

CLIMATEC MEASUREMENT AND VERIFICATION AGREEMENT FOR City of San Leandro

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ATTACHMENTS

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CLIMATEC M&V AGREEMENT

This Measurement and Verification (“M&V”) Agreement (“Agreement”) dated March 23, 2016 (“Effective Date”) is made by and between:

City of San Leandro (“Purchaser”)
with its principal place of business at
835 E 14th Street, San Leandro, CA 94577
and

Climatec LLC
with its principal place of business at
18002 Cowan, Irvine, CA 92614-6812

Purchaser and Climatec LLC agree as follows:

This agreement shall include the Attachment(s) listed below:

- Attachment “A” - Guaranteed Savings Measurement & Verification
- Attachment “B” – Utility Baseline Summary
- Attachment “C” – Standards of Operation (Lighting & HVAC)

SCOPE OF SERVICES

Energy Savings Measurement & Verification Service:

Climatec LLC will provide measurement and verification services of the energy savings associated with Purchaser Energy Retrofit Installation, as described in Attachment A - Scope of Work, located in the associated Installation Agreement. Energy Savings M&V reports will be provided to the Purchaser on an annual basis.

Term:

This Service Agreement shall commence upon the completion and acceptance of the Purchaser’s energy retrofit installation project and receipt of final payment for the associated Installation Contract and shall continue for a term of 15 years. The Purchaser may terminate this service agreement at any time with a 60 day written notice. However, termination of this agreement will void any savings guarantee associated with this project.

Charges:

This Agreement shall be billed once per year and is due and payable upon the Purchaser’s receipt of invoice. The annual Service Agreement charge is \$10,500 for the first three years and escalated at 5% annually for every subsequent year thereafter. This rate does not include taxes.

TERMS AND CONDITIONS

1.0 General Provisions:

1.1 Unless stated otherwise, the services provided under this Agreement shall be provided during Climatec LLC's normal business hours. Normal business hours are Monday through Friday, 8:00 A.M. to 5:00 P.M. inclusive, excluding holidays.

1.2 The Purchaser shall provide reasonable means of access to the equipment being measured or verified. Climatec LLC shall not be responsible for any removal, replacement, or refinishing of the building structure, if required to gain access to the equipment. Climatec LLC shall be permitted to start and stop all equipment necessary to perform the services herein described as arranged with the Purchaser's representative.

1.3 This Agreement, when accepted in writing by the Purchaser and approved by an authorized Climatec LLC representative, shall constitute the entire Agreement between the two (2) parties.

2.0 Charges:

2.1 For services not covered by this Agreement, but performed by Climatec LLC upon the Purchaser's authorization, the Purchaser agrees to pay Climatec LLC upon presentation of itemized invoice(s) at Climatec LLC's current rates.

2.2 If emergency service is requested by the Purchaser and inspection does not reveal any defect for which Climatec LLC is liable under this Agreement, the Purchaser will be charged at Climatec LLC's current emergency charge rates.

3.0 Limitations of Liability:

3.1 Climatec LLC shall not be liable for any loss, delay, injury, or damage that may be caused by circumstances beyond its control including, but not restricted to; acts of God, war, civil commotion, acts of government, fire, theft, corrosion, floods, lightning strikes, freezes, strikes, lockouts, differences with workmen, riots, explosions, quarantine restrictions, delays in transportation, shortage of vehicles, fuel, labor or materials, or malicious mischief. **IN NO EVENT SHALL CLIMATEC LLC BE LIABLE FOR BUSINESS INTERRUPTION, LOSSES, OR CONSEQUENTIAL, INDIRECT, SPECIAL OR SPECULATIVE DAMAGES.**

3.2 Climatec LLC shall not be required to make safety tests, install new devices, or make modifications to any equipment to comply with recommendations or directives of insurance companies, governmental bodies, or for other reasons.

3.3 Climatec LLC shall not be required to make replacements or repairs necessitated by reason of negligence, abuse, misuse.

3.5 This agreement pre-supposes that all equipment is in satisfactory working order. Climatec LLC will inspect the equipment within sixty (60) days after the agreement takes effect and will advise the Purchaser of any equipment found to be in need of repair. If the Purchaser does not authorize Climatec LLC to make the repairs or if the Purchaser does not have the work performed, the equipment will be eliminated from coverage and the Agreement savings will be adjusted. Maintenance of existing equipment and systems is the responsibility of the Purchaser. Failure to properly maintain equipment and systems can result in reduced energy efficiency and may necessitate a baseline energy adjustment. There may be some equipment which, for reasons beyond Climatec LLC's control, cannot be inspected before this Agreement takes effect. Climatec LLC will inspect such equipment on the first visit where the equipment is available.

3.6 The amount of any present or future sales, use, occupancy excise, or other tax (federal, state, or local) which Climatec LLC hereafter shall be obligated to pay, either on its own behalf or on the behalf of the Purchaser or otherwise, with respect to the services covered by this Agreement, shall be paid by the Purchaser.

3.7 If the equipment or software included under this Agreement is altered, modified, or changed by a party other than Climatec LLC, this Agreement shall be modified to incorporate such changes and the Agreement price and/or Savings shall be adjusted accordingly.

3.9 Following twelve (12) months of service or any time thereafter, if individual item(s) cannot, in Climatec LLC's opinion, be properly repaired on-site because of excessive wear or deterioration, Climatec LLC may withdraw the item(s) from coverage upon ninety (90) days prior written notice. Energy savings may be adjusted accordingly.

3.10 This Agreement shall be governed by, construed, and enforced in accordance with the laws of the State of California.

4.0 Miscellaneous Provisions:

4.1 The services provided hereunder may occur on active Purchaser sites. As such, Climatec LLC shall ensure that its services on and around the Purchaser site comply with all applicable laws, regulations and standards and any other legal requirements which may be applicable to Climatec LLC's activities on or about the Purchaser sites. While the Purchaser shall reasonably assist Climatec LLC in determining the applicable requirements, it shall be Climatec LLC's sole responsibility for determining and complying with all applicable laws, regulations, and standards.

4.2 Dispute Resolution:

4.2.1 Disputes: This Section shall apply to any dispute arising under or related to this Agreement (whether arising in contract, tort or otherwise, and whether arising at law or in equity), including (a) any dispute regarding the performance, validity or enforceability of any provision of this Agreement or whether any Party is in compliance with, or breach of, any provisions of this Agreement and (b) the applicability of this Section to a particular dispute. Any dispute to which this Section applies is referred to herein as a "Dispute."

4.2.2 Negotiation to Resolve Disputes: If a Dispute arises, the Parties shall attempt to resolve such dispute through the following procedure:

4.2.2.1 First, the representatives of each of the Parties shall promptly meet (whether by phone or in person) in a good faith attempt to resolve the Dispute;

4.2.2.2 Second, if the Dispute is still unresolved after 20 days following the commencement of the negotiations described in Section 4.2.2.1 then the designated executive officer of each Party shall meet (whether by phone or in person) in a good faith attempt to resolve the Dispute;

4.2.2.3 Third, if the Dispute is still unresolved after 10 days following the commencement of the negotiations described in Section 4.2.2.2, then either Party may submit such Dispute to arbitration pursuant to Section 4.2.2.4;

4.2.2.4 Any Dispute arising from or relating to this Agreement that is adjudicated pursuant to this Section 4.2.2.4 shall be arbitrated in San Leandro, California. The arbitration shall be administered by JAMS in accordance with its Comprehensive Arbitration Rules and Procedures, and judgment on any award may be entered in any court of competent jurisdiction. If the Parties agree, a mediator may be consulted prior to arbitration. The prevailing party in any dispute arising out of this Agreement shall be entitled to reasonable attorneys' fees and costs; and

4.2.2.5 Pending a final resolution of a Dispute, the Parties shall each proceed diligently and faithfully with performance of their respective obligations under this Agreement.

4.3 Indemnification:

Climatec LLC shall indemnify, defend with counsel acceptable to City, and hold harmless City and its officers, elected officials, employees, agents and volunteers from and against any and all liability, loss, damage, claims, expenses, and costs (including without limitation, reasonable attorney's fees and costs and fees of litigation) (collectively, "Liability") of every nature (except 3rd party consequential claims) arising out of or in connection with Climatec LLC's performance of the services called for or its failure to comply with any of its obligations contained in this Agreement, except such Liability caused by the negligence or misconduct of City.

Notwithstanding the forgoing, to the extent this Agreement is a “construction contract” as defined by California Civil Code Section 2782, as may be amended from time to time, such duties of Climatec LLC to indemnify shall not apply when to do so would be prohibited by California Civil Code Section 2782.

Climatec LLC must respond within 30 days to the tender of any claim for defense and indemnity by the City. If the Climatec LLC fails to accept or rejects a tender of defense and indemnity for a covered claim within 30 days, in addition to any other remedy authorized by law, so much of the money due the Climatec LLC under and by virtue of this Agreement as shall reasonably be considered necessary by the City, may be retained by the City until disposition has been made of the claim or suit for damages, or until the Climatec LLC accepts or rejects the tender of defense, whichever occurs first.

5. **Occupational Safety and Health:** The Parties hereto agree to notify each other immediately upon becoming aware of any alleged violation of, the Occupational Safety and Health Act (OSHA) relating in any way to the project or project site.
6. **Entire Agreement:** This Agreement, upon acceptance, shall constitute the entire agreement between the parties and supersedes any prior representations or understandings.
7. **Changes:** No change or modification of any of the terms and conditions stated herein shall be binding upon either Party unless accepted by both Parties in writing.
8. **Severability:** If one or more of the provisions of this Agreement are held to be unenforceable under laws, such provision(s) shall be excluded from these terms and conditions and the remaining terms and conditions shall be interpreted as if such provision were so excluded and shall be enforced in accordance to their terms and conditions.
9. **Counterparts:** This Agreement may be executed in multiple counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument. A signature on a copy of this agreement received by either party by facsimile or portable document format (PDF) is binding upon the other party as an original. The parties shall treat a photocopy of such facsimile as a duplicate original.
10. **Assignment:** Climatec LLC retains the right to assign its rights and obligations of this Agreement with written consent of Purchaser.
11. **Acknowledgment:** Both Climatec LLC and the Purchaser acknowledge having read this Agreement and all contract documents incorporated herein and have executed this agreement on the date written above.

12. **Approval:** Each party represents that the person that has executed this Agreement on its' behalf is authorized to do so.

City of San Leandro

Climatec LLC

Signature

Signature

Print Name

Steve Siverson
Print Name

Title

Vice President – Energy Services
Title

Date

Date

Attachment “A”
Guaranteed Savings Measurement & Verification

Attachment A

Guaranteed Savings Measurement & Verification

This document contains the energy savings Measurement and Verification (M&V) plan for the Facility Efficiency Measures (FEMs) contained in the Installation Agreement. The following table summarizes the FEMs proposed. – See below Table 1.0

TABLE 1.0

Site	Lighting System Upgrades	Street Lighting System Upgrades	Irrigation System Upgrades	New HVAC System Installation	HVAC Control Upgrades
City Hall	X			X	X
Downtown Parking Garage	X				
Fire Stations # 9, 10, 11, 12 & 13	X				
Halcyon Park Kiddie College/Park	X		X		
History Museum	X				
Main Library	X			X	
Manor Branch Library	X				
Marina Community Center	X			X	
Public Safety (Police)/PD Motor Barn	X				
Public Works	X				
San Leandro Family Aquatic Center	X				X
South Branch Library	X				X
Washington Manor Kiddie College/Park	X		X		
Water Pollution Control and New Administration Building	X				
Bonarie Park	X		X		
Grover Cleveland Park	X		X		
Heath Park			X		
Marina Park/Marina	X		X		
McCartney Park	X		X		
Memorial Park	X		X		
Root Park	X		X		
San Leandro Ball Park (aka Burrell Field)	X		X		
Stenzel Park	X		X		
Thrasher Park	X		X		
Toyon Park	X		X		
Victoria Park	X		X		
Warden Park	X				
City Wide		X			

A specific Measurement and Verification Plan is submitted for each Facility Conservation Measure (FEM) to provide a comprehensive overall Plan for City of San Leandro. Energy savings are to be compared to the Utility Baseline Summary, as shown in Attachment B to this agreement. Each measure's M&V Plan provides:

- A description of how the savings shall be verified for each FEM.
- Selection of specific protocol for verification of savings of each FEM.
- Requirements for measurement or other means to establish the FEM savings.

Climatec Building Technologies Group (Climatec LLC) is responsible for the pre-retrofit measurement, energy savings calculations, equipment installation, and required post retrofit verification as outlined herein. Purchaser agrees to operate and maintain all equipment installed. **Proper operation and maintenance of equipment and systems is critical to long-term achievement of energy savings.**

SAVINGS GUARANTEE

Climatec LLC warrants that Purchaser shall realize total energy and water savings, total operational savings and utility rebates ("Guaranteed Project Savings") in excess of the project cost as shown in the Installation Agreement during the course of the useful life of the installed equipment. The effective date will begin on the date of final acceptance of the Installation project and receipt of final payment for the associated Installation Contract and continue for a term not to exceed 15 years (Guarantee Period). Climatec LLC agrees to complete the M&V Report on an annual basis and deliver to the Purchaser within sixty (60) days of the anniversary date of final acceptance and annually thereafter. Project savings that are verified during the course of construction will be applied to the 1st year guaranteed project savings.

If the annual M&V Report demonstrates that the project will achieve one hundred percent (100%) or more of the Guaranteed Project Annual Savings, then Climatec LLC shall have satisfied its energy performance guarantee obligation and the Purchaser shall accept the Annual M&V Report.

In the event that an annual M&V Report savings value (including any excess savings from previous years) does not meet the Guaranteed Project Savings in accordance with the M&V Plan, then Climatec LLC shall repair, replace, or substitute the ECM that is not performing at the required level, as identified in the M&V Report. Following corrective action, Climatec LLC shall re-perform the relevant M&V work for the affected ECM(s) and amend or supplement the M&V Report. If the sum of the ECMs indicates that the Guaranteed Project Savings are met or exceeded, then no further remedy shall be required.

If, after the opportunity to make corrections, the M&V Report, as amended, indicates that verified savings are less than the Guaranteed Project Savings as shown in the Savings Summary, then Climatec LLC shall pay the Purchaser the shortfall amount. However, under no circumstances will the amount(s) paid for the total of the energy savings shortfalls exceed the Installation Contract Amount.

The Purchaser agrees that project savings, which exceed the guaranteed amount in any one (1) year, may be applied to previous or future year's savings to offset an energy savings shortfall. The savings guarantee will remain in effect for the term of this agreement. Cancellation of this agreement will result in the termination of the savings guarantee.

The Utility Baseline Summary, as shown in Attachment B, may be modified over the course of the Guarantee Period to adjust for changes in utility rates, number of days in utility billing cycle, square footage, energy using equipment, building occupancy and weather. This Guarantee is subject to the Purchaser's adherence to the Standards of Operation for Lighting and HVAC systems, as documented in Attachment "C" of this agreement.

MEASUREMENT AND VERIFICATION METHODS

Measurement and Verification (M&V) of energy savings is a methodology based on standard industry protocol intended to provide reasonable assurance that energy savings calculated are realized over the term of the contract.

The development of the M&V plan is based on the IPMVP-2001 (International Performance Measurement and Verification Protocol) and the application of sound engineering and business guidelines to the overall need for verification of energy savings for each FEM. This plan contains methodology that shall cost effectively provide assurance of equipment savings through short term or spot measurements, engineering calculations and/or direct utility billing comparisons. The necessary components to a well-established M & V Plan are:

- Specific identification of each FEM and proposed M & V. Reporting requirements for overall savings.
- Participation of all parties and any necessary coordination with independent review.

Methods of M&V vary in accordance with the type of project, level of assurance of savings, cost, and availability of data, financing constraints, and energy costs. The methods selected must be cost effective given the financial savings to the Purchaser. The methods used for the FEMs detailed herein were selected to minimize M&V cost while still providing a reasonable assurance of the savings calculations.

The IPMVP-2001 guideline provides the following options related to methodology for M&V:

Option A – Partially Measured Retrofit Isolation. Option A uses a combination of stipulated and/or measured factors to calculate baseline usage and savings associated with the FEM. Spot or short-term measurement would be used for the measured values. Stipulated values are supported by Purchaser input, historical data, or manufacturer data.

- Baseline and savings calculations are provided through engineering calculations, component or system models.
- Depending on number of points measured, Option A provides the least cost alternative to M&V.

Option B – Retrofit Isolation. Option B provides for measurement to provide data for assessing values or variables. Spot or short-term measurement, taken at the component and/or system level are taken when variations in factors can be accounted for or eliminated. Continuous measurement at the component and/or system level can also be used to account for the variations in factors over time.

- Baseline and savings calculations are provided through engineering calculations, component or system models.
- Cost is variable depending on the points measured, and the term of the measurement process used. Option B provides a better scenario for FEMs where a small number of factors can be accurately measured with a measurement plan.

Option C – Whole Building. Option C involves the use of utility meters or whole building sub-metering to assess the energy performance of the entire building. After an FEM is implemented the billing data is assessed in accordance with an approved plan to determine actual FEM savings.

- Baseline is established through utility data and engineering/regression analysis.
- Engineering calculations or modeling initially provides estimated FEM savings.
- Actual FEM savings are based on the utility or metered data. Savings must be adjusted for changes in building operation and variables assumed in the engineering calculations or modeling (such as weather, occupancy, etc.).
- Cost of this approach is variable based on the availability of utility data, sub-metered data, and overall savings guarantee. If the metered data is used for a savings guarantee, all variables related to building performance

must be measured and adjusted, usually on an annual basis. Option C usually requires a substantial amount of time and effort to establish the baseline, provide adjustments and track the savings.

Option D – Calibrated computer simulation. Option D uses computer-modeling techniques to provide an engineering model of component and/or system performance. The inputs to the computer simulation may be made by engineering estimates, short or long term measurements, and utility or other metered data. Once the model is properly calibrated it is used for the establishment of the baseline and savings by changing appropriate inputs.

- Baseline is established through a calibration process for the computer modeling. Appropriate measurements and inputs are reflected against regression analysis for the metered data.
- Once the model is calibrated and the baseline established inputs are varied for the proposed FEM to establish savings.
- Actual FEM savings are stipulated based on the computer model. There may be follow up calibration of the model with the FEM in place to affirm the overall building simulation model.
- Cost of this method varies based on the complexity and accuracy of model desired, availability of data and overall measurement required.

SELECTED MEASUREMENT AND VERIFICATION OPTIONS

For the FEM's covered under this M&V plan, the Table of Selected M&V Options, located on the following page summarizes the proposed **IPMVP Options selected**: See table 1.1 below

TABLE 1.1

Site	Lighting System Upgrades	New HVAC System Installation	HVAC Control Upgrades
City Hall	A	A	A
Downtown Parking Garage	A		
Fire Stations # 9, 10, 11, 12 & 13	A		
Halcyon Park Kiddie College/Park	A		
History Museum	A		
Main Library	A	A	
Manor Branch Library	A		
Marina Community Center	A	A	
Public Safety (Police)/PD Motor Barn	A		
Public Works	A		
San Leandro Family Aquatic Center	A		A
South Branch Library	A		A
Washington Manor Kiddie College/Park	A		
Water Pollution Control and New Administration Building	A		
Bonarie Park	A		
Grover Cleveland Park	A		
Heath Park			
Marina Park/Marina	A		
McCartney Park	A		
Memorial Park	A		
Root Park	A		
San Leandro Ball Park (aka Burrell Field)	A		
Stenzel Park	A		
Thrasher Park	A		
Toyon Park	A		
Victoria Park	A		
Warden Park	A		

The particular option selected for each ECM was based on a number of related issues including: ECM cost, ECM savings, cost of Measurement and Verification and the ability to accurately determine whole building operations. The water cost savings from irrigation system upgrades and the energy cost savings from the city-wide street lighting system upgrades are stipulated and agreed by the Purchaser and are met upon the completed installation of these retrofit projects.

The baseline and the post-installation energy use depend on various system and external factors, such as energy demand, operating hours, weather conditions, motor loading, energy rates, and occupancy. Development of the baseline, post FEM consumption, cost avoidances and simple payback for each FEM covered by this M&V plan includes:

- Stipulated Values – These values are important in the overall calculations for energy consumption, financial calculations, and operating conditions. Climatec LLC and Purchaser have agreed to these values for purposes of establishing savings.
- Developed/Measured Values – These are the values determined by spot or short-term measurement. Values are determined based on a sound engineering approach to variable determination. Both values used for baseline consumption and values to be measured/determined as parts of the post FEM implementation are detailed.
- Assumptions – Some values that are assumed in order to calculate energy use are necessary in certain circumstances.
- Calculations – The necessary calculations for baseline energy and demand usage, the calculation of the energy and demand components with implementation of the FEM, the calculation of costs, and annual savings are the primary tool for assessing the estimated and actual savings of any FEM.
- Instrumentation – The type and specifications, if applicable, for any instrumentation used for developed/measured values is provided to ensure appropriate meters and measurement equipment is used for specified applications.
- Pre Retrofit Measurements – Each FEM may have a section detailing the measurements required prior to the retrofit. These measurements are used to establish the baseline or adjustments required to establish an accurate baseline.
- Post Retrofit Measurements – Each FEM may have a section that details the measurements required if any after the retrofit is completed. This section is utilized to detail the type of measurements required for verification of the energy savings calculations.
- Adjustments – Each FEM may have a section for adjustments. This section includes possible adjustments to the actual Energy Audit Report and energy information, appropriate adjustments to the M&V plan, and adjustments to any savings guarantee. This section is utilized to anticipate changes necessary due to field conditions and provide an appropriate response in the verification of actual energy and cost avoidances.
- Commissioning – Each FEM may have a section regarding the commissioning process. This provides the detail for how the savings will be verified upon project completion, and the type of inspection that will be completed, and the billing method for verified savings. This section is utilized to provide a standard approach for each FEM upon project completion.

Climatec LLC will follow the agreed-upon M&V protocols for the measurement period and will prepare post-installation reports with supporting documentation for the Purchaser. The cost of M&V is included in the project cash flow requirements.

SPECIFIC MEASUREMENT AND VERIFICATION PLAN

“OPTION A” FOR LIGHTING SYSTEM UPGRADES

Introduction

This Measurement and Verification Plan (M&V) is specific to all lighting retrofits and occupancy sensor installations. The sites receiving these upgrades are listed in the Table of Recommended Measures located at the beginning of this Attachment.

M&V Protocol

For this FEM, IPMVP Protocol – Option A shall be utilized. This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a representative sample of each of the fixture types will be measured. The same sample will be used for both pre and post retrofit calculations. Wattage shall be measured with an appropriate instrument that is properly calibrated.

Light Levels

A representative sample of the light levels shall be measured. Where rooms have similar or identical lighting design, it is not required that each room be measured. Light levels shall be measured by an appropriate instrument that is properly calibrated. Light level measurements apply to both pre and post retrofit areas and shall be recorded at the work surface. Where rooms do not have a specific work surface (such as gymnasiums) light levels shall be measured at the floor.

Documentation

All areas measured shall be documented. The data shall indicate areas that do not meet IESNA standard light level requirements. All instrumentation used shall be clearly documented.

Stipulated Values

Operating Hours are stipulated for purposes of M&V. Please see Attachment “C”, Lighting Standards of Operation for a complete list of lighting hours of operation.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings provide the basis for the overall financial viability of this FEM.

kWh and/or kW Savings

The electrical consumption reduction of a particular lighting FEM is determined by comparing the pre and post conditions applied to the hours agreed upon in the Standards of Operation.

$$\{[(\text{Existing watts/fixture}) \times (\text{existing quantity}) \times (\text{existing hours of operation})] - [(\text{proposed watts/fixture}) \times (\text{proposed quantity}) \times (\text{proposed hours of operation})]\} / 1000 = \text{kWh savings}$$

Dollar Savings

After calculating the kWh saved, the specific facility’s average cost per kilowatt hour shall be used to determine dollar savings.

$$\begin{aligned} (\text{kWh saved}) \times (\text{average kWh rate}) &= \$ \text{kWh saved} \\ (\$ \text{kWh saved}) &= \text{the total dollars saved} \end{aligned}$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new lighting system installations, extended warranties, and/or service agreements provided by Climatec LLC. The operational savings are stipulated and met upon the completed installation of the energy retrofit contract.

Adjustments

For this FEM the following adjustments are allowed for purposes of Measurement and Verification:

- Light level requirements may be modified as detailed in this plan.
- Changes in actual construction including number and/or type of fixtures. All changes shall be clearly documented and provided to the Purchaser's representative.
- Utility rates, billing days or degree days.

Commissioning

Commissioning shall consist of inspections and a final savings verification report. Inspections shall consist of:

- During the construction phase of the project, Climatec LLC shall keep a detailed record of the quantity and types of fixtures retrofitted and fixtures installed in each building. A post construction inspection is required by the responsible M&V party.
- After lighting modifications have been made, the installations shall be inspected to verify the retrofit counts by fixture code.
- Post retrofit lighting levels shall be measured to verify compliance with the contract standards.

SPECIFIC MEASUREMENT AND VERIFICATION PLAN

“OPTION A” FOR HVAC SYSTEMS INSTALLATION

Introduction

This Measurement and Verification Plan (M&V) is specific to the installation of new high efficiency HVAC units and chiller at the sites listed in the Table of Recommended Measures located at the beginning of this Attachment.

M&V Protocol

For this FEM, IPMVP Protocol – Option A shall be utilized. This option shall provide for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, field data shall be collected which includes, unit counts, unit tonnage, nameplate horsepower and efficiency rating for each existing HVAC system.

Stipulated Values

Hours of Operation, heating/cooling loads and runtime hours of the existing HVAC systems are stipulated for purposes of M & V. Please refer to Attachment C, HVAC Standards of Operation in this agreement for specific operating hours and runtime hours for each HVAC unit or area. Stipulated values are agreed to by Purchaser.

Calculations

The calculations for the baseline energy consumption and post-retrofit savings provide the basis for the overall financial viability of these FEM's. The following equations summarize the calculation of savings:

Electric (kWh) Savings

The electrical usage reduction of this FEM is determined by the following equation:

$$((\text{Size of Existing HVAC Unit}) \times (\text{Unit Efficiency}) \times (\text{Stipulated Load Factor}) - (\text{Size of New Cooling Unit}) \times (\text{Unit Efficiency}) \times (\text{Stipulated Load Factor})) \times (\text{Annual Operating Hours}) = \text{kWh Savings}$$

Dollar Savings

After calculating the kWh saved, the specific facility's average cost per kilowatt hour shall be used to determine dollar savings.

$$\begin{aligned} (\text{kWh saved}) \times (\text{average kWh rate}) &= \$ \text{ kWh saved} \\ (\$ \text{ kWh saved}) &= \text{Total dollars saved} \end{aligned}$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by Climatec LLC. The operational savings are agreed to be met upon the completed installation of the energy retrofit contract.

Pre Retrofit Measurements

None required for this FEM.

Post Retrofit Measurements

None required for this FEM.

Adjustments

None required for this FEM.

Commissioning

Commissioning shall consist of inspections, and a final Commissioning report. The Inspections and Report shall consist of:

- Commissioning of the newly installed HVAC equipment shall include verification that each new unit is operating, as specified, in all modes (heat/cool).

SPECIFIC MEASUREMENT AND VERIFICATION PLAN

“OPTION A” FOR HVAC CONTROLS UPGRADE

Introduction

This Measurement and Verification Plan (M&V) is specific to the energy management system upgrades at the sites listed in the Table of Recommended Measures located at the beginning of this Attachment.

M&V Protocol

For this FEM, IPMVP Protocol – Option A shall be utilized. This option shall provide for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. The cooling and heating setpoints during occupied and unoccupied modes of the HVAC equipment will be verified and documented. For this retrofit, field data shall be collected which includes, unit counts, unit tonnage, nameplate horsepower, efficiency rating, operating schedules, cooling and heating temperature setpoints for each HVAC system.

Stipulated Values

Hours of operation and heating/cooling load factors are stipulated for purposes of M & V. Please refer to the Attachment C, HVAC Standards of Operations for specific existing and proposed operating hours for each HVAC unit or area. Stipulated values are agreed to by Purchaser.

Calculations

The calculations for the baseline energy consumption and post retrofit savings provide the basis for the overall financial viability of these FEM's. Post-retrofit operating schedules and trend reports will be used to verify the inputs such as operating hours, cooling/heating temperature setpoints that are used in the calculations to validate the savings. The following equations summarize the calculation of savings:

Electric (kWh) Savings

The electrical usage reduction of this FEM is determined by applying the stipulated runtime reduction to the calculated energy usage of the HVAC unit.

$(\text{Size of HVAC unit}) \times (\text{Unit efficiency}) \times (\text{Stipulated load factor}) \times (\text{Existing annual operating hours} - \text{Proposed annual operating hours}) = \text{kWh savings}$

Natural Gas (Therms) Savings

The natural gas usage reduction of this FEM is determined by applying the stipulated runtime reduction to the calculated energy usage of the HVAC unit.

$(\text{Size of Heating unit}) \times (\text{Unit efficiency}) \times (\text{Stipulated load factor}) \times (\text{Existing annual operating hours} - \text{Proposed annual operating hours}) = \text{Therm savings}$

Dollar Savings

After calculating the kWh saved and the Therms saved, the specific facility's average cost per kilowatt hour and the average cost per Therm of natural gas shall be used to determine dollar savings.

$(\text{kWh saved}) \times (\text{average kWh rate}) = \$ \text{ kWh saved}$

$(\text{Therms saved}) \times (\text{average Therm rate}) = \$ \text{ Therms saved}$

$(\$ \text{ kWh saved}) + (\$ \text{ Therms saved}) = \text{Total dollars saved}$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by Climatec LLC. The operational savings are agreed to be met upon the completed installation of the energy retrofit contract.

Pre Retrofit Measurements

Existing operating hours and cooling/heating temperature setpoints for each HVAC unit or area will be obtained from current thermostats/EMS.

Post Retrofit Measurements

Post-retrofit operating schedules, cooling and heating temperature setpoints in both occupied and unoccupied modes for the HVAC equipment will be obtained using the new controls system.

Adjustments

For this FEM the following adjustments are allowed for purposes of Measurement and Verification:

- Addition or subtraction to the conditioned square footage of facilities.
- Utility rates, billing days or degree days.
- Equipment changes.
- Increase or decrease in facility usage as associated with daily occupancy times and special events.

Commissioning

Commissioning shall consist of inspections, and a final Commissioning report. The Inspections and Report shall consist of:

- Commissioning of the energy management system (EMS) shall include verification that the operating schedules, cooling and heating temperature set points and the control sequences for the HVAC equipment have been programmed as specified.

Attachment “B”
Utility Baseline Summary

Energy Baseline

Site Name	Address	Square Footage	4/1/2014 through 3/31/2015			4/1/2014 through 3/31/2015			1/1/2014 through 12/31/2014		
			Dollars Electric	kWh	\$ / kWh	Dollars Gas	Therms	\$ / Therms	Dollars Water	Gallons	\$ / Gallons
City Hall	835 E 14th St San Leandro, CA 94577	71,052	\$172,128	874,575	\$0.197	\$7,461	7,104	\$1.05			
Downtown Parking Garage	120 Estudillo Ave San Leandro, CA 94577	127,285	\$29,009	178,156	\$0.163				\$2,053	274,516	\$0.01
Farely Pool	864 Dutton Ave San Leandro, CA 94577	6,000	\$26,708	132,874	\$0.201	\$6,129	5,808	\$1.06			
Fire Station # 9	450 Estudillo Ave San Leandro, CA 94577	9,204	\$13,481	63,148	\$0.213	\$1,869	1,645	\$1.14			
Fire Station # 10	2194 Williams St San Leandro, CA 94577	12,510	\$13,064	67,906	\$0.192	\$3,038	2,648	\$1.15			
Fire Station # 11	14903 Catalina St San Leandro, CA 94577	10,000	\$10,294	53,568	\$0.192	\$1,921	1,682	\$1.14			
Fire Station # 12	1065 143rd Ave San Leandro, CA 94578	10,178	\$17,759	98,297	\$0.181	\$2,018	1,717	\$1.18			
Fire Station # 13	637 Fargo Ave San Leandro, CA 94579	3,600	\$6,101	30,477	\$0.200	\$906	747	\$1.21			
Halcyon Park Kiddie College / Park	1245 147th Ave San Leandro, CA 94578	2,850	\$3,540	17,616	\$0.201	\$278	172	\$1.62			
History Museum	320 W Estudillo Ave San Leandro, CA 94577	6,800	\$9,345	45,417	\$0.206	\$889	634	\$1.40			
Main Library	300 Estudillo Ave San Leandro, CA 94577	78,000	\$170,835	980,472	\$0.174	\$9,902	9,194	\$1.08			
Manor Branch Library	1241 Manor Blvd San Leandro, CA 94579	10,344	\$25,585	126,964	\$0.202	\$1,372	1,177	\$1.17			
Marina Community Center	15301 Wicks Blvd San Leandro, CA 94579	24,000	\$37,235	191,368	\$0.195	\$3,198	2,808	\$1.14			
Public Safety (Police) / PD Motor Barn	901 E 14th St San Leandro, CA 94577	38,654	\$98,852	633,347	\$0.156	\$8,385	7,739	\$1.08			
Public Works	14200 Chapman Rd San Leandro, CA 94578	42,180	\$37,231	205,200	\$0.181	\$5,142	4,459	\$1.15			
San Leandro Family Aquatic Center	14900 Zaina St San Leandro, CA 94579	24,000	\$44,132	243,466	\$0.181	\$12,881	12,705	\$1.01			
South Branch Library	14799 E 14th St San Leandro, CA 94578	1,400	\$1,529	6,163	\$0.248	\$261	155	\$1.69			
Washington Manor Kiddie College / Park	14900 Zaina St San Leandro, CA 94579	409,071	\$1,392	8,363	\$0.166				\$5,910	1,003,068	\$0.01
Water Pollution Control Plant & new admin bldg	3000 Davis St San Leandro, CA 94577	19,940	\$490,479	3,178,839	\$0.154	\$4,320	3,728	\$1.16			
Lighting - LS2A	Various		\$360,149	2,395,180	\$0.150						
Lighting - LS3	Various		\$57,812	382,373	\$0.151						
Traffic Control	Various		\$79,923	430,745	\$0.186						
Bonaria Park	14825 Juniper St San Leandro, CA 94579	144,774	\$3,327	19,910	\$0.167				\$14,380	2,603,040	\$0.01
Grover Cleveland Park	862 O'Donnell Ave San Leandro, CA 94577	23,285	\$968	5,050	\$0.192				\$2,909	436,084	\$0.01
Marina Park / Marina	14001 Monarch Blvd San Leandro, CA 94577	456,992	\$54,615	300,670	\$0.182	\$1,554	1,160	\$1.34	\$85,686	14,826,108	\$0.01
McCartney Park	339 Breed Ave San Leandro, CA 94577	60,794	\$1,041	5,091	\$0.204				\$8,013	1,400,256	\$0.01
Memorial Park	576 Callan Ave San Leandro, CA 94577	53,515	\$1,358	7,091	\$0.192				\$7,064	1,107,788	\$0.01
Root Park	1033 E 14th St San Leandro, CA 94577	24,402	\$1,706	8,719	\$0.196				\$3,594	565,488	\$0.01
San Leandro Ball Park (aka Burrell Field)	1193 Aladdin Ave San Leandro, CA 94577	474,165	\$7,340	36,960	\$0.199				\$5,572	825,792	\$0.01
Senzel Park	15300 Wicks Blvd San Leandro, CA 94579	246,294	\$3,656	18,048	\$0.203				\$39,481	7,344,612	\$0.01
Thrasher Park	1300 Davis St San Leandro, CA 94577	101,040	\$4,522	23,542	\$0.192				\$1,962	257,312	\$0.01
Toyon Park	1500 Bancroft Ct San Leandro, CA 94578	65,802	\$969	4,749	\$0.204				\$13,164	2,373,404	\$0.01
Victoria Park	399 Bancroft Ave San Leandro, CA 94577	13,300	\$495	1,444	\$0.343				\$3,251	387,464	\$0.01
Warden Park	652 Warden Ave San Leandro, CA 94577	5,124							\$1,146	103,224	\$0.01
Greenbelts	Various		\$23,457	107,810	\$0.218				\$60,774	6,720,032	\$0.01
		2,596,295	\$1,810,037	10,883,599	\$0.166	\$71,524	65,282	\$1.10	\$254,958	40,228,188	\$0.01

Attachment “C”

Standards of Operation for HVAC & Lighting

STANDARDS OF OPERATION

The hours of operation for the Purchaser's Lighting and HVAC systems, located on the following pages, were used to calculate the energy savings in the Savings Summary section of this agreement and will be used in all measurement and verification calculations.

City of San Leandro HVAC Standards of Operation

Facility	Area Served	Existing					Proposed				
		Existing Equipment Controls	Occupied HVAC Schedule	Set Point	Observed Cooling Occupied/ Unoccupied Temperatures	Observed Heating Occupied/ Unoccupied Temperatures	Proposed Equipment Controls	Occupied HVAC Schedule	Cooling Occupied/ Unoccupied Temperatures	Heating Occupied/ Unoccupied Temperatures	
Main Library	AHU	JCI Metasys	M-F 7:30am - 8:00pm Sat 9:30am - 5:00pm Sun 11:00am - 4:00pm				JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm			
	Chiller	JCI Metasys	M-F 8:00am - 8:00pm Sat 10:00am - 5:00pm Sun 11:30am - 4:00pm				JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm			
	HW	JCI Metasys	M-F 7:00am - 8:00pm Sat 9:00am - 5:00pm Sun 10:00am - 4:00pm				JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm			
	Main Area	JCI Metasys	M-F 7:30am - 8:00pm Sat 9:30am - 5:00pm Sun 11:00am - 4:00pm		70/90	68/60	JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm	76 +/- 2/90	68 +/-2/60	
	1st Floor South	JCI Metasys	M-F 7:30am - 8:00pm Sat 9:30am - 5:00pm Sun 11:00am - 4:00pm		68/90	66/60	JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm	76 +/- 2/90	68 +/-2/60	
	2nd Floor - Lecture	JCI Metasys	M-F 7:30am - 8:00pm Sat 9:30am - 5:00pm Sun 11:00am - 4:00pm		74/90	72/60	JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm	76 +/- 2/90	68 +/-2/60	
	2nd Floor - Office	JCI Metasys	M-F 7:30am - 8:00pm Sat 9:30am - 5:00pm Sun 11:00am - 4:00pm		72/90	70/60	JCI Metasys	M-Th 9:30am - 8:00pm Fri 9:30am - 5:30pm Sat 9:30am - 5:00pm Sun 11:30am - 4:00pm	76 +/- 2/90	68 +/-2/60	
	Family Aquatic	Zone 1 - Men's Locker Room	Novar Envo Infosystem	7 Days 8am-5pm (June - Sept)		70/85	65/60	JCI Metasys	7 Days 8am-5pm (June - Sept)	76 +/- 2/90	65/55
Zone 2		Novar Envo Infosystem	7 Days 8am-5pm (June - Sept)		74/85	65/55	JCI Metasys	7 Days 8am-5pm (June - Sept)	76 +/- 2/90	65/55	
Zone 3 - Woman's Locker Room		Novar Envo Infosystem	7 Days 8am-5pm (June - Sept)		74/85	65/55	JCI Metasys	7 Days 8am-5pm (June - Sept)	77 +/- 2/90	65/55	
Zone 4 - Event Room		Novar Envo Infosystem	7 Days 8am-5pm (June - Sept)		74/85	65/55	JCI Metasys	7 Days 8am-5pm (June - Sept)	76 +/-2/90	65/55	
South Branch Library	Main Office Area		7 Days a week		80		Push to Run	2 hour per push	76 +/- 2/90	68 +/-2/60	
	Main Office Area		3 Days a week				Push to Run	2 hour per push	76 +/-2/90	68 +/-2/60	

City of San Leandro **Lighting Standards of Operations**

Line #	Space Usage	Admin Open Area	Gym	Dusk/Dawn	Mech/Elec	Office Admin	Hallways	24/7	Dusk/<Dawn
1	Bonarie Park			4380					
2	Boys & Girls Club Pool / Lockers	3432	1600	4380					
3	City Hall	2300		4380	800	2300	2300		
4	Downtown Parking Garage			4380				8760	
5	Farrelly Pool	1500		4380					
6	Fire Station #10	8760		4380					
7	Fire Station #11	8760		4380					
8	Fire Station #12			4380					
9	Fire Station #13			4380					
10	Fire Station #9	1500		4380					
11	Greenbelts			4380					
12	Grover Cleveland Park			4380					
13	Halcyon Park Kiddie College / Park			4380					
14	Heath Park			4380					
15	History Museum	1050							
16	Lighting - LS-2A			4380					
17	Lighting - LS-3			4380					
18	Main Library	3500		4380			2000		
19	Manor Branch Library	1500		4380					
20	Marina Community Center	2300		4380			8760	8760	
21	Marina Park / Marina			4380					
22	McCartney Park			4380					
23	Memorial Park			4380				8760	
24	Monarch Bay Golf	1200		4380					
25	Parks / Restrooms	1500		4380					
26	Public Safety (Police) / PD Motor Barn	3800		4380		8760		8760	
27	Public Works	2400		4380					4380
28	Root Park			4380					
29	San Leandro Ball Park (aka Burrell Field)			4380					
30	San Leandro Family Aquatic Center			4380					2500
31	South Branch Library	2300		4380					
32	Stenzel Park			4380					
33	Thrasher Park			4380					4380
34	Toyon Park			4380					
35	Traffic Control			4380					
36	Unknown			4380					
37	Victoria Park			4380					
38	Warden Park			4380					
39	Washington Manor Kiddie College / Park			4380					
40	Water Pollution Control Plant & new admin bldg	1300		4380					

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