Performance Guarantee Agreement
Exhibits

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Exhibit A
Building System Scope

The 1063 Block Replacement Project building's energy performance is a combination of the building's architectural design, mechanical systems design, the building envelope design and equipment, electrical systems design and equipment and the building controls system. Each system works together to provide environmental controls (i.e. heating and cooling) for the building's occupants and equipment. The entire building's performance is measured by how much energy the building uses in terms of Energy Unit Intensity (EUI) and is expressed in the units of kBtu/sf/yr.

The following is a summary of equipment and systems that are subject to this Agreement's performance guarantee for energy, operations and maintenance. The equipment must be procured and installed by Design-Builder and located within, or on, the 1063 Building to be considered part of this Agreement.

1. Mechanical
   a. Air handling systems: Includes air handlers, terminal units, fan coil units and exhaust systems.
   b. Cooling systems: Includes chillers, heat exchange units, and associated pumps.
   c. Heating water systems: Includes boilers and associated pumps.
   d. Domestic hot water systems: Includes water heater and associated pumps.

2. Electrical
   a. Lighting fixtures, occupancy and daylight sensors, and Lighting controls.
   b. Energy Monitoring System with connection to the automated building control system (SkySpark).
   c. Onsite energy generation systems.

3. Automated Building Controls
   a. Alerton automated building controls system.
      3.a.1.Control system interface.
      3.a.2.Control valves, dampers, and other appurtenances.
   b. SkySpark analytics engine to identify equipment anomalies, provide trending data for equipment performance and information on utility usage.
   c. Connection to the Capitol Campus Johnson Controls Metasys systems.

4. Deliverables: An itemized list of equipment covered by the operations and maintenance portion of this agreement will be provided by the Design-Builder at the completion of construction for review by the Owner.

Exhibit B
Designated Performance Criteria

1. Energy

The 1063 Block Replacement Project consists of a 215,000 sf Office Building – 5 floors (Level G to Level 4).

The Performance building criteria are as follows:
The 1063 Block Replacement Project is being designed to out-perform a building built to the ASHRAE 90.1 2007 standard by 41 percent. More importantly, the building will be designed and constructed to enable it to achieve an energy performance target that will be validated through the Measurement and Verification process described in Exhibit C. Without relying on onsite energy generation achieved through renewables, the design energy model expects energy performance as follows:

a. Energy Use Intensity = 30.1 kBtu/sf/yr
b. Annual Energy Consumption = 1,900,000 kWh

The performance criterion for the 1063 building's energy performance is 30.1 kBtu/sf/yr.

The Design-Builder proposed a change order of adding photovoltaic cells (PV) on the roof for on-site renewable energy generation. The system is designed to offset seven percent of the building's energy costs and would also help the project achieve LEED Platinum certification. It is expected that the current proposed solar powered PV system design can generate an annual on-site energy generation consumption of 135,000 kWh (2.1 kBtu/sf/yr reduction).

2. Operations & Maintenance

The performance criterion for the operations and maintenance of the project will be the total annual cost of the Department of Enterprise Services (DES) work order tickets for the activity codes listed in Table 1, divided by the major buildings' square footage on campus listed in Table 2. This performance criterion for the 1063 building's operations and maintenance is $1.18 per gross square foot per fiscal year based on FY2013 data.

The Owner's fiscal year is July 1 to June 30, and the Owner does not close out the fiscal year until August 30th of each year. The Campus performance criteria will be calculated each fiscal year. The performance criteria of $1.18/GSF/fiscal year may increase based on actual DES costs but shall not decrease below $1.18/GSF/fiscal year.

At each annual milestone, the DES work order cost for activity codes listed in Table 1 for the 1063 Building will be divided by 215,000 GSF to determine the 1063 Building's operations & maintenance performance criteria. The 1063 building's cost per gross square foot number may not be available to the Design-Builder until after August 30th. To determine if the Design-Builder has met the criterion, it may be necessary to use the most recent fiscal year end data to determine the building's operations and maintenance calculation of the cost per gross square foot per year.

Exhibit B
Designated Performance Criteria

Table 1: Performance Criteria – Activity Codes

Activity	*Description*
110	Electrical equipment repairs & maintenance
120	Fixture & circuit repairs & maintenance
130	HVAC motors repairs & maintenance
140	Mech. system motors repairs & maintenance
150	Generator repair, maintenance, & setup
170	Variable frequency drive repairs & maintenance
180	Lighting controller repairs & maintenance
200	Elect power distribution system repairs & maintenance
240	Monitoring & controlling campus automatic controls system
250	HVAC controller repairs & maintenance
260	Other electronic system repairs, installation & maintenance
510	Boiler Plant-System Check
512	Boiler Plant-support equipment repair
514	Boiler Plant-water treatment
515	Pressure vessel inspection
520	Chiller Plant-System Monitoring
521	Cooling tower maintenance
531	Steam Leak repair & response
590	"Hot & Cold" calls (not incl. repairs to mech/elect equip)
599	Refrigeration Repair & Maintenance
600	Heating systems repairs & maintenance
601	Cooling systems repairs & maintenance
602	Ventilation systems repairs & maintenance
607	HVAC Controls
801	IAQ Investigation Activities
802	IAQ Industrial Hygiene Sampling & Analysis
804	IAQ Remedial Activities
891	Light replacement-office areas
892	Light replacement-public areas
893	Light replacement-restrooms

from 4/4/2013 activity code list/ssh

The criterion was developed by taking the average annual cost of the specific activity codes listed above for the following Capitol Campus buildings listed in Table 2.

Exhibit B
Designated Performance Criteria

Table 2: Capitol Campus Buildings included in the Operation & Maintenance Criteria

Building Common Name	Asset ID	Gross SF
ARCHIVES	045	51,317
CHERBERG (JAC)	010	100,377
CHERBERG (P&HF)	210	incl
EMPLOYMENT SECURITY	040	93,200
GA BUILDING	080	283,865
HIGHWAY-LICENSES (HLB)	030	193,900
INSURANCE (INS)	070	66,502
LEGISLATIVE (LEG)	005	255,564
LEG BLDG (P&HF)	205	incl
NATURAL RESOURCES (NRB)	011	387,558
NEWHOUSE	015	25,084
O'BRIEN (JOB)	020	100,700
O'BRIEN (P&HF)	220	incl
OFFICE BUILDING #2 (OB2)	072	379,204
PRITCHARD	025	55,485
PRITCHARD	225	Incl
TEMPLE OF JUSTICE (TOJ)	075	85,900
TEMPLE (P&HF)	275	incl
TRANSPORTATION (DOT)	050	204,767
Total GSF		2,283,423

Notes:

1. Excludes: Mansion, Conservatory, Press Houses, Visitor Center, Garages
2. The following buildings are connected to the campus chilled water loop and/or steam plant and share Powerhouse distribution costs: Archives, Employment Security, Highway-License, OB2, Cherberg, Insurance, Legislative, Newhouse, O'Brien, Pritchard, Temple and GA.

Exhibit C
Measurement & Verification Plan

1. Introduction
The measurement and verification process tracks the energy performance guarantee and the achievement of LEED 2009 NC Energy and Atmosphere Credit 5 – Measurement and Verification to create real energy cost savings. The following Measurement and Verification (M&V) plan provides:

a. A definition of the design energy performance and confirmation of the agreed upon operational assumptions used in the design including hours of operation and occupancy profiles
b. A description of the energy accounting process and the Parties' approach to energy adjustments based upon variances in actual occupancy and operation patterns from the assumptions used in designing the project and establishing the targets.
c. A description of what is required of the Design-Builder through its controls contractor, ATS Automation Inc. (ATS), and M&V consultant, WSP Built Ecology, in setting up the M&V process.
d. The collaborative approach that the Parties will take to assess and improve quarterly and cumulative energy performance
e. Documentation required for LEED 2009 NC Energy and Atmosphere Credit 5.

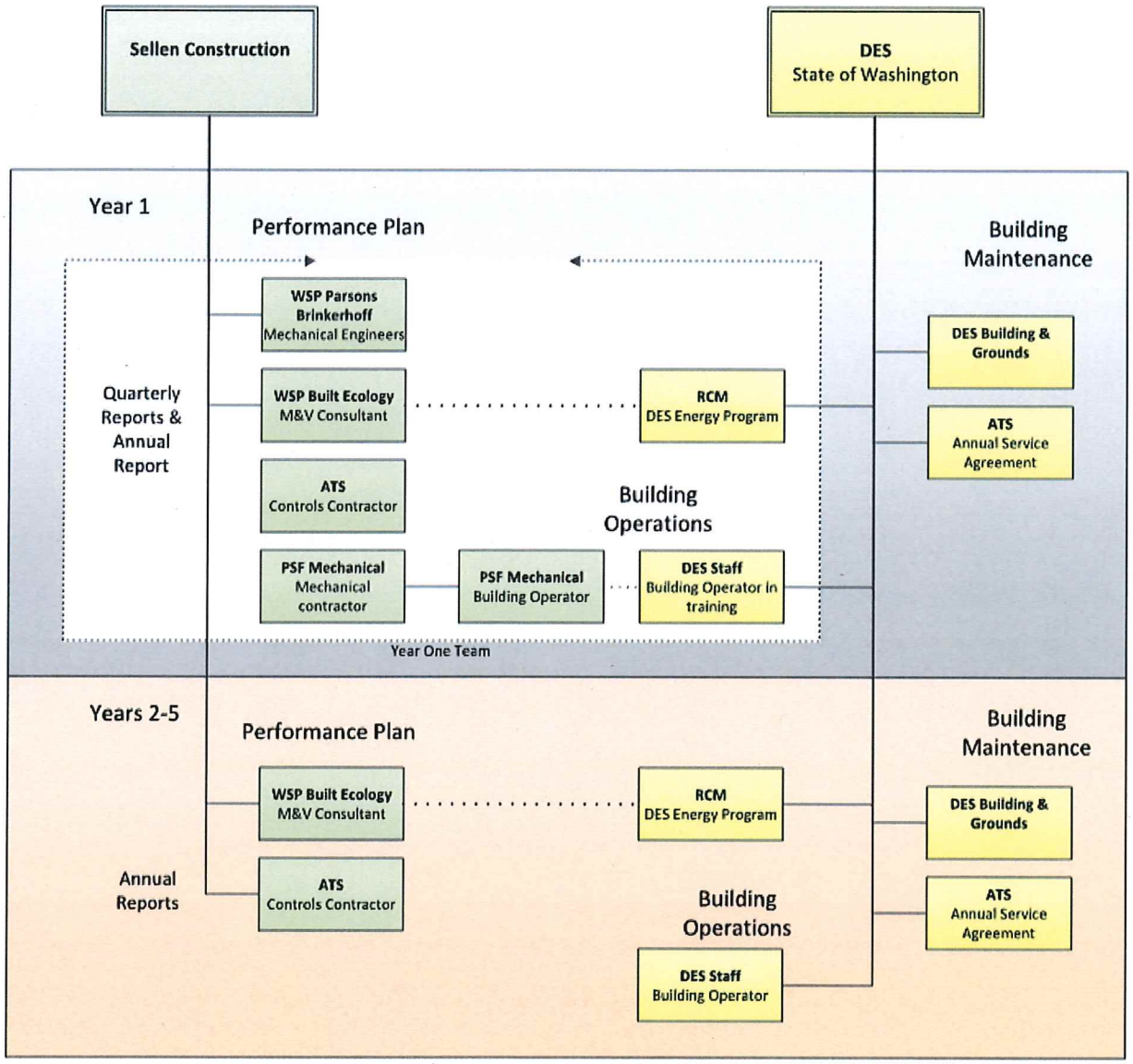
2. Measurement & Verification Plan participants
An organization chart of the participants is provided in Table 3.

a. Owner Team
    1) DES Asset Management
    2) DES Building & Grounds maintenance staff
    3) DES Resource Conservation Management (RCM)
    4) Commissioning Agent (third party vendor, Engineering Economics, Inc. (EEI))

b. Design-Build team
    1) Sellen Construction, Design-Builder
    2) ZGF Architects, architect
    3) WSP Parsons Brinckerhoff, mechanical engineer
    4) WSP Built Ecology, a division of WSP Parsons Brinckerhoff with expertise in energy modeling and measurement & verification plans.
    5) PSF Mechanical, Inc., mechanical contractor
    6) Valley Electric, electrical contractor
    7) ATS automated building controls contractor. Also provides annual service agreement services directly to DES.

Exhibit C
Measurement & Verification Plan

Table 3: Organizational Chart for Roles and Responsibilities



3. Process Overview

This M&V plan is designed to align the operating energy performance with design and identify areas of excess energy consumption that can be addressed to improve performance, and help enable consistency in performance over time. Despite thorough design, construction, controls implementation, and commissioning, many new buildings consume much more than the energy modeled during the design. Part of this is often caused by higher than anticipated, "non-regulated" equipment energy usage (or "plug load") by the tenant that can vary greatly and be problematic to accurately estimate during design. Another cause can be attributed to HVAC and lighting systems operating out of spec and consuming more energy than they were designed to use. The proposed process and responsibilities are outlined below to identify and address such issues. For each phase, a task is listed with the responsible party for the deliverable in parenthesis.

Scope Validation & Design Phase

a. Review assumptions to confirm energy model assumptions associated with the building tenants and operation and the validity of the energy target after substantial completion. (Sellen and Owner)
b. M&V Plan Development to outline the agreed upon target and the process through which built energy performance will be assessed and reconciled (Sellen/ WSP Built Ecology)
c. Controls and Metering Design (Sellen/ WSP Parsons Brinckerhoff/ATS)
d. Design Energy Model (Sellen/ WSP Built Ecology)

Construction Phase

a. Metering infrastructure Installation (PSF Mechanical Inc. & Valley Electric)
b. BMS program and M&V software integration (ATS)

Commissioning Phase

a. Sample data report from BMS system and any software overlay reviewed for completeness (EEI and ATS)
b. Commissioning report delivered to WSP Built Ecology (EEI)

Post Occupancy (M&V) Phase

a. Meter data delivered (Owner/ATS)
b. Access to M&V Software (Owner/ATS)
c. Regular meter data collection and analysis to identify anomalies during Year 1 (WSP Built Ecology)
d. Quarterly M&V reporting during Year 1. (WSP Built Ecology)
e. Annual M&V reporting in Years 2 to 5. (WSP Built Ecology)

4. Energy Performance Assumptions

The energy performance of 30.1 kBtu/sf/yr is based on an energy model developed using the architecture, materials, and building systems included in the design. This energy is broken out and will be tracked as follows:

Table 4: EUI Assumptions

1063 Block Replacement Project

Item	Power	Unit	Amount	Percentage
Lights	Elec	kBtu/sf/yr	7.34	24.4%
Space Heating	Elec	kBtu/sf/yr	3.18	10.6%
Space Heating	Gas	kBtu/sf/yr	1.56	5.2%
Space Cooling	Elec	kBtu/sf/yr	0.95	3.2%
Pumps	Elec	kBtu/sf/yr	0.32	1.1%
Heat Rejection	Elec	kBtu/sf/yr	0.32	1.1%
Fans	Elec	kBtu/sf/yr	3.55	11.8%
Domestic Hot Water	Gas	kBtu/sf/yr	0.82	2.7%
Receptacles	Elec	kBtu/sf/yr	8.62	28.6%
Other Plug Load	Elec	kBtu/sf/yr	3.45	11.5%
Total		**kBtu/sf/yr**	**30.11**	

Photovoltaics	Elec	kBtu/sf/yr	-2.11	7.0%	*

*Add-on option with separate audit trail

The basis for the energy performance detailed above includes numerous assumptions with regards to the tenant use and operation of the building. These assumptions were included in the Sellen/ZGF competition submission and are included on the following pages for reference. These assumptions have been reviewed and accepted by the Owner.

Exhibit C
Measurement & Verification Plan

Table 5: Measurement & Verification Plan Assumptions

Item	Assumptions
1. Schedule of Operations	a. Responsibility: DES/Tenant b. Assumption: Weekdays 6:00 am to 6:00 pm (except 24/7 spaces). No weekend work, ASHRAE 90.1 load profiles c. Narrative: This category covers the amount of time and the quantity of equipment that is on throughout the year including: lighting systems, tenant equipment, and HVAC systems. This plan assumes 12 hour week day only operating hours (6am to 6pm – except 24/7 spaces). It also assumes that lighting and equipment are operated per ASHRAE 90.1 load profiles, with less than 10% of lights and equipment are on overnight. This is indicative of occupants shutting of lights and computers when they leave.
2. Plug Load	a. Responsibility: DES/Tenant b. Assumption: 0.75 watts/sf c. Narrative: Plug loads in offices typically range from 0.5W/SF to 1.5 W/SF or higher. Based on research, experience and the improvement in energy performance of office equipment, the plan's model uses 0.75W/SF.
3. Central Plant Systems	a. Responsibility: Design-Builder b. Assumption: Stand-alone heating and cooling system c. Narrative: The Design for the 1063 Building has a number of features that enable high performance. 1) The cooling units in the workplace zone operate at a higher supply water temperature than typical air based VAV systems. This enables more use of high efficiency water side economizers and higher efficiencies on the chiller. 2) The heating is done hydronically to enable the use of a heat recovery chiller (also referred to as a heat pump) that sources heat from a 50 ton ground loop. The Design-Build team studied the costs and benefits of connecting to the campus central plant system. The current campus steam system does not run next to the 1063 Building site. It was more cost effective to use a stand-alone system at this time. If the central system changes to a hot water system, the 1063 Building's hydronic system is able to tie into high efficiency district systems when those systems become available.
4. HVAC systems	a. Responsibility: Design-Builder & tenant b. Assumption: Occupant Enabled systems c. Narrative: The HVAC system includes a strategy of an Occupant Enabled System. This system saves energy be being off when the outside air temperature is appropriate for passive cooling. Occupants can open the windows if they feel warm, or activate the system via wall mounted switches. Ventilation air is always provided and window operation is not necessary for breathing, only for passive cooling.

Table 5: Measurement & Verification Plan Assumptions - continued

Item	Assumptions
5. Thermostat set points	a. Responsibility: Design-Builder b. Assumption: Occupied indoor range: Winter minimum – 68 degrees F Winter maximum – 74 degrees F Summer minimum – 70 degrees F Summer maximum – 76 degrees F Unoccupied Indoor range: Minimum – 55 degrees F Maximum – 85 degrees F c. Narrative: Temperature set points are based on the RFP documents and provide a wide enough band to support energy savings and passive cooling.
6. Lighting	a. Responsibility: Design-Builder b. Assumption: 0.7 watts/sf plus controls c. Narrative: The lighting design achieves the targeted light levels in the space with a high efficiency 0.7 W/SF of lighting load density coupled with daylight and occupant sensors.
7. Building Form	a. Responsibility: Design-Builder b. Assumption: As shown in RFP proposal c. Narrative: With respect to energy, the 1063 Building form considers access to daylight and the associated lighting energy reductions, the massing and the associated heating and cooling, and the occupant's access to operable windows which can reduce energy usage when used for passive cooling.
8. Facade	a. Responsibility: Design-Builder b. Assumption: Glass performance 56 percent WWR Center of Glass U value = 0.28 btu/h-ft^2 – K, SHGC =0.27 VLT = 0.64 c. Narrative: Glass performance and the amount of glass will behave energy impacts on heating, cooling, and daylight harvesting/lighting energy. The glass assumed in the model is a high performance glass with a balance of good insulating value to keep the building warm in the winter, a low SHGC to block solar gain and enable the low energy cooling system, and a high VLT to allow in natural daylight. This coupled with the well balanced 56% glass which is low enough for energy performance with sacrificing views or access to natural light. The façade also includes external shading tuned to our solar orientation and internal blinds to protect against direct sun and visual discomfort.

Table 5: Measurement & Verification Plan Assumptions - continued

Item	Assumptions
9. Domestic Hot Water	a. Responsibility: Design-Builder b. Assumption: High Efficiently plumbing fixtures c. Narrative: Domestic hot water energy is only expected to make up a small portion of the overall energy usage in this office building. However, by simply reducing the water flow through low flow showers and faucets, the energy required to heat water in the building can be reduced.
10. 24/7 loads within the building	a. Responsibility: DES/Tenant b. Assumption: 7 percent of plug load 25kW constant load 219,000 kWh/yr SF is defined in Table 6. c. Narrative: Server rooms can have a tremendous impact on building energy performance. The 1063 Building includes electrical design requirements of a 150kW service for the server room and IDF rooms.
11. On-site Renewables	a. Responsibility: Design-Builder & DES b. Assumption: Closed loop geothermal and Photovoltaics c. Narrative: Included in the proposal is a closed loop geothermal system to supply approximately 50 tons of cooling. The geothermal system is included in the EUI calculation. During the project design phase, DES added a photovoltaic system to supply approximately 7% of the electrical power load. The contribution to EUI for the photovoltaic system is tracked separately.
12. Occupancy Type	a. Responsibility: DES & Tenant b. Assumption: Office with support spaces c. Narrative: The occupancy type is based on the program provided in the DES Request for Proposal dated Nov. 27, 2013 and its addenda. The re-programming during the design phase did not changed the occupancy type. If the occupancy type changes to a more intensive energy use, the EUI calculation will be adjusted per Exhibit C, paragraph 6.
13. Occupancy Load	a. Responsibility: DES & Tenant b. Assumption: Approximately 775-780 FTE's c. Narrative: The total number of people occupying the building can impact the building's energy use. DES will report FTE count to the Design-Builder per Exhibit D.
14. Weather	a. Responsibility: Design-Builder to track b. Assumption: Olympia, Washington, NOAA Olympia Airport weather station c. Narrative: The energy model is based on the average temperatures for Olympia, Washington. Weather will be tracked and compared to the typical meteorological year that was used for the energy model. If larger variance are observed (1.3 times the ASHRAE listed HDD/CDD for Olympia) then the energy model will be rerun to calculate the impacts of this weather anomaly.

Item	Assumptions
15. Elevators	a. Responsibility: DES & Tenant - Design-Builder to track b. Assumption: 8,815 kWh c. Narrative: 3 passenger and 1 freight elevator serve the building and are projected to use 8,815 kwh. This estimated energy usage was included in the energy model as part of "Other plug load" in Table 4. Efficient motors are incorporated into the elevator design however actual energy use will be dependent on number of occupants and hours of operation which are outside of the control of the design-build team.

Table 6: 24/7 Areas included in the assumptions

No	Tenant Group	Dept/Division	Room Name	Quant.	SF	Multi-plier	Total SF
1	DES	Building Support	MDF	1	300		300
2	DES	Building Support	IDF, east	5	140		700
3	DES	Building Support	IDF, west	5	140		700
4	WSP	Criminal Records	Tenprint Office	3	120	1.44	518
5	WSP	Criminal Records	Tenprint workstations	21	64	1.44	1,935
6	WSP	Criminal Records	ACCESS terminal	1	264		264
7	WSP	Criminal Records	File Storage	1	1,100		1,100
8	WSP	Criminal Records	AFIS workstation	6	30		180
9	WSP	Information Technology	Tier 1 workstations	12	64	1.44	1,106
10	WSP	Special Operations	Squad Room	1	1,020		1,020
11	WSP	Special Operations	Command Post	1	500		500
12	WSP	Special Operations	workstation	3	64	1.44	276
13	Legislative	LSC	workstations	34	80	1.44	3,917
	Total			**94**	**3,886**		**12,517**

5. Data Collection

The project has been designed to include metering and data collection points from key systems equipment to determine the project's energy performance. The Building Management System (BMS) is the primary system for data collection. Through the BMS, the data will be exported to the Energy Monitoring software used during the M&V process. The 1063 Block project will use the SkySpark software as the Energy Monitoring software.

ATS shall insure energy metering data is provided as follows:

a. On no greater than 15 minute intervals to the Energy Monitoring software
b. Readings will be at a minimum 98 percent complete – missing data due to lost data connection will total less than 2 percent per point each month.

ATS shall, upon request, provide additional trend data on other, non-energy meter points collected by the overall BMS. The trend data may be used by WSP Built Ecology and others responsible for the building operational performance to diagnose energy anomalies.

SkySpark will allow manipulation of the data such that each point can be graphically represented and compared to other points, on a varying time basis. The software interface will be accessible remotely by the WSP Built Ecology. SkySpark will also be easily programmable to output repeatable reports that can be used by the EEI, WSP Built Ecology, the PSF and DES to assess the building's performance.

Table 7 provides an example of the Excel form that the team will use to collect the data.

Table 7: Data Collection Form

1063 Block Replacement Project

Monthly Energy Data
Measurement and Verification Plan

Targeted Energy Performance vs. Metered Energy Performance

This Energy Data spreadsheet has been developed to compare the targeted energy performance with the metered energy performance. A portion of the annual energy target will be allocated to each month based on the number of days per month and the modeled cooling and heating loads. Each month the total metered energy will entered into the spreadsheet and adjusted based on actual operating conditions. Measurement and Verification reports will indicate if the building energy is tracking as budgeted and will provide the energy budget that is

Month:

	Monthly Summary (kWh)	Monthly Summary (kBtu/SF)	Cumulative To Date (kWh)	Cumulative To Date (kBtu/SF)	Remarks	M&V Performance 2017 - Jan	2017 - Feb	2017 - Mar	2017 - April	2017 - May	2017 - June	
Electrical Meter (includes reductions from renewable energy generation)												Continued for the full year and repeated for each year of Measurement and Verification
Beginning of Month												
End of Month												
Total Electrical Energy												
Gas Meter												
Beginning of Month												
End of Month												
Total Gas Energy												
Total Electrical & Gas Energy												
Renewable Energy Meter												
Beginning of Month												
End of Month												
Total Renewable Energy												
Adjustments (see separate sheets for details)												
a1 Tenant Plug Load												
a2 24/7 Plug Load												
a3 Occupancy (kWh)												
a4 Lighting Hours (kWh)												
a5 Plug Load (kWh)												
a6 Other												
Adjusted Energy Use (kWh)												
Adjusted Energy Use (kBtu/SF)												
Contract Target Comparison												
Targeted Energy Use												
Delta (Adjusted-Target)												
% variation												

Exhibit C
Measurement & Verification Plan

After the mechanical systems are designed and during the construction process, the controls contractor will generate a points list that daylights the information that will be acquired by the building management system (BMS).

Table 8: Partial Points List

ACM Slot 3 MSTP Module

Mac			
0			
1	FPT-1-3-1		
2	FPT-1-3-2		
3	FPT-1-3-3		
4	FPT-1-3-4		
5	FPT-1-3-5		
6	FPT-1-3-6		
7	FPT-1-3-7		
8	FPT-1-3-8		
9	FPT-1-3-9		
10	FPT-1-3-10		
11	FPT-1-3-11		
12	FPT-1-3-12		
13	FPT-1-3-13		
14	FPT-1-3-14		
15	FPT-1-3-15		
16	FPT-1-3-16		
17	FPT-1-3-17		
18	FPT-1-3-18		
19	FPT-1-3-19		
20	FPT-1-3-20		
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99			
127			

ADDITIONAL NOTES:

Configuration Settings	Default Settings
Location of Controller	Level G
Host Name:	1st Floor Controllers
Device Instance:	1631200
Enable NiagaraD	N
Enable ETH0	N
Enable ETH1	N
Slot 3 Device	MSTP Module
Enable MSTP	Y
MSTP Slot number	3
MS/TP Network #	111
MS/TP Mac #	0
MS/TP Baud Rate	76.8K
Max Info Frames	60
Enable v1.02 and Earlier VLC's	Y
Enable v1.14 VLC's	Y
Enable MS/TP Slave Proxy	N
Enable MS/TP Slave Auto dscvry	N
Network Settings:	
Network Numbers, IP Address,	See Global Network List
Subnet Mask, Gateway Address	For Settings
Annex J, Public IP Address, Etc	
Day Light Savings Menu:	
Enable Date Range	N
Set UTC Offset Minutes	480
Daylight Savings Start Time	2:00 am
Daylight Savings Start Date	2nd Sunday in March
Daylight Savings End Time	2:00 am
Daylight Savings End Date	1st Sunday in November

REVIEWED

Sellen

WN BY: AM	DATE: 6/30/2016	REV:Preliminary Set	JOB# 1115132
Mac Address Table 1063 Building Capitol Campus 1115132.dwg			

GLOBAL MAC Address Table
Global 01C 01D

3.301

6. Adjustments

The energy performance guarantee was based on an energy model with the assumptions stated in Section 4 above. It is likely that the building will operate in ways that are not within the parameters of the assumptions. Therefore, the data collected by the BMS will need to be adjusted to account for actual operations. The following outlines the categories and adjustment methodology for each category.

Item a1. Plug Load – Tenant Receptacles

Basis of Design	0.75 W/sf 550,000 kWh/yr. 8.62 kBtu/sf/yr.
Operational Metering	Sub-metering of whole building tenant receptacles
Energy End Use Impacted	Plug
Adjustment Methodology	Total Metered Tenant Receptacle Loads (kWh) minus Total Modeled Tenant Receptacles Loads (kWh) equals a1. Plug Load Adjustment (kWh)

Item a2. Plug Load 24/7 spaces

Basis of Design	25kW constant load 219,000 kWh/yr. 3.45 kBtu/sf/yr.
Operational Metering	Sub-metering of 24/7 building loads
Energy End Use Impacted	Plug
Adjustment Methodology	Total Metered 24/7 Loads (kWh) minus Total Modeled 24/7 Loads (kWh) equals a2. 24/7 Plug Load Adjustment (kWh)

Item a3. HVAC Operating Hours

Basis of Design	Weekdays 6am to 6pm See Table 5.
Operational Metering	BMS System
Energy End Use Impacted	HVAC System
Adjustment Methodology	Metered HVAC energy outside of operating hours (kWh) equals a3. HVAC Operating Hours Adjustment (kWh) The Design-Build team understands that spaces designated in Table 6 will/may be operated on a 24/7/365 basis. The HVAC energy for these spaces will be tracked and not counted against the EUI target.

Item a4. HVAC Windows

Basis of Design	The benefits and the risks of window operation are not included in the energy model. (This adjustment is expected to be minor and may be removed from the M&V process if this is confirmed during the early periods of the performance guarantee period.)
Operational Metering	BMS System and zone thermostats
Energy End Use Impacted	HVAC System
Adjustment Methodology	Not anticipated to be required

Item a5. Lighting – Operating Hours

Basis of Design	0.70 W/sf 470,000 kWh/yr. 7.34 kBtu/sf/yr. Weekdays 6am to 6pm ASHRAE 90.1 office profiles with overnight lighting less than 10% of lighting loads (including emergency lighting)
Operational Metering	Sub-metering of building interior lighting
Energy End Use Impacted	Interior Lighting
Adjustment Methodology	Total Metered Lighting Loads (kWh) minus Total Modeled Lighting Loads (kWh) equals a5. Lighting - Operating Hours Adjustment (kWh)

Item a6. Other: Any other adjustments will be discussed and agreed upon with the Owner prior to being applied

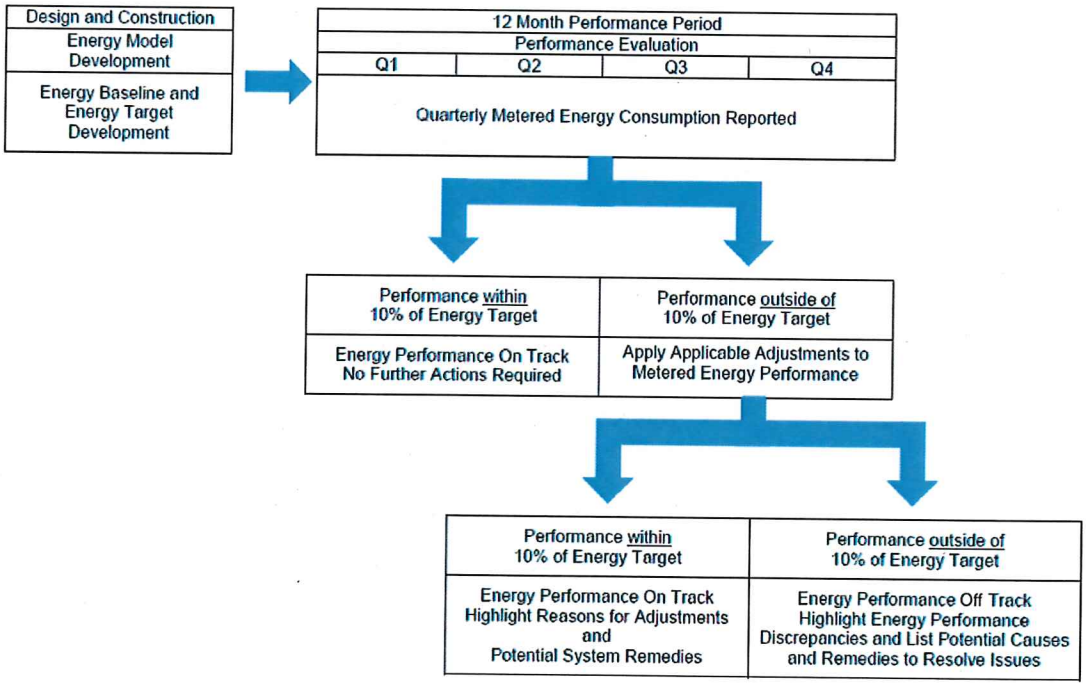
Once the data is collected and adjustments made, WSP Built Ecology will review and analyze the data and issue reports that:

a. Identify the areas of the building with the highest energy usage
b. Provide the measured energy breakdown by system type
c. Confirm that the building systems are being operated and controlled as designed
d. Confirm that equipment is performing as designed and as promised by the equipment manufacturers
e. Indicate the built energy performance compared to the modeled energy performance
f. Identify solutions to energy performance issues and opportunities for performance improvements

7. Operational Performance

This M&V plan provides a systematic procedure for determining the operational performance and energy consumption of the building and its systems. The International Performance Measurement and Verification Protocol (IPMVP) document provides the framework for this plan. IPMVP Option D, Calibrated Simulation, has been selected as the approach for this project. This entails the use of an energy simulation model to determine end use loads and annual building energy consumption. The main reason for selecting Option D is that we would like to investigate performance on a whole building level. This is a large building with a number of energy conservation measures and interacting systems making assessment of an individual measure difficult. Energy modeling and calibration is achieved through the following process:

Table 9: Operational Performance Flow Chart



8. Operations

Collaborative Process

The Design-Builder and Owner understand that the performance of this high-performance building relies on great design, quality construction, thorough commissioning, optimization, proper operation, and occupant engagement. In order for the Design-Builder to guarantee the energy performance of the building, they need to be involved in the operations, monitoring, and maintenance of the building. Therefore, the following operations plan outlines activities for the Design-Builder and the Owner.

YEAR ONE

During the first year a M&V team will be deployed that includes the following people:

1. The building owner and the operator: DES
2. The Year One building operator: PSF Mechanical & DES Building & Grounds staff
3. The mechanical subcontractor: PSF Mechanical
4. The controls contractor: ATS
5. The general contractor: Sellen Construction
6. The architect: ZGF Architects
7. The mechanical design engineer: WSP Parsons Brinckerhoff
8. The M&V Consultant: WSP Built Ecology

This team will continually monitor the building and tune it for optimal performance. Quarterly reports will be issued to the owner, the tenants, the operator and the design team to document tuning actions taken and to track the targeted performance. At the end of year one, the year one team will hand the operations of the building over to the fully engaged DES building operator and issue a final quarter/annual report.

YEARS 2-5

For years 2, 3, 4 & 5 of the Performance Guarantee period, DES staff will be operating the building full time. At the end of each year, the Design-Build team will use data collected throughout the year and consolidate it into an annual building energy report that tracks the targeted performance. Along with the report, the team will meet with the Owner to discuss the findings in the report and recommend opportunities for continued or improved building performance. The Design-Build team is available on a consulting basis at additional per diem compensation to provide additional training if needed (for example if the DES operator trained during the Year One period leaves, and DES wants to train additional staff).

9. Maintenance Responsibility

In general, the maintenance of the building is the responsibility of the Owner. The following chart outlines the maintenance plan for the building's environmental systems for the performance guarantee period.

Table 10: Maintenance Responsibility Plan

Equipment	Preventive maintenance	Regularly scheduled maintenance	Warranty work
HVAC systems	To be conducted by DES staff per the O&M manuals provided by the Design-Builder.	To be conducted by DES staff per the O&M manuals provided by the Design-Builder.	**Year 1** – covered by the 1 year warranty period as part of the Design-Build GMP.
Electrical systems related to building controls	To be conducted by DES staff per the O&M manuals provided by the Design-Builder.	To be conducted by DES staff per the O&M manuals provided by the Design-Builder.	**Year 1** – covered by the 1 year warranty period as part of the Design-Build GMP.
Building controls system	To be conducted by ATS staff under the annual service agreement with DES.	To be conducted by ATS staff under the annual service agreement with DES.	**Year 1** – covered by the 1 year warranty period as part of the Design-Build GMP.
SkySpark analytics program	To be conducted by ATS staff under the annual service agreement with DES.	To be conducted by ATS staff under the annual service agreement with DES.	Included in the Building Controls system
Connection to the campus Johnson Controls Metasys systems	To be conducted by ATS staff under the annual service agreement with DES.	To be conducted by ATS staff under the annual service agreement with DES.	Included in the Building Controls system

Exhibit D
Owner's Obligations

1. **Energy**
   The Owner shall provide the following:

   a. Prior to substantial completion of the Design-Build Contract, the Owner shall provide the Design-Builder the estimated number of tenants moving into the building and their expected move-in dates. The Owner shall update this information on a monthly basis for the six months following substantial completion of the Design-Build Contract.
   b. During the five year performance guarantee period, the Owner shall provide the Design-Builder unfettered access to the building control systems data.
   c. Owner shall quarterly inform Design-Builder of the occupancy level.

2. **Operations & Maintenance**
   The Owner is responsible for the following items:

   a. The owner will provide staff for the commissioning period with DES participation during the first year of the performance guarantee, see Table 3: Organizational Chart for Roles and Responsibilities.
   b. During the first year of the performance guarantee period, the Owner shall notify the Design-Builder within two weeks of any changes in DES operations personnel and cooperate in developing a training program for the new DES operations personnel.
   c. During years two through five of the performance guarantee period the Owner shall notify the Design-Builder within two weeks of any changes in DES operations personnel. If the Owner wishes to engage the Design-Builder to train DES staff, the Parties will cooperate to develop a training program. The Design-Builder expenses and fee for additional training for new staff are in addition to payments per Exhibit E and are not included in this Agreement.
   d. During the five year performance guarantee period, the Owner shall perform the building's preventive and regularity scheduled maintenance by its own forces or contracted forces.
   e. During the five year performance guarantee period, the Owner shall engage ATS for annual service agreements.
   f. During the first year of the performance guarantee period, the Owner shall provide the Design-Builder quarterly reports of the applicable work orders and their dollar amounts as outlined in Exhibit B.
   g. During years two through five of the performance guarantee period, the Owner shall provide the Design-Builder annual reports (or fiscal year end reports) of the applicable work orders and their dollar amounts as outlined in Exhibit B.
   h. Other Owner obligations are to be per Exhibit C, Table 5.

Exhibit E
Payment Schedule for Financial Agreement

The payment for the performance guarantee shall be paid to the Design-Builder per the following plan.

1. Year One

The Parties agree that the first year of building operations is a process and requires adjustments to the design assumptions, adjustments to equipment operations and occupant operations. It may take several months to demonstrate that the building is meeting or exceeding the performance criteria set forth in Exhibit B. Therefore, the payment for the first year of the performance guarantee is structured as follows:

a. At the end of first year, the Design-Builder shall demonstrate that the building over at least the last three months of the first year meets or exceeds the annual energy performance criterion established in Exhibit B. The building shall meet the operations and maintenance criterion established in Exhibit B during the entire first year.
b. If the Design-Builder satisfies paragraph 1a, then the Owner shall pay the Design-Builder $60,000.00. The payment shall be divided as follows:
    i. Meeting the energy performance criterion per Exhibit B shall be 80 percent (80%) of the payment.
    ii. Meeting the operations and maintenance performance criterion per Exhibit B shall be 20 percent (20%) of the payment.
c. If the Design-Builder does not meet the performance criterion in Exhibit B, then the payment shall be as follows:
    i. If the energy performance criterion is not met, the Owner shall pay the Design-Builder the pro rata share of the 80 percent (80%) of $60,000.00. For example, if the EUI is 39.1 kBtu/sf/yr, then the criterion is 30 percent over and the payment would be 70 percent of $48,000.00 or $33,600.00.
    ii. If the operations and maintenance criterion is not met, the Owner shall pay the Design-Builder a pro rata share of the 20 percent (20%) of $60,000.00 at the end of the year.
d. If the Owner does not fulfill the obligations outlined in Exhibit D, then the Design-Builder will not be able to demonstrate that the building does, or does not, meet the performance criteria. For maintenance related Owner obligations, the Design-Builder will substitute the assumptions stated in Exhibit C, Table 4 in the data adjustment of system or equipment that is not maintained per this Agreement. If the non-maintenance obligations are not fulfilled, then the Owner shall pay the Design-Builder $60,000.00.

2. Years Two through Five

For each subsequent year after Year One of the performance guarantee period, the payments of the performance guarantee are structured as follows:

a. At the end of each year of the performance guarantee period, the Design-Builder shall demonstrate that the building meets or exceeds the performance criteria in Exhibit B.
b. If the Design-Builder satisfies paragraph 2a, then the Owner shall pay the Design-Builder $90,000.00 each year. The payment shall be divided as follows:
    i. The energy performance criterion per Exhibit B shall be 80 percent (80%) of the payment.
    ii. The operations and maintenance performance criterion per Exhibit B shall be 20 percent (20%) of the payment.

c. If the Design-Builder does not meet the performance criteria in Exhibit B, then the payment shall be as follows:
    i. If the energy performance criterion is not met, the Owner shall pay the Design-Builder the pro rata share of the 80 percent (80%) of $90,000.00. For example, if the EUI is 39.1 kBtu/sf/yr, then the criterion is 30 percent over and the payment would be 70 percent of $72,000.00 or $50,400.00.
    ii. If the operations and maintenance criterion is not met, the Owner shall pay the Design-Builder a pro rata share of the 20 percent (20%) of $90,000.00 at the end of the year.
d. If the Owner does not fulfill the responsibilities outlined in Exhibit D, then the Design-Builder will not be able to demonstrate that the building does, or does not, meet the performance criteria for that year. For maintenance related Owner obligations, the Design-Builder will substitute the assumptions stated in Exhibit C, Table 4 in the data adjustment of system or equipment that is not maintained per this Agreement. If the non-maintenance obligations are not fulfilled for each of years 2, 3, 4 or 5, then the Owner shall pay the Design-Builder $90,000.00 for that year.