MEASUREMENT AND VERIFICATION AGREEMENT
FOR
CITY OF HUNTINGTON BEACH

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MEASUREMENT & VERIFICATION AGREEMENT

This Measurement and Verification ("M&V") Agreement ("Agreement") dated __/__/__ ("Effective Date") is made by and between:

City of Huntington Beach
("Purchaser") with its principal place of business at
2000 Main Street, Huntington Beach, CA 92648

and

Alliance Building Solutions, LLC.
("ABS") with its principal place of business at
12520 High Bluff Drive, Ste 345, San Diego, CA 92130

SCOPE OF SERVICES

Energy Savings Measurement & Verification Service:

"ABS" will provide measurement and verification services of the energy savings associated with "Purchaser" Energy Retrofit and Renewable Installation, as described in "Scope of Work" attached to the Installation Agreement. Energy Savings M&V reports will be provided to the "Purchaser" on an annual basis for the term specified below.

Term:

This Service Agreement shall commence upon the completion and acceptance of the Purchaser energy retrofit installation project and receipt of final payment for the Contract and shall continue for an initial term of one (1) year. The "Purchaser" may elect to enter into further extended terms upon written notice provided to ABS not less than thirty (30) days prior to termination of the initial term. If the "Purchaser" fails to provide ABS with a written notice of extension prior to the end of the initial term or any subsequent extensions, the M&V Agreement shall be considered terminated. Once terminated, the M&V Agreement cannot be renewed. The "Purchaser" may terminate this service agreement at any time with a (30) 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 is due and payable 30-days after "Purchaser's" receipt of invoice. The annual Service Agreement charge is $0 for the first year, $25,000 for the second year and escalated at 5% annually for every subsequent year thereafter. This rate does not include taxes.

TERMS AND CONDITIONS

I. General Provisions:

I.1 Unless stated otherwise, the services provided under this Agreement shall be provided during "ABS" normal business hours. Normal business hours are Monday through Friday, 7:00AM to 4:00PM, excluding holidays. "ABS" will coordinate with the "Purchaser" so that any variations in these normal business hours necessitated by "Purchaser" Schedules can be accommodated.

I.2 The "Purchaser" shall provide reasonable means of access to the equipment being measured or verified. "ABS" shall not be responsible for any removal, replacement, or refinishing of the building structure, if required to gain access to the equipment. "ABS" shall be permitted to start and stop all equipment necessary to perform the services herein described as arranged with the "Purchaser's" representative. "ABS" will obtain agreement from the "Purchaser's" representative prior to any starting or stopping of equipment.

I.3 This Agreement shall supersede any previous Measurement and Verification Agreements accepted and approved by the "Purchaser" and "ABS."

I.4 This Agreement, when accepted in writing by the "Purchaser" and approved by an authorized "ABS" representative, shall constitute the entire Agreement between the two (2) parties.

II. Charges:

II.1 For services not covered by this Agreement but performed by "ABS" upon the "Purchaser's" prior written authorization, the "Purchaser" agrees to pay "ABS"'s invoice(s) 30 days after receipt of invoice. Failure to pay the invoice within 30 days after receipt will result in a 10% late payment penalty and failure to pay within 60 days will result in forfeiture of the entire agreement.

II.2 If emergency service is requested by the "Purchaser" and inspection does not reveal any defect for which "ABS" is liable under this Agreement, the "Purchaser" will be charged at "ABS"'s current emergency charge rates.

III. Limitations of Liability:

III.1 Neither party shall 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 EITHER PARTY BE LIABLE FOR BUSINESS INTERRUPTION, LOSSES, CONSEQUENTIAL, INDIRECT, SPECIAL OR SPECULATIVE DAMAGES.

III.2 "ABS" 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.

III.3 Section removed.

III.4 "ABS" warrants that for equipment furnished and/or installed but NOT manufactured by "ABS", "ABS" will extend the same warranty and terms and conditions, which "ABS" received from the manufacturer of said equipment.

III.5 This agreement pre-supposes that all equipment is in satisfactory working order. Should any equipment be in need of repair, "ABS" will have ninety (90) days to make such repair. If the "Purchaser" does not authorize "ABS" to make the repairs or if the "Purchaser" does not have the work performed, the equipment will be eliminated from coverage and the Agreement saving 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.

III.6 The amount of any present or future sales, use, occupancy excise, or other tax (federal, state or local) which "ABS" hereafter shall be obligated to pay, either on its own behalf or on the behalf of the "Purchaser" (shall reasonably assist "ABS" in determining the applicable requirements, it shall be "ABS"'s sole responsibility for determining and complying with all applicable laws, regulations and standards.) or otherwise, with respect to the services covered by this Agreement, shall be paid by the "Purchaser".

III.7 If the equipment or software included under this Agreement is altered, modified, or changed by a party other than "ABS", this Agreement shall be modified to incorporate such changes the Agreement price and/or Savings shall be adjusted accordingly.

III.8 Following twelve (12) months of service or any time thereafter, if individual item(s) cannot, in "ABS"'s opinion, be properly repaired on-site because of excessive wear, deterioration or an Act of God that is out of "ABS" control. "ABS" may withdraw the item(s) from coverage upon ninety (90) days prior written notice. Energy savings may be adjusted accordingly.

III.9 This agreement shall be governed by, construed, and enforced in accordance with the laws of the State of California.

IV. Miscellaneous Provisions:

IV.1 The services provided hereunder may occur on active "Purchaser" sites. As such, "ABS" shall ensure that its services on and around the "Purchaser" site comply with all applicable laws, regulations and standards including but not limited to, the fingerprinting requirements and any other legal requirements which maybe applicable to "ABS"'s activities on or about the "Purchaser" sites. The "Purchaser" shall reasonably assist "ABS" in determining the applicable laws, regulations and stands.

IV.2 Dispute Resolution:

IV.2.1 Disputes: This section shall apply to any disputes arising under our 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 or, 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"

IV.2.2 Negotiation to Resolve Disputes: If a dispute arises, the Parties shall attempt to resolve such dispute through the following procedure.

IV.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;

IV.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 a designated executive officer to each party shall meet (whether by phone or in person) in a good faith attempt to resolve the Dispute;

IV.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 litigation;

IV.2.2.4 The venue for any Dispute arising from or relating to this Agreement that is adjudicated pursuant to this Section 4.2.2.4 shall be arbitrated in Los Angeles, California. Any Dispute arising from or relating to this Agreement that is adjudicated pursuant to this Section 4.2.2.4 shall be arbitrated in Los Angeles, California. The arbitration shall be administered by JAMS in accordance with its Comprehensive Arbitration Rules and Procedures, and judgment on any award maybe entered in any court of competent jurisdiction. If the Parties agree, a mediator may be consulted prior to arbitration;

IV.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.

IV.3 **Indemnification:**

The Parties hereto agree to defend, indemnify, and hold harmless the other Party, it's employees, agents, officials, officers and directors from any and all liabilities, claims, expenses, losses or damages, including attorney's fees which may arise in connection with the work herein specified and which are caused in whole or in part by the negligent act or omission of the indemnifying Party. To the extent it may lawfully do so, the Parties hereby indemnify, defend (with counsel of it choosing), and holds harmless the other party and its affiliates, directors, representatives, agents, officers, employees and volunteers from and against any and all liability or claim of liability, loss or expense, including defense costs and legal fees and claims for damages of whatsoever character, nature and kind, whether directly or indirectly arising from any third party actions from injury to or death of persons, and damage to or loss of property to the extent caused by or arising out the connected with an act or omission of the indemnifying party, or an agent, invitee, guest, employee, or anyone in, on or about he "Purchaser" sites, including, but not limited to, liability, expense, and claims for: bodily injury, death, personal injury, or property damage caused by negligence, creation or maintenance of a dangerous condition of property, breach of express or implied warranty of product, defectiveness of product, or intentional infliction of harm, including any workers' compensation suites, liability, or expense, arising from or connected with services performed by, or on behalf of the indemnifying party, by any person pursuant to this Agreement; nonpayment for labor materials, appliances, teams or power, performed on, or furnished or contributed to the "Purchaser" sites. Notwithstanding the above, neither party shall be required to defend, indemnify and hold harmless the other for its own negligent acts and omissions' or willful misconduct. It is the intent of the Parties that were negligence is determined to have been joint or contributory, principles of comparative negligence will be followed, and each Party shall bear the proportionate cost of any loss damage, expense or liability attributable to that Party's negligence.

V. **Occupational Safety and Health:** The Parties hereto agree to notify each other immediately upon becoming aware of any alleged violations of, the Occupational Safety and Health Act (OSHA) relating in any way to the project or project site.

VI. **Audits:** In accordance with Government Code Section 8546.7, the State has the right to examine, review, audit and/or copy the Records of the work during the three (3) year period following final payment to the Contractor pursuant to the Contract. In addition, the "Purchaser" hereby has the right to examine, review, audit and/or copy the Records of the work during the three (3) year period following final payment to the Contractor pursuant to the Contract. Therefore, the Contractor shall make the Project Records available at its offices at all reasonable time during the performance of the Work and for three (3) years from the date of final completion or filing of a Notice of Completion for the Project, whichever is later. However, if any audit is commenced within such three (3) year period, the Contractor shall make the Project Records available at all reasonable times until proceedings related to such audit are complete and all statutes of limitations related thereto have expired. In the event the "Purchaser" notifies the Contractor that federal funds have been used in connection with Project, the Contractor shall retain and make available the Project Records for such longer period as may be required by federal law.

VII. **Entire Agreement:** This Agreement, upon acceptance, shall constitute the entire agreement between the parties and supersedes any prior representations or understandings.

VIII. **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.

IX. **Severability:** if one or more of the provisions of this Agreement are held to be unenforceable under laws, such provisions(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.

X. **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.

XI. **Assignment:** "ABS" retains the right to assign its rights and obligations of the Agreement with written consent of "Purchaser".

XII. **Acknowledgement:** Both "ABS" and the "Purchaser" acknowledge having read this Agreement and all contract documents incorporated herein and have executed this agreement on the date written above.

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

City of Huntington Beach	**Alliance Building Solutions, LLC.**
_____	_____
Signature	Signature
_____	_____
Title	Title
_____	_____
Date	Date

Attachment 1

Guaranteed Savings Measurement & Verification

Guaranteed Savings Measurement & Verification

This document contains the Measurement and Verification (M&V) plan for the energy savings related to the Energy Efficiency Measures (EEMs) contained in the Installation Agreement. The following table summarizes the EEMs implemented in these Phases of work.

Site	Lighting Upgrades	Mechanical Upgrades	Controls Upgrades	Electrical Upgrades	Renewable Energy Systems
Banning Library			X		
Beach Yard	X				
Bushard Fire Station	X				
Central Library	X	X		X	
City Gym and Pool	X				
Civic Center Complex	X			X	
Corporate Yard	X	X	X	X	
Gothard Fire Station	X				
Helen Murphy Library	X				
Joint Powers Training Center	X				
Junior Lifeguard HQ	X				
Lake Fire Station	X	X			
Lifeguard HQ	X				
Magnolia Fire Station	X	X			
Murdy Community Center	X	X	X	X	
Murdy Fire Station	X				
Newland Barn	X				
Oakview Community Center	X	X	X		
Oakview Library		X	X		
Search & Rescue Heliport	X			X	
Senior Center	X				X
Warner Fire Station	X	X			

For each EEM, a specific M&V plan is submitted to provide a comprehensive overall plan for the City. Energy savings shall be compared to the Utility Baseline Summary, as shown in Attachment 2. Each EEM's M&V Plan provides:

- A description of how the savings shall be verified.
- The selection of the specific protocol of verification of savings.
- The requirements for measurement or other means to establish savings.

ABS is responsible for pre-retrofit measurements, 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

As of the date hereof, ABS guarantees that Purchaser shall realize total annual project savings (utility savings, operational savings, capital cost avoidance, rebates and Solar ITC) as shown in the table below. Notwithstanding the foregoing or anything to the Contrary contained herein, Purchaser hereby agrees that (i) ABS's expectation regarding the annual project savings is an estimate, (ii) ABS's expectation regarding the project savings are based on IRS rules and regulations as of the date hereof, and (iii) ABS shall not be liable for any changes or amendments to the IRS rules and regulations after the date hereof. Additionally, Purchaser hereby agrees that Purchaser shall be solely responsible for the application required for Purchaser to claim any tax credits related to the Solar ITC. 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. The total project savings will exceed the Design Build Agreement amount and M&V payments associated with this agreement during the course of the useful life of the installed equipment. ABS agrees to complete the M&V Report on an annual basis and deliver to the Purchaser within one hundred and twenty (120) 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 ABS 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 ABS shall repair, replace, or substitute the EEM that is not performing at the required level, as identified in the M&V Report. Following corrective action, ABS shall re-perform the relevant M&V work for the affected EEM(s) and amend or supplement the M&V Report. If the sum of the EEMs 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 ABS 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 total guaranteed amount associated with this contract.

The Purchaser agrees that project savings, which exceed the guaranteed amount in any one (1) year, may be applied to previous and 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 2, may be modified over the course of the Guarantee Period to adjust for changes in utility rates, number of days in utility billing cycle, missing bills, missing meters, square footage, energy using equipment, building occupancy and weather. This Guarantee is subject to the Purchaser's adherence to the Control Parameters for Lighting and HVAC systems, as documented in the Installation Agreement Attachments. This guarantee assumes the annual utility rate escalator of 6% and the annual solar production at 100% of the estimated solar production in kWh.

Year	Guaranteed Savings
1	$426,053
2	$458,668
3	$493,039
4	$529,262
5	$567,440
6	$607,681
7	$650,101
8	$694,820
9	$741,965
10	$791,673
11	$844,085
12	$899,353
13	$957,636
14	$1,019,103
15	$1,028,198
Total	**$10,709,075**

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 International Performance Measurement and Verification Protocol (IPMVP): Concepts and Options for Determining Energy and Water Savings, Volume 1. This plan contains methodology that shall provide verification of the estimated program savings through direct utility billing comparisons, engineering calculations and/or field measurements.

M&V methods can differ based on the type, size and complexity of the project, as well as the availability of data, level of assurance of saving, financing constraints, and energy costs. The M&V methods used for this project are detailed herein and were selected to be the most cost effective while still providing a reasonable assurance of the savings calculations.

IPMVP Core Concepts March 2022 provides an overview of the IPMVP Options, as illustrated below:

M&V Option	M&V Methodology Description	How Savings Are Calculated
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 EEM's 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. Estimates can be based on historical data, manufacturer's specifications, or engineering judgment. Documentation of the source or justification of the estimated parameter is required. The plausible savings error arising from estimation rather than measurement is evaluated.	Engineering calculation of baseline and reporting period energy from short-term or continuous measurements of key operating parameter(s) and estimated values. Routine and non-routine adjustments as required.
Option B Retrofit Isolation: All Parameter Measurement	Savings are determined by field measurement of the energy use of the EEM-affected system. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the savings and the length of the reporting period.	Short-term or Continuous measurements of baseline and reporting period energy, and/or engineering computations using measurements of proxies of energy use. Routine and non-routine adjustments as required.
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 throughout the reporting period.	Analysis of whole facility baseline and reporting period (utility) meter data. Routine adjustments as required, using techniques such as simple comparison or regression analysis. Non-routine adjustments as required.
Option D Calibrated Simulation	Savings are determined through simulation of the energy use of the whole facility, or of a sub-facility. Simulation routines are demonstrated to adequately model actual energy performance measured in the facility. This Option usually requires considerable skill in calibrated simulation.	Energy use simulation, calibrated with hourly or monthly utility billing data. (Energy end use metering may be used to help refine input data.)

Selected Measurement and Verification Options

The below table illustrates the selected IPMVP Options for the EEMs covered under this M&V plan:

Site	Lighting Upgrades	Mechanical Upgrades	Controls Upgrades	Electrical Upgrades	Renewable Energy Systems
Banning Library			A, C		
Beach Yard	A, C				
Bushard Fire Station	A, C				
Central Library	A, C	A, C		A, C	
City Gym and Pool	A, C				
Civic Center Complex	A, C			A, C	
Corporate Yard	A, C	A, C	A, C	A, C	
Gothard Fire Station	A, C				
Helen Murphy Library	A, C				
Joint Powers Training Center	A, C				
Junior Lifeguard HQ	A, C				
Lake Fire Station	A, C	A, C			
Lifeguard HQ	A, C				
Magnolia Fire Station	A, C	A, C			
Murdy Community Center	A, C	A, C	A, C	A, C	
Murdy Fire Station	A, C				
Newland Barn	A, C				
Oakview Community Center	A, C	A, C	A, C		
Oakview Library		A, C	A, C		
Search & Rescue Heliport	A, C			A, C	
Senior Center	A, C				A, C
Warner Fire Station	A, C	A, C			

The particular options selected for each EEM was based on a number of related issues including: EEM complexity, EEM cost, EEM savings, cost of M&V and the ability to accurately determine holistic building operations. If more than one option is selected, either option will be considered valid by ABS and the Purchaser.

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

- Stipulated Values – These agreed upon values are important in the overall calculations for energy consumption, financial calculations, and operating conditions.
- 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 installation 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 usage, costing, and annual savings for evaluating the estimated and actual savings of EEMs.
- Pre-Retrofit Measurements – EEMs 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 – EEMs 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 – EEMs 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 – EEMs 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 EEM upon project completion.
- ABS will follow the agreed-upon M&V protocols for the measurement period and will prepare post installation reports with supporting documentation for the Purchaser.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement
For Lighting System Upgrades

M&V Procedure
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.

Stipulated Values
Operating Hours are stipulated for purposes of M&V. Please refer to the Lighting Systems Attachment in the Installation Agreement for a complete list of lighting hours of operation. Stipulated values are agreed to by the Purchaser.

Adjustments
For this EEM, 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 the number and/or type of lighting fixtures.
- Utility rates, billing days or degree days.

Savings Calculations
The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Savings = [(Existing Watts / Fixture) x (Existing Quantity) x (Existing Hours of Operation) / 1000] – [(Proposed Watts / Fixture) x (Proposed Quantity) x (Proposed Hours of Operation) / 1000]

Dollar Savings = (kWh Savings) x (Current Utility $/kWh Rate)

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

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

- During construction, ABS shall maintain a detailed record of the types and quantities of fixtures retrofitted and fixtures installed in each facility. A post construction inspection is required by the responsible M&V party.
- After lighting modifications have been completed, the installations shall be inspected to verify counts by fixture code.
- Post-retrofit lighting levels shall be measured to verify compliance with the contract standards.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement
For Mechanical System Upgrades

M&V Procedure
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 capacity, nameplate electrical and gas data 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 The Mechanical Systems and Controls Systems Attachment(s) in the Installation Agreement for specific operating hours and runtime hours for each HVAC unit or area. Stipulated values are agreed to by Purchaser.

Adjustments
None required for this EEM.

Savings Calculations
The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Savings = [(Capacity of Existing HVAC Unit) x (Existing Unit Efficiency) x (Stipulated Load Factor)] – [(Capacity of New HVAC Unit) x (New Unit Efficiency) x (Stipulated Load Factor)] x (Annual Hours of Operation)

Therm Savings = [(Capacity of Existing HVAC Unit) x (Existing Unit Efficiency) x (Stipulated Load Factor)] – [(Capacity of New HVAC Unit) x (New Unit Efficiency) x (Stipulated Load Factor)] x (Annual Hours of Operation)

Dollar Savings = (kWh Savings) x (Current Utility $/kWh Rate) + (Therm Savings) x (Current Utility $/therm Rate)

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

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

- ABS shall include verification that each new unit is operating as specified in all modes (heat/cool).

City of Huntington Beach HVAC Controls Operating Parameters									
Location	Equipment	M-F Start	M-F Stop	Wk End Start	Wk End Stop	Wk/Yr	Notes	Heating Set-Pt	Cooling Set-Pt
Central Library	HVAC	M: 13:00 Tue-Thu: 09:00	M: 21:00 Tue-Thu: 21:00	Fri-Sat: 09:00 Sun: 12:00	Fri-Sat: 17:00 Sun: 17:00	52		68	74
Corporate Yard	HVAC	5:00	19:00	N/A	N/A	51		68	74
Murdy Community Center	HVAC	8:00	21:00	8:00	13:00	52		68	74
Oakview Library	HVAC	9:00	19:00	9:00	19:00	51	Closed Sunday	68	74
Oakview Community Center	HVAC	14:00	18:00	10:00	16:00	52	Closed Sunday	68	74
Magnolia Fire Station	HVAC	24/7	24/7	24/7	24/7	52		68	74
Lake Fire Station	HVAC	24/7	24/7	24/7	24/7	52		68	74
Warner Fire Station	HVAC	24/7	24/7	24/7	24/7	52		68	74

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement
For Control System Upgrades

M&V Procedure
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 capacity, nameplate electrical data, efficiency rating, operating schedules, cooling and heating temperature setpoints for each 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 The Mechanical Systems and Controls Systems Attachment(s) in the Installation Agreement for specific operating hours and temperature setpoints. Stipulated values are agreed to by Purchaser.

Adjustments
For this EEM, the following adjustments are allowed for the purposes of Measurement and Verification:

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

Savings Calculations
The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Savings = (Capacity of HVAC Unit) x (Unit Efficiency) x (Stipulated Load Factor) x (Existing Annual Operating Hours – Proposed Annual Operating Hours)

Therm Savings = (Heating Capacity of HVAC Unit) x (Unit Efficiency) x (Stipulated Load Factor) x (Existing Annual Operating Hours – Proposed Annual Operating Hours)

Dollar Savings = [(kWh Savings) x (Current Utility $/kWh Rate)] + [(Therm Savings) x (Current Utility $/therm Rate)]

Operational Savings
The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are stipulated and 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 and/or Energy Management System.

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 control systems.

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

- ABS shall include verification that the operating schedules, cooling and heating setpoints and controls sequences for the HVAC equipment connected to the new thermostats and/or energy management system are programmed as specified.

City of Huntington Beach HVAC Controls Operating Parameters									
Location	Equipment	M-F Start	M-F Stop	Wk End Start	Wk End Stop	Wk/Yr	Notes	Heating Set-Pt	Cooling Set-Pt
Banning Library	HVAC	8:00	18:00	N/A	N/A	51	Closed Su-Mon	68	74
Corporate Yard	HVAC	5:00	19:00	N/A	N/A	51		68	74
Murdy Community Center	HVAC	8:00	21:00	8:00	13:00	52		68	74
Oakview Library	HVAC	9:00	19:00	9:00	19:00	51	Closed Sunday	68	74
Oakview Community Center	HVAC	14:00	18:00	10:00	16:00	52	Closed Sunday	68	74

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement
For Transformer Upgrades

M&V Procedure
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 transformer 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.

Stipulated Values
Operating Hours are stipulated for purposes of M&V. The hours of operation will match the hours the facilities were operating during the baseline period. The transformers are energized 24/7 year-round for all facilities. Stipulated values are agreed to by the Purchaser. The below table illustrates stipulated existing and proposed transformer losses and percentage loading based on extensive field measurements:

Transformer	Existing Equipment		Proposed Equipment				Savings
kVA	No Load Losses (W)	Full Load Losses (W)	No Load Losses (W)	Full Load Losses (W)	ON % Loading	Off % Loading	kWh Savings
15	315	1182	47	411	9.00%	5.00%	2,477
30	468	1462	68	594	9.00%	5.00%	3,579
45	642	2202	91	801	9.00%	5.00%	4,936
75	868	3347	127	1109	9.00%	5.00%	6,630
112.5	1200	4271	189	1653	9.00%	5.00%	9,067
150	1518	5544	227	1992	9.00%	5.00%	11,543
225	1870	8088	343	3009	9.00%	5.00%	13,679
300	2543	8592	421	3685	9.00%	5.00%	19,060

Adjustments
For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Utility rates, billing days or degree days.

Savings Calculations
The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Saving = EXISTING [(No Load Losses + ((On % Loading)^2(Full Load Losses-No Load Losses))) / 1000]*(Operation Hours) +*
[(No Load Losses + ((OFF % Loading)^2(Full Load Losses-No Load Losses))) / 1000]*(Operation Hours) –*
PROPOSED [(No Load Losses + ((On % Loading)^2(Full Load Losses-No Load Losses))) / 1000]*(Operation Hours) +*
[(No Load Losses + ((OFF % Loading)^2(Full Load Losses-No Load Losses))) / 1000]*(Operation Hours)*

Dollar Savings = (kWh Savings) x (Average Utility Baseline $/kWh Rate)

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

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

- During construction, ABS shall maintain a detailed record of the types and quantities of fixtures retrofitted and fixtures installed in each facility. A post construction inspection is required by the responsible M&V party.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement
For Solar Photovoltaic System

M&V Procedure
This option shall provide for the measurement of at least one variable pre- and post-retrofit with other variables allowed for stipulation. For this installation, the kilowatt-hour (kWh) production from the solar PV systems shall be measured and recorded.

Stipulated Values
The solar system savings are stipulated for the purposes of M&V. Values are obtained from the expected solar kWh production outlined in the Solar Systems Attachment and assuming a NEM 3.0 tariff with the utility. The solar panel degradation factor (0.8%/year), avoided energy cost ($/kWh, based on the City's rate schedule) and utility escalation rate (6%/year) are stipulated for the solar photovoltaic systems. Stipulated values are agreed to by Purchaser.

Savings Calculations
The calculations for the baseline energy consumption and post installation savings provided the basis for the overall financial viability of these EEMs. The following equations summarize the calculation of savings:

Electricity Production*: Electricity production of the PV system is determined by recording the kilowatt hours (kWh) off the net electric meter and recording the results.*

Dollar Savings: *After recording kWh production, each site's avoided energy cost ($/kWh), as shown in Utility Baseline, shall be used to determine dollar savings. Dollar Savings = (Annual kWh production) x (Avoided $/kWh) = Annual $ kWh Saved*

Maintenance of System
Calculation of energy cost savings from the solar PV systems are contingent upon the Purchaser maintaining an active operations and maintenance (O&M) contract with a solar service provider for the term of this agreement.

Pre-Retrofit Measurements
Existing utility electrical energy (kWh) consumption as shown in the Utility Baseline Summary, as shown in Attachment 2.

Post-Retrofit Measurements
Electrical energy (kWh) produced from the solar PV systems recorded from the net electrical meter.

Adjustments
For this EEM, the following adjustments are allowed for the purposes of Measurement and Verification:

- Addition or subtraction to the square footage of facilities.
- Utility rates, billing days or degree days.
- Addition or subtraction of electrical load at the facilities.
- Changes in the solar PV system sizing, location and layout.
- Changes in the conditions at or near any of the sites, which causes additional shading, soiling, or otherwise reduced performance of the solar PV systems.
- Adjustment to the Guaranteed Production values for weather shall use local weather data as recorded during the corresponding period.
- To the extent that the System output is negatively impacted by casualty, government regulation and or restriction that is beyond the Contractor's control to remedy within a reasonable time period, the Parties shall negotiate in good faith a modification of the Guaranteed Production.

Excused Production Losses
For this EEM, the following events are excused from production losses and any necessary adjustments are allowed for the purposes of Measurement and Verification:

- Force Majeure Events: Lost production from the beginning of a Force Majeure Event until production limiting factors caused by the Force Majeure Event have been remedied.

- Grid Event: Lost production when a fluctuation in the Grid frequency or voltage causes the inverters or the System to disconnect from the Grid. The "Grid" is defined to be the system receiving power exported from the System.
- Grid Outage: Lost production when a failure in the grid or Interconnection Infrastructure prevented energy from being exported from the solar facility. "Interconnection Infrastructure" means that utility-owned and maintained interconnection equipment (the substation including but not limited to transformers, switches, and protective relays) that is used to connect the Facility to the utility grid. Grid operator/owner ordered curtailments for any reason, other than an issue in the System, is a Grid Outage.
- Weather Events: Lost production from weather that limits or prevents safe operation of the solar facility including floods, snow, hurricanes, tornadoes, insolation-limiting wildfires, and volcanic activity.
- Purchaser Caused: Lost production when System dc capacity is off-line due to outages attributable to Purchaser's decision to perform or cause to be performed, any investigations, studies, operations, construction, installation and maintenance work or other activities deemed appropriate by ABS at its sole discretion.

Commissioning

Commissioning shall consist of inspections and a final Commissioning report. Commissioning of the new solar PV system shall include securing the Utility Interconnect agreement, proper alignment of the solar panels and functional testing.

Measurement and Verification Plan

IPMVP Option C: Whole Facility

M&V Procedure

The Measurement and Verification (M&V) Plan following IPMVP Option C protocol is designed to evaluate the energy performance of the whole facility, not just individual EEMs. The energy performance is assessed through utility meters, whole-facility meters, or sub-meters. The measurement boundary encompasses either the whole facility or a major section of the facility where EEMs were installed. Option C determines the combined savings of all the EEMs installed at the facility and is monitored by the associated energy meter. Savings reported under this Option will include the positive or negative effects of any non-EEM changes made in the facility because whole-facility meters are used.

Adjustments

Adjustments will be computed from identifiable physical facts about the energy governing characteristics of equipment within the measurement boundary. Adjustments are used to express both pieces of measured energy data under the same set of conditions. Two types of adjustments are possible:

- *Routine Adjustments* are used to account for any energy-governing factors, expected to change routinely during the reporting period. Routine Adjustments are completed by developing a mathematical model of each meter's energy-use pattern. Typically, the baseline model includes factors derived from regression analysis, which correlates energy to one or more independent variables such as occupancy, weather, and metering period length. Values of independent variables over the reporting period can be inputted into the baseline model to predict what the baseline energy consumption would have been had if no EEM's were installed.
- *Non-Routine Adjustments* are used to account for those energy-governing factors which are not usually expected to change, such as: the facility size, the design and operation of installed equipment, or the type of occupants. ABS will monitor these static factors for change throughout the reporting period. Adjustments will be based on industry standards and sound engineering principles as they pertain to the specific affected system.

Metering

Whole-facility energy measurements can use the utility's meters. Utility meter data is considered 100% accurate for determining savings because this data defines the payment for energy. The energy supplier's meter(s) may be equipped or modified to provide output that can be recorded by the facility's monitoring equipment. Meter data can be hourly, daily or monthly whole-facility data.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and ASHRAE. The baseline period and reporting period should use complete years of continuous data (12, 24, or 36 months). The electrical consumption reduction of the facility (measured in kWh and/or kW) shall be reported as Savings, or Avoided Energy Use, in which the savings are stated under the conditions of the reporting period and determined by the following equation:

Energy Savings (Avoided Energy Use) = (Baseline Energy ± Routine Adjustments to reporting-period conditions
± Non-Routine Adjustments to reporting-period conditions) - Reporting-Period Energy

The price schedule of the reporting period will be used to compute the "avoided cost" on a meter-by-meter basis. The price schedule will be obtained from the utility and will include all elements that are affected by metered amounts, such as consumption charges, demand charges, power factor, and demand ratchets. In the event of a significant decrease in energy prices, the price schedule used for savings reporting will be that which prevailed at the time of commitment to the investment. Cost savings are determined by applying the appropriate rate / price schedule in the following equation:

Cost Savings (Avoided Cost) = Cost of Baseline Energy - Cost of Reporting-Period Energy

Attachment 2

Utility Baseline Summaries

City of Huntington Beach - Electric Utility Data							
Site Name	Address	City, State	Account #	Range	Annual kWh	Annual Cost	Blended Cost
Banning Library	9281 Banning Ave.	Huntington Beach, CA	8013040267	6/2023 - 5/2024	8,132	$ 2,297	$ 0.28
Beach Yard	8669 Edison Drive	Huntington Beach, CA	8012960114	6/2023 - 5/2024	48,174	$ 11,296	$ 0.23
Bushard Fire Station	19711 Bushard St.	Huntington Beach, CA	8012961818	6/2023 - 5/2024	30,160	$ 7,505	$ 0.25
Central Library	18000 Goldenwest St.	Huntington Beach, CA	8014480642	6/2023 - 5/2024	586,740	$ 227,165	$ 0.39
City Gym and Pool	1600 Palm Ave.	Huntington Beach, CA	8012960264	6/2023 - 5/2024	210,943	$ 47,481	$ 0.23
Civic Center Complex	2000 Main St.	Huntington Beach, CA	8014333878	6/2023 - 5/2024	1,872,196	$ 1,416,464	$ 0.30
Corporate Yard	17371 Gothard St.	Huntington Beach, CA	8014490539	6/2023 - 5/2024	197,548	$ 67,496	$ 0.34
Gothard Fire Station	18311 Gothard St.	Huntington Beach, CA	8012962055	6/2023 - 5/2024	100,681	$ 29,073	$ 0.29
Harbor View Community Center	16600 Sybrook Ln.	Huntington Beach, CA	8013040325	6/2023 - 5/2024	5,024	$ 1,499	$ 0.30
Heil Fire Station	5891 Heil Ave	Huntington Beach, CA	8012961483	6/2023 - 5/2024	30,574	$ 8,330	$ 0.27
Helen Murphy Library	15882 Graham St.	Huntington Beach, CA	8013040337	6/2023 - 5/2024	7,882	$ 2,314	$ 0.29
Joint Powers Training Center	18301 Gothard St.	Huntington Beach, CA	8012962070	6/2023 - 5/2024	185,355	$ 52,049	$ 0.28
Junior Lifeguard HQ	21001 Coast Hwy.	Huntington Beach, CA	8012961267	6/2023 - 5/2024	106,504	$ 31,240	$ 0.29
Lake Fire Station	530 Lake St.	Huntington Beach, CA	8012961820	6/2023 - 5/2024	77,577	$ 17,229	$ 0.22
Lake View Community Center	17451 Zeider Ln.	Huntington Beach, CA	8013040355	6/2023 - 5/2024	1,195	$ 348	$ 0.29
Lifeguard HQ	103 Coast Hwy.	Huntington Beach, CA	8012961648	6/2023 - 5/2024	156,778	$ 37,340	$ 0.24
Magnolia Fire Station	21441 Magnolia St.	Huntington Beach, CA	8012965638	6/2023 - 5/2024	40,286	$ 9,694	$ 0.24
Main Street Library	524 Main St.	Huntington Beach, CA	8013040213	6/2023 - 5/2024	23,522	$ 6,375	$ 0.27
Murdy Community Center	7000 Norma Dr.	Huntington Beach, CA	8013040331	6/2023 - 5/2024	119,090	$ 59,493	$ 0.50
Murdy Fire Station	16221 Gothard St.	Huntington Beach, CA	8012961559	6/2023 - 5/2024	90,697	$ 23,308	$ 0.26
Newland Barn	19822 Beach Blvd.	Huntington Beach, CA	8012961624	6/2023 - 5/2024	5,466	$ 1,665	$ 0.30
Oakview Community Center	17261 Oak Ln.	Huntington Beach, CA	8013040227	6/2023 - 5/2024	30,082	$ 8,810	$ 0.29
Oakview Library	17251 Oak Ln.	Huntington Beach, CA	8013040381	6/2023 - 5/2024	27,349	$ 8,623	$ 0.32
Search and Rescue Heliport	18401 Gothard St.	Huntington Beach, CA	8012960944	6/2023 - 5/2024	108,366	$ 29,068	$ 0.27
Senior Center	1718 Orange Ave.	Huntington Beach, CA	8013537874	6/2023 - 5/2024	344,872	$ 87,942	$ 0.25
Terry Park Community Center	7701 Taylor Dr.	Huntington Beach, CA	8013040357	6/2023 - 5/2024	3,408	$ 992	$ 0.29
Warner Fire Station	3831 Warner Ave.	Huntington Beach, CA	8012961426	6/2023 - 5/2024	57,515	$ 17,018	$ 0.30

Attachment 3

Energy Efficiency and Renewable Project Cashflow