.31	0.00	2,216	0	691	0.71	1,569
21	Admin	0	Admin	Boardroom	6	0%	50	0	0.3	0.30	0.00	2,216	0	665	6	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.13	0.13	0.00	2,216	0	293	0.17	372
22	Admin	0	Admin	Boardroom	10	0%	50	0	0.5	0.50	0.00	2,216	0	1,108	10	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.22	0.22	0.00	2,216	0	488	0.28	621
23	Admin	0	Admin	Boardroom	1	0%	30	0	0.03	0.03	0.00	2,216	0	66	1	Replace w/ new LED bug-eye	0%	2	0	0.00	0.00	0.00	2,216	0	4	0.03	62
24	Admin	0	Admin	>Storage	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	365	156	9	0.03	21
25	Admin	0	Admin	>A/V	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	365	156	9	0.03	21
26	Admin	0	Admin	Reception	3	0%	85	0	0.255	0.26	0.00	2,216	0	565	3	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.09	0.09	0.00	2,216	0	206	0.16	359
27	Admin	0	Admin	>Office	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.07	190
28	Admin	0	Admin	>Copy machine	2	0%	32	0	0.064	0.06	0.00	2,216	0	142	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.02	70
29	Admin	0	Admin	Hallway	1	0%	85	0	0.085	0.09	0.00	521	0	44	1	Retrofit w/ LED 2x2 troffer kit with bi-level switching	0%	23	0	0.02	0.02	0.00	521	0	12	0.06	32
30	Admin	0	Admin	Hallway	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.07	190
31	Admin	0	Admin	Hallway	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.01	0.01	0.00	8,760	0	79	0.03	289
32	Admin	0	Admin	Finance	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
33	Admin	0	Admin	Network Communication	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
34	Admin	0	Admin	File room	2	0%	59	0	0.118	0.12	0.00	1,043	0	123	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	1,043	0	53	0.07	70

35	Admin	0	Admin	GM office	3	0%	23	0	0.069	0.07	0.00	2,216	0	153	0	No Action	0%	23	0	0.00	0.07	0.00	2,216	0	0	0.07	153
36	Admin	0	Admin	Storage	2	0%	85	0	0.17	0.17	0.00	521	0	89	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	0%	23	0	0.05	0.05	0.00	521	0	24	0.12	65
37	Admin	0	Admin	Admin Assistant	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
38	Admin	0	Admin	Office	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
39	Admin	0	Admin	Human Resources	1	0%	23	0	0.023	0.02	0.00	2,216	0	51	0	No Action	0%	23	0	0.00	0.02	0.00	2,216	0	0	0.02	51
40	Admin	0	Admin	Human Resources	1	0%	23	0	0.023	0.02	0.00	2,216	0	51	0	No Action	0%	23	0	0.00	0.02	0.00	2,216	0	0	0.02	51
41	Admin	0	Admin	Mechanical-ext access	1	0%	75	0	0.075	0.08	0.00	521	0	39	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.06	30
42	ext-Admin	0	Admin	ext-Main Entry	2	0%	34	0	0.068	0.07	0.00	3,650	0	248	2	Retrofit w/ LED recessed can kit	0%	33	0	0.07	0.07	0.00	3,650	0	241	0.00	7
43	ext-Admin	0	Admin	ext-Patio (front)	8	0%	20	0	0.16	0.16	0.00	3,650	0	584	0	No Action	0%	20	0	0.00	0.16	0.00	3,650	0	0	0.16	584
44	ext-Admin	0	Admin	ext-Patio (front)	1	0%	20	0	0.02	0.02	0.00	3,650	0	73	0	No Action	0%	20	0	0.00	0.02	0.00	3,650	0	0	0.02	73
45	ext-Admin	0	Admin	ext-Patio (back)	2	0%	20	0	0.04	0.04	0.00	3,650	0	146	0	No Action	0%	20	0	0.00	0.04	0.00	3,650	0	0	0.04	146
46	ext-Admin	0	Admin	ext-Entry (rear)	1	0%	20	0	0.02	0.02	0.00	3,650	0	73	0	No Action	0%	20	0	0.00	0.02	0.00	3,650	0	0	0.02	73
47	Carports	0	Carports	Carport 1	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED area luminaire	50%	51	0	0.20	0.20	0.00	1,825	1,825	372	0.03	489
48	Carports	0	Carports	Carport 1	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED wallpack	0%	22	0	0.04	0.04	0.00	3,650	0	161	0.55	1,993
49	Carports	0	Carports	Carport 2 (main)	11	0%	295	0	3.245	3.25	0.00	3,650	0	11,844	11	Replace w/ new LED wallpack	0%	22	0	0.24	0.24	0.00	3,650	0	883	3.00	10,961
50	Carports	0	Carports	Carport 2 (main)	15	0%	59	0	0.885	0.89	0.00	3,650	0	3,230	15	Replace w/ new LED area luminaire	50%	51	0	0.77	0.77	0.00	1,825	1,825	1,396	0.12	1,834
51	Carports	0	Carports	Carport 3	1	0%	295	0	0.295	0.30	0.00	3,650	0	1,077	1	Replace w/ new LED wallpack	0%	22	0	0.02	0.02	0.00	3,650	0	80	0.27	996
52	Carports	0	Carports	Carport 3	5	0%	59	0	0.295	0.30	0.00	3,650	0	1,077	5	Replace w/ new LED area luminaire	50%	51	0	0.26	0.26	0.00	1,825	1,825	465	0.04	611
53	Carports	0	Carports	Carport 4	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED area luminaire	50%	51	0	0.20	0.20	0.00	1,825	1,825	372	0.03	489
54	Carports	0	Carports	Carport 5	1	0%	295	0	0.295	0.30	0.00	3,650	0	1,077	1	Replace w/ new LED wallpack	0%	22	0	0.02	0.02	0.00	3,650	0	80	0.27	996
55	Carports	0	Carports	Carport 5	6	0%	59	0	0.354	0.35	0.00	3,650	0	1,292	6	Replace w/ new	50%	51	0	0.31	0.31	0.00	1,825	1,825	558	0.05	734

																LED area luminaire											
56	Mobil Equipment	0	Mobile Equipment	Office	4	0%	85	0	0.34	0.34	0.00	2,086	0	709	4	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.12	0.12	0.00	1,460	626	181	0.22	528
57	Mobil Equipment	0	Mobile Equipment	Shower/Locker	1	0%	85	0	0.085	0.09	0.00	2,086	0	177	1	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.03	0.03	0.00	1,460	626	45	0.05	132
58	Mobil Equipment	0	Mobile Equipment	>RR	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,460	626	37	0.03	86
59	Mobil Equipment	0	Mobile Equipment	Electrical	4	0%	59	0	0.236	0.24	0.00	521	0	123	4	Retrofit w/ LED strip kit	0%	27	0	0.11	0.11	0.00	521	0	56	0.13	67
60	Mobil Equipment	0	Mobile Equipment	Bays	8	0%	50	0	0.4	0.40	0.00	2,086	0	834	0	No Action	0%	50	0	0.00	0.40	0.00	2,086	0	0	0.40	834
61	Mobil Equipment	0	Mobile Equipment	Work Area 1	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Replace w/ new LED strip luminaire	30%	60	0	0.24	0.24	0.00	1,460	626	350	0.00	142
62	Mobil Equipment	0	Mobile Equipment	Work Area 2	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED strip luminaire	30%	60	0	0.12	0.12	0.00	1,460	626	175	0.00	71
63	Mobil Equipment	0	Mobile Equipment	>Work Area (2)	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED strip luminaire	30%	60	0	0.12	0.12	0.00	1,460	626	175	0.00	71
64	ext-Mobil Equipment	0	Mobile Equipment	Canopy 1	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Replace w/ new LED vapor-tight	30%	18	0	0.07	0.07	0.00	1,460	626	105	0.16	387
65	ext-Mobil Equipment	0	Mobile Equipment	Canopy 2	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED vapor-tight	30%	18	0	0.04	0.04	0.00	1,460	626	53	0.08	194
66	ext-Mobil Equipment	0	Mobile Equipment	building perimeter	3	0%	458	0	1.374	1.37	0.00	3,650	0	5,015	3	Replace w/ new LED wallpack	0%	79	0	0.24	0.24	0.00	3,650	0	865	1.14	4,150
67	Cold Storage	0	Cold Storage	Dry Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
68	Cold Storage	0	Cold Storage	Dry Storage	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
69	Cold Storage	0	Cold Storage	Storage (small)	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
70	Cold Storage	0	Cold Storage	Storage (small)	2	0%	59	0	0.118	0.12	0.00	782	0	92	2	Replace w/ new LED vapor-tight	0%	18	0	0.04	0.04	0.00	782	0	28	0.08	64
71	Cold Storage	0	Cold Storage	Cold Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
72	Cold Storage	0	Cold Storage	Cold Storage	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
73	Cold Storage	0	Cold Storage	>more Cold Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
74	ext-Cold Storage	0	Cold Storage	building perimeter	4	0%	295	0	1.18	1.18	0.00	3,650	0	4,307	4	Replace w/ new LED wallpack	0%	79	0	0.32	0.32	0.00	3,650	0	1,153	0.86	3,154

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75	ext-Cold Storage	0	Cold Storage	Canopy	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED wallpack	0%	26	0	0.05	0.05	0.00	3,650	0	190	0.54	1,964
76	ext-Cold Storage	0	Cold Storage	>area 1	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED vapor-tight	50%	18	0	0.07	0.07	0.00	1,825	1,825	131	0.16	730
77	ext-Cold Storage	0	Cold Storage	>area 2	6	0%	59	0	0.354	0.35	0.00	3,650	0	1,292	6	Replace w/ new LED vapor-tight	50%	18	0	0.11	0.11	0.00	1,825	1,825	197	0.25	1,095
78	ext-Cold Storage	0	Cold Storage	>area 3	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED vapor-tight	50%	18	0	0.07	0.07	0.00	1,825	1,825	131	0.16	730
79	Tank	0	Storage (tank)	Bay	4	0%	270	0	1.08	1.08	0.00	2,086	0	2,253	4	Replace w/ new LED high-bay	30%	132	0	0.53	0.53	0.00	1,460	626	771	0.55	1,482
80	Tank	0	Storage (tank)	Bay	3	0%	30	0	0.09	0.09	0.00	8,760	0	788	3	Replace w/ new LED bug-eye	0%	2	0	0.01	0.01	0.00	8,760	0	53	0.08	736
81	Tank	0	Storage (tank)	Bay	2	0%	0	0	0.0005	0.00	0.00	8,760	0	4	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.00	-13
82	Tank	0	Storage (tank)	Electrical roomext	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
83	Tank	0	Storage (tank)	Storage-ext	4	0%	59	0	0.236	0.24	0.00	521	0	123	4	Replace w/ new LED wrap luminaire	0%	26	0	0.10	0.10	0.00	521	0	53	0.13	70
84	Tank	0	Storage (tank)	>storage	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	521	0	27	0.07	35
85	ext-Tank	0	Storage (tank)	over exterior sink	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	521	0	29	0.06	32
86	ext-Tank	0	Storage (tank)	Bay entry front	1	0%	128	0	0.128	0.13	0.00	4,380	0	561	1	Replace w/ new LED wallpack	0%	26	0	0.03	0.03	0.00	4,380	0	114	0.10	447
87	ext-Tank	0	Storage (tank)	Bay entry rear	1	0%	128	0	0.128	0.13	0.00	4,380	0	561	1	Replace w/ new LED wallpack	0%	26	0	0.03	0.03	0.00	4,380	0	114	0.10	447
88	ext-Tank	0	Carports	Carport 6	4	0%	138	0	0.552	0.55	0.00	3,650	0	2,015	4	Replace w/ new LED wallpack	0%	26	0	0.10	0.10	0.00	3,650	0	380	0.45	1,635
89	ext-Tank	0	Carports	Carport 6	2	0%	20	0	0.04	0.04	0.00	3,650	0	146	0	No Action	0%	20	0	0.00	0.04	0.00	3,650	0	0	0.04	146
90	ext-Tank	0	Carports	Carport 6	8	0%	59	0	0.472	0.47	0.00	3,650	0	1,723	8	Replace w/ new LED area luminaire	50%	51	0	0.41	0.41	0.00	1,825	1,825	745	0.06	978
91	0	0	Tents (3)	tent area	8	0%	50	0	0.4	0.40	0.00	3,650	0	1,460	0	No Action	0%	50	0	0.00	0.40	0.00	3,650	0	0	0.40	1,460
92	Operations	PO	Operations	Public Outreach	10	0%	23	0	0.23	0.23	0.00	2,477	0	570	0	No Action	0%	23	0	0.00	0.23	0.00	2,477	0	0	0.23	570
93	Operations	PO	Operations	>Office	1	0%	23	0	0.023	0.02	0.00	2,477	0	57	0	No Action	0%	23	0	0.00	0.02	0.00	2,477	0	0	0.02	57
94	Operations	PO	Operations	>Storage	3	0%	59	0	0.177	0.18	0.00	521	0	92	3	Replace w/ new LED wrap luminaire	0%	26	0	0.08	0.08	0.00	521	0	40	0.10	52
95	Operations	PO	Operations	>Storage2	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED bar kit	0%	22	0	0.04	0.04	0.00	521	0	23	0.07	39
96	Operations	IT	Operations	transition	1	0%	85	0	0.085	0.09	0.00	2,477	0	211	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	2,477	0	77	0.05	134

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97	Operations	IT	Operations	>IT storage	2	0%	85	0	0.17	0.17	0.00	521	0	89	2	Retrofit w/ LED bar kit	0%	22	0	0.04	0.04	0.00	521	0	23	0.13	66
98	Operations	IT	Operations	>IT storage	1	0%	60	0	0.06	0.06	0.00	521	0	31	1	Replace w/ new LED surfacemount luminaire	0%	24	0	0.02	0.02	0.00	521	0	13	0.04	19
99	Operations	IT	Operations	>IT-Assistant office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
100	Operations	IT	Operations	>IT-Manager office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
101	Operations	IT	Operations	>IT-Analyst office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
102	Operations	0	Operations	Hallway	4	0%	85	0	0.34	0.34	0.00	8,760	0	2,978	4	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.12	0.12	0.00	8,760	0	1,086	0.22	1,892
103	Operations	0	Operations	Hallway	5	0%	85	0	0.425	0.43	0.00	2,477	0	1,053	5	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.16	0.16	0.00	1,734	743	269	0.27	784
104	Operations	0	Operations	Hallway	3	0%	21	0	0.063	0.06	0.00	8,760	0	552	3	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	26	0.06	526
105	Operations	0	Operations	Hallway	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	30%	16	0	0.02	0.02	0.00	1,734	743	28	0.03	96
106	Operations	0	Operations	>Ice machine	1	0%	85	0	0.085	0.09	0.00	2,477	0	211	1	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.03	0.03	0.00	1,734	743	54	0.05	157
107	Operations	0	Operations	>RR-W	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	2,477	0	40	0.03	84
108	Operations	0	Operations	>RR-W	2	0%	112	0	0.224	0.22	0.00	2,477	0	555	2	Replace w/ new LED wrap luminaire	0%	50	0	0.10	0.10	0.00	2,477	0	248	0.12	307
109	Operations	0	Operations	>RR-W	3	0%	59	0	0.177	0.18	0.00	2,477	0	438	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,477	0	208	0.09	230
110	Operations	0	Operations	>RR-W	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,477	0	69	0.03	77
111	Operations	0	Operations	>>Locker	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	2,477	0	126	0.07	166
112	Operations	0	Operations	>>>Shower	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,477	0	139	0.06	154
113	Operations	0	Operations	>Breakroom	9	0%	85	0	0.765	0.77	0.00	2,477	0	1,895	9	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.28	0.28	0.00	1,734	743	484	0.49	1,411
114	Operations	0	Operations	>Breakroom	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.00	-7
115	Operations	0	Operations	>Janitor closet	1	0%	59	0	0.059	0.06	0.00	1,043	0	62	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	1,043	0	28	0.03	33
116	Operations	0	Operations	>Network closet	1	0%	75	0	0.075	0.08	0.00	521	0	39	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.06	30

117	Operations	0	Operations	>RR-M	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	2,477	0	40	0.03	84
118	Operations	0	Operations	>RR-M	2	0%	112	0	0.224	0.22	0.00	2,477	0	555	2	Replace w/ new LED wrap luminaire	0%	50	0	0.10	0.10	0.00	2,477	0	248	0.12	307
119	Operations	0	Operations	>RR-M	3	0%	59	0	0.177	0.18	0.00	2,477	0	438	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,477	0	208	0.09	230
120	Operations	0	Operations	>RR-M	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,477	0	69	0.03	77
121	Operations	0	Operations	>>Locker/Shower	6	0%	59	0	0.354	0.35	0.00	2,477	0	877	6	Replace w/ new LED wrap luminaire	0%	26	0	0.15	0.15	0.00	2,477	0	379	0.20	498
122	Operations	0	Operations	transition rear	3	0%	50	0	0.15	0.15	0.00	2,477	0	372	3	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.05	0.05	0.00	2,477	0	119	0.10	253
123	Operations	0	Operations	transition rear	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,477	0	139	0.06	154
124	Operations	0	Operations	RIFA Ops	14	0%	23	0	0.322	0.32	0.00	2,477	0	798	0	No Action	0%	23	0	0.00	0.32	0.00	2,477	0	0	0.32	798
125	Operations	0	Operations	RIFA Ops	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.04	350
126	Operations	0	Operations	>Office 1	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
127	Operations	0	Operations	>Office 1	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
128	Operations	0	Operations	>Office 2	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
129	Operations	0	Operations	>Office 2	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
130	Operations	0	Operations	>Office 3	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
131	Operations	0	Operations	>Office 3	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
132	Operations	0	Operations	>Copy machine	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
133	Operations	0	Operations	>Copy machine	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
134	Operations	0	Operations	>Office 4	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
135	Operations	0	Operations	>Office 4	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
136	Operations	0	Operations	Field Ops	14	0%	23	0	0.322	0.32	0.00	2,477	0	798	0	No Action	0%	23	0	0.00	0.32	0.00	2,477	0	0	0.32	798

137	Operations	0	Operations	Field Ops	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.04	350
138	Operations	0	Operations	>Ops Manager office	2	0%	23	0	0.046	0.05	0.00	2,477	0	114	0	No Action	0%	23	0	0.00	0.05	0.00	2,477	0	0	0.05	114
139	Operations	0	Operations	Accounting	6	0%	23	0	0.138	0.14	0.00	2,477	0	342	0	No Action	0%	23	0	0.00	0.14	0.00	2,477	0	0	0.14	342
140	Operations	0	Operations	Accounting	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.00	-7
141	Operations	0	Operations	Electrical roomext	3	0%	59	0	0.177	0.18	0.00	521	0	92	3	Retrofit w/ LED strip kit	0%	27	0	0.08	0.08	0.00	521	0	42	0.10	50
142	ext-Operations	0	Operations	Entries/perimet er	5	0%	128	0	0.64	0.64	0.00	3,650	0	2,336	5	Replace w/ new LED wallpack	0%	26	0	0.13	0.13	0.00	3,650	0	475	0.51	1,862
143	ext-Operations	0	Operations	Entries/perimet er	2	0%	30	0	0.06	0.06	0.00	3,650	0	219	0	No Action	0%	30	0	0.00	0.06	0.00	3,650	0	0	0.06	219
144	ext-Operations	0	Operations	Entries/perimet er	1	0%	31	0	0.031	0.03	0.00	3,650	0	113	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	3,650	0	58	0.02	55
145	Carports	0	Carports	Carport 7	5	0%	59	0	0.295	0.30	0.00	4,380	0	1,292	5	Replace w/ new LED area luminaire	50%	51	0	0.26	0.26	0.00	2,190	2,190	558	0.04	734
146	Parking	0	Parking	Pathway west	5	0%	295	0	1.475	1.48	0.00	3,650	0	5,384	5	Replace w/ new LED area luminaire	0%	51	0	0.26	0.26	0.00	3,650	0	931	1.22	4,453
147	Parking	0	Parking	Pathway west	1	0%	50	0	0.05	0.05	0.00	3,650	0	183	0	No Action	0%	50	0	0.00	0.05	0.00	3,650	0	0	0.05	183
148	Parking	0	Parking	between Tent/Carport6	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED area luminaire	0%	51	0	0.10	0.10	0.00	3,650	0	372	0.49	1,781
149	Parking	0	Parking	Pathway south	3	0%	50	0	0.15	0.15	0.00	3,650	0	548	0	No Action	0%	50	0	0.00	0.15	0.00	3,650	0	0	0.15	548
150	Parking	0	Parking	West/Front	4	0%	50	0	0.2	0.20	0.00	3,650	0	730	0	No Action	0%	50	0	0.00	0.20	0.00	3,650	0	0	0.20	730
151	Laboratory	0	Laboratory	Electrical-ext access	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
152	Laboratory	0	Laboratory	Mechanical-ext access	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
153	Laboratory	0	Laboratory	Mechanical-ext access	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED strip kit	0%	27	0	0.05	0.05	0.00	521	0	28	0.06	33
154	Laboratory	0	Laboratory	Mechanical Aext access	1	0%	46	0	0.046	0.05	0.00	521	0	24	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.03	15
155	Laboratory	0	Laboratory	Main Entry vestibule	2	0%	27	0	0.054	0.05	0.00	2,086	0	113	2	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.03	0.03	0.00	2,086	0	67	0.02	46

156	Laboratory	0	Laboratory	Main Entry vestibule	1	0%	21	0	0.021	0.02	0.00	0	0	0	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	0	0	0	0.02	0
157	Laboratory	0	Laboratory	>IT closet	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	2,086	0	56	0.03	67
158	Laboratory	0	Laboratory	Open area 1	1	0%	85	0	0.085	0.09	0.00	8,760	0	745	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	8,760	0	272	0.05	473
159	Laboratory	0	Laboratory	Open area 1	5	0%	85	0	0.425	0.43	0.00	2,086	0	886	5	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.16	0.16	0.00	2,086	0	323	0.27	563
160	Laboratory	0	Laboratory	Open area 1	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
161	Laboratory	0	Laboratory	Open area 1	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
162	Laboratory	0	Laboratory	>Office 1	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
163	Laboratory	0	Laboratory	>Office 2	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
164	Laboratory	0	Laboratory	>Office 3	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
165	Laboratory	0	Laboratory	Open area 2	2	0%	85	0	0.17	0.17	0.00	8,760	0	1,489	2	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.06	0.06	0.00	8,760	0	543	0.11	946
166	Laboratory	0	Laboratory	Open area 2	3	0%	85	0	0.255	0.26	0.00	2,086	0	532	3	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.09	0.09	0.00	2,086	0	194	0.16	338
167	Laboratory	0	Laboratory	Kitchen/Breakroom	6	0%	27	0	0.162	0.16	0.00	2,086	0	338	6	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.10	0.10	0.00	2,086	0	200	0.07	138
168	Laboratory	0	Laboratory	Kitchen/Breakroom	1	0%	27	0	0.027	0.03	0.00	2,086	0	56	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	2,086	0	33	0.01	23
169	Laboratory	0	Laboratory	>Riser room	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
170	Laboratory	0	Laboratory	Hallway	4	0%	85	0	0.34	0.34	0.00	2,086	0	709	4	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.12	0.12	0.00	2,086	0	259	0.22	451
171	Laboratory	0	Laboratory	Hallway	1	0%	85	0	0.085	0.09	0.00	8,760	0	745	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	8,760	0	272	0.05	473
172	Laboratory	0	Laboratory	Hallway	3	0%	21	0	0.063	0.06	0.00	8,760	0	552	3	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	26	0.06	526
173	Laboratory	0	Laboratory	Hallway	1	0%	27	0	0.027	0.03	0.00	8,760	0	237	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	8,760	0	140	0.01	96
174	Laboratory	0	Laboratory	Workroom 109	6	0%	23	0	0.138	0.14	0.00	2,086	0	288	0	No Action	0%	23	0	0.00	0.14	0.00	2,086	0	0	0.14	288
175	Laboratory	0	Laboratory	Workroom 109	6	0%	33	0	0.198	0.20	0.00	2,086	0	413	0	No Action	0%	33	0	0.00	0.20	0.00	2,086	0	0	0.20	413

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176	Laboratory	0	Laboratory	RR-W	1	0%	23	0	0.023	0.02	0.00	2,086	0	48	0	No Action	0%	23	0	0.00	0.02	0.00	2,086	0	0	0.02	48
177	Laboratory	0	Laboratory	RR-M	1	0%	23	0	0.023	0.02	0.00	2,086	0	48	0	No Action	0%	23	0	0.00	0.02	0.00	2,086	0	0	0.02	48
178	Laboratory	0	Laboratory	RIFA 110	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
179	Laboratory	0	Laboratory	RIFA 110	3	0%	33	0	0.099	0.10	0.00	2,086	0	206	0	No Action	0%	33	0	0.00	0.10	0.00	2,086	0	0	0.10	206
180	Laboratory	0	Laboratory	RIFA 110	1	0%	60	0	0.06	0.06	0.00	2,086	0	125	0	No Action	0%	60	0	0.00	0.06	0.00	2,086	0	0	0.06	125
181	Laboratory	0	Laboratory	BSL3 107A	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
182	Laboratory	0	Laboratory	>BSL3 107	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Retrofit w/ LED bar kit	0%	28	0	0.11	0.11	0.00	2,086	0	234	0.12	259
183	Laboratory	0	Laboratory	BSL2A 106	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Retrofit w/ LED bar kit	0%	28	0	0.11	0.11	0.00	2,086	0	234	0.12	259
184	Laboratory	0	Laboratory	BSL2B 103	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
185	Laboratory	0	Laboratory	BSL2B 103	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,086	0	58	0.03	65
186	Laboratory	0	Laboratory	Autoclave 104	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
187	Laboratory	0	Laboratory	Sorting Lab 101	9	0%	85	0	0.765	0.77	0.00	2,086	0	1,596	9	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.28	0.28	0.00	2,086	0	582	0.49	1,014
188	Laboratory	0	Laboratory	Sorting Lab 101	7	0%	33	0	0.231	0.23	0.00	2,086	0	482	0	No Action	0%	33	0	0.00	0.23	0.00	2,086	0	0	0.23	482
189	Laboratory	0	Laboratory	Insectary 105	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
190	Laboratory	0	Laboratory	Insectary 105	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,086	0	58	0.03	65
191	Laboratory	0	Laboratory	>room 105B	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
192	Laboratory	0	Laboratory	>room 105A	6	0%	59	0	0.354	0.35	0.00	4,380	0	1,551	6	Retrofit w/ LED bar kit	0%	28	0	0.17	0.17	0.00	4,380	0	736	0.19	815
193	Laboratory	0	Laboratory	>room 105A	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
194	Laboratory	0	Laboratory	>room 105C	6	0%	59	0	0.354	0.35	0.00	4,380	0	1,551	6	Retrofit w/ LED bar kit	0%	28	0	0.17	0.17	0.00	4,380	0	736	0.19	815
195	Laboratory	0	Laboratory	>room 105C	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
196	Laboratory	0	Laboratory	Batteries 102	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
197	Laboratory	0	Laboratory	exit vestibule	1	0%	27	0	0.027	0.03	0.00	2,086	0	56	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	2,086	0	33	0.01	23
198	Laboratory	0	Laboratory	exit vestibule	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
199	ext-Laboratory	0	Laboratory	building perimeter	13	0%	45	0	0.585	0.59	0.00	4,380	0	2,562	13	Replace w/ new LED wall-mount round	0%	15	0	0.20	0.20	0.00	4,380	0	854	0.39	1,708
200	ext-Laboratory	0	Laboratory	Entry main	2	0%	27	0	0.054	0.05	0.00	4,380	0	237	2	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.03	0.03	0.00	4,380	0	140	0.02	96
201	ext-Laboratory	0	Laboratory	Entry 1	1	0%	27	0	0.027	0.03	0.00	4,380	0	118	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	4,380	0	70	0.01	48

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202	ext-Laboratory	0	Laboratory	Entry 2	1	0%	27	0	0.027	0.03	0.00	4,380	0	118	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	4,380	0	70	0.01	48
203	ext-Laboratory	0	Laboratory	Entry 3 (by Fire entry)	2	0%	27	0	0.054	0.05	0.00	4,380	0	237	2	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.03	0.03	0.00	4,380	0	140	0.02	96
					600										477											

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Interactive Energy Savings				Energy Savings				
kW Interactive Factor	kW Saved	kWh Interactive Factor	kWh Saved	kW Demand Saved	kWh Saved	Existing Quantity	Existing Fixture Description	Proposed Action Description
0.23	0.0	0.07	48	0.25	764	12	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED recessed can kit
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	19	0.13	300	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	12	0.08	195	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	7	0.05	103	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	23	0.15	364	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	6	0.04	97	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	7	0.05	103	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	67	0.55	1,060	16	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit
0.23	0.0	0.07	11	0.02	178	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	11	0.02	178	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	9	0.02	145	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	2	0.08	35	1	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	2	0.04	37	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	9	0.02	145	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	8	0.07	128	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	24	0.20	383	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	71	0.58	1,117	8	Strip 4' - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ 2xLED tube and driver
0.23	0.2	0.07	106	0.87	1,675	12	Strip 4' - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ 2xLED tube and driver
0.23	0.0	0.07	25	0.21	398	6	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit
0.23	0.1	0.07	42	0.34	663	10	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit

0.23	0.0	0.07	4	0.03	66	1	EXIT Incandescent, (2) 15W lamp	Replace w/ new LED bug-eye
0.23	0.0	0.07	1	0.04	23	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	1	0.04	23	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	24	0.20	383	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	13	0.09	203	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	5	0.02	75	2	2X4 Troffer - Fluorescent, (1) 48", T-8 lamp, Rapid Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	2	0.08	35	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	13	0.09	203	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	20	0.04	309	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	1	0.04	18	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	5	0.08	75	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	10	0.08	163	3	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.15	69	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	54	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	54	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.06	30	1	Strip 3' - Fluorescent, (2) 36", STD lamps	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.00	7	2	Recessed Can Hi-Hat Fixture w/(1) PL 32w CF Quad Lamp	Retrofit w/ LED recessed can kit
0.00	0.0	0.00	0	0.16	584	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	73	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.04	146	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	73	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.03	489	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.55	1,993	2	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	3.00	10,961	11	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack

0.00	0.0	0.00	0	0.12	1,834	15	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.27	996	1	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.04	611	5	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.03	489	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.27	996	1	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.05	734	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.23	0.0	0.07	36	0.27	564	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	9	0.07	141	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	6	0.04	92	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.13	67	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.40	834	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.00	142	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.00	71	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.00	71	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.16	387	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.08	194	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	1.14	4,150	3	Fixture Type - Metal-Halide, 400W	Replace w/ new LED wallpack
0.23	0.0	0.07	15	0.13	232	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	4	0.10	68	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.33	0.0	0.30	66	0.14	282	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.33	0.0	0.30	-11	-0.01	-48	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.33	0.0	0.30	66	0.14	282	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.86	3,154	4	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.54	1,964	2	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.16	730	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.25	1,095	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.16	730	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.55	1,482	4	High Bay - Compact Fluorescent, (6) 42w 4-pin lamps	Replace w/ new LED high-bay
0.00	0.0	0.00	0	0.08	736	3	EXIT Incandescent, (2) 15W lamp	Replace w/ new LED bug-eye

0.00	0.0	0.00	0	0.00	-13	2	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.13	70	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.07	35	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.06	32	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.00	0.0	0.00	0	0.10	447	1	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.10	447	1	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.45	1,635	4	Fixture Type - High-Pressure Soduim, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.04	146	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.06	978	8	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.40	1,460	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.1	0.07	39	0.28	608	10	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.03	61	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.12	56	3	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	3	0.09	41	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	9	0.07	143	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	4	0.15	70	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	1	0.04	20	1	Incandescent, (1) 60W lamp	Replace w/ new LED surface-mount luminaire
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	128	0.27	2,020	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	53	0.33	837	5	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	36	0.07	561	3	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	7	0.04	103	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	11	0.07	167	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	6	0.04	90	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	21	0.15	328	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	16	0.11	246	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit

0.23	0.0	0.07	5	0.04	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	11	0.08	177	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	10	0.08	164	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	96	0.60	1,507	9	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	0	0.00	-7	1	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.23	0.0	0.07	2	0.04	36	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	2	0.07	32	1	Strip 3' - Fluorescent, (2) 36", STD lamps	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	6	0.04	90	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	21	0.15	328	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	16	0.11	246	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	5	0.04	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	34	0.25	532	6	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	17	0.13	270	3	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	10	0.08	164	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	54	0.40	852	14	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	24	0.05	374	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire

0.23	0.1	0.07	54	0.40	852	14	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	24	0.05	374	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	8	0.06	122	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	23	0.17	365	6	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	0	0.00	-7	1	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.10	50	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.51	1,862	5	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.06	219	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	55	1	Recessed Can Hi-Hat Fixture w/(2) PL 13w CF Twin Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.04	734	5	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	1.22	4,453	5	Fixture Type - High-Pressure Soduim, 250W	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.05	183	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.49	1,781	2	Fixture Type - High-Pressure Soduim, 250W	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.15	548	3	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.20	730	4	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.06	33	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.03	15	1	Strip 3' - Fluorescent, (2) 36", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	3	0.03	49	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	0	0.02	0	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	5	0.04	71	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	32	0.07	505	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	38	0.33	601	5	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign

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0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	64	0.13	1,010	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	23	0.20	361	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	9	0.08	147	6	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	2	0.01	24	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	1	0.04	18	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	31	0.27	481	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	32	0.07	505	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	36	0.07	561	3	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	7	0.01	103	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	20	0.17	307	6	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	28	0.24	441	6	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	3	0.03	51	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	51	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	9	0.08	138	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	14	0.12	220	3	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	8	0.07	134	1	Incandescent, (1) 60W lamp	No Action
0.23	0.0	0.07	9	0.08	138	2	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.15	276	4	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.15	276	4	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	9	0.08	138	2	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	4	0.04	69	1	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	69	0.60	1,082	9	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	33	0.28	514	7	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	4	0.04	69	1	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	55	0.23	870	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	55	0.23	870	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit

0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	2	0.01	24	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.39	1,708	13	Compact Fluorescent, (1) 42W lamp	Replace w/ new LED wall-mount round
0.00	0.0	0.00	0	0.02	96	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.01	48	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.00	0.0	0.00	0	0.01	48	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.02	96	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit

EXHIBIT B

Form of Annual Savings Reconciliation Report

The annual M&V report will consist of the following items:

1. Executive Summary
    a. Project background
        i. Project acceptance date
        ii. Date of any contract modifications
    b. Brief Project and ECM Description
        i. What was done and how savings are generated
    c. Summary of Proposed Savings
    d. Summary of Verified Savings
    e. Savings Adjustments
        i. Summary of any energy or cost savings adjustments used in calculations
    f. Performance and O&M Issues
        i. Impact of operating deficiencies or enhancements on generation of savings.
        ii. Impact of maintenance deficiencies on generation of savings.
        iii. Any deficiencies needed to be addressed by contractor or agency.
    g. Energy and O&M Rate Data
        i. Detail energy rates used to calculate cost savings for this period.
        ii. Provide post-acceptance performance period rate adjustment factors for energy and O&M, if used.
    h. Summary of Verified Savings to Date

2. Details for each ECM
    a. Overview of ECM, M&V Plan, and Savings Calculations
        i. Summarize the scope of work, location, and how cost savings are generated. Describe source of all savings including energy, water, O&M, and other (if applicable).
        ii. Provide an overview of M&V Activities for ECM. Explain the intent of M&V plan, including what is being verified.
        iii. Provide an overview of savings calculation methods for ECM. Provide a general description of analysis methods used for savings calculations.
    b. M&V Activities Conducted This Period
        i. Measurement equipment used.
        ii. Dates/times of data collection
        iii. Include all measured values for this period
        iv. Describe how performance criteria have been met.
        v. Detail any performance deficiencies that need to be addressed by Company or Agency

vi. Note impact of performance deficiencies or enhancements on generation of savings.

c. Verified Savings Calculations and Methodology
    i. Provide detailed description of analysis methodology used.
    ii. Detail all assumptions and sources of data, including all stipulated values used in calculations.
    iii. Details of any baseline or savings adjustments made.
    iv. Detail energy and water rates used to calculate cost savings.
        1. Provide post-acceptance performance period energy and water rate adjustment factors, if used.
    v. Detail verified savings for this energy conservation measure for performance year in.
d. Details of O&M Savings
e. Details of other savings (if applicable)
f. O&M Activities
    i. Operating Requirements
        1. Organization responsible for operation
        2. Any deficiencies found
            a. If so, what impacts on operation did they have.
    ii. Preventative Maintenance Requirements
    iii. Scheduled Maintenance Requirements
    iv. Repair and Replacement Requirements

EXHIBIT C

Certificate of Substantial Completion

Project Name: _____

Date of Substantial Completion: _____

Customer Name: _____

Project Address: _____
_____

This Certificate of Substantial Completion applies to all Work under the Contract dated _____ and any Change Order or other documents subsequently executed in relation to the Contract.

The Work to which this Certificate applies has been inspected by authorized representatives of Owner and Contractor and is hereby declared substantially complete in accordance with Contract documents.

CBSS :	_____	Customer:	_____
Print Name:	_____	Print Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Schedule 1

The Facilities

District Facilities:

- Coachella Valley Mosquito and Vector Control District: 43-420 Trader Pl, Indio, CA 92201

Schedule 2A

Scope of Work

This schedule provides the scope of work for the project conducted by Centrica Business Solutions for their client Coachella Valley Mosquito and Vector Control District (CVMVCD). The following is a documentation of the Facility Improvement Measures (FIM) that are to be implemented during this project as well as what the scope of work for each FIM will entail.

FIM Name
1 - LED Lighting Upgrades
2 – HVAC BMS Upgrade
3 – New Solar Installation
4 – Existing Solar Replacement

FIM #1: LED Lighting Upgrades

This FIM will be completed in the following facilities:

- Admin Building
- Cold Storage
- Laboratory Building
- Mobile Equipment
- Operations Building
- Tank Storage
- Carports
- Parking Lots

A. Scope of Work

a. Mechanical
   i. None
b. Controls
   i. Install title 24 Compliant Controls
c. Electrical
   i. Remove and dispose of existing light fixtures, lamps and ballasts where entire fixture is being replaced with a new LED fixture according to Section C
   ii. Remove and dispose of existing lamps and ballasts where fixture is to be retrofit with an LED kit according to Section C
   iii. Recycle existing interior lamps and ballasts in compliance with local regulations and codes
   iv. Install new LED lamps and luminaires as presented in Section C
d. Structural
   i. None
e. Commissioning
   i. Occupancy sensor programming compliant with Title 24 code

B. Scope of Services

a. Design
    i. Documents required for permitting purposes through AHJ for all sites
    ii. Title 24 approval documents for AHJ, as required for permitting
b. Implementation
    i. Pre-construction services:
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Project installation as stated in Schedule 3
    iii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer training
c. One-year workmanship warranty from date of Substantial Completion
d. Exemptions, Exclusions and Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. No modifications to existing circuits are included in this Scope of Work, including but not limited to:
        1. Relocation of fixtures, switches or circuits
        2. New conduit installation
        3. Removal of timeclocks
        4. Removal of circuit level photocells
    iii. Hazardous material abatement is excluded
    iv. Correction of unknown existing system deficiencies is excluded, including but not limited to:
        1. Electrical quality issues
    v. Cutting, patching, fireproofing and painting is excluded
    vi. Centrica Business Solutions Services assumes all electrical service is properly sized and electrical conduit is properly installed and undamaged.
    vii. Centrica Business Solutions Services assumes all work shall be conducted during 1st Shift Monday through Friday
    viii. LEED certification or evaluation is excluded
    ix. Photometric calculations are excluded
    x. Additional engineering services not listed in B.a above are excluded
    xi. Temporary facilities including but not limited to toilets, power and lighting are excluded

C. Equipment Details

Centrica Business Solutions Services will upgrade the existing fluorescent and HID lighting with LED lighting technology. Centrica Business Solutions Services will furnish and install lighting fixtures/kits for energy savings and occupancy sensors to automatically shut the lights off in certain identified areas.

The table below provides a summary of the lighting upgrades by fixture type.

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Lobby, Halls, Rooms	Emergency EXIT/bug-eye	10	4	New LED EXIT and emergency bug-eye
	Restroom, Storage	Wrap fixtures (4ft)	10	9	New 4' Wrap luminaires
	Restroom, Storage	Wrap fixtures (8ft)	8	3	New 8' Wrap luminaires
	Lobby, Halls, Rooms	Troffers on T-bar ceiling	9	18	Retrofit troffer kit
	Restroom	Cove over sink (4' strips)	8	2	Retrofit 4' 2-bar kits
	Boardroom	Fancy Pendant Strips	15	20	Rebuild w/ 2x4'tube + driver
	Network Comm room	4' Strip fixture	8	1	Retrofit strip kit
	Lobby	8" diameter recessed can	22	12	Replace with LED recessed can kit
	Boardroom, MPR	6" diameter recessed can	10	22	Replace with LED recessed can kit
	Boardroom	6" diameter recessed can	15	10	Replace with LED recessed can kit
Cold Storage	Storage	EXIT signs (radioactive)	10	2	New EXIT, requires new wiring, proper disposal
	Storage	EXIT signs	10	1	New EXIT signs
	Storage	4' Vaportight on jack-chain	14	2	new LED vaportight
	Storage	8' Strips on jack-chain	14	6	new LED strip luminaires
Laboratory	Entry, Halls, Open areas	EXIT signs	8	7	New EXIT sings
	Mechanical room	2' Wrap fixture	8	1	new LED Wrap luminaire
	Mechanical, Storage	4' Strip fixture	8	6	new LED strip luminaires
	Offices, Halls, Lab Spaces	Troffers on T-bar ceiling	8	60	Retrofit troffer kit
	Lab rooms	4' Vaportight fixtures	8	20	Retrofit 4' 2-bar kits
	Rooms, Halls	6" diameter recessed can	8	11	Replace with LED recessed can kit
Mobile Equipment	Restroom	4' Wrap fixture	8	1	new LED Wrap luminaire
	Electrical Room	4' Strip fixture on jack-chain	14	4	new LED strip luminaires
	Offices, Shower/Locker	Troffers on T-bar ceiling	8	5	Retrofit troffer kit
	Work Bays	8' Strips on jack-chain	14	8	new LED strip luminaires
Operations	Halls, Rooms	Emergency EXIT signs	10	9	New LED EXIT signs
	Offices, Storage	Wrap fixtures (4ft)	10	23	New 4' Wrap luminaires
	Restrooms	Wrap fixtures (8ft)	8	4	New 8' Wrap luminaires
	Offices, Halls	Troffers on T-bar ceiling	8	26	Retrofit troffer kit
	Restrooms, Storage	4' Strip fixtures (various)	8	16	Retrofit 4' 2-bar kits
	Janitor, Electrical room	4' Strip fixtures	10	4	Retrofit strip kit
	Restroom, Halls	8" diameter recessed can	8	6	Replace with LED recessed can kit
Storage (tank)	Bay	Emergency EXIT signs (Print)	10	3	New EXIT, requires new wiring
	Bay	Emergency bug-eye	10	2	New LED emergency bug-eye
	Bay	High-Bay (6xCFL) pendant (2')	13	13	New LED High-Bay
	Storage	4' Wrap fixture	8	6	new LED Wrap luminaire
	Electrical Room	4' Strip fixture	8	1	Retrofit strip kit

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Building Perimeter	6" diameter recessed can	22	2	Replace with LED recessed can kit
Mobile Equipment	Building Perimeter	Wallpack	12	3	Replace with LED wallpack
	Canopy area	4' Vaportight on jack-chain	15	6	Replace with LED vaportight
Cold Storage	Building Perimeter	Wallpack	14	6	Replace with LED wallpack
	Canopy area	4' Vaportight on jack-chain	10	14	Replace with LED vaportight
Storage (tank)	Building Perimeter	Wallpack	10	2	Replace with LED wallpack
	over Sink area	4' Vaportight wall-mount	6	2	Replace with LED vaportight
Laboratory	Building Perimeter	wall-mount disk	12	13	Replace with LED wall-mount luminaire
	Building Perimeter	6" diameter recessed can	11	6	Replace with LED recessed can kit
Operations	Building Perimeter	Wallpack	8	5	Replace with LED wallpack
	Building Perimeter	6" diameter recessed can	7	1	Replace with LED recessed can kit
Carports	Carport Perimeter	Wallpack	8	19	Replace with LED wallpack
	Carport Canopy	4' Vaportight wall-mount	10	47	Replace with LED vaportight
Parking	Pole, 12-foot	HID Pole fixture	12	7	Replace with LED Pole luminaire

Please note, equipment specified in the table above is contingent upon submittal and permitting acceptance.

FIM #2: HVAC BMS Upgrade

Facilities Affected

- Laboratory Building
- Admin Building
- Operations Building
- Tank Storage
- Mobile Equipment
- Cold Storage

Centrica Business Solutions Services will furnish and install a new Distech BMS System to replace the existing Johnson Control's system. Centrica will also integrate the climate control equipment from the entire site onto the BMS network so that all systems can be controlled and monitored by the BMS, where currently only the laboratory building is connected to the BMS network.

A. Scope of Work

a. Electrical
   i. Installation labor and material for the BMS control points in accordance with the design package (submittal)

b. Commissioning
   i. Startup and check out of the new control points shall be provided

B. Scope of Services

a. Design
   i. Programming of BMS with schedules and setpoints designed for energy savings and comfort

b. Implementation
   i. Project installation as stated in Schedule 3
   ii. Project Closeout:
      1. Operations and Maintenance manuals
      2. Warranty Documents
      3. Customer Training

c. User Interface that is accessible by customer with in-network computer

d. One-year workmanship warranty from date of Substantial Completion

e. Exemptions, Exclusions and Assumptions
   i. This measure has been priced with prevailing wage rates.
   ii. Hazardous material abatement is excluded.
   iii. Centrica Business Solutions Services assumes all electrical service is properly sized and electrical conduit is properly installed and undamaged
   iv. Patching, painting, or otherwise repairing walls is excluded
   v. Annual subscription fees for remote access to graphical user interface (GUI) us excluded
   vi. Centrica Business Solutions Services assumes all work shall be conducted during 1st Shift Monday through Friday
   vii. It is assumed that all HVAC units are operational (cooling, heating, and airflow). HVAC units found to have faults during BMS control point installation shall be communicated to CVMVCD representatives, but repairs are excluded from this scope of work

C. Equipment Details

Centrica Business Solutions Services will provide a comprehensive conversion of the existing Johnson Controls BMS with Distech. Below is a list of equipment that will be modified to facilitate the BMS upgrade and integration of equipment not controlled by current BMS system.

Building Name	Equipment	Proposed Action
Lab	AHU 1 & 2	New DDC controls and wiring
Lab	Heating Hot Water System	New DDC controls and wiring
Lab	Chilled Water System	New DDC controls and wiring
Lab	Fan Coil Units	New DDC controls and wiring
Lab	Exhaust Fan	New DDC controls and wiring
Lab	Mini Splits	New BACnet thermostat and I/O device in field
Lab	Thermo Scientific Freezer (-80 freezer)	New BACnet thermostat, alarm contacts, and wiring to central switch
Lab	Phoenix Lab Controls	New BMS server and wiring to existing Phoenix Controls
Lab	Rearing Rooms (walk in freezer)	Temperature monitoring and alarming
Lab	Humidifier	New thermostat and humidity sensor connected to nearest DDC controls
Admin	AC units	New controller in units and new field device for monitoring
Operations	AC units	New controller in units and new field device for monitoring
Operations	Mini Splits	New BACnet thermostat and I/O device in field
Mobile Equipment	AC units	New controller in units and new field device for monitoring
Mobile Equipment	Swamp Coolers	New BACnet thermostat and I/O device in field
Mobile Equipment	Radiant Heaters	New BACnet thermostat and I/O device in field
Cold Storage	Fan Coil Unit	New BACnet thermostat and I/O device in field
Cold Storage	Refrigeration System	New BACnet thermostat and I/O device in field
Tank Storage	AC units	New controller in units and new field device for monitoring
Tank Storage	Swamp Cooler	New BACnet thermostat and I/O device in field

FIM #3: New Solar Installation

Facility Affected

- Laboratory building
- Carports

Centrica Business Solutions Services has determined that this site is viable for solar PV on top of existing carports. The system was sized to achieve the maximum feasible production based on the site's electrical and space constraints.

The Solar PV systems will go through a detailed design process during implementation to determine the final product specifications and system sizing of the solar panels and inverters. **The system size may vary from preliminary design and expected annual production is contingent upon interconnection agreement with local utility**. The Solar PV systems will have the following characteristics:

- Tier 1 solar panels and inverters
- Solar production monitoring software
- Interconnection Agreement with utilities
- Change rate structure to Net Billing rate structure

The preliminary system size is as follows:

Site	PV Size/Type (kW DC)	Expected Annual Production
Coachella Valley Mosquito and Vector Control District	210.1 kW	326,235 kWh/yr

A. Scope of Work

a. Mechanical
   i. None

b. Controls
   i. None

c. Electrical
   i. Compliance with Imperial Irrigation District (IID) Interconnection Requirement Rules, Regulations 21, and UL 1741-SA compliant
   ii. Install positive attachment roof mounting system with associated roof protection and required seismic attachments
   iii. Install module on the module racks; run equipment ground wiring; wire DC strings to Inverters
   iv. Install Balance of System (BOS) components including switchgear (as required), AC combiner boxes (as required), disconnect switches (as required), and all wiring between electrical components

d. Structural
   i. Inspection of carport and roof structure
   ii. Structural Modifications as needed to support solar system

e. Commissioning
   i. Following installation, the system components will be tested according to manufacturer's recommendations to confirm proper functionality
   ii. Inspections by Utility Service Provider or the AHJ will be coordinated by Centrica Business Solutions Services

B. Scope of Services

a. Design
    i. A full set of California licensed structural and electrical stamped drawings for all solar PV Systems listed above, as required by the Authority Having Jurisdiction (AHJ).
b. Implementation
    i. Pre-construction services
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Procurement of all materials
    iii. Coordination with the AHJ for permits
    iv. Completion of all required field inspections and documentation.
    v. All utility interconnection application submittals and fees
    vi. Project installation as stated in Schedule 3
    vii. Installation of cloud based solar PV monitoring solution
    viii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer Training
c. Warranty service and labor within one year of substantial completion of this FIM.
d. Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. The utility has capacity to complete the utility service upgrade at time of project submittal to utility
    iii. Assumes no additional variance, historic district, special use or any other Special Permits will be required except for those defined herein. Street closure permits and police details are not included, and if needed will be presented as a change order request
    iv. All work will be performed during 1st shift Monday through Friday
    v. Re-striping as needed for accommodating carport ADA parking
e. Exemptions and Exclusions
    i. Impacts to the Work due to Concealed Conditions, or correction of such Concealed Conditions are excluded, including but not limited to:
        1. De-watering
        2. Removal of unsuitable soils
    ii. Correction, testing, or remediation of mold, fungus, mildew, or organic pathogens are excluded
    iii. Removing or repairing rot or insect infestation is excluded
    iv. Removal of, disposal of, or work involving any materials containing asbestos or any other Hazardous Conditions is excluded
    v. Moving or relocation any personal property belong to any Personal that in not Centrica or Centrica subcontractor or supplier is excluded
    vi. Painting of conduits, walls or other structural parts is excluded
    vii. Supply of a back-up lighting system for use during the installation of the System is excluded
    viii. Work at the site due to ADA requirements by the AHJ is excluded that are not listed above
    ix. Hiring of Health Safety Professional to monitor and track COVID-19

FIM #4: Existing Solar Refurbishment

Facilities Affected

- Operations Building
- Carports

Centrica Business Solutions Services has determined that this site is viable for carport solar PV replacement. The system was sized to replace the current failing solar system and regain full production of the original design.

The Solar PV systems will go through a detailed design process during implementation to determine the final product specifications and system sizing of the solar panels and inverters. **The system size may vary from preliminary design and expected annual production is contingent upon interconnection agreement with local utility**. The Solar PV systems will have the following characteristics:

- Tier 1 solar panels and inverters
- Solar production monitoring software
- Interconnection Agreement with utilities
- Continued rate structure of Net Energy Metering rate

The preliminary system sizes are as follows:

Site	PV Size/Type (kW DC)	Expected Annual Production
Coachella Valley Mosquito and Vector Control District	168.5 kW	254,873 kWh/yr

A. Scope of Work

a. Mechanical
   i. Decommissioning and demolition of existing solar carport system
   ii. Recycling and disposal of all waste from demolition
b. Controls
   i. None
c. Electrical
   i. Compliance with Imperial Irrigation District's Interconnection Requirement Rules, Regulations 21 and UL 1741-SA compliant
   ii. Install ballasted roof mounting system with associated roof protection and required seismic attachments
   iii. Install module on the module racks; run equipment ground wiring; wire DC strings to Inverters
   iv. Install Balance of System (BOS) components including switchgear (as required), AC combiner boxes (as required), disconnect switches (as required), and all wiring between electrical components
d. Structural
   i. Inspection of carport structure
   ii. Structural Modifications as needed to support solar system

e. Commissioning
    i. Following installation, the system components will be tested according to manufacturer's recommendations to confirm proper functionality
    ii. Inspections by Utility Service Provider or the AHJ will be coordinated by Centrica Business Solutions Services

B. Scope of Services

a. Design
    i. A full set of California licensed structural and electrical stamped drawings for all solar PV Systems listed above, as required by the Authority Having Jurisdiction (AHJ).
b. Implementation
    i. Pre-construction services
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Procurement of all materials
    iii. Coordination with the AHJ for permits
    iv. Completion of all required field inspections and documentation
    v. All utility interconnection application submittals and fees
    vi. Project installation as stated in Schedule 3
    vii. Installation of cloud based solar PV monitoring solution
    viii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer Training
c. Warranty service and labor within one year of substantial completion of this FIM.
d. Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. The existing electrical service is capable of being back fed and no major upgrades are required, and interconnection will be made using a supply-side connection in the existing switchgear that is in compliance with NEC requirements
    iii. Assumes no additional variance, historic district, special use or any other Special Permits will be required except for those defined herein. Street closure permits and police details are not included, and if needed will be presented as a change order request
    iv. All work will be performed during 1st shift Monday through Friday
    v. Re-striping as needed for accommodating carport ADA parking
e. Exemptions and Exclusions
    i. Impacts to the Work due to Concealed Conditions, or correction of such Concealed Conditions including but not limited to:
        1. De-watering
        2. Removal of unsuitable soils
        3. Structural modification to existing roofing
    x. Correction, testing, or remediation of mold, fungus, mildew, or organic pathogens.
    xi. Removing or repairing rot or insect infestation

xii. Removal of, disposal of, or work involving any materials containing asbestos or any other Hazardous Conditions
xiii. Moving or relocation any personal property belong to any Personal that in not Centrica or Centrica subcontractor or supplier
xiv. Painting of conduits, walls or other structural parts
xv. Supply of a back-up lighting system for use during the installation of the System
xvi. Work at the site due to ADA requirements by the AHJ is excluded that are not listed above
xvii. Hiring of Health Safety Professional to monitor and track COVID-19

SCHEDULE 2B

SCOPE OF MM&V AND O&M SERVICES

The date of the commencement of Contractor's obligations under the MM&V Services Phase shall be the same as the date of Substantial Completion under Exhibit 2 ("MM&V Services Commencement Date").

For each year of the MM&V Term after the MM&V Services Commencement Date, within sixty (60) days of the anniversary date of the MM&V Services Commencement Date, Contractor shall provide Owner with an annual energy savings guarantee reconciliation report that calculates annual energy savings according to the Energy Savings Methodologies defined in the "Energy Savings Schedule" below ("Savings Reconciliation Report"). Contractor will provide Owner with an explanation as to any variations between annual energy savings and the Guaranteed Energy Savings (as hereinafter defined). The Savings Reconciliation Report shall initially be submitted by Contractor to Owner in draft form whereupon Contractor and Owner shall use their best efforts to resolve any discrepancies in the report as soon as possible so as to arrive at mutually acceptable Savings Reconciliation Report. Contractor and Owner will indicate their acceptance of the Savings Reconciliation Report by signing at the end thereof.

Contractor has formulated and hereby guarantees the energy and operations savings (the "Guaranteed Energy Savings") to be achieved as a result of the installation and operation of the Scope of Work and the provisions of the MM&V services. The amount of the Guaranteed Energy Savings is subject to modification based upon i) changes in the Scope of Work after the Effective Date, ii) changes in the MM&V services after the Effective Date, and iii) changes to proposed material, and the Parties shall reflect all such modifications by revising accordingly the Guaranteed Energy Savings and any other applicable portions of the Energy Savings Schedule.

Commencing with the first twelve (12) month period following the MM&V Services Commencement Date, and for each twelve (12) month period within the MM&V Term thereafter, where the energy savings, as calculated using the method defined in the Energy Savings Schedule, are less than the Guaranteed Energy Savings, Contractor agrees to pay to Owner the difference between the Guaranteed Energy Savings and the sum of the actual energy savings as calculated. Contractor will make any such Guaranteed Energy Savings payment within ninety (90) days of the date of Owner's acceptance of the Savings Reconciliation Report.

Owner shall not move, remove, modify, alter, or change the Equipment or any part thereof ("Alterations") in any way without the prior written approval of Contractor, except in the event of a *bona fide* emergency where it is not reasonably possible to notify Contractor before carrying out Alterations. In the event of such an emergency, Owner shall take reasonable steps to protect the Equipment from damage or injury, shall follow any instructions for emergency action provided in advance by Contractor, and shall notify Contractor within three (3) business days of such emergency. Any telephonic notice of such emergency shall be followed within one (1) business day by written notice to Contractor from Owner. Owner agrees to maintain the facilities in good repair and to protect and preserve all portions thereof that may in any way affect the operation or maintenance of the Equipment.

In the event that any actions of Owner, including but not limited to the carrying out of Alterations, affect the performance of the Equipment, the Guaranteed Energy Savings shall be adjusted to reflect the impact of such actions. If Owner unreasonably delays in notifying Contractor of changes resulting from an

emergency and/or Owner does not receive written approval to carry out Alterations, all Guaranteed Energy Savings obligations of Contractor shall automatically cease and be of no further force or effect.

At all times during the MM&V Term, Contractor shall have the right, subject to Owner's prior written approval, which approval shall not be unreasonably withheld, to change the Equipment or any related energy automation management systems, revise any procedures for the operation thereof, and/or implement other energy saving actions in the facilities, provided that: (i) such modifications are necessary, in Contractor's reasonable judgment, to enable Contractor to achieve the Guaranteed Energy Savings at the facilities, and (ii) any cost incurred relative to such modifications, additions or replacement of the Equipment, or operational changes or new procedures shall be the responsibility of Contractor. All such modifications, additions or replacements of the Equipment or revisions to operating or other procedures shall be described in a supplemental schedule to be provided to Owner.

Section 1: MM&V Scope of Work

Table 1: Year 1 Total Energy Savings

FIM	Electric Usage Savings (kWh/yr)	Gas Usage Savings (Therms/yr)
1 – Lighting Upgrades	74,258	
2 – HVAC BMS Upgrade	28,500	453
3 – New Solar PV Installation	287,739	
4 – Existing Solar PV Replacement	168,006	
Total	**558,504**	**453**

REPAIR AND REPLACEMENT SAVINGS. Table 2 identifies the annual repair and replacement savings throughout the project term. The Repair & Replacement savings are associated with the annual material replacement savings associated with replacing the existing lighting with long-life LED lighting. The annual repair and replacement savings will be $3,208 for Year 1 and will be escalated annually for the remainder of the term. Repair and replacement savings are stipulated and shall not be measured or guaranteed.

UTILITY ESCALATION RATES. Annual energy savings are escalated using the following annual escalation factors:

Escalation Factor	Rate of Escalation
Electric Cost Escalation Rate	4.0%
Natural Gas Cost Escalation Rate	3.0%
Maintenance & Replacement Cost Escalation Rate	2.0%

TOTAL ANNUAL COST SAVINGS. The total annual savings for each year of the MM&V term applying the applicable escalation rates is provided in Table 2. The savings for the solar PV systems include a degradation rate of 2% for Year 1 and 0.6% for all subsequent years. The energy cost savings are calculated by multiplying the energy savings by the baseline rates described in section Baseline: Energy and Operating Conditions. The savings guarantee does not operate to guarantee the savings per FIM. Rather, the calculation of savings is based on aggregate performance of all FIMs contained in the project.

Table 2: Energy Savings Schedule for Contract Term

Annual Period	Guaranteed Utility Cost Savings	Stipulated Repair & Replacement Cost Savings	Total Savings
Year 1	$ 72,076	$ 3,268	$ 75,344
Year 2	$ 74,613	$ 3,333	$ 77,946
Year 3	$ 77,239	$ 3,400	$ 80,639
Year 4	$ 79,958	$ 3,468	$ 83,426
Year 5	$ 82,773	$ 3,537	$ 86,311
Year 6	$ 85,688	$ 3,608	$ 89,296
Year 7	$ 88,707	$ 3,680	$ 92,387
Year 8	$ 91,832	$ 3,754	$ 95,586
Year 9	$ 95,068	$ 3,829	$ 98,897
Year 10	$ 98,419	$ 3,906	$ 102,324

Baseline: Energy and Operating Conditions

BASELINE PERIOD. The baseline period is May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas.

BASELINE UTILITY CONSUMPTION. Twelve months of utility data were compiled for electricity and natural gas for the buildings in the project. The annual utility baseline data is summarized in Table 3.

Table 3: Baseline Utility Usage Summary

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (Therms/yr)
Lab Meter (5DY3B-203687)	361,500	
Net Meter (5DY3BPV-200024)	209,440	
Gas Meter		3,366

BASELINE UTILITY RATES. The utility rates presented in Table 4a are the current rates for distribution and supply of utilities at the time of this agreement and shall be used to calculate savings associated with the reduction of electricity in Year 1. After Year 1, these stipulated utility rates shall be increased by the utility escalation rates described in section Utility Escalation Rates to calculate the savings in each subsequent year after Year 1.

Table 4a: Baseline Utility Rates

Facility	Electricity Rate ($/kWh)	Natural Gas Rate ($/Therm)
Lab Meter (5DY3B-203687)	$0.1688	
Net Meter (5DY3BPV-200024)	$0.1624	
Gas Meter (16293456)		$1.70

The utility avoided utility cost rates presented in Table 4b are the current rates for solar PV production at the time of this agreement and shall be used to calculate savings associated with the avoided electricity usage in Year 1. After Year 1, these stipulated utility rates shall be increased by the utility escalation rates described in section Utility Escalation Rates to calculate the savings in each subsequent year after Year 1.

Table 4b: Baseline Avoided Utility Cost Rates for Solar PV Systems

System	Avoided Cost Rate ($/kWh)
FIM 3 - Solar PV Installation	$0.1298
FIM 4 - Solar PV Replacement	$0.1011

Baseline Operating Conditions. Baseline operating conditions provide a summary of the building use, equipment and operating modes during the baseline period. No significant changes are expected related to these conditions; however, if a change occurs in these conditions, the baseline energy usage may be adjusted (permanently or temporarily).

Table 5: Baseline Operating Conditions

Building	Address	Square Footage/ Park Acreage	Weekday Operating Schedule	Weekend Operating Schedule
Coachella Valley Mosquito Vector Control District	43-420 Trader Place, Indio, CA 92201	440,000 ft^2	5am – 5pm Monday - Friday	Not Operating

INDEPENDENT VARIABLES. Independent variables include factors that can affect a facility's energy consumption. The most influential independent variable is typically weather. A safety factor has been applied to the energy calculations to minimize the effect of likely changes to independent variables. If a change occurs that is outside the range accounted for by the safety factor, however, a routine adjustment to the baseline energy usage may be done to fairly represent this.

The relevant weather data and other independent variables associated with the energy savings calculations can be found below in the individual MM&V Method by FIM.

STATIC FACTORS. Static factors are components of the energy savings calculations that are not subject to change during the measurement and verification period. Within this document they are referred to as "Stipulated Parameters". An example of a stipulated parameter is often equipment and/or facility operating hours. These parameters were either measured or assumed during the investment grade audit and are non-variable from the baseline to the proposed energy consumption periods. If changes to the stipulated parameters are reported by the Owner to have occurred, a non-routine savings adjustment may be performed to represent this. If the change in the stipulated parameter cannot be adequately quantified, or the adjusted savings impacts the total project savings such that a savings shortfall were to occur, Centrica may return the parameter to its stipulated value outlined in this document and calculate the actual energy savings with said value.

The relevant operating hours and other stipulated parameters associated with the energy savings calculations can be found below in the individual MM&V Method by FIM.

MM&V Plan

MM&V PLAN OVERVIEW.

The purpose of the Monitoring, Measurement and Verification (MM&V) Plan is to identify the methods, measurements, procedures, and tools that will be used to verify the savings for each FIM. Savings are determined by comparing baseline usage and cost against the post FIM implementation usage and costs.

Measurement and verification of energy savings will be based on the International Performance Measurement and Verification Protocol (IPMVP) Option A - Retrofit Isolation: Key Parameter. This plan was developed by Steve Rickels, Certified Measurement & Verification Professional (CMVP).

Option A - Retrofit Isolation: Key Parameter Measurement. Savings are determined by field measurement of the key performance parameter(s) which define the energy use of the ECMs affected system(s) and/or the success of the Project. Measurement frequency ranges from short term to continuous, depending on the expected variations in the measured parameter and the length of the reporting period. Parameters not selected for field measurement are estimated.

Option B – Retrofit Isolation or System Level Approach: All Parameter Measurement. Savings are determined by field measurement of all parameters affected by the ECM. No parameter estimations will be made to determine the energy savings of the ECM. Measurements can be short term or continuous, depending on the expected variations in the measured parameters and the length of the reporting period.

Option C – Whole Facility: Savings are determined by measuring energy use at the whole facility or sub-facility level. Continuous measurements of the entire facility's energy use are taken annually throughout the reporting period. All changes that occur in the facility or sub-facility are captured in this measurement. Periodic inspections of the facility may be required to document the operating conditions and any changes that occur in the facility.

Option D – Calibrated Simulation: Savings are determined by modeling a ECM in computer software that has been calibrated to the facilities conditions. Simulations can be done for an entire facility affected by multiple ECMs or it can be done for a single ECM. Simulations will require calibration to the facilities utility bills or metering data to ensure accuracy. All assumptions and inputs for the model will need to be carefully documented.

Stipulation – This approach is intended for ECMs where end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are assumed and are used in a calculation or analysis method that has stipulated the savings outcome.

Table 6 provides an overview of the key parameters to be analyzed and their frequency. The MM&V schedule is broken down into two frequency types:

1. First Year Measurements – to be completed in the first MM&V period only
2. Annual Measurements – to be conducted in every year of the MM&V term

Table 6: MM&V Key Parameters, Option, and Frequency

Facility Improvement Measure	MM&V Option	Key Parameter(s)	First Year	Annual
1 – Lighting Upgrades	A	Fixture Power Measurements	Yes	No
2 – BMS Upgrade	A	Annual Hours of Operation	Yes	Yes
3 – New Solar Installation	A	Solar Production Monitoring	Yes	Yes
4 – Existing Solar Replacement	A	Solar Production Monitoring	Yes	Yes

M&V METHOD BY FIM

FIM-1: Lighting Upgrades

Centrica Business Solutions Services will replace the existing lighting with LED lighting technology equipped with occupancy controls where applicable and required by code. Centrica Business Solutions Services will furnish and install lighting and occupancy sensors to automatically turn off the lights where applicable. Energy savings have not been included for occupancy-based control of fixtures.

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured will be power draw of a representative sample of post-implementation fixtures. MM&V services for this measure will be performed in Year 1 only, after which the savings will be
stipulated and agreed upon by the Customer for the remaining term of the contract.

Pre-FIM Measurements

1. Count of existing fixture types (Appendix C of Exhibit A)
2. Lighting operating hours by space type

Post-FIM Measurements

1. Count of each fixture type
2. Identification and documentation of each fixture type
3. Fixture wattage for a representative sample
4. Visual inspection of all units and verification of wattage rating by referencing specification sheets for each fixture type not included in the representative sample

Sample Size for Power Measurements.

Post-FIM power will be measured for fixture types that make up at least 75% of the energy savings. Estimated sample sizes for these fixture types assume a coefficient of variation (Cv) of 0.1, 10% Precision, and 90% Confidence are shown in the table that follows.

Stipulated Parameters

1. Baseline and post install hours of operation for each facility/ facility usage type (Appendix C of Exhibit A)
2. Baseline fixture wattages (Appendix C of Exhibit A)
3. Post install fixture wattages for fixtures types not included in sample (Appendix C of the Exhibit A)

The table below summarizes the stipulated lighting operating hours by building type or usage group that have been agreed upon by the Customer.

Lighting Operating Hours by Fixture Type

Fixture Type	Hours / Year
New small wallpack	3,650
New flood	2,095
Retrofit 2x4 troffer kit	2,749
New large wallpack	3,650
New medium wallpack	3,762
Retrofit 4' bar kit HO	2,838
New vapor-tight	1,631
Retrofit 2xLED tube and driver	2,216
New 4' wrap	1,392
Retrofit 8" recessed can	2,216
New round wall-mount	4,380
New high-bay	1,460
Retrofit 6" recessed can	3,069
New 8' wrap	1,933
New 8' strip	1,728
Retrofit 8" recessed can HO	1,851
Retrofit 2x4 troffer kit LO	1,208
Retrofit 2x2 troffer kit	2,086
New 4' strip	1,734
Retrofit 4' strip kit	652
Retrofit 4' bar kit	865
New 2' wrap	521
New surface-mount	521

Savings Calculation Method

The average post installation wattage measured for each fixture type that make up 75% of the lighting savings were applied to the Post Install Fixture Wattages variable in the Post Install kW equation below to calculate realized energy savings. Appendix C of Exhibit A provides a summary of the retrofitted fixtures (as-built) for each space affected. The annual energy usage and cost savings are calculated using the following equations for each space.

$$kWh\ Savings\ =\ (Baseline\ kWh\ -\ Post\ Install\ kWh)$$

$$Baseline\ kW\ =\ \left(\frac{Fixture\ Count\ *\ \text{Baseline}\ Fixture\ Wattages}{1000}\right)$$

$$Baseline\ kWh\ =\ (Baseline\ KW\ *Hours\ of\ Operation)$$

$$Post\ Install\ kW\ =\ \left(\frac{Fixture\ Count\ *\ Post\ Install\ Fixture\ Wattages}{1000}\right)$$

$$Post\ Install\ kWh\ =\ (Post\ Install\ KW\ *\ Hours\ of\ Operation)$$

$$Cost\ Savings\ =\ (kWh\ Savings\ *\ \frac{\$}{kWh}\ Rate)$$

FIM-2: BMS Upgrade

Completion of this FIM includes the following energy efficiency measures:

- FIM 2A: Fan VFD Controls
- FIM 2B: Adjust Space Temperatures
- FIM 2C: Adjust Schedules

FIM 2A – Fan VFD Controls

Contractor will reduce laboratory air handling unit (AHU) fan motor operating speed by altering control sequences to allow for a reduction of fan speed based on space conditions, schedules, and setpoints.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Laboratory

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings for each item.

Overview of MM&V Activities

The key parameter to be measured will be the annual hours of operation of the VFD fan motors using the equipment data logged by newly installed BMS system. MM&V services for this measure will be performed annually for the term of the project.

In the event the annual data cannot be obtained from the BMS system, and the Customer is unable to provide the annual data, the savings for this FIM will be stipulated.

Baseline FIM Measurements

1. Survey of existing Air Handling Unit motors (Appendix B of Exhibit A)
2. Motor operating hours via BMS schedules and staff interviews (Appendix B of Exhibit A)

Post Installation FIM Measurements

1. Trended annual fan operating hours and fan speed via upgraded BMS (continuous annual data based on change of state). Data will be collected continuously and reviewed on an annual basis.

Stipulated FIM Parameters

1. Motor Size in Horsepower (Table 2.1)
2. Fan Part Load Factor – percentage of full load HP the motor runs at on average (40% of maximum load) (correlated to outside air temperatures from TMY 3 data)
3. Motor Efficiency (Table 2.1)

The stipulated parameters are utilized for variables that do not vary as a result of the changes made to the system. For example, the motor is not being changed and its size, load factor, and efficiency are not affected by reducing the motor run hours.

Table 2.1 summarizes the stipulated motor horsepower based on NEMA Premium Efficient motors utilizing the Department of Energy Motor Master database program Version 1.1.0.

Table 2.1: Motor Efficiency Summary by Motor Size

Motor Size (HP)	Efficiency
1	90%
5	90%

Savings Calculation Method

The average post installation operating hours measured for each fan were applied to the Post Install Operating Hours variable in the Post Install kWh equation below to calculate realized energy savings. A detailed AHU motor summary is provided in Appendix B of Exhibit A. To calculate energy and cost savings the following equations applied to the equipment in Appendix B of Exhibit A shall be used:

$$kWh\ Savings\ = Baseline\ kWh - Post\ Install\ kWh$$

$$Baseline\ kWh = \frac{Motor\ HP\ x\ Load\ Factor\ x\ 0.746 \frac{kW}{HP} x\ Baseline\ OperatingHours}{Motor\ Efficiency}$$

$$Post\ Install\ kWh = \frac{Motor\ HP\ x\ Load\ Factor\ x\ 0.746 \frac{kW}{HP} x\ Post\ Install\ Operating\ Hours}{Motor\ Efficiency}$$

$$Cost\ Savings\ = (kWh\ savings\ * \frac{\$}{kWh}\ Rate)$$

FIM 2B – Adjust Lab Space Temperatures

Contractor will adjust space temperatures to global setpoints agreed upon by the Customer using the upgraded Building Management System (BMS) as specified in Exhibit A Section 4.2.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Laboratory

MM&V Option

The energy savings for this measure will be stipulated. The energy savings for this measure represent less than 3% of the total project utility savings, therefore stipulating the savings for this FIM is the best value for the Customer. No MM&V activities will be performed for this FIM.

Stipulated Parameters

The annual electric energy savings will be stipulated to 4,146 kWh/yr and the annual natural gas savings will be stipulated to 458 therms/yr.

FIM 2C – Adjust Facility Schedule

Contractor will adjust space schedules agreed upon by the Customer using the upgraded Building Management System (BMS) as specified in Exhibit A Section 4.2.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Administration Building
- Operations Building
- Cold Storage
- Mobile Equipment
- Tank Storage

M&V Option

The energy savings for this measure will be stipulated. The energy savings for this measure represent less than 1% of the total project utility savings, therefore stipulating the savings for this FIM is the best value for the Customer. No MM&V activities will be performed for this FIM.

Stipulated Parameters

The annual electric energy savings will be stipulated to 888 kWh/yr and the annual natural gas savings will be stipulated to -5 therms/yr.

FIM-3: New Solar Installation

Centrica Business Solutions Services will install a new 210.1 kW DC roof mounted solar system connected to the laboratory meter as described in Schedule 2A.

MM&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured post-installation will be the annual electric (kWh) production of the PV system using the newly installed web-based monitoring system. MM&V services for this measure will be performed annually for the term of the contract.

Baseline FIM Measurements

1. Electric consumption for the facilities involved based on provided data from Imperial Irrigation District Utilities for the time period of May 2022 – April 2023.

Post Installation FIM Measurements

1. Annual electric (kWh) production for each PV system using the web-based monitoring system.

Savings Calculation Method

Energy savings are determined by the energy generation for each PV system as indicated in the equation below for each year of the term.

$$kWh\ Savings = Annual\ electric\ (kWh)\ production$$

$$Cost\ Savings = kWh\ Savings\ \times \left(\frac{\$}{kWh}\right) Avoided\ Cost\ Rate$$

FIM-4: Existing Solar Replacement

Centrica Business Solutions Services will replace the existing solar system and install a new 168.5 kW DC roof mounted solar system connected to the Net meter as described in Schedule 2A.

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured post-installation will be the annual electric (kWh) production of the PV system using the newly installed web-based monitoring system. MM&V services for this measure will be performed annually for the term of the contract.

Baseline FIM Measurements

1. Electric consumption for the facilities involved based on provided data from IID Utilities for the time period of May 2022 – April 2023.

Post Installation FIM Measurements

1. Annual electric (kWh) production for each PV system using the web-based monitoring system.

Stipulated Parameters

The existing solar PV system production will be stipulated at 64,390 kWh/yr as determined in Section 4.4 of Exhibit A.

Savings Calculation Method

Energy savings are determined by the additional energy production of the newly installed PV system compared to the existing solar PV system as indicated in the equation below for each year of the term.

$$kWh\ Savings\ = New\ PV\ System\ Production - Existing\ PV\ System\ Production$$

$$New\ PV\ System\ Production\ = New\ PV\ System\ Annual\ Electric\ (kWh)\ Production$$

$$Annual\ Cost\ Savings\ = kWh\ Savings\ \times \left(\frac{\$}{kWh}\right) Avoided\ Cost\ Rate$$

Section 2: O&M Service Scope of Work

FIM # 1 – Lighting Upgrade Annual Maintenance

This FIM will not have any annual service conducted.

FIM # 2 – BMS Upgrade Annual Maintenance

TERM

This Support Services Agreement, ("Agreement, Services") will be effective upon Provider signature date.

Once signed by both parties, this agreement will be effective for:

- Two (2) physical site visits of eight (8) hours each visit
- Ten (10) hours of remote support via Owners provided VPN access

TOTAL PRICE

Centrica agrees to provide the support services outlined in this proposal at a not-to-exceed price of:

- Six Thousand four Hundred Dollars and No Cents ($6,400)

"Additional Services" not listed in "Scope of Services" can be provided subject to the terms defined in this document at the applicable rates provided under Description of Services. All invoicing for Services performed will include a copy of the Site Support Services Report ("Customer Invoice") summarizing hours and services performed. All payments are due within thirty (30) days of invoicing.

Description of Services:

Agreement Overview

This Support Services Agreement is to provide maintenance and service of the existing control system, correcting control issues, training staff, and assisting with other controls related tasks listed under "Scope of Services". Any software or hardware required to correct issues or maintain the system in peak operating condition not under warranty will be provided by the "Owner" or quoted and then billed by the "Provider". Additional material or labor services not listed in "Scope of Services" requires an "Owner" provided purchase order separate from this Agreement and requires approval by "Owner" representative prior to procurement.

Scope of Services:

- Building Automation System - Maintenance
    - System Backups
    - System Review
    - Update Control Drawings as required to reflect field changes or additions
    - Customer Training
- Building Automation System – Service Calls
    - Troubleshooting control system issues to determine point of failure

- Field inspection of controls hardware components and wiring
- Replacement of failed controls components or controls hardware under warranty or billed under a separate Quote for non-warranty items.
- Provide written daily report of services provided

Requirements and Clarifications:

- CVMVCD will own and maintain Control system access levels for CVMVCD employees
- CVMVCD is to provide Centrica remote access to the onsite BMS server
- CVMVCD will provide reasonable access to buildings for site work as required
- All "Support Service Agreement" work will be performed during "Normal Working Hours" (7AM to 5PM Mon-Fri, PST)
- Overtime rate is 1.5 times the rate in the "Labor Description" table
- Holiday rate is 2.0 times the rate in the "Labor Description" table
- Services provided outside of normal working hours will be billed at a minimum of four (4) hours
- Equipment warranties are not provided by this Agreement
- No software, software licensing or software upgrades will be provided as part of this Agreement
- Hardware or field components not under warranty and Labor to replace will be provided under separate "Provider" Quote and require a "Owner PO" to proceed
- Administrative and Project Management labor to be billed at Controls Technician rate

Additional Labor Rates:

Requests for Additional Services or Labor billed outside normal business hours will be provided at the following rates and will be initiated by written request for support by CVMVCD management. CBSS is guaranteed a minimum of (4) technician hours per site visit.

LABOR DESCRIPTION	PRICE EACH
CBSS Controls Technician – As Needed Straight Time labor (pre-scheduled)	**$200.00/ HR**
3rd Party Controls Technician – As Needed Straight Time labor (pre-scheduled)	**$250.00/ HR**
CBSS Controls Technician – Overtime Time labor (Emergency Service)	**$300.00/ HR**
CBSS Controls Technician – Holiday Time labor (Emergency Service)	**$400.00/ HR**
Site Visit – for each onsite representation For CBSS technician or 3rd party controls technician	**$585.00 /Per Visit**

FIM # 3 and 4 – New Solar Photovoltaic and Existing Solar Photovoltaic Array Replacement Annual Maintenance

Schedule 1

(Scope of Services in respect of each System)

[#] of Solar PV Inspections (per annual term), included in Annual O&M Fee: **One (1)**

[#] of Module Washing services (per annual term), included in Annual O&M Fee: **Two (2)**

[#] of Thermal Aerial Inspections (per annual term), included in Annuals O&M Fee: **Zero (0)**

Water access **___X___ WILL** / _____ WILL NOT be provided on-site (by Owner) for module cleaning.

1. Solar Preventative Maintenance Inspection

- PV Modules and DC Electrical System
    - Onsite IR Inspections – DC
        - **DC Combiners and Disconnects**. Open combiners, inspect for discoloration, signs of arcing or faults, defects, missing or blown fuses. Capture IR images of combiners and DC disconnects. Re-torque any connections displaying high resistance heat (if possible). Capture before and after IR images of any corrective actions.
    - Visual Inspections and Maintenance – DC
        - **Arrays.** Inspect arrays for soiling, evidence of pest infestation, water pooling, vegetation growth, shading or damage. Photo-document general condition of each array, noting location of any issues requiring remediation beyond PM visit time allocation.
        - **Racking Structures, Ballast Blocks.** Inspect for mechanical integrity, corrosion, settling, damage, pest infestation, and any condition impacting safety, performance or serviceability. Photo-document general conditions and any abnormalities.
        - **DC Combiners, Disconnects and Raceways.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or pest infestation. Verify proper operation of DC disconnects.
        - **Modules.** Inspect for integrity of electrical and ground connections, wire management, visible defects or damage, and proper and secure attachment to racking structures or trackers. Photo-document any damaged modules, noting locations and serial numbers

        - **Grounding System.** Inspect grounding system connections for mechanical and electrical integrity, corrosion, and damage. Spot check torques.

    - Testing – DC

        - **Grounding System.** Perform electrical resistance testing to verify continuity of grounding systems on all major equipment. Measure current on ground conductors and test for ground faults.

        - **DC-Side Surge Protection Devices.** Determine status of SPDs through visual inspection or electrical testing as required by device manufacturer. Note deficiencies in service report.

- Inverters and AC Electrical System

    - Onsite IR Inspections – AC

        - **Inverters - IR Inspection.** Open inverter termination cabinets, inspect for discoloration, signs of arcing or faults, and defects. Capture IR images of inverter terminations. Re-torque any connections displaying high resistance heat (if possible). Capture before and after IR images of any corrective actions.

        - **AC Panels and Disconnects.** Capture IR images of AC Panels and Disconnects. Note any connections displaying high resistance heat. Capture before and after IR images of any corrective actions.

    - Visual Inspections and Maintenance – AC

        - **Inverters - Visual Inspection.** Inspect enclosures for corrosion, damage, mechanical integrity, and evidence of overheating, moisture intrusion, or pest infestation. Inspect inverter display screens for cracking or evidence of thermal fatigue. Verify proper operation of inverter circuit breakers. Verify fan operation, filter condition, and proper cooling airflow. Clean fans, heat sinks, and clean or replace filters as necessary to ensure optimal cooling. Photo-document each inverter during inspection, and before and after any corrective actions.

        - **Inverters - Warranty Preservation.** Perform all inspections and preventative maintenance procedures required by the manufacturer. Adequately document required inspections & service procedures to preserve inverter warranties.

        - **AC Panels, AC Disconnects and Raceways.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or pest infestation. Verify proper operation of AC disconnects and breakers.

    - Testing – AC

        - **Surge Protection Devices - AC.** Determine status of SPDs through visual inspection or electrical testing as required by device manufacturer and replace any that are faulted.

- Data Acquisition System and Instrumentation

- **DAS Equipment.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or animal nesting.

- **Meteorological Stations, Reference Cells and Soiling Stations.** If present, visually inspect sensor clusters and/or reference cells to verify secure mounting and free of debris and obstructions. Clean the dome or window of irradiance sensors per the manufacturer's recommended procedure even if there is no apparent soiling. If a soiling station is installed, wash the "clean" module and photo-document the station.

- **Module Temperature Sensor.** Inspect back of module temperature sensor to ensure proper and secure attachment. Re-attach sensor if improperly secured.

- Site Maintenance

  - **Roof & Site Condition Monitoring.** Inspect and photo-document general condition of roof surfaces including debris, drainage, pooling and staining, degradation of roofing materials, racking wear pads, and flashings. Inspect site for vegetation growth or accumulation which could shade arrays and impact PV production.

  - **Pest Infestations.** Inspect and photo-document evidence of any wildlife or pest infestations on the project site noting locations.

  - **Safety Equipment and Placards.** Confirm location and charge of fire extinguishers. Verify applicable signage and placards are present and legible. Photo-document any deficiencies noting locations.

  - **Erosion and Drainage.** Inspect project site for evidence of erosion greater than 3" wide and 3" deep, or which could reasonably be expected to hamper safety or project serviceability. Photo-document areas impacted by erosion noting locations.

  - **General Site - Roads, Fences, Gates, Lighting, Security.** Inspect and photo-document condition of any roads to access or traverse the project site. Inspect perimeter fences and gates for integrity and security. Inspect any lighting fixtures on project site. Inspect any security cameras or devices on project site for integrity and evidence of vandalism

  - **Housekeeping.** Inspect project site for excessive rubbish or debris buildup. Remove reasonable amounts of rubbish and debris. Photo-document excessive amounts noting locations.

2. Reporting

Within fifteen (15) business days after completion of the annual Maintenance Service, Contractor shall notify Client of the work performed by providing a report and interpretation of inspection results, recommendations for performance improvement, relevant observations, and photos of any equipment which shows signs of damage, disrepair, extreme weathering, requiring further attention or maintenance. Any items flagged during inspection will be assigned one of the following impacts:

High Priority: Finding of condition that currently exists, or could result in, a reduction of system output by greater than 10% of expected maximum power capacity. Examples include damage to or incapacitation of central inverter, transformers, or switchgear.

Medium Priority: Finding of damage to or incapacitation of minor equipment (combiner box/string inverter) or communication loss (for example, cell modem) that does not affect the maximum power capacity of the system by more than 10%.

Low Priority: Finding of damage to or incapacitation of a source circuit, module(s) or communication device (for example, weather station), or other minor issue identified at facility that may not be directly affecting output of system (pest or other infestation, as example).

3. Monitoring Services

Should PV facility be equipped with monitoring through the PowerTrack™ web-based monitoring platform, Centrica or designated Contractor shall utilize PowerTrack to create a reasonable monitoring alert scheme that shall alarm Centrica in the event of a performance anomaly. Centrica shall remotely investigate all alarms within 72 hours and if necessary, provide Owner with a proposal for investigative services on site. Centrica shall contact equipment manufacturer should any product warranties be intact and product replacement covered under warranty terms. Centrica shall not be responsible for any failure of manufacturers to provide remedy or replacement of parts under product warranty. All investigative service visits shall produce a service report outlining the work completed, any findings, and recommended next steps. This service report shall be included with any invoice for Additional Services.

4. Inverter and Panel warranty servicing

Centrica shall provide the technician labor services and submission responsibilities for inverter and module failures identified and approved for Return-Merchandise Authorization by the respective manufacturer during the term of this agreement. Centrica shall bear no responsibility for replacement parts except those provided directly from the manufacturer during the term. Centrica shall use all commercially reasonable efforts to pursue warranty replacement parts, including required documentation of failure under the manufacturer warranty terms, but shall not be responsible for failure of manufacturer to provide required parts under warranty.

5. Module Cleaning

Module washing services will be completed with industry methods and hardware with the exact tools and delivery of cleaning dependent upon the location of water access (if Owner supplied) and/or the physical layout of the modules on location (rooftop, ground mount, canopy, etc). Most cleanings will utilize a mobile water pump and a rotating soft-bristle brush to gently lift and rinse any debris from the face of the modules. Your system cleaning quote was prepared with the following assumptions:

- Water will be provided by the Owner, with water bib at least 200 feet from module location.
- Mounting type: Canopy/Carport, Pitched Metal Roof
- Carports, Canopies and pitched metal roofs are accessible to motor vehicles with boom or bucket lifts

6. Emergencies / Additional Services

"Emergency" means an event occurring at or impacting the Site or the System that (a) poses actual, or imminent risk of, (i) serious personal injury or death or (ii) material physical damage to the Site or the Facility; and (b) requires a good faith determination by Contractor or Owner that immediate preventative or remedial action is necessary. In the event of any emergency, Contractor shall take such action as may be reasonable and necessary. All labor, equipment, fees and costs for responding to and addressing such emergencies or other recommended work *are not included* in the Annual Maintenance Fee and shall be

billed as Additional Services as follows. All investigative service visits shall be billed at the Additional Services rate.

7. Warranty

The foregoing warranty shall last for the period of ninety (90) days following completion of the Maintenance Service.

Additional Services Rate Table

	Rate
Technician Travel	$115/hr
Licensed Electrician	$160/hr
Weekend/Overtime	2x Regular Rate
*4 Hour Service Call Minimum (includes travel)	

Schedule 3

FIM Work Schedule

Name	Duration	Start	Finish
Notice to Proceed	0 days	1/1/2025	1/1/2025
Design Engineering	45 days	1/1/2025	3/4/2025
Utility Interconnection Approval	45 days	3/4/2025	5/6/2025
Permitting	85 days	3/5/2025	7/1/2025
Material Procurement	66 days	7/2/2025	10/1/2025
Installation	150 days	10/2/2025	4/29/2026
Project Closeout	23 days	4/30/2026	6/1/2026
Substantial Completion	0 days	6/1/2026	6/1/2026

SCHEDULE 4
As-Built Drawing Requirement

The as-built requirements for each FIM are provided below:

FIM 1 – Interior and Exterior Lighting Upgrades
At the end of the installation, Centrica Business Solutions Services will supply an electronic PDF and 3 hard copies of the as-built lighting room-by-room scope, lighting cutsheets, and O&M manuals.

FIM 2 – BMS Upgrade
At the end of the installation, Centrica Business Solutions Services will supply an electronic PDF and 3 hard copies of the stamped as-built drawings, equipment cutsheets, and O&M manuals.

FIM 3 – New Solar PV Installation
At the end of the installation Centrica Business Solutions Services will provide stamped drawings of the new solar photovoltaic array(s). Centrica Business Solutions Services shall also provide an electronic PDF and 3 hard copies of the equipment cutsheets and O&M manuals.

FIM 4 – Existing Solar PV Replacement
At the end of the installation Centrica Business Solutions Services will provide stamped drawings of the new solar photovoltaic array(s). Centrica Business Solutions Services shall also provide an electronic PDF and 3 hard copies of the equipment cutsheets and O&M manuals.

SCHEDULE 5

ENERGY SAVINGS SCHEDULE

Energy Savings Schedule

FIM	Electric Usage Savings (kWh/yr)	Gas Usage Savings (Therms/yr)
1 – Lighting Upgrades	74,258	
2 – HVAC BMS Upgrade	28,500	453
3 – New Solar Installation	287,739	
4 – Existing Solar Replacement	168,006	
Total	**558,504**	**453**

SCHEDULE 6A
FIM Work Schedule of Values

Item	Work Item	Value
1	Project Kickoff, Mobilization, and Planning	$ 102,365.00
2	Engineering Design, Submittals, and Permits	$ 172,569.00
3	Interior & Exterior Lighting	$ 198,505.00
4	Equipment	$ 113,269.00
5	Installation	$ 85,236.00
6	BMS Upgrade	$ 166,450.00
7	Equipment	$ 68,265.00
8	Installation	$ 98,185.00
9	New Solar PV Installation	$ 973,556.08
10	Equipment	$ 328,269.08
11	Installation	$ 645,287.00
12	Existing Solar PV Replacement	$ 600,751.00
13	Equipment	$ 237,795.00
14	Installation	$ 362,956.00
15	As-Builts and Closeout Packs	$ 48,569.00
	Total Project Cost	$ 2,262,765.08

**The Investment Tax Credit (ITC) submission is the responsibility of the District. Centrica Business Solutions is available to assist with gathering the correct information, but Coachella Valley Mosquito and Vector Control District is responsible for the final submission to the Government for this tax credit.*

SCHEDULE 6B

MM&V Services Schedule of Values

Annual Period	Work Item	Value
1	Year 1 M&V	$14,043
2	Year 2 M&V	$6,583
3	Year 3 M&V	$6,775
4	Year 4 M&V	$6,978
5	Year 5 M&V	$7,182
6	Year 6 M&V	$7,397
7	Year 7 M&V	$7,612
8	Year 8 M&V	$7,841
9	Year 9 M&V	$8,069
10	Year 10 M&V	$8,311

O&M Services Schedule of Values

Annual Period	Work Item	Value
1	Year 1 O&M	$40,434
2	Year 2 O&M	$42,051
3	Year 3 O&M	$43,733
4	Year 4 O&M	$45,483
5	Year 5 O&M	$47,302
6	Year 6 O&M	$49,194
7	Year 7 O&M	$51,162
8	Year 8 O&M	$53,208
9	Year 9 O&M	$55,337
10	Year 10 O&M	$57,550