DISTRICT OF COLUMBIA DEPARTMENT OF GENERAL SERVICES

REQUEST FOR PROPOSALS

ON-SITE SOLAR POWER PURCHASING AGREEMENT AT VARIOUS MUNICIPAL FACILITIES

Issue Date: **March 25, 2014**

Proposal Due Date: **May 30, 2014 by 2:00 p.m. EDT**

Contact:

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Solicitation Number: DCAM-14-CS-0123

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SECTION A EXECUTIVE SUMMARY

A.1 Background

The Department of General Services ("Department" or "DGS") is issuing this Request for Proposals ("RFP") to solicit proposals from qualified on-site solar electric power ("photovoltaic" or "PV") project developers ("Offeror(s)") interested in the development of solar power generation systems ("solar power" or "Systems") at multiple locations throughout the District of Columbia. It is contemplated that the Systems will be developed at approximately 50 municipal facilities and will collectively generate approximately 10MW.

The sites have been grouped into three (3) bid bundles ("Bundles") to achieve the best value pricing for the Department and to create Bundles that will achieve broad competitive appeal. Bundle 1 ("Small Bundle") consists of 16 sites with a total solar capacity of approximately 1.5 MW. Bundle 2 ("Large Bundle") has 29 sites with a total solar capacity of approximately 7.6 MW. Bundle 3 ("Innovation Bundle") contains 4 sites with a total solar capacity of 1.2 MW.

The Department anticipates entering into a power purchase agreement ("PPA") with each successful Offerors for the purchase of all electricity generated by the Systems once they become commercially operational. Such PPAs will be negotiated following the completion of Phase 2 of this procurement. With respect to the Innovation Bundle, Offerors may also propose pricing for the District's direct purchase of the Systems within that Bundle. It is the intent of the specifications, terms and conditions contained herein to describe the requirements and process for Phase 1 of this procurement.

The Department intends to purchase all electricity generated by the Systems on an on-going basis. Ultimately, the Department's goal is to both reduce its energy consumption from existing energy sources and to lower its energy costs by entering into a contract with the Offeror(s) selected in Phase 2 of this procurement.

Cost Components. The Department intends to enter into a PPA with the selected Offeror(s) that will have a 20-year term and locks the cost of generated electricity over the life of the PPA (or alternatively agree upon a fixed yearly escalator for this component). Furthermore, the District shall only be responsible for paying for electricity delivered to the Potomac Electric Power Company (Pepco) utility meter at each facility. The District shall not be responsible for any other payments during the term of the PPA, including, but not limited to, network upgrades, environmental costs, curtailment costs, fees or similar items up to and including the Pepco meter that might not yet be identified or may arise after PPA execution or commercial operation.

Financial Structure/Capital Lease. Given the budgetary requirements applicable to the District, any PPA will need to be structured in such a manner so that it will not be considered debt and will not qualify as a capital lease under generally accepted accounting standards. In addition, the District's obligation to purchase the resulting electricity will be subject to annual appropriation over the life of the PPA.

Minimum Qualifications. At a minimum, Offerors must have successfully developed at least five (5) projects totaling at least two (2) megawatts (MW) that are in commercial operation at the

time of the issuance of this RFP. A proposal that fails to meet this standard shall be deemed non-responsive.

A.2 Two-Step Procurement Process

The Department will conduct a competitive two-step solicitation process, including evaluating and recommending Offerors for award. During this first phase, Offerors will be required to submit a proposal that demonstrates their experience and qualifications to implement a project of this size and complexity, as well as certain technical details. Offerors may provide proposals for one, two, or all Bundles, but must bid on all sites within each Bundle for which they are providing a bid. The Phase 1 proposal must include all information requested in **Section E** of this RFP. The Phase 1 submissions will be evaluated by the Department in accordance with **Section D** of this RFP. Based on this review, the Department anticipates that it will shortlist no more than three (3) Offerors for each Bundle to participate in the second phase of the procurement. An Offeror may be shortlisted for more than one Bundle.

During the second phase of the procurement, the Department will request from the shortlisted Offerors detailed information for each site. Shortlisted Offerors will also be required to provide bid security with their Phase 2 submission. The Department will undertake certain due diligence regarding the shortlisted proposals based on criteria to be provided in the Phase 2 solicitation documents. The Department intends to award the contract(s) to the shortlisted Offeror(s) that provide(s) the best value to the District, all evaluation criteria considered, for each Bundle.

A.3 Bid Forms

The Department intends to enter into a contract that provides for unit rates for electricity over the life of the PPA. Offerors will be required to submit their proposal substantially in the format described in **Section E** of this RFP.

A.4 Economic Inclusion

The Department desires that Small, Local, and Disadvantaged Business Enterprises ("SLDBEs") participate in this project to the greatest extent possible. Offerors should include in their proposal a proposed plan that demonstrates the level of participation by such businesses.

A.5 Selection Criteria

Proposals will be evaluated in accordance with **Section D** of this RFP. The following evaluation criteria will be used:

- Technical Proposal (15 points)
- Project Cost (25 points)
- Implementation Plan & Schedule (10 points)
- Financing Plan & Financing Partners (15 points)
- Experience & References (20 points)
- SLDBE Compliance/Utilization (15 points)
- SLDBE Preference (12 extra points)

A.6 Procurement Schedule

The Department maintains the right to adjust the schedule at its sole discretion.

EVENT	DATE
Issue RFP	March 25, 2014
Preproposal Conference	April 1, 2014 at 11:00 a.m.
Initial Questions/Clarifications Due	April 11, 2014
Addendum 1 Issued	April 25, 2014
Site Tours	May 5 – May 9, 2014
Last Day for Questions/Clarifications	May 14, 2014
Addendum 2 Issued	May 21, 2014
RFP Response Due	May 30, 2014 by 2:00 p.m.
Evaluation Period	May 30, 2014 – June 20, 2014
Vendor Interviews, if necessary	June 23 – June 27, 2014
Selection for Phase 2 and issuance of Phase 2 Solicitation Documents	Summer 2014

A.7 Attachments

Attachment A.1 Master Site Summary and Bundling List
Attachment A.2 Site Technical Overview Document
Attachment A.3 Site Historical Electricity Usage
Attachment A.4 Solar PV System Design Specifications
Attachment B Pricing Proposal and Production Form
Attachment C Experience Form
Attachment D Form of Offer Letter
Attachment E Disclosure Form
Attachment F Tax Affidavit

SECTION B SCOPE OF WORK

B.1 Scope of Work

In general, the selected developer(s) will be required to develop, at no upfront cost to the Department or the District, PV Systems for the awarded Bundle. Pursuant to the terms and conditions of the applicable PPA, the District will purchase electricity from the Systems once they become commercially operational.

The potential capacity for solar power generation across the approximately 50 sites has been estimated to be approximately 10 MW by independent energy consultants. These sites have been grouped into three (3) Bundles to achieve the best value pricing for the Department given considerations for technology, system size, geography, unique contracting requirements, etc., and to create Bundles that will achieve broad competitive appeal. Offerors may provide proposals for one, two, or all Bundles, but must bid on all sites within each Bundle for which they are providing a bid.

The Bundle pricing is intended to reflect a discounted price given the economies of scale and reduced transaction costs associated with aggregation. Although the Department has conducted site surveys and other due diligence, the Offerors' submitted Bundle pricing should anticipate that there may be some sites within each Bundle for which unforeseen conditions or other factors exist which may result in the inability to proceed with an individual site or sites as described. In such cases, the Department will have the opportunity (but not the obligation) to identify and propose substitute alternate sites of a similar size to those described in the relevant Bundle within this solicitation; however, no such site will be substituted unless it is mutually acceptable to both the Department and the Offeror.

For the Innovation Bundle, Offerors may submit both direct purchase and PPA pricing for all sites within that Bundle.

The Department will continue to explore and evaluate options for other on-site and off-site renewable energy generation projects. Future projects are not within the scope of work for this solicitation.

B.1.1 Overview of Bundles

TABLE 1: BUNDLES

Bundle ID	Bundle Name	Total Solar Capacity of Bundle (kW-DC)	# of Sites per Bundle
B1	Bundle 1: Small bundle	1,496	16
B2	Bundle 2: Large bundle	7,638	29
B3	Bundle 3: Innovation bundle	1,221	4
	TOTAL	10,355	49

The sites in this solicitation have been grouped into three (3) Bundles to achieve the best value pricing for the Department and broad competitive appeal. Offerors may provide proposals for

one, two, or all Bundles, but must bid on all sites within each Bundle for which they are providing a bid. The Small Bundle contains sites with an estimated PV capacity of less than 150 kW-DC, while the Large Bundle contains sites with an estimated PV capacity greater than or equal to 150 kW-DC. The Innovation Bundle contains four (4) sites that are currently under construction or being modernized and are expected to be ready to receive solar PV installations in early 2015. The Department desires that the sites in the Innovation Bundle incorporate innovative financing structures and/or technologies compatible with solar PV. The Department intends to leverage the Innovation Bundle to increase District of Columbia citizen participation and help catalyze community engagement in the District's efforts to achieve its renewable energy goals.

B.2 Site Information and Data

The Department and its team of consultants have organized the site and Bundle information in an attempt to optimize Offerors' assessment of the sites. Site information has been provided for Offerors' reference. All referenced documents are attached to this RFP in **Attachments A.1-A.4**.

- Master Site Summary and Bundling List – Attachment A.1
- Site Technical Overview Documents – Attachment A.2
- Site Historical Electricity Usage – Attachment A.3
- Solar PV System Design Specifications – Attachment A.4, which will be issued as an addendum to this RFP.

The Department makes no representations with respect to the accuracy or completeness of any of the information provided as part of this RFP regarding the sites, including their suitability. All provided information has been checked for accuracy, but errors or omissions may exist, for which the Department shall have no liability. Offerors take sole and full responsibility for conducting any necessary due diligence and assessing the sites and their conditions in developing their proposals. Such assessment of the sites and their conditions shall be performed by the Offeror at its own cost. Neither the Department nor the District is responsible for compensating Offerors for such work.

B.2.1 Preliminary Site Assessment Data

In order to select potential sites, the Department engaged roofing and solar energy consulting firms to perform feasibility studies of the District's facilities. Sites included in this RFP were selected on the basis of the completed feasibility studies, with consideration given to proposed solar photovoltaic (PV) system size and the anticipated economic feasibility of the proposed solar PV systems. The potential for solar PV systems was analyzed for each location. The evaluation of this site data was used to develop the Bundles, and to verify the financial and technical feasibility of each site. Detailed information regarding each site is included in **Attachment A.2**.

B.2.2 Site Visits

The Department will not be able to coordinate individual site visits for every site. However, bid walks of representative sites from across the Bundles will be conducted. A list and schedule of the bid walks will be provided to Offerors by Addendum. Although these site walks are not mandatory, they are strongly recommended.

B.3 Specific Requirements

The Offeror's proposal shall address the following requirements.

B.3.1 Technical Requirements

All solar power generation systems proposed under this RFP must conform to industry best practices and the requirements that will be described in detail in **Attachment A.4**, along with site information provided in **Attachments A.2 and A.3**, and any addenda issued as a result of the site walks. Each Offeror must demonstrate how their proposal will meet these technical requirements, and its pricing must be based on these specifications.

B.3.2 Financing Requirements

The Department presently intends to enter into PPAs with the Offerors selected in Phase 2 of this Solicitation. The Department may also consider alternate structures for the Innovation Bundle. Offerors are therefore encouraged in this Phase 1 to suggest innovative structures for the Department's consideration that may offer cost savings and other advantages to the District. The type of financing method selected by the Department for the Innovation Bundle will ultimately be determined in Phase 2 of this solicitation.

B.3.3 Terms and Conditions

Offerors are advised that the Department has not determined the form of PPA that will be used in Phase 2 of this solicitation; however, Offerors are advised that:

- The PPA will include such provisions as are required to comply with the budgetary laws applicable to the District of Columbia. Among other things, this will require a provision which provides that all payments shall be subject to appropriation.
- The PPA must be structured in such a way that it will not be considered a capital lease. Among other things, this will require that the term of the PPA not be more than 75% of the useful life of the generating assets.
- Neither the District nor the Department shall provide any financial security (i.e., letter of credit, guarantee, etc.) to secure its obligations under the PPA.
- Neither the District nor the Department will indemnify any party as part of the PPA or otherwise.
- The prices established in the PPA will not be subject to adjustment during the term of the PPA, other than any agreed upon escalation provided for in the PPA, including, but not limited to, any changes to the selected developer's costs as a result of state or Federal incentives, tax credits, bonus depreciation or similar items that are not achieved or

received.

- The PPA will provide for liquidated damages in the event that the project does not begin commercial operations in accordance with the agreed upon schedule. Such liquidated damages must be guaranteed by a parent guarantee, letter of credit or other security acceptable to the Department.
- The Department reserves the right to terminate consideration or negotiations if the Offeror makes significant changes to its key internal or external team members during or after negotiation of the PPA.

To assist the Department, each Offeror is required to submit the form of PPA it would propose be used in Phase 2. Offerors are cautioned that nothing herein shall require the Department to use any particular form of PPA in Phase 2.

B.3.4 Conformance with Laws Including Licensing, Accreditation and Registration

Each selected developer and all of its subcontractors and sub-consultants (regardless of tier) shall comply with all applicable District of Columbia and federal laws, including those relating to the licensing, accreditation, and registration.

B.3.5 Time is of the Essence

Time is of the essence with respect to the implementation of these solar energy projects. The Department anticipates that all the projects will begin commercial operations no later than 2015.

SECTION C ECONOMIC INCLUSION

C.1 Preference for Small, Local, and Disadvantaged Business Enterprises (SLDBE)

General: Under the provisions of the Small, Local, and Disadvantaged Business Enterprise Development and Assistance Act of 2005, D.C. Law 16-33 (codified at D.C. Code § 2-218.01 et seq.), preferences shall be given to Offerors that are certified by the Department of Small and Local Business Development. The following preferences shall be awarded in evaluating an Offeror's proposal:

- Three (3) preference points shall be awarded if the Offeror is certified as a small business enterprise.
- Five (5) preference points shall be awarded if the Offeror is certified as a resident-owned business.
- Five (5) points shall be awarded if the Offeror is certified as a longtime resident business.
- Two (2) preference points shall be awarded if the Offeror is certified as a local business enterprise.
- Two (2) preference points shall be awarded if the Offeror is certified as being a local business enterprise with its principal office located in an enterprise zone.
- Two (2) preference points shall be awarded if the Offeror is certified as a disadvantaged business enterprise.
- Two (2) preference points shall be awarded if the Offeror is certified as a veteran-owned business enterprise.
- Two (2) preference points shall be awarded if the Offeror is certified as a local manufacturing business enterprise.

Offerors may qualify for more than one of the foregoing preference categories; however, the maximum number of points available under this section is 12 points. Offeror's that wish to be awarded preference points must submit a copy of their certification acknowledgment letter with their proposal.

Information: For information regarding the application process, contact the Department of Small and Local Business Development at the following address or telephone number:

Department of Small and Local Business Development
One Judiciary Square Building
441 4th Street, N.W., 9th Floor
Washington, D.C. 20001
(202) 727-3900 (Telephone Number)
(202) 724-3786 (Facsimile Number)

C.2 SLDBE Participation

The Department desires that business enterprises certified by the Department of Small and Local Business Development participate in this transaction to the greatest extent practical. All Offerors will be required to submit a Local Business Enterprise Utilization Plan with their proposals. The Utilization Plan must demonstrate how this requirement will be met and, to the extent possible at this stage in the project, should identify the specific firms that will be used and their respective roles.

With respect to the Large Bundle, the Department anticipates that Offerors will mentor one or more certified businesses so that the certified business will perform all aspects of the installation at some portion of the sites in the Large Bundle. The Department's intent is to help grow the capabilities of one of more local installers that are certified firms. Offeror's are advised that the mentoring commitment should extend beyond the installation of the Systems and should encompass at least the first five (5) years of the PPA.

SECTION D EVALUATION AND AWARD CRITERIA

D.1 Evaluation Process

The Department shall evaluate submissions and any best and final offers in accordance with the provisions of this **Section D** and the Department's Procurement Regulations.

D.2 Evaluation Committee

Each submission shall be evaluated in accordance with this **Section D** by an Evaluation Committee. The Evaluation Committee shall prepare a written report summarizing its findings and submit the same to the source selection official. Based on the information submitted by the Offerors in response to this RFP and the report prepared by the Evaluation Committee, the source selection official shall select the Offerors that will participate in Phase 2 of this solicitation.

D.3 Oral Presentation

The Department currently does not intend to interview Offerors as part of Phase 1 of this procurement; however, the Department reserves the right to interview any Offerors in the competitive range of this Phase 1, if necessary. If the Department conducts such interviews, each Offeror within the competitive range shall make an oral presentation to the Department's Evaluation Committee, and participate in a question and answer session. The purpose of the oral presentation and the question and answer session is to permit the Evaluation Committee to fully understand and assess the qualifications of each Offeror and the Offeror's key personnel. The Department will announce the schedule for and details of any such oral presentations if it elects to hold them as part of this Phase 1.

D.4 Proposal Evaluation

Each of the Evaluation Criteria described in this **Section D** will be used in evaluating proposals and establishing for each Bundle a short list of Offerors to participate in Phase 2 of this procurement. In addition to the 100 points available in Section D.4, there are up to an additional twelve (12) preference points available for Offerors that are certified by the Department of Small and Local Business Development. See **Section C** for more information. Thus, each proposal will be scored on a scale of 1 to 112 points with a maximum number of points possible of 112.

D.4.1 Technical Proposal (15 points)

The Department desires to engage a developer with the technical capability necessary to realize the Department's objectives set forth in this RFP. Submittals should address the items set forth in Section E.4, Part V. This element of the evaluation will be worth up to fifteen (15) points.

D.4.2 Project Cost (25 points)

Each Offeror is required to complete Attachment B for each Bundle for which it wishes to be considered. For the Innovation Bundle, Offerors may also bid the price per site if the Department were to elect to purchase the applicable Systems. The Offeror will be evaluated

based on the anticipated levelized cost of energy over a 20-year period (including, in the case of the purchase of the Systems, the costs of operations and maintenance). Offerors shall provide information and cash-flow modeling with transparent methodology. This element of the evaluation will be worth up to twenty-five (25) points.

D.4.3 Implementation Plan & Schedule (10 points)

The project schedule and timetable should be complete, realistic, with risk mitigation and escalation processes, and appropriate for the relevant Bundle(s). The submission should demonstrate the Offeror's methodology for management of multiple projects with concurrent construction timelines. This element of the evaluation will be worth up to ten (10) points.

D.4.4 Financing Plan & Financing Partners (15 points)

The Offeror will be evaluated based on its financial stability and ability to provide timely financing. Offerors should address in detail their anticipated funding for the project as well as their prior experience with any proposed financing partners on comparable projects. Offerors should detail why their proposed financing plan would be offer the best value to the District. This element of the evaluation is worth fifteen (15) points.

D.4.5 Experience & References (20 points)

Offerors will be evaluated based on their demonstrated experience in bringing solar energy projects with collective generation capacity of over two (2) megawatts to commercial operations. In addition, Offerors will be evaluated on the demonstrated experience of the team's senior management personnel in structuring such projects and bringing such projects into commercial operations on time. If the Offeror is a team or joint venture of multiple companies, the Evaluation Panel will consider the experience of each member of the team or joint venture in light of their role in the proposed team or joint venture. This element of the evaluation is worth twenty (20) points.

D.4.6 SLDBE Compliance/Utilization (15 points)

The Department desires the selected developer to provide the maximum level of participation for Small, Local, and Disadvantaged Business Enterprises as well as employment opportunities for District of Columbia residents. Offerors will be evaluated in light of their plan to involve such business enterprises. Bidders on the Large Bundle shall also include a mentoring program consistent with Section C.2. This factor of the evaluation will be worth up to fifteen (15) points.

SECTION E PROPOSAL ORGANIZATION AND SUBMISSION

This section outlines specific information necessary for the proper organization and manner in which Offerors' Proposals should be proffered. References are made to other sections in this RFP for further explanation.

E.1 Submission Identification

Except for spreadsheet bid forms, which shall be submitted in Microsoft Excel format, submissions shall be proffered in electronic PDF format. The Offeror's submission shall be on a CD-ROM, USB drive, or other digital device and placed in a sealed envelope conspicuously marked: "Proposal for On-Site Solar Power Purchasing Agreement at Various Municipal Facilities" and this solicitation number DCAM-14-CS-0123.

E.2 Delivery or Mailing of Submissions

Submissions should be delivered or mailed to:

DC Department of General Services
Att'n: JW Lanum
Frank D. Reeves Center,
2000 14th Street, N.W., 8th Floor
Washington, D.C. 20009

E.3 Date and Time for Receiving Submissions

Submissions must be received no later than 2:00 pm EDT on May 30, 2014. The Offeror assumes the sole responsibility for timely delivery of its Submission, regardless of the method of delivery.

E.4 Submission Size, Organization and Offeror Qualifications

All submissions shall be submitted in electronic PDF format, except for spreadsheet bid forms, which shall be submitted in Microsoft Excel format. Hard-copy, telephonic, telegraphic, email, and facsimile submissions shall not be accepted. The Department is seeking brief, clear and concise proposals. The submission shall be organized substantially as follows:

PART I Table of Contents

Proposals shall include a table of contents listing the individual sections of the proposal and their corresponding page numbers.

PART II Executive Summary

Each Offeror should provide an executive summary of no more than three (3) pages providing a brief synopsis of the highlights of its proposal and addressing the Offeror's capabilities, experience, access to capital and the experience of its management personnel.

PART III General Team Information and Firm(s) Data

Each Offeror should provide the following information for the principal developer firm and each of its sub-consultants.

A. Name(s), address(es), and role(s) of each firm (including all sub-consultants).

B. Firm profile(s), including:

i. Age
ii. Firm history(ies)
iii. Firm size(s)
iv. Areas of specialty/concentration
v. Current firm workload(s) projected over the next year
vi. Provide a list of any contracts held by the Offeror where the contract was terminated (either for default or convenience). This list should also identify any contracts that resulted in litigation or arbitration.

C. Description of the team organization and personal qualifications of key staff, including:

i. Identification of the single point of contact for the Offeror.
ii. Organizational chart illustrating reporting lines and names, titles, and roles for key participants proposed by the team.
iii. Resumes of the key senior management personnel and each key participant of the Offeror's team that would oversee aspects of this project, including technology selection, capital planning, construction, and Pepco interconnection coordination.

D. Letters or agreements memorializing the commitment of various team members should be included with the Offeror's proposal.

PART IV Relevant Experience and Capabilities

Offerors are to complete the Experience Form contained in **Attachment C** providing additional information demonstrating relevant project experience in terms of project type, size, client type, and financing mechanism. Offerors shall identify, in the past three (3) years, the number of installations completed in the Government sector listing PV system sizes and broken down by system type: ground mount, roof mount, parking lot, and parking garage.

PART V Technical Proposal

The Technical Proposal shall describe the equipment, materials, and methods the Offeror would employ if selected. Offerors shall provide a narrative that describes the equipment and systems proposed and discussing why these were selected as the optimal choice. This section shall include:

A. Proposed System Overview: Technical narrative that describes the proposed systems, including but not limited to: general considerations, rated kWp DC capacity, expected

kWh AC output in the first year and over a twenty (20) year period, mounting approach (tilt, tracking), and total area required for the PV system at each site in the applicable Bundle.

B. Proposed Equipment List: Model, technical specifications, quantity and characteristics of: modules, inverters, mounting structures, tracking system (if any), generation meters, Data Acquisition System (DAS) and monitoring system. The Technical proposal will describe the availability, supply and quality of proposed equipment. Technical spec sheets should be included in this section.

C. Monitoring System Preliminary Design: Overview of the proposed Data Acquisition System (DAS), including quantity and model of proposed sensors, data acquisition hardware and software, screen shots of proposed solutions, and IT requirements. Respondents shall identify requirements for connecting the DAS to the Internet.

D. Monitoring / Data Presentation Information: Specifications of proposed monitoring software, including screenshots of user interface and system diagnostic capabilities, as well as hosting requirements, performance data and billing management plan and processes.

E. Supporting Data: Offeror shall submit, in **Attachment B**, proposed quantity and model of modules and inverters for each site in each Bundle being proposed. Offerors shall also submit annual estimated production data copied and pasted into the appropriate cells in **Attachment B**. Offeror must also submit estimated production results report(s) from NREL's PVWatts™ Calculator (http://pvwatts.nrel.gov/) for each site. If there are multiple arrays with different azimuth and/or tilt values at the same site, then each sub-array must have a separate output report. Offeror must adhere to following method:

i. Enter address
ii. For Solar Resource Data value, Offeror must use default recommended weather data at "WASHINGTON DC REAGAN AP, VA" which is included as part of **Attachment B**.
iii. For System Info, Offeror may enter all input values based on proposed system specifications to run the simulation, with the exception of "DC-to-AC Derate Factor" which must be set at 0.81. "DC System Size" value must match those calculated by **Attachment B**.
iv. For Results, Offeror must select "Print Results" command and create PDF of 1-page results report and submit with proposals. Annual estimated production data and total system size, from all sub-arrays if applicable, must match values submitted in **Attachment B**.

In Phase 2 of this procurement, short-listed Offerors will be required to provide more detailed information regarding the details of their proposed systems including estimated production data using software such as PVsyst or other industry leading tools.

PART VI Description of the Proposed Project Approach:

The Proposal shall include a description of the approach Offeror will use to design, procure long-lead time equipment, construct, and commission the solar power generation systems. The Proposal shall describe how Offeror will comply with the requirements of the RFP, obtain timely permits and approvals, and accommodate ongoing operations during construction, including how Offeror intends to meet the Department's schedule.

The Proposal shall describe Offeror's approach to Project and construction management, document control, and Project administration including risk mitigation and escalation processes. Due to the number of potential PV sites, particularly in the Large Bundle, the Proposal shall include a narrative addressing how Offeror recommends phasing the work in order to efficiently execute the design, design review, installation, and commissioning of the systems at the various sites. The Proposal shall also describe quality assurance procedures and safety plans. The Proposal shall contain a description of Offeror's strategy for communicating with the Department and assisting the Department in its efforts to achieve the overall objective(s) for this project. This part shall not exceed ten (10) pages.

PART VII Financial Strength

All Offerors must provide information as requested below relating to their team's financial ability to build, own (if necessary) and operate (if necessary) the solar power generation systems. Each Offeror must demonstrate to the Department that it has access to capital on terms and conditions that will allow it to construct the systems on competitive terms. Offerors must also establish that they have sufficient bonding from a surety licensed in the District of Columbia to undertake the construction at the various sites in the applicable Bundle(s). In this regard, Offerors must specify the total bonding that the surety will issue for all of the Offeror's work including uncompleted contracts.

PART VIII Financing Methodologies

All Offerors must address the financing methodologies they intend to use for the Bundle(s) on which they are bidding. This part shall not exceed ten (10) pages. Each Offeror must:

A. For a PPA, describe the structure of its partnership with the financial partners it anticipates will be used for these Projects. If self-financing, please describe the financing plan, the source of funding and number of projects that the prime firm has financed utilizing this methodology.

B. For a PPA, identify any financing or funding mechanisms it is considering that are not found in typical PPAs.

C. Please describe any additional sources of federal or other funding that may be available to the Department for this project. If the additional sources are a loan or credit support, please provide indicative metrics (principal payments, interest rates, debt service schedules, final maturity, etc.).

D. Identify whether the prime firm has ever filed for bankruptcy or experienced a delayed renewable energy generation project that resulted from a lack of available funding and/or a loss of funding to a client due to the inability to secure a financial partner. If yes, please explain.

E. Provide representation that the prime firm and anticipated financial partners have not, nor has any of the members of its governing board or principal officers, been indicted or convicted of fraud, corruption, collusion, bribery, or money laundering. If Offeror is unable to so warrant, then describe the circumstances.

F. Those Offerors proposing an alternate financing mechanism must:

i. Describe the mechanisms and provide indicative metrics (principal payment structure, interest rates, debt service schedules, final maturity, up-front fees, credit requirements, demographic requirements, etc.)

ii. Provide examples and references of similar successful financing placements using the proposed method(s).

iii. Provide a discussion on the difficulty of implementation and a description of the financing timeline.

PART IX Form of PPA

To assist the Department, each Offeror is required to submit the form of PPA it would propose be used in Phase 2. Each such PPA shall be consistent with the requirements of Section B.3.3. Offerors are cautioned that nothing herein shall require the Department to use any particular form of PPA in Phase 2.

PART X Implementation Plan

Offerors are to provide a detailed GANTT style schedule describing all phases of the project and Offeror's services, major milestones, task dependencies, associated with designing, permitting, and installing the systems at the sites within each Bundle. This implementation narrative shall include the financing strategy and timing, the procurement strategy for equipment and materials, steel fabrication plan, workforce plan, staging, construction, equipment installation, acceptance testing, project close-out, and commitment from financial partners and suppliers and/or manufacturers substantiating the availability of major long lead-time equipment or resources to meet the proposed schedule. The implementation plan, excluding the schedule, should be no more than five (5) pages in total and shall cover all applicable Bundles.

PART XI Local Business Utilization Plan

Each Offeror must submit a proposed Local Business Utilization Plan that identifies the specific certified business enterprises that will participate in the contract and their anticipated roles. In addition, each Offeror should provide: (i) a narrative description of similar projects and the Offeror's success in meeting such goals; and (ii) a chart, in summary form, that identifies the

Offeror's major public projects over the last five (5) years and its success in achieving such goals (creativity should be displayed regarding joint-venture and subcontractor agreements). Offerors bidding on the Large Bundle shall also address the mentoring program discussed in Section C.2.

PART XII Cost Information

The Offeror should submit project pricing by completing the worksheet at **Attachment B** for each of the Bundles for which Offeror is submitting a proposal.

PART XIII Form of Offer Letter

Each Offeror shall submit a Form of Offer Letter substantially in the form of **Attachment D**. Material deviations, in the opinion of the Department, from the bid form may be sufficient to render the proposal non-responsive.

PART XIV Disclosure Form

Each Offeror shall submit a Disclosure Statement substantially in the form of **Attachment E**.

PART XV Tax Affidavit

Each Offeror must submit a tax affidavit substantially in the form of **Attachment F**. In order to be eligible for this procurement, Offerors must be in full compliance with their tax obligations to the District of Columbia government.

SECTION F BIDDING PROCEDURES & PROTESTS

F.1 Contact Person

For information regarding this RFP please contact:

Thomas D. Bridenbaugh
Leftwich & Ludaway, LLC
1400 K Street, N.W.
Suite 1000
Washington, D.C. 20005
Phone: (202) 434-9100

Any written questions or inquiries should be sent to the following e-mail addresses: tbridenbaugh@leftwichlaw.com with a copy to sam.brooks@dc.gov with a subject line that reads: "DC DGS Solar PV RFP".

F.2 Explanations to Prospective Offerors

Each Offeror should carefully examine this Request for Proposals and any and all amendments, addenda or other revisions, and thoroughly familiarize itself with all requirements prior to proffering a submission. Should an Offeror find discrepancies or ambiguities in, or omissions from, the RFP and amendments, addenda or revisions, or otherwise desire an explanation or interpretation of the RFP, any amendments, addenda, or revisions, it must submit a request for interpretation or correction in writing. Any information given to an Offeror concerning the solicitation shall be furnished promptly to all other Offerors as an amendment or addendum to this RFP if in the sole discretion of the Department that information is necessary in proffering submissions or if the lack of it would be prejudicial to any other prospective Offerors. Oral explanations or instructions given before the award of the contract shall not be binding.

Initial questions should be directed to the e-mail addresses listed in Section F.1 no later than 5:00 p.m. EDT on April 11, 2014. Questions will be addressed and included in a RFP Addendum. After site visits have been conducted, final questions should be directed to the e-mail addresses listed in Section F.1 no later than 5:00 p.m. EDT on May 14, 2014. These questions will also be addressed and included in a RFP Addendum.

F.3 Protests

Protests shall be governed by Section 4734 of the Department's Procurement Regulations (27 DCMR § 4734). Protests alleging defects in this solicitation must be filed prior to the time set for receipt of submissions. If an alleged defect does not exist in this initial RFP, but was incorporated into the RFP by an amendment or addendum, a protest based on that defect must be filed before the next closing time established for proffering submissions. In all other cases, a protester shall file the protest within ten (10) days after the protester knows or should have known, whichever is earlier, of the facts and circumstances upon which the protest is based. All protests must be made in writing to the Department's Chief Contracting Officer ("CCO") and must be filed in duplicate. Protests shall be served on the Department by obtaining written and

dated acknowledgment of receipt from the Department's CCO. Protests received by the Department after the indicated period shall not be considered. To expedite handling of protests, the envelope shall be clearly labeled "Protest".

This section is intended to summarize the bid protest procedures and is for the convenience of the Offerors only. To the extent any provision of this section is inconsistent with the Department's Procurement Regulations, the more stringent provisions shall prevail.

F.4 Conduct of Procurement

This procurement is being conducted in accordance with the provisions of Section 4712 of the Department's Procurement Regulations (27 DCMR § 4712).

F.5 Retention of Submissions

All submissions shall be retained by the Department and therefore shall not be returned to the Offerors. With the exception of proprietary financial information, the submissions shall become the property of the Department and the Department shall maintain the right to distribute or use such information as it determines.

F.6 Examination of Submissions

Offerors are expected to examine the requirements of all instructions (including all amendments, addenda, attachments and exhibits) in this RFP. Failure to do so shall be at the sole risk of the Offeror and may result in disqualification.

F.7 Late Submissions; Modifications

A. Any submission received at the office designated in this RFP after the exact time specified for receipt shall not be considered.

B. Any modification of a submission is subject to the same conditions as in Section F.7.A above.

C. The only acceptable evidence to establish the time of receipt at the Department's office is the time-date stamp of such submittal on the submission wrapper or other documentary evidence of receipt maintained by the Offeror.

D. Notwithstanding any other provisions of this Request for Proposals to the contrary, a late modification of an otherwise successful submission which makes its terms more favorable to the Department may be considered at any time it is received and may be accepted.

E. Submissions shall be irrevocable and remain in full force and effect for a period not less than 120 days after the close of Phase 2 of this solicitation.

F.8 No Compensation for Preparation of Submissions

The Department shall not bear or assume any financial obligations or liabilities regarding the preparation of any submissions submitted in response to this RFP, or prepared in connection therewith, including, but without limitation, any submissions, statements, reports, data, information, materials or other documents or items.

F.9 Rejection of Submissions

The Department reserves the right, in its sole discretion:

A. To cancel this solicitation or reject all submissions.

B. To reject submissions that fail to prove the Offeror's responsibility or access to capital.

C. To reject submissions that contain conditions and/or contingencies that in the Department's sole judgment, make the submission indefinite, incomplete, otherwise non-responsive, or otherwise unacceptable to the Department.

D. To waive minor irregularities in any submission provided such waiver does not result in an unfair advantage to any Offeror.

E. To take any other action within the applicable Procurement Regulations or law.

F. To reject the submission of any Offeror that has submitted a false or misleading statement, affidavit or certification in connection with such submission or this Request for Proposals.

F.10 Non-Responsive Pricing

In general, the Department considers a proposal non-responsive if Offeror's price is greater than 150% of the median price submitted by other Offerors. The Department reserves the right to deem a proposal non-responsive if Offeror's price is greater than 150% of the independent government estimate.

ATTACHMENT A

SITE INFORMATION AND REQUIREMENTS

A.1 Master Summary and Bundling List
A.2 Site Technical Overview Document
A.3 Site Historical Electricity Usage
A.4 Solar PV System Design Specifications – *to be provided by addendum*

District of Columbia, Department of General Services (DC DGS)
RFP for On-Site Solar Power Purchasing Agreement at Various Municipal Facilities
Solicitation Number: DCAM-14-CS-0123
Attachment A.1 - Master Site Summary and Bundling List

Usage	Rooftop Capacity	Carport Capacity	Total Capacity	Generation	Offset	Sites	Bundle	
27,954,547	1,320	176	1,496	1,775,138	6%	16	B1	Small
50,469,297	5,988	1,649	7,638	8,961,386	18%	29	B2	Large
7,944,201	1,221	-	1,221	1,447,295	18%	4	B3	Innovation
86,368,044	**8,529**	**1,825**	**10,355**	**12,183,819**	**14%**	**49**	**TOTAL**	

Site #	Site Name	Street	City	State	Zip	Ward	Pepco Rate Schedule	FY 2012-2013 Usage (kWh)	Recommended Rooftop System Capacity (kW DC)	Recommended Carport System Capacity (kW DC)	Total Recommended System Capacity (kW_{DC})	Estimated Year 1 Production (kWh)	Offset	Site Spec Sheet Available (Y/N)	Bundle #	Bundle Name
DGS63	John A. Wilson Building	1350 PENNSYLVANIA AVENUE NW	Washington	DC	20004	2	HPS-GT	6,284,310	20	-	20	23,525	0%	Y	B1	Small
DGS13	Deal Middle School	3815 FORT DRIVE NW	Washington	DC	20016	3	NR GT	3,519,398	56	-	56	67,220	2%	Y	B1	Small
DGS29	Langley Education Campus	101 T STREET NE	Washington	DC	20002	5	NR GT	795,996	71	-	71	84,792	11%	Y	B1	Small
DGS10	H.D. Cooke Elementary School	2525 17TH STREET NW	Washington	DC	20009	1	NR MPS-GT	885,600	78	-	78	93,871	11%	Y	B1	Small
DGS62	Wilson Aquatic Center	4551 FORT DRIVE NW	Washington	DC	20016	3	NR GT	95,250	81	-	81	95,145	100%	Y	B1	Small
DGS35	Moten Elementary School	1565 MORRIS ROAD SE	Washington	DC	20020	8	NR MPS-GT	926,329	84	-	84	100,123	17%	Y	B1	Small
DGS54	Trinidad Recreation Center	1310 CHILDRESS STREET NE	Washington	DC	20002	5	NR MPS-GS D	241,510	57	28	86	99,513	40%	Y	B1	Small
DGS48	Shepherd Elementary School	7800 14TH STREET NW	Washington	DC	20012	4	NR MPS-GT	467,658	90	-	90	108,292	23%	Y	B1	Small
DGS31	Luke C. Moore High School	1001 MONROE STREET NE	Washington	DC	20017	5	NR MPS-GT	1,133,392	95	-	95	114,329	10%	Y	B1	Small
DGS06	Brightwood Education Campus	1300 NICHOLSON STREET NW	Washington	DC	20011	4	NR MPS-GT	1,510,213	76	32	108	122,774	7%	Y	B1	Small
DGS57	Walker-Jones Education Campus	1125 NEW JERSEY AVENUE NW	Washington	DC	20001	6	NR GT	2,897,224	77	33	110	129,682	5%	Y	B1	Small
DGS30	LaSalle-Backus Education Campus	501 RIGGS ROAD NE	Washington	DC	20011	4	NR MPS-GT	1,026,148	111	-	111	131,109	14%	Y	B1	Small
DGS26	Hillcrest Recreation Center	3100 DENVER STREET SE	Washington	DC	20020	7	NR MPS-GT	341,519	117	-	117	140,058	34%	Y	B1	Small
DGS61	Wilson High School	3950 CHESAPEAKE STREET NW	Washington	DC	20016	3	NR GT	4,501,019	119	-	119	141,987	3%	Y	B1	Small
DGS02	5th District Police Station	1805 BLADENSBURG ROAD NE	Washington	DC	20002	5	NR GT	999,306	43	83	126	149,076	15%	Y	B1	Small
DGS11	Coolidge High School	6315 5TH STREET NW	Washington	DC	20011	4	NR MPS-GT	2,329,679	145	-	145	173,644	8%	Y	B1	Small
DGS25	Hendley Elementary School	425 CHESAPEAKE STREET SE	Washington	DC	20032	8	NR MPS-GT	500,565	96	54	150	174,545	32%	Y	B2	Large
DGS37	Nalle Elementary School	219 50TH STREET SE	Washington	DC	20019	7	NR MPS-GT	1,216,799	150	-	150	179,452	23%	Y	B2	Large
DGS42	Plummer Elementary School	4601 TEXAS AVENUE SE	Washington	DC	20019	7	NR MPS-GT	467,755	151	-	151	180,699	40%	Y	B2	Large
DGS28	King Elementary School	3200 6TH STREET SE	Washington	DC	20032	8	NR MPS-GT	743,680	160	-	160	191,658	46%	Y	B2	Large
DGS52	Takoma Education Campus	7010 PINEY BRANCH ROAD NW	Washington	DC	20012	4	NR GT	1,685,888	117	48	165	194,435	15%	Y	B2	Large
DGS46	Savoy Elementary School	2400 SHANNON PLACE SE	Washington	DC	20020	8	NR GT	1,257,171	166	-	166	187,376	15%	Y	B2	Large
DGS51	Stoddert Elementary School	4001 CALVERT STREET NW	Washington	DC	20007	3	NR GT	1,425,424	169	-	169	202,211	17%	Y	B2	Large
DGS44	Randle Highlands Elem. School	1650 30TH STREET SE	Washington	DC	20020	7	NR MPS-GT	1,448,813	170	-	170	203,732	16%	Y	B2	Large
DGS60	J.O. Wilson Elementary School	660 K STREET NE	Washington	DC	20002	6	NR MPS-GT	1,213,479	171	-	171	204,690	16%	Y	B2	Large
DGS04	Anacostia High School	1601 16TH STREET SE	Washington	DC	20020	8	NR GT	3,301,927	92	86	179	210,085	7%	Y	B2	Large
DGS18	Evidence Control Branch	17 DC VILLAGE LANE SW	Washington	DC	20032	8	NR MPS-GS D	512,023	135	45	180	205,381	40%	Y	B2	Large
DGS67	Kramer Middle School	1700 Q STREET SE	Washington	DC	20020	8	TBA	1,499,646	184	-	184	220,896	15%	Y	B2	Large
DGS34	Miner Elementary School	601 15TH STREET NE	Washington	DC	20002	6	NR MPS-GT	1,015,564	194	-	194	232,575	23%	Y	B2	Large
DGS40	Patterson Elementary School	4399 SOUTH CAPITOL TERRACE SW	Washington	DC	20032	8	NR MPS-GT	872,686	195	-	195	233,593	27%	Y	B2	Large
DGS23	C.W. Harris Elementary School	301 53RD STREET SE	Washington	DC	20019	7	NR MPS-GT	539,158	195	-	195	233,594	45%	Y	B2	Large
DGS55	Turner Elementary School	3264 STANTON ROAD SE	Washington	DC	20020	8	NR MPS-GT	1,543,524	135	61	196	231,154	21%	Y	B2	Large

DGS53	3rd District Police Station	1620 V STREET NW	Washington	DC	20009	1	NR GT	808,906	72	160	232	265,838	33%	Y	B2	Large
DGS14	Deanwood Recreation Center	1350 49TH STREET NE	Washington	DC	20019	7	NR GT	1,364,973	237	-	237	275,709	20%	Y	B2	Large
DGS15	Eastern High School	1700 EAST CAPITOL STREET NE	Washington	DC	20003	6	NR GT	4,150,850	67	189	256	297,852	8%	Y	B2	Large
DGS45	Raymond Education Campus	915 SPRING ROAD NW	Washington	DC	20010	4	NR MPS-GT	701,846	228	34	262	307,309	42%	Y	B2	Large
DGS20	Garrison Elementary School	1200 S STREET NW	Washington	DC	20009	2	NR GT	453,666	209	78	287	338,282	74%	Y	B2	Large
DGS41	Payne Elementary School	305 15TH STREET SE	Washington	DC	20003	6	NR MPS-GT	445,188	209	81	290	340,328	76%	Y	B2	Large
DGS50	Sousa Middle School	3650 ELY PLACE SE	Washington	DC	20019	7	NR MPS-GT	1,726,409	264	37	301	356,310	20%	Y	B2	Large
DGS27	Kelly Miller Middle School	301 49TH STREET NE	Washington	DC	20019	7	NR GT	1,978,533	263	38	301	358,597	18%	Y	B2	Large
DGS07	Burrville Elementary School	801 DIVISION AVENUE NE	Washington	DC	20019	7	NR MPS-GT	1,099,595	313	-	313	373,111	35%	Y	B2	Large
DGS36	Municipal Warehouse	2000 ADAMS PLACE NE	Washington	DC	20018	5	NR GT	839,803	377	-	377	425,878	47%	Y	B2	Large
DGS24	H.D. Woodson High School	5500 EADS STREET NE	Washington	DC	20019	7	NR MPS-GT	3,664,818	246	257	503	588,566	18%	Y	B2	Large
DGS12	Police Training Academy	4665 BLUE PLAINS DRIVE SW	Washington	DC	20032	8	NR GT	1,889,613	224	481	705	810,602	43%	Y	B2	Large
DGS64	St. Elizabeth's Hospital	1100 ALABAMA AVENUE SE	Washington	DC	20032	8	TBA	12,101,001	798	-	798	936,928	8%	Y	B2	Large
DGS65	Brookland Middle School	1150 MICHIGAN AVENUE NE	Washington	DC	20017	5	TBA	286,139	136	-	136	162,899	11%	Y	B3	Innovation
DGS69	Southeast Tennis and Learning Center	701 MISSISSIPPI AVENUE SE	Washington	DC	20032	8	TBA	543,076	159	-	159	190,089	35%	Y	B3	Innovation
DGS68	Roosevelt High School	4301 13TH STREET NW	Washington	DC	20011	4	TBA	3,995,876	304	-	304	363,565	9%	Y	B3	Innovation
DGS66	Ballou Senior High School	3401 4TH STREET SE	Washington	DC	20032	8	TBA	3,119,110	623	-	623	730,741	14%	Y	B3	Innovation

DGS02 5th District Police Station

Site Address	1805 Bladensburg Road NE, Washington DC 20002
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	999,306 kWh
Maximum System Size	126 kW-DC
Maximum System Output	149,076 kWh
Recommended System Size	126 kW-DC
Recommended System Output	149,076 kWh
Energy Offset	15%
Issues	Low energy offset; Uncertain roof condition under retired helipad
Opportunities	Potential to repurpose helipad roof area that is no longer in service

Located in Washington's 5th Ward, the 5th District Police Station is a two-level building with ample space for a solar PV system. The building was constructed in 1978 and the thermoset membrane roof layer is in good condition. However, the helipad in section 2 is no longer in service and the condition of the roof layer underneath is uncertain and should be inspected further prior to the installation of a PV system. **Figure 1** shows the usable areas at the site.

Figure 1: 5th District Police Station Usable Area

Recommendation

All Sections highlighted in **Figure 1** are recommended at this site. Optony recommends a solar PV system of 126 kW-DC, which would produce 149,076 kWh per year and offset 15% of the site's electricity usage annually. Additional information on each section and other site characteristics is contained on the following page.

Energy Consumption

In the 12 months of fiscal year 2011-2012, the average annual electricity usage at this site was 999,306 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 1**, which can host a solar PV system with a technical potential of 126 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce apporoximately 149,076 kWh per year and offset 15% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt for the rooftop sections and a 5° tilt for carport section. **Table 1** below shows a summary of the production from each reviewed section.

Table 1: 5th District Police Station Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	2,678	28
2	180°	2,550	27
3	180°	2,763	29
4	180°	3,575	43
Technical Potential		11,566	126
Maximum Production (kWh)			149,076
Recommended System Size (kW)			**126**
Recommended System Output (kWh)			**149,076**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor at the northeast corner of the building, as shown by the yellow and black electrical sign in **Figure 1**. The main breaker amperage rating is 2000A and voltage is 277/480V. Current electrical equipment appears suitable for a PV system without major upgrades.

There is no space available in the electrical room for additional electrical equipment. Inverters and other solar-specific equipment would need to be installed against the outside wall of the electrical room, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections. Minimal tree trimming may be needed for the recommended carport (Section 4) in the employee parking area.

Figure 3: View of proposed carport area (far left)

Figure 2: Roof of main building with retired helipad

DGS04 Anacostia High School

Site Address	1601 16th Street SE, Washington DC 20020
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	3,301,306 kWh
Maximum System Size	179 kW-DC
Maximum System Output	210,085 kWh
Recommended System Size	179 kW-DC
Recommended System Output	210,085 kWh
Energy Offset	6%
Issues	Low energy offset; Potential security concerns for solar carport
Opportunities	Solar energy curriculum integration; Solar bleacher canopy potential (not assessed)

Located in Washington's 8th Ward, Anacostia High School is a four-story building with limited space available for a solar PV system. The building was constructed in 1969 and many of the rooftop areas are unsuitable for solar due to unfavorable orientation and roof materials. However, the thermoplastic membrane roof layer on Section 1 in Figure 4 was installed in 2012 and is in good condition. A parking lot is under construction at northern end of property, which would provide significant additional solar carport opportunities when completed. There may be additional solar potential in the form of a solar canopy structure over the bleachers of the sports field. This opportunity was not assessed, but developers are encouraged to include in proposal if deemed feasible. Figure 4 shows the current usable areas at the site.

Figure 4: Anacostia High School Usable Area

Recommendation

All Sections highlighted in Figure 4 are recommended at this site. Optony recommends a solar PV system of 179 kW-DC, which would produce 210,085 kWh per year and offset 6% of the site's electricity usage annually. Additional information on each section and other site characteristics is contained on the following page.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 3,301,306 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in Figure 4, which can host a solar PV system with a technical potential of 179 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 210,085 kWh per year and offset 6% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt for the rooftop section and a 5° tilt for carport sections. **Table 2** below shows a summary of the production from each reviewed section.

Table 2: **Anacostia High School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	8,825	92
2	180°	3,640	43
3	180°	3,625	43
Technical Potential		16,090	179
Maximum Production (kWh)			210,085
Recommended System Size (kW)			**179**
Recommended System Output (kWh)			**210,085**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located in the basement of the southwest corner of the main building, as shown by the yellow and black electrical sign in Figure 4. Each breakers' amperage rating is 2000A and voltage is 480/277V. The electrical equipment at this site has been recently upgraded and appears to be suitable for a PV system without major upgrades.

As **Figure 5** shows, despite temporary materials storage, there is ample space available in the electrical room for the installation of inverters and additional PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter located in the basement.

Figure 5: Available space in the electrical

Shading

There are no significant shading issues at this site for the recommended sections.

Security

There are security concerns for the recommended carport sections, which could be mitigated through the installation of fencing around the parking areas and other security measures.

Figure 6: Area of recommended carport section

Figure 7: View of parking area under construction

Figure 8: Close south-facing view of Section 1

Figure 9: View of Section 1 from the main building

DGS06 Brightwood Education Campus

Site Address	1300 Nicholson Street NW, Washington DC 20011
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,510,213 kWh
Maximum System Size	108 kW-DC
Maximum System Output	122,774 kWh
Recommended System Size	108 kW-DC
Recommended System Output	122,774 kWh
Energy Offset	8%
Issues	Low energy offset; Shading from HVAC and satellite equipment, and vegetation
Opportunities	Solar energy curriculum integration

Located in Washington's 4th Ward, the Brightwood Education Campus is a series of multi-story buildings with three rooftop sections and one carport section that are suitable for solar PV. The thermoplastic membrane roof was installed in 2005 and is in good condition. The pitched green roof is composed of an Energysmart green membrane and unique rubber strips that imitate a metal standing seam rooftop. However, due to the roofing material, shading concerns, and possible issues with penetrations the pitched roof, solar is not recommended for that building. Additionally, the parking area is fenced in. **Figure 10** shows the usable areas at the site.

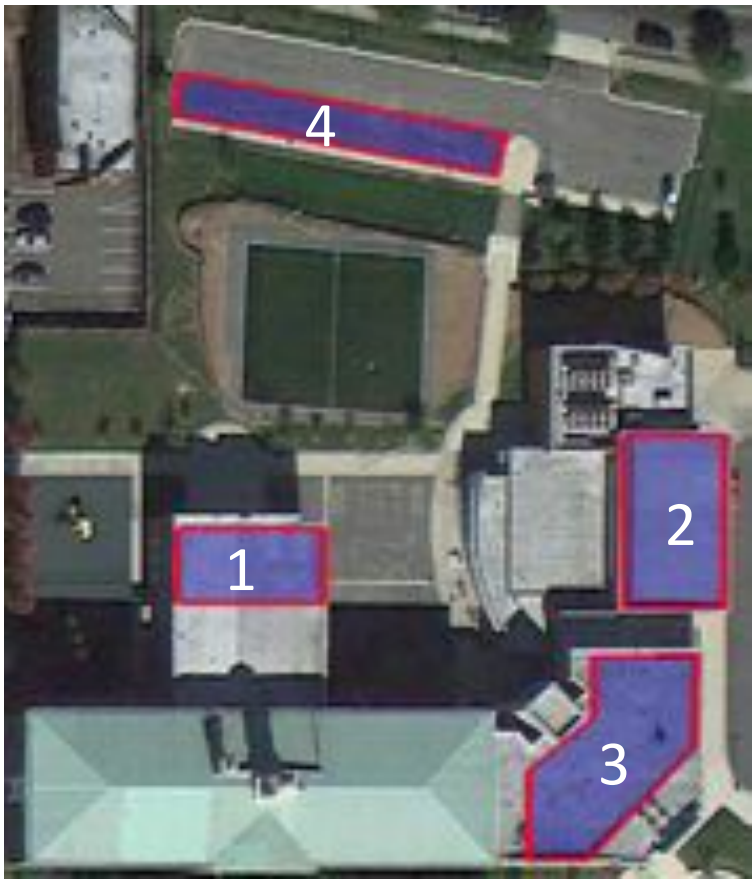


Figure 10: Brightwood Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 10** are recommended at this site. Optony recommends a solar PV system of 108 kW-DC, which would produce 122,774 kWh per year and offset 8% of the site's electricity usage annually. Additional information on each section and other site characteristics is contained on the following page.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,510,213 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 10**, which can host a solar PV system with a technical potential of 108 kW-DC. To maximize system production with limited available space, all of the panels on the rooftop sections are assumed to be tilted at a 10° tilt and those on the carport section is assumed to be tilted at a 5° tilt. **Table 3** below shows a summary of the production from each reviewed section.

Table 3: **Brightwood Education Campus Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,406	15
2	180°	2,270	24
3	135°	2,885	30
4	190°	2,647	32
Technical Potential		9,209	108
Maximum Production (kWh)			122,774
Recommended System Size (kW)			**108**
Recommended System Output (kWh)			**122,774**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. Building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As Figure 11 shows, there is limited space available in the electrical room for inverters and additional PV equipment, thus an alternative location is required for PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter.

Figure 11: Limited available space in the electrical room

Shading

All identified usable areas are on a flat surface with minimal shading from surrounding buildings and utility equipment.

Figure 12: An example of roof material and obstructions

DGS07 Burrville Elementary School

Site Address	801 Division Avenue NE, Washington DC 20019
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,099,595 kWh
Maximum System Size	313 kW-DC
Maximum System Output	373,111 kWh
Recommended System Size	313 kW-DC
Recommended System Output	373,111 kWh
Energy Offset	34%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & Maintenance

Located in Washington's 7th Ward, Burrville Elementary School is a two-story building with ample space available for a solar PV system. The building was constructed in 1976. The modified bitumen roof layer that was installed in 2000 and is scheduled to be upgraded in 2014 in order to receive the solar PV system. According to school staff, the building is scheduled to be modernized in the coming years. **Figure 13** shows the usable areas at the site.

Figure 13: Burrville Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 13** are recommended at this site. Optony recommends a solar PV system of 313 kW-DC, which would produce 373,111 kWh per year and offset 34% of the site's electricity usage annually. Additional information on each section and other site characteristics is contained on the following page.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,099,595 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 13**, which can host a solar PV system with a technical potential of 313 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 373,111 kWh per year and offset 34% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 4** below shows a summary of the production from each reviewed section.

Table 4: **Burrville Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	195°	8,161	85
2	195°	3,059	32
3	195°	18,666	195
Technical Potential		29,885	313
Maximum Production (kWh)			373,111
Recommended System Size (kW)			**313**
Recommended System Output (kWh)			**373,111**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor in the boiler room on the north side of the building, as shown by the yellow and black electrical sign in **Figure 13**. The main breaker amperage rating is 2500A and voltage is 277/480V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 14** shows, there is ample space available in the boiler room for inverters and additional PV equipment. Conduit runs that go from the roof to the electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter.

Figure 14: Ample available space in the boiler room

Shading

There are no significant shading issues at this site for the recommended sections. While the parking area is fenced in at this site, there is too much tree shading for solar carports to be a viable option.

Figure 15: East-facing view of Section 3

Figure 16: South-facing view of Section 3

DGS10 H.D. Cooke Elementary School

Site Address	2525 17th Street NW, Washington DC 20009
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	885,600 kWh
Maximum System Size	78 kW-DC
Maximum System Output	93,871 kWh
Recommended System Size	78 kW-DC
Recommended System Output	93,871 kWh
Energy Offset	11%
Issues	Low energy offset; Limited available space
Opportunities	Solar energy curriculum integration; Roof access for tours and Maintenance

Located in Washington's 1st Ward, H.D. Cooke Elementary School is a three-level building with limited space available for a solar PV system. The building was modernized in 2009 and its thermosplastic and modified bitumen roof layers in Sections 1-3 in **Figure 17** are in good condition, though the modified bitumen layer appears to have less remaining service life than the thermoplastic sections. **Figure 17** shows the usable areas at the site.

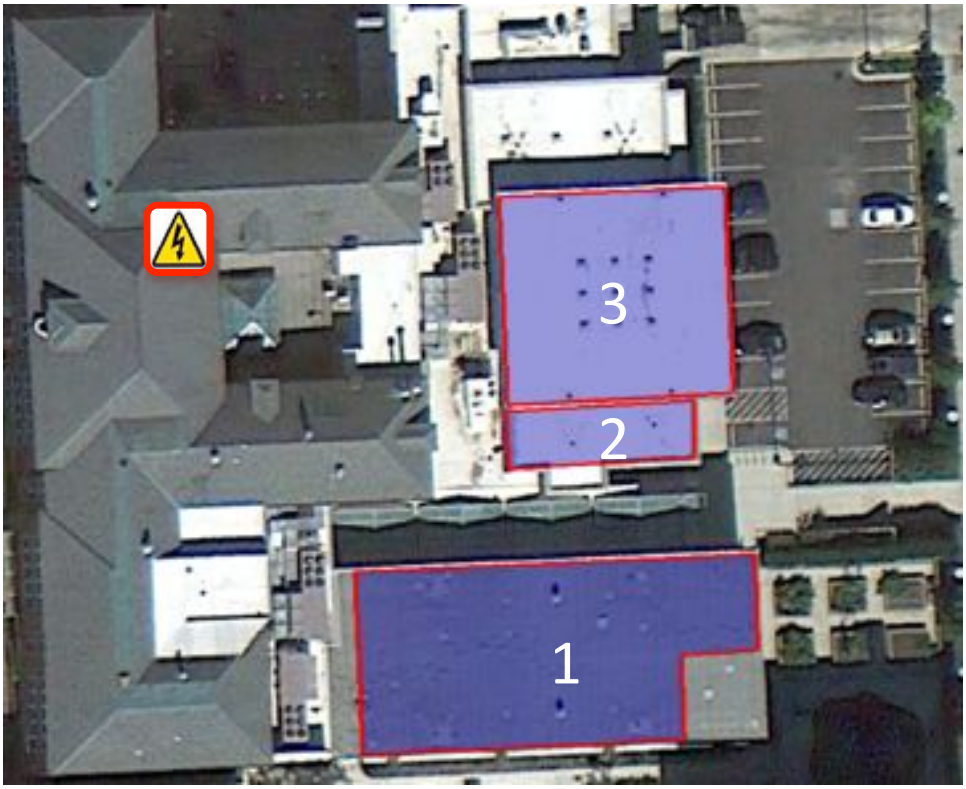


Figure 17: H.D. Cooke Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 17** are recommended at this site. Optony recommends a solar PV system of 78 kW-DC, which would produce 93,871 kWh per year and offset 11% of the site's electricity usage annually. Additional information on each section and other site characteristics is contained on the following page.

Energy Consumption

In the 12 months of fiscal year 2011-2012, the average annual electricity usage at this site was 885,600 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 17**, which can host a solar PV system with a technical potential of 78 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 93,871 kWh per year and offset 11% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 5** below shows a summary of the production from each reviewed section.

Table 5: **H.D. Cooke Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	3,995	42
2	180°	645	7
3	180°	2,852	30
Technical Potential		7,491	78
Maximum Production (kWh)			93,871
Recommended System Size (kW)			**78**
Recommended System Output (kWh)			**93,871**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor of the main building and the yellow and black electrical sign in **Figure 17** marks its location. The main breaker amperage rating is 3000A and voltage is 480/277V. Current electrical equipment at this site has been recently upgraded and appears to be suitable for a PV system without major upgrades.

As **Figure 18** shows, the electrical room is in good condition and there is open space in the room for inverters and additional PV equipment.

Figure 18: Electrical room has ample space

Shading

There is a significant shading issue for Section 1 posed by a residential building to the south. Solmetric SunEye shade readings were used to identify the portion of Section 1 with solar access of less than 85%, which was removed from consideration as shown in **Figure 17**.

Figure 19: View of building to south of Section 1

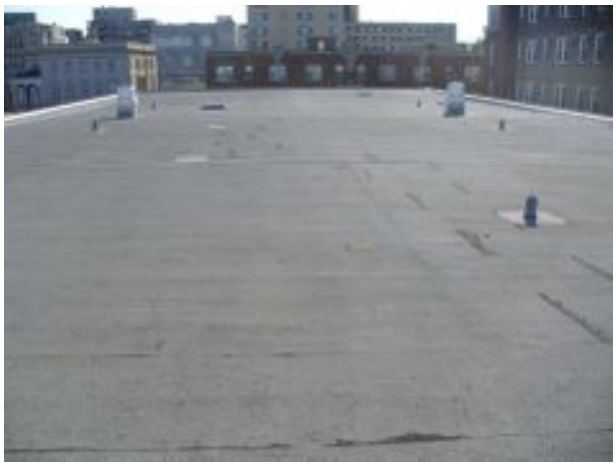


Figure 20: East-facing view of Section 1

DGS11 Coolidge High School

Site Address	6315 5th Street NW, Washington DC 20011
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	2,329,679 kWh
Maximum System Size	145 kW-DC
Maximum System Output	173,644 kWh
Recommended System Size	145 kW-DC
Recommended System Output	173,644 kWh
Energy Offset	7%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 4th Ward, Coolidge High School has a historic architecture with pitched roofs and a dome structure. According to the information provided by the DC roof auditors, the main building's roof is not adequate for solar. To the north of the main building is the gymnasium building, which was recently renovated. The gymnasium is a three-story building with a modified bitumen roof layer that was installed in 2000 and is scheduled to be upgraded in 2014 in order to receive the solar PV system. **Figure 21** shows the usable areas at the site.

Figure 21: Coolidge High School Usable Area

Recommendation

Section highlighted in **Figure 21** is the only recommended section at this site. Optony recommends a solar PV system of 145 kW-DC, which would produce 173,644 kWh per year and offset 7% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 2,329,679 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There is one usable section at this site, as shown in **Figure 21**, which can host a solar PV system with a technical potential of 145 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 173,644 kWh per year and offset 7% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 6** below shows a summary of the production from each reviewed section.

Table 6: **Coolidge High School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	13,858	145
Technical Potential		13,858	145
Maximum Production (kWh)			173,644
Recommended System Size (kW)			**145**
Recommended System Output (kWh)			**173,644**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

The main electrical room for the gymnasium is located in the basement within the boiler room. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 800A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 22** shows, there is space available in the electrical room for inverters and additional PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be installed to house the wires from PV panels output to main switch board.

Figure 22: Potential Inverter Locations at Coolidge HS

Shading

The highlighted usable area in **Figure 21** is ideal for a solar installation and it does not experience any shading issues. Although the gymnasium has multiple rooftop areas, due to elevation change and HVAC equipment, not all the rooftop areas are suitable for solar. From the onsite analysis it was concluded that only the main rooftop area is ideal for solar. The rooftops on the lower level experience drastic shading from the school's main building, which is south of gymnasium. Additionally, the entire upper level of the roof is not usable for solar, as it has four HVAC equipment surrounded by 14-foot screens and two pyramid shaped skylights that limit the usable area on the roof, as shown in **Figure 23**.

Figure 23: Example of Roof Material and Obstructions

DGS12 DC Police Academy Annex

Site Address	4665 Blue Plains Drive SW, Washington DC 20032
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,889,613 kWh
Maximum System Size	705 kW-DC
Maximum System Output	810,602 kWh
Recommended System Size	705 kW-DC
Recommended System Output	804,451 kWh
Energy Offset	43%
Issues	Low energy offset
Opportunities	High visibility to government employees; Shading for personal vehicles

Located in Washington's 8th Ward, the DC Police Academy Annex is a series of three-story buildings with ample space available for rooftop and carport solar PV systems. The modified bitumen roof layers in Sections 1-5 in **Figure 24** are scheduled to be upgraded in 2014 in order to receive the solar PV system. **Figure 24** shows the usable areas at the site.

Figure 24: DC Police Academy Annex Usable Area

Recommendation

All Sections highlighted in **Figure 24** are recommended at this site. Optony recommends a solar PV system of 705 kW-DC, which would produce 810,602 kWh per year and offset 43% of the site's electricity usage annually.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,889,613 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are 12 usable sections at this site, as shown in **Figure 24**, which can host a solar PV system with a technical potential of 705 kW-DC. To maximize system production with limited available space, all of the panels for rooftop sections are assumed to be tilted at a 10° tilt and carport sections are assumed to be tilted at a 5° tilt. **Table 7** below shows a summary of the production from each reviewed section.

Table 7: **DC Police Academy Annex Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	195°	1,856	19
2	195°	2,442	26
3	205°	8,362	88
4	205°	6,712	70
5	205°	2,011	21
6	180°	3,316	40
7	180°	7,824	93
8	180°	6,284	75
9	115°	6,657	79
10	115°	6,764	81
11	115°	6,796	81
12	115°	2,806	33
Technical Potential		61,829	705
Maximum Production (kWh)			810,602
Recommended System Size (kW)			**705**
Recommended System Output (kWh)			**810,602**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located at the site, as shown by the yellow and black electrical signs in **Figure 24**. The meter in the original building (Sections 3-5) has a main breaker amperage rating of 2000A and voltage is 277/480V. The meter in the newer building (Sections 1-2) has a main breaker amperage rating of 800A and voltage is 277/480V. Current electrical equipment appears suitable for a PV system without major upgrades.

There is space available in both electrical rooms for inverters and additional PV equipment. The electrical service panels at this site appear to be in good condition and properly functioning. Conduit runs that go from the roof to the basement

electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter located in the basement.

Shading

There are several areas of unavoidable shading at this site for the recommended sections. The identified usable areas are designed to avoid shading from the surrounding trees and structures. The roof and carport area with less than 85% solar access, calculated through Solmetric SunEye shade readings, were removed from consideration. Several trees will likely need to be relocated in the employee and visitor parking areas.

Additionally, the existing lighting structures in the parking areas will need to be removed and integrated into the solar canopy structures, which could provide additional energy efficiency through the use of LED lighting technologies.

Figure 25: South-facing view of Sections 2 and 3

Figure 26: Shading threats to east of Section 5

Figure 27: South-facing view of Sections 9-12

Figure 28: East-facing view of Sections 6-8

DGS13 Deal Middle School

Site Address	3815 Fort Drive NW, Washington DC 20016
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	3,519,398 kWh
Maximum System Size	56 kW-DC
Maximum System Output	67,220 kWh
Recommended System Size	56 kW-DC
Recommended System Output	67,220 kWh
Energy Offset	2%
Issues	Low energy offset; Existing PV system on gymnasium roof
Opportunities	Solar energy curriculum integration

Located in Washington's 3rd Ward, Deal Middle School is a newly renovated, multi-story facility. The building's modified bitumen roof layers were constructed in 2005 and are in good condition. The school has an existing PV system on the northeastern building (gymnasium roof). It is unclear why this was the only rooftop area developed for solar PV. Due to the existing PV system, change in roof elevation, and existing HVAC and utility equipment, the entire roof surface is not suitable for a solar PV system. **Figure 29** shows the usable areas at the site.

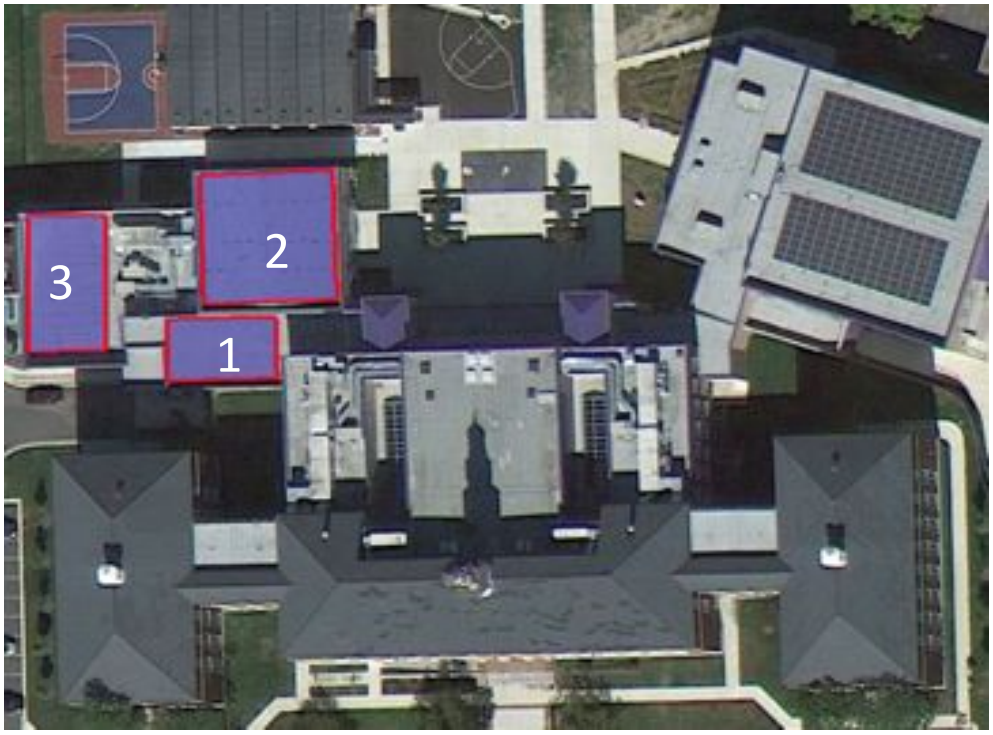


Figure 29: **Deal Middle School Usable Area**

Recommendation

All Sections highlighted in **Figure 29** are recommended at this site. Optony recommends a solar PV system of 56 kW-DC, which would produce 67,220 kWh per year and offset 2% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 3,519,398 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 29**, which can host a solar PV system with a technical potential of 56 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 67,220 kWh per year and offset 2% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 8** below shows a summary of the production from each reviewed section.

Table 8: **Deal Middle School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	980	9
2	180°	3050	28
3	180°	2070	19
Technical Potential		6,100	56
Maximum Production (kWh)			67,220
Recommended System Size (kW)			**56**
Recommended System Output (kWh)			**67,220**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the main building. Building voltage is 277/480 V and the main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As Figure 2 shows, there is ample space available in the electrical room for inverters and additional PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter located in the basement.

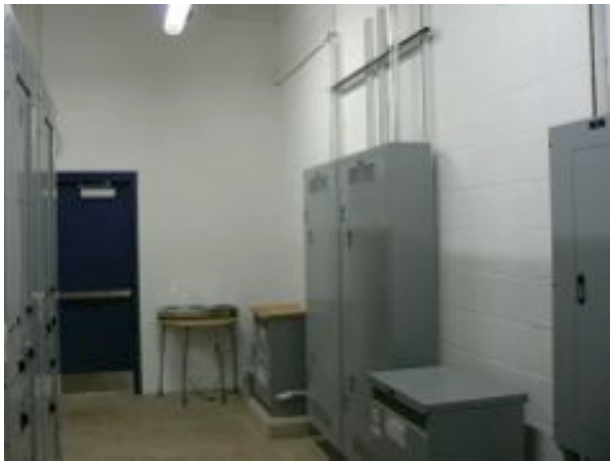


Figure 30: Ample available space in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. Although Section 3 is on a lower rooftop compared to Section 1 and 2, the usable area in Section 3 does not experience shading from either of the rooftops. Sections 1 and 2 are on different portions of the rooftop with varying rooftop height.

Figure 31: Example of Roof Material and Existing Obstructions

DGS14 Deanwood Recreation Center

Site Address	1350 49th Street NE, Washington DC 20019
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,364,973 kWh
Maximum System Size	237 kW-DC
Maximum System Output	275,709 kWh
] Recommended System Size	237 kW-DC
Recommended System Output	275,709 kWh
Energy Offset	20%
Issues	Low energy offset
Opportunities	Highly visible monitoring display; Easy roof access for tours and maintenance

Located in Washington's 7th Ward, the Deanwood Recreation Center is a one-story building with ample space available for a solar PV system. The building was constructed in 2011 and its white modified bitumen (Sections 2-8) and standing seam roof (Section 1) layers are in good condition. **Figure 32** shows the usable areas at the site.

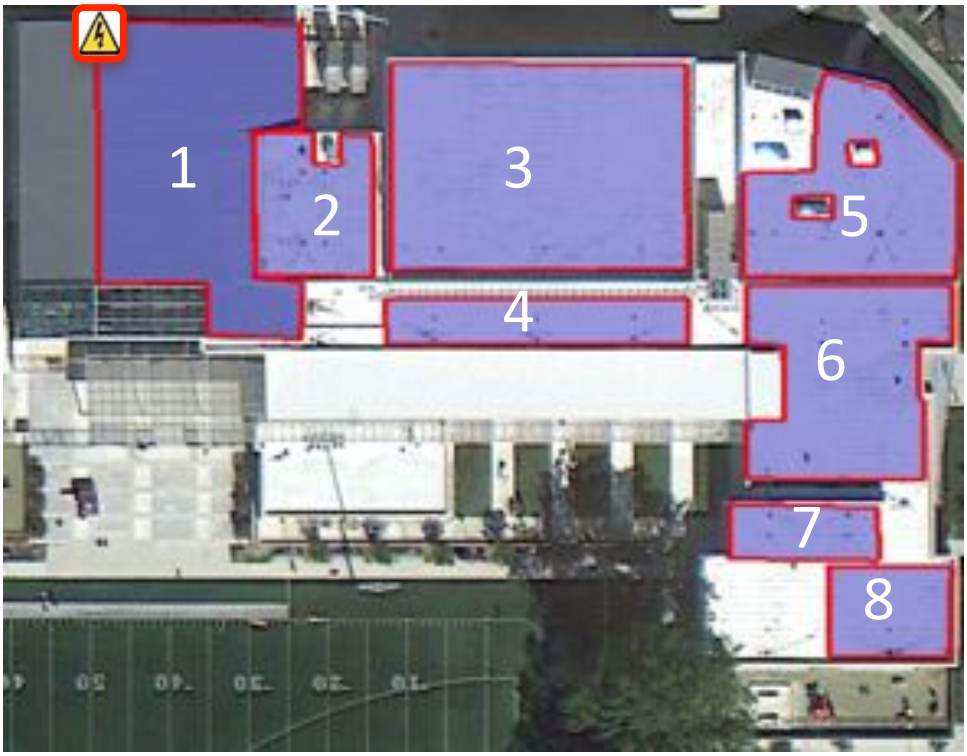


Figure 32: Deanwood Recreation Center Usable Area

Recommendation

All Sections highlighted in **Figure 32** are recommended at this site. Optony recommends a solar PV system of 237 kW-DC, which would produce 275,709 kWh per year and offset 20% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,364,973 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are eight usable sections at this site, as shown in **Figure 32**, which can host a solar PV system with a technical potential of 237 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 275,709 kWh per year and offset 20% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 9** below shows a summary of the production from each reviewed section.

Table 9: **Deanwood Recreation Center Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	90°	5,129	54
2	180°	1,616	17
3	180°	6,161	65
4	180°	1,404	15
5	180°	3,098	32
6	180°	3,327	35
7	180°	806	8
8	180°	1,117	12
Technical Potential		22,656	237
Maximum Production (kWh)			275,709
Recommended System Size (kW)			**237**
Recommended System Output (kWh)			**275,709**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor of the building near the pool, as shown by the yellow and black electrical sign in **Figure 32**. The main breaker amperage rating is 1600A and voltage is 480/277 V. The electrical service panels at this site are brand new and functioning properly. Current electrical equipment has been recently installed and appears suitable for a PV system without major upgrades.

There is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would need to be installed against the outside wall of the electrical room, where sufficient space is available.

Shading

There are minimal shading issues at this site for the recommended sections. Minimal tree trimming may be needed to the south of Sections 7-8. However, the identified usable areas are designed to avoid shading from the surrounding structures.

Figure 33: View of roof and parapet above gym (Section 3)

Figure 34: West-facing view of Section 1

Figure 35: West-facing view of Section 4

Figure 36: Skylight obstructions on Section 5

DGS15 Eastern High School

Site Address	1700 East Capitol Street NE, Washington DC 20003
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	4,150,850 kWh
Maximum System Size	256 kW-DC
Maximum System Output	297,852kWh
Recommended System Size	256 kW-DC
Recommended System Output	297,852kWh
Energy Offset	7%
Issues	Low energy offset; Security concerns for solar carport structure
Opportunities	Solar energy curriculum integration; High visibility solar carport structure

Located in Washington's 6th Ward, Eastern High School is a three-story building that was constructed in 1936 and modernized in 2010. The building's main rooftop has a thermoplastic roof layer that was installed in 2005 and is in good condition. The usable area is limited by the architectural towers at the main entrance and the HVAC, skylights, and cell phone tower equipment. This school has an opportunity for a highly visible solar carport structure between the school and the sports field. However, this section may not be desirable due to security concerns. There may be additional solar potential in the form of a solar canopy structure over the bleachers of the sports field. This opportunity was not assessed, but developers are encouraged to include in proposal if deemed feasible. **Figure 37** shows the usable areas at the site.

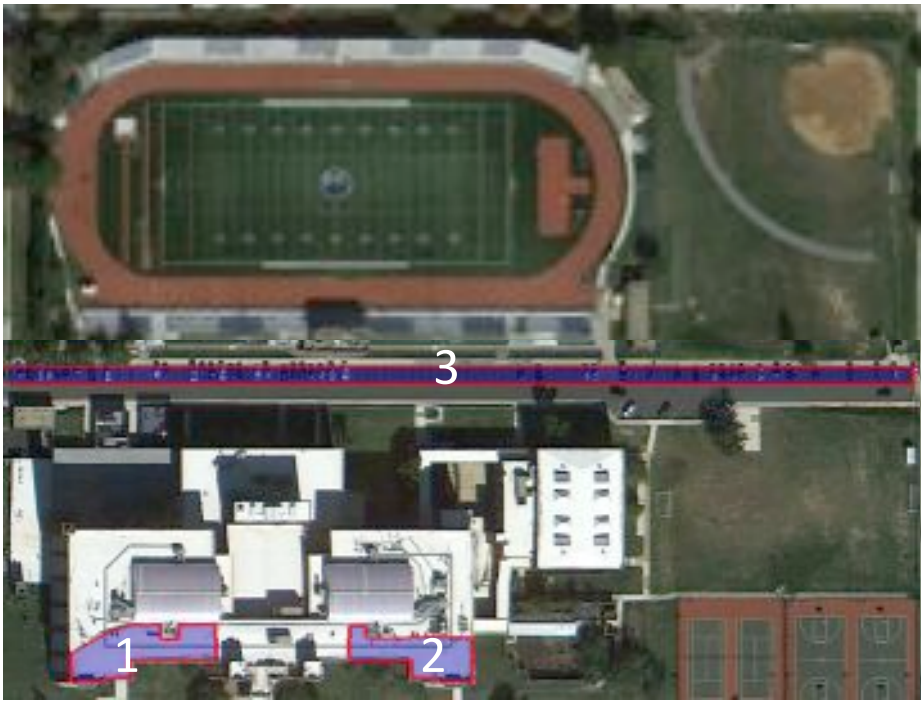


Figure 37: **Eastern High School Usable Area**

Recommendation

All Sections highlighted in **Figure 37** are recommended at this site. Optony recommends a solar PV system of 256 kW-DC, which would produce 297,852 kWh per year and offset 7% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 4,150,850 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 37**, which can host a solar PV system with a technical potential of 256 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 297,852 kWh per year and offset 7% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels on the rooftop areas are assumed to be tilted at a 10° tilt and those on the carport area are assumed to be tilted at a 5° tilt. **Table 10** below shows a summary of the production from each reviewed section.

Table 10: **Eastern High School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	3,637	38
2	180°	2,812	29
3	180°	15,847	189
Technical Potential		22,296	256
Maximum Production (kWh)			297,852
Recommended System Size (kW)			**256**
Recommended System Output (kWh)			**297,852**

Under the District's net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

The main electrical room for the school is located in the basement. Building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 4000A. Current electrical equipment appears suitable for a PV system without major upgrades.

Figure 38 shows a potential location for an inverter installation within the electrical room. Space is available in the main electrical room for additional electrical PV equipment. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 38: Potential inverter location inside elec. room

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures. The rooftop area north of Section 1 and 2 is on the lower level. This area experiences shading during the peak sun hours from the elevated, southern rooftop, and therefore is not considered usable for solar PV. Minimal tree trimming may be needed in the parking areas.

Security

There are security concerns for the recommended carport section, which cannot be mitigated through the installation of fencing around the parking area or other security measures.

Figure 39: Example of Roof Material and Obstructions

DGS18 Evidence Control Branch

Site Address	17 DC Village Lane SW, Washington DC 20032
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GS D
Annual Energy Usage	512,023 kWh
Maximum System Size	180 kW-DC
Maximum System Output	205,381 kWh
Recommended System Size	180 kW-DC
Recommended System Output	205,381 kWh
Energy Offset	40%
Issues	Uncertain warehouse roof structural integrity
Opportunities	Good energy offset

Located in Washington's 8th Ward, the Evidence Control Branch is a one-story building and has more than enough space for a PV system that would offset all of the building's electricity consumption. The building was constructed in 2011 and its thermoplastic roof layer is in great condition. However, the structural adequacy of this warehouse building to host a solar PV system should be confirmed prior to the installation of a solar system. **Figure 40** shows the usable areas at the site.

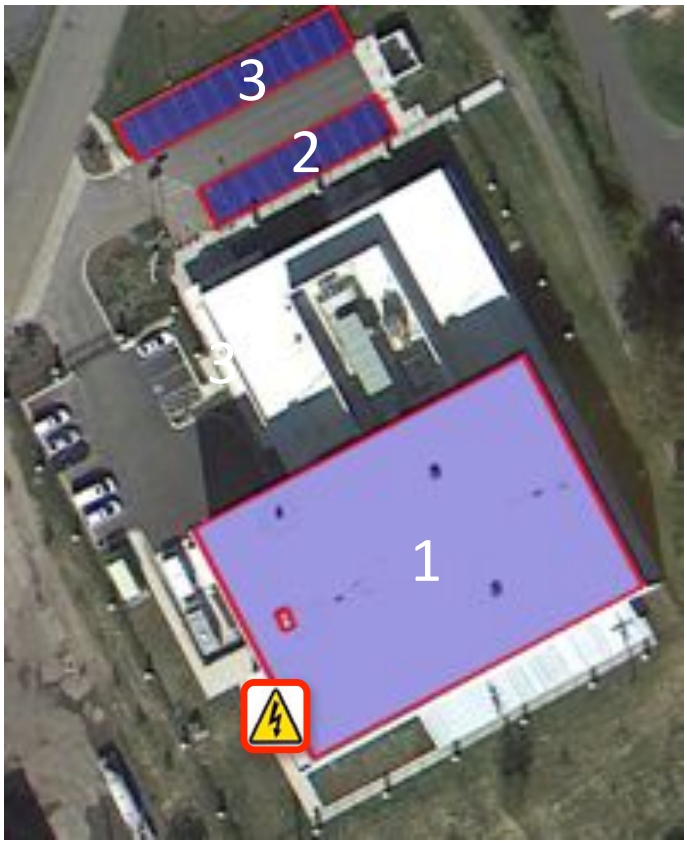


Figure 40: Evidence Control Branch Usable Area

Recommendation

All Sections highlighted in **Figure 40** are recommended at this site. Optony recommends a solar PV system of 180 kW-DC, which would produce 205,381 kWh per year and offset 40% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 512,023 kWh. This site is on Pepco's Non-Residential MPS-GS D rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 40**, which can host a solar PV system with a technical potential of 180 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 205,381 kWh per year and offset 40% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt and those on the carport area are assumed to be tilted at a 5° tilt. **Table 11** below shows a summary of the production from each reviewed section.

Table 11: **Evidence Control Branch Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	240°	12,913	135
2	150°	2,115	25
3	150°	1,626	20
Technical Potential		16,654	180
Maximum Production (kWh)			205,381
Recommended System Size (kW)			**180**
Recommended System Output (kWh)			**205,381**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor of the building, as shown by the yellow and black electrical sign in **Figure 40**. The main breaker amperage rating is 1200A and voltage is 480/277 V. The electrical equipment at this site has recently been installed and appears to be suitable for a PV system without major upgrades.

There is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the electrical room, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections. In the event that solar carport structures were built, the parking lot lampposts would need to be removed and integrated into the structure.

Figure 41: View of Section 1

Figure 42: View of structural support for Section 1

DGS20 Garrison Elementary School

Site Address	1200 S Street NW, Washington DC 20009
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	453,666 kWh
Maximum System Size	287 kW-DC
Maximum System Output	338,282 kWh
Recommended System Size	287 kW-DC
Recommended System Output	338,282 kWh
Energy Offset	75%
Issues	Security concerns for solar carport Section 4
Opportunities	Solar energy curriculum integration; High energy offset

Located in Washington's 2nd Ward, Garrison Elementary School is a three-story structure with the potential to incorporate LEED certification of their facility into their development plans. The building was recently modernized and there are three rooftop sections with modified bitumen roof layers that were installed in 2003 and are in good condition. Additionally, there are three parking areas that are usable for solar carports, of which Sections 5 and 6 are fenced in. **Figure 43** shows the usable areas at the site.

Figure 43: **Garrison Elementary School Usable Area**

Recommendation

All Sections highlighted in **Figure 43** are recommended at this site. Optony recommends a solar PV system of 287 kW-DC, which would produce 338,282 kWh per year and offset 75% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 453,666 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are six usable sections at this site, as shown in **Figure 43**, which can host a solar PV system with a technical potential of 287 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 338,282 kWh per year and offset 75% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 12** below shows a summary of the production from each reviewed section.

Table 12: **Garrison Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	7,403	77
2	180°	3,247	34
3	180°	9,360	98
4	180°	3,187	38
5	270°	1,661	20
6	270°	1,635	20
Technical Potential		26,493	287
Maximum Production (kWh)			338,282
Recommended System Size (kW)			**287**
Recommended System Output (kWh)			**338,282**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 1600A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 44** shows, there is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside walls of the buildings, where sufficient space is available. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 44: Limited available space in the electrical room

Shading

There are minimal shading issues at this site for the recommended sections. The identified usable areas are designed to avoid shading from the surrounding structures. Minimal tree trimming may be needed in the Section 4 parking area.

Security

There are security concerns for the recommended carport Section 4 that is not fenced in. This risk can be mitigated through the installation of fencing or other security measures.

Figure 45: Roof Material and Obstructions

DGS23 C.W. Harris Elementary School

Site Address	301 53rd Street SE, Washington DC 20019
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	539,158 kWh
Maximum System Size	195 kW-DC
Maximum System Output	233,954 kWh
Recommended System Size	195 kW-DC
Recommended System Output	233,954 kWh
Energy Offset	43%
Issues	None
Opportunities	Solar energy curriculum integration; Wide-open roof areas

Located in Washington's 7th Ward, C.W. Harris Elementary School is a two-story building that was constructed in 1964 and has ample space for a PV system. According to staff, this school is scheduled to undergo modernization in the coming years. Despite the dark watermarks on the building's roof, the thermoplastic roof layer was installed in 2005 and appears to be in good condition. **Figure 46** shows the usable areas at the site.

Figure 46: C.W. Harris Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 46** are recommended at this site. Optony recommends a solar PV system of 195 kW-DC, which would produce 233,954 kWh per year and offset 43% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 539,158 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 46**, which can host a solar PV system with a technical potential of 195 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 233,954 kWh per year and offset 43% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 13** below shows a summary of the production from each reviewed section.

Table 13: **C.W. Harris Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	190°	13,679	143
2	190°	4,997	52
Technical Potential		18,675	195
Maximum Production (kWh)			233,954
Recommended System Size (kW)			**195**
Recommended System Output (kWh)			**233,954**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the ground floor of the building and has an outside entrance, as shown by the yellow and black electrical sign in **Figure 46**. The main breaker amperage rating is 1200A and voltage is 120/208V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 47** shows, there is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would need to be installed against the outside wall of the electrical room, where sufficient space is available.

Figure 47: No space in the elec. room

Shading

There are no significant shading issues at this site for the recommended sections. The identified usable areas are designed to avoid shading from the HVAC structure between the two sections.

Figure 48: View of HVAC roof obstruction

Figure 49: North-facing view of Section 1

DGS24 — H.D. Woodson High School

Site Address	540 55th Street NE, Washington DC 20019
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	3,664,818 kWh
Maximum System Size	503 kW-DC
Maximum System Output	588,566 kWh
Recommended System Size	503 kW-DC
Recommended System Output	588,566 kWh
Energy Offset	16%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Solar bleacher canopy potential (not assessed)

Located in Washington's 7th Ward, the H.D. Woodson High School is a three-story building that was constructed in 2012 and despite rooftop areas already covered with vegetative roof covering there is still ample space for a PV system. The thermoplastic roof layer is nearly brand new and is in great condition. Also, the parking areas are fenced in, which provide security for solar carport structures. There may be additional solar potential in the form of a solar canopy structure over the bleachers of the sports field. This opportunity was not assessed, but developers are encouraged to include in proposal if deemed feasible. **Figure 50** shows the usable areas at the site.

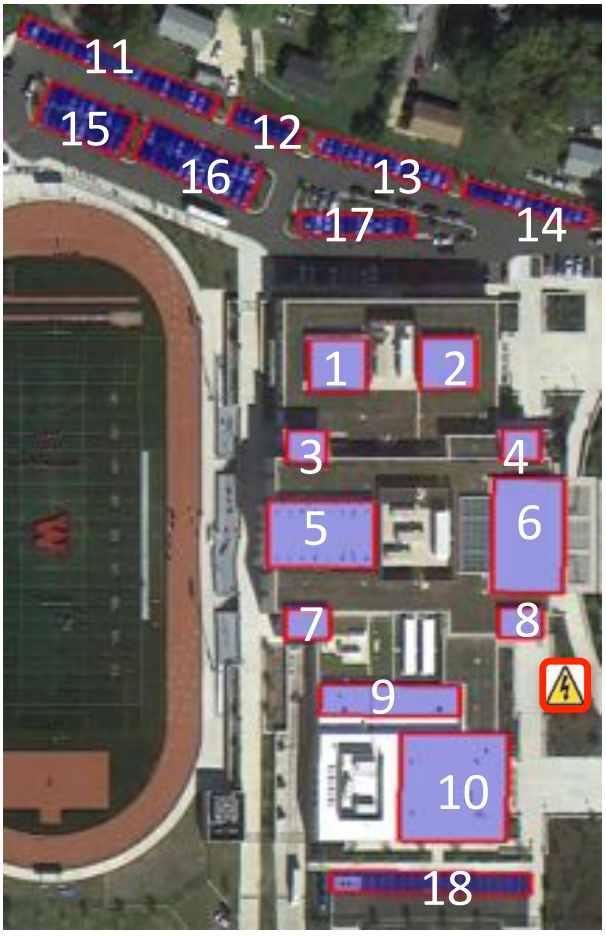


Figure 50: H.D. Woodson High School Usable Area

Recommendation

All Sections highlighted in **Figure 50** are recommended at this site. Optony recommends a solar PV system of 503 kW-DC, which would produce 588,566 kWh per year and offset 16% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 3,664,818 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are 18 usable sections at this site, as shown in **Figure 50**, which can host a solar PV system with a technical potential of 503 kW-DC. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 14** below shows a summary of the production from each reviewed section.

Table 14: **H.D. Woodson High School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,694	18
2	180°	1,596	17
3	180°	730	8
4	180°	688	7
5	180°	3,943	41
6	180°	4,556	48
7	180°	785	8
8	180°	739	8
9	180°	2,381	25
10	205°	6,431	67
11	205°	3,505	42
12	205°	1,309	16
13	205°	2,278	27
14	205°	1,820	22
15	205°	3,221	38
16	205°	4,147	49
17	180°	1,852	22
18	180°	3,420	41
Technical Potential		45,095	503
Maximum Production (kWh)			588,566
Recommended System Size (kW)			**503**
Recommended System Output (kWh)			**588,566**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 50**. The main breakers' amperage and voltage ratings are both 3000A and 480/277 V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 51** shows, there is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Figure 51: Limited available space in the electrical room

Shading

There are no significant shading issues for the recommended rooftop sections at this site. Tree relocation would be necessary in the north parking area to avoid shading and fully realize the solar carport potential.

Figure 52: View of north parking area

Figure 53: East-facing view of Section 6 at 3deg. tilt

Figure 54: Example of Sections 3,4,7,8

Figure 55: East-facing view of Section 10

DGS25 Hendley Elementary School

Site Address	425 Chesapeake Street SE, Washington DC 20032
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	500,565 kWh
Maximum System Size	150 kW-DC
Maximum System Output	174,575 kWh
Recommended System Size	150 kW-DC
Recommended System Output	174,575 kWh
Energy Offset	35%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration

Located in Washington's 8th Ward, the Hendley Elementary School is a three-story building with ample space for a PV system. According to staff, the school is expected to be modernized in the summer of 2013. The buildings currently has a modified bitumen roof layer that was installed in 2005 and is in good condition. The parking area is fenced in, providing additional security for solar carport structures. **Figure 56** shows the usable areas at the site.

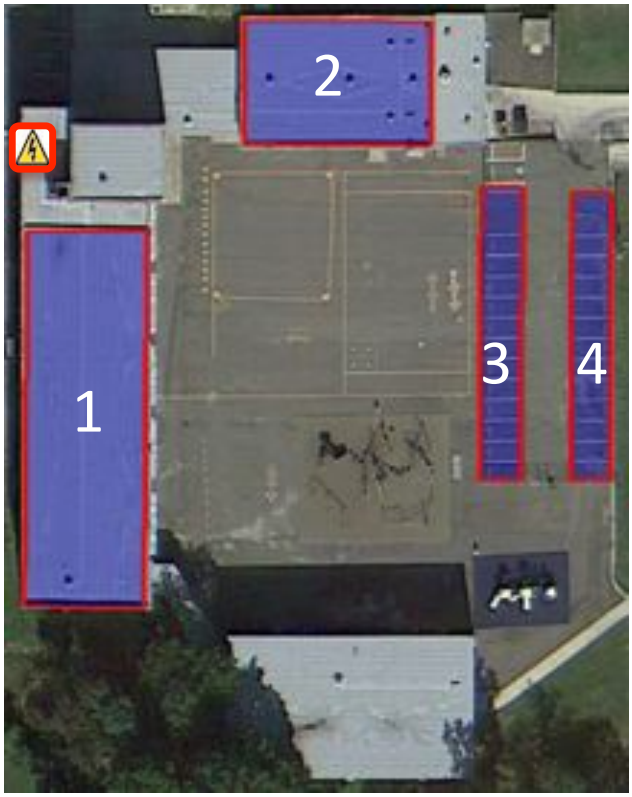


Figure 56: Hendley Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 56** are recommended at this site. Optony recommends a solar PV system of 150 kW-DC, which would produce 174,545 kWh per year and offset 35% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 500,565 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 56**, which can host a solar PV system with a technical potential of 150 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 174,575 kWh per year and offset 35% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 15** below shows a summary of the production from each reviewed section.

Table 15: **Hendley Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	6,074	64
2	180°	3,095	32
3	270°	2,340	28
4	270°	2,186	26
Technical Potential		13,695	150
Maximum Production (kWh)			174,575
Recommended System Size (kW)			**150**
Recommended System Output (kWh)			**174,575**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building at the northwest corner of the site, as indicated by the yellow and black electrical sign in **Figure 56**. The main breaker amperage rating is 1200A and voltage is 120/208V. Current electrical equipment appears suitable for a PV system without major upgrades.

There is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections. The southern most building at the site has significant shading issues and, therefore, is not recommended.

Figure 57: South-facing view of Section 1

Figure 58: View of Section 2

Figure 59: View of parking area

DGS26 Hillcrest Recreation Center

Site Address	3100 Denver Avenue SE, Washington DC 20020
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	341,519 kWh
Maximum System Size	117 kW-DC
Maximum System Output	140,058 kWh
Recommended System Size	117 kW-DC
Recommended System Output	140,058 kWh
Energy Offset	41%
Issues	None
Opportunities	Large open roof areas with few obstructions

Located in Washington's 7th Ward, the Hillcrest Recreation Center is a one-story building with a modest space available for a solar PV system. Constructed in 2004, the building has a modified bitumen roof layer that is in good condition. **Figure 60** shows the usable areas at the site.

Figure 60: Hillcrest Recreation Center Usable Area

Recommendation

All Sections highlighted in **Figure 60** are recommended at this site. Optony recommends a solar PV system of 117 kW-DC, which would produce 140,058 kWh per year and offset 41% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 341,519 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 60**, which can host a solar PV system with a technical potential of 137 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 140,058 kWh per year and offset 41% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 16** below shows a summary of the production from each reviewed section.

Table 16: **Hillcrest Recreation Center Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	6,434	67
2	180°	2,209	23
3	180°	1,751	18
4	180°	784	8
Technical Potential		13,073	117
Maximum Production (kWh)			140,058
Recommended System Size (kW)			**117**
Recommended System Output (kWh)			**140,058**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the ground floor at the site, as shown by the yellow and black electrical sign in **Figure 60**. The main breaker amperage rating is 1600A and voltage is 208/120V. Current electrical equipment appears suitable for a PV system without major upgrades. There is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections.

Figure 61: West-facing view of Section 1

Figure 62: South-facing view of Sections 2 & 3

DGS27 Kelly Miller Middle School

Site Address	301 49th Street NE, Washington DC 20019
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,978,533 kWh
Maximum System Size	301 kW-DC
Maximum System Output	358,597 kWh
Recommended System Size	301 kW-DC
Recommended System Output	358,597 kWh
Energy Offset	18%
Issues	Low energy offset; Security concerns for solar carport structures
Opportunities	Solar energy curriculum integration; Visibility for solar carport structures

Located in Washington's 7th Ward, the Kelly Miller Middle School is series of multi-story buildings that was shut down from 1997 and reopened in 2004 after a complete modernization. There are a total of seven rooftops that are usable for solar PV and two sections of the parking area, which is not fenced in. The roof was installed in 2005 using built-up gravel layers and is in good condition. **Figure 63** shows the usable areas at the site.

Figure 63: **Kelly Miller Middle School Usable Area**

Recommendation

All Sections highlighted in **Figure 63** are recommended at this site. Optony recommends a solar PV system of 301 kW-DC, which would produce 358,597 kWh per year and offset 18% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,978,533 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are eight usable sections at this site, as shown in **Figure 63**, which can host a solar PV system with a technical potential of 301 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 358,597 kWh per year and offset 18% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 17** below shows a summary of the production from each reviewed section.

Table 17: **Kelly Miller Middle School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	4,539	48
2	180°	2,211	23
3	180°	5,527	58
4	180°	1,029	11
5	180°	1,892	20
6	180°	428	5
7	180°	9,510	100
8	180°	1,293	15
9	180°	1,893	23
Technical Potential		23,332	301
Maximum Production (kWh)			358,597
Recommended System Size (kW)			**301**
Recommended System Output (kWh)			**358,597**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. The building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 64** shows, there is space available in the electrical room for inverters and additional PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Figure 64: Available space in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. Although Section 2 is on a lower rooftop compared to Sections 1 and 3, the usable area in Section 2 does not experience shading from either of the rooftops. Section 4 is on the highest rooftop, but due to its location it does not cast a shadow on any of the usable areas of the other rooftops. Minimal tree trimming and/or relocation may be needed in the parking area.

Figure 65: Example of Roof Material and Obstructions

DGS28 King Elementary School

Site Address	3200 6th Street SE, Washington DC 20032
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	743,680 kWh
Maximum System Size	160 kW-DC
Maximum System Output	191,658 kWh
Recommended System Size	160 kW-DC
Recommended System Output	191,658 kWh
Energy Offset	26%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration

Located in Washington's 8th Ward, the King Elementary School is a newly modernized three-story building that has ample space for PV. The roof layers of both buildings were renovated in 2008 with energy-efficient white membrane roofing materials. **Figure 66** shows the usable areas at the site.

Figure 66: **King Elementary School Usable Area**

Recommendation

All Sections highlighted in **Figure 66** are recommended at this site. Optony recommends a solar PV system of 160 kW-DC, which would produce 191,658 kWh per year and offset 26% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 743,680 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 66**, which can host a solar PV system with a technical potential of 160 kW-DC. Optony recommends a solar PV system of the full technical potential, which would produce 191,658 kWh per year and offset 26% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 18** below shows a summary of the production from each reviewed section.

Table 18: **King Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	4,347	39
2	180°	10,949	107
Technical Potential		15,296	160
Maximum Production (kWh)			191,658
Recommended System Size (kW)			**160**
Recommended System Output (kWh)			**191,658**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. The building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 1200A. Current electrical equipment appears suitable for a PV system without major upgrades.

There is space available in the main electrical room for all the PV electrical equipment. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed. Space is available in the main electrical room for all the PV electrical equipment.

Shading

There are no significant shading issues at this site for the recommended sections. Sections 1 and 2 are on different rooftops with varying rooftop height. Nonetheless, both the sections are at distance where shading is not an issue.

Figure 67: View of roof material and obstruction

DGS29 Langley Education Campus

Site Address	101 T Street NE, Washington DC 20002
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	795,996 kWh
Maximum System Size	71 kW-DC
Maximum System Output	84,792 kWh
Recommended System Size	71 kW-DC
Recommended System Output	84,792 kWh
Energy Offset	11%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration

Located in Washington's 5th Ward, the Langley Education Campus is a three-story building that was modernized in 2011. Although the school was recently modernized, the modified bitumen roof layer was installed in 2000. The roof is scheduled to be upgraded in 2014 in order to receive the solar PV system. **Figure 68** shows the usable areas at the site.

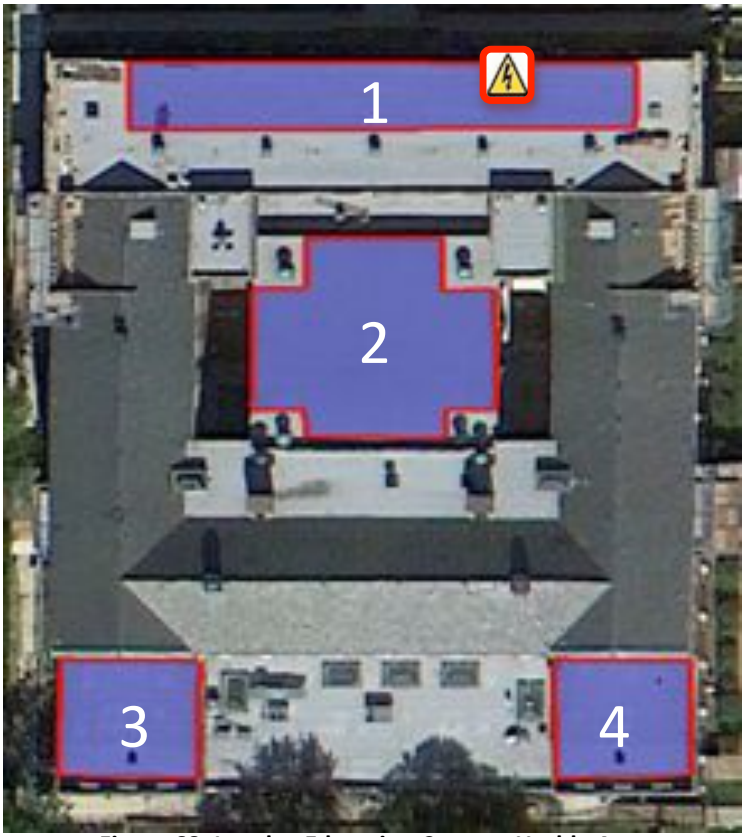


Figure 68: Langley Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 68** are recommended at this site. Optony recommends a solar PV system of 71 kW-DC, which would produce 84,792 kWh per year and offset 11% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 795,996 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 68**, which can host a solar PV system with a technical potential of 71 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 84,792 kWh per year and offset 11% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 19** below shows a summary of the production from each reviewed section.

Table 19: **Langley Education Campus Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	2,141	22
2	180°	2,577	27
3	180°	1,038	11
4	180°	1,010	11
Technical Potential		6,767	71
Maximum Production (kWh)			84,792
Recommended System Size (kW)			**71**
Recommended System Output (kWh)			**84,792**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located on the ground floor of the building, as shown by the yellow and black electrical sign in **Figure 68**. The main breaker of the newer panel's amperage rating is 3000A and voltage is 208/120V. The main breaker of the older panel's amperage rating is 800A and voltage is 208/120V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 69** shows, there is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Figure 69: No available space in the elec. room

Shading

There are a couple potential tree shading issues at this site for Sections 3 and 4. Thee mature trees to the south of these Sections could pose a shading threat. Access to these Sections was not made possible, so further verification is needed to determine if Sections 3 and 4 are viable options for this site.

Figure 70: East-facing view of Section 1

Figure 71: Southeast facing view of Section 2

DGS30 LaSalle-Backus Education Campus

Site Address	501 Riggs Road NE, Washington DC 20011
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,026,148 kWh
Maximum System Size	111 kW-DC
Maximum System Output	131,109 kWh
Recommended System Size	111 kW-DC
Recommended System Output	131,109 kWh
Energy Offset	13%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration

Located in Washington's 4th Ward, the LaSalle-Backus Education Campus is a four-story building that has undergone modernization. The building's modified bitumen roof layer was installed in 2005 and appears to be in good condition. There are a total of three rooftops that are usable for solar PV with approximately 10,500 square feet of usable roof space. **Figure 72** shows the usable areas at the site.

Figure 72: LaSalle-Backus Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 72** are recommended at this site. Optony recommends a solar PV system of 111 kW-DC, which would produce 131,109 kWh per year and offset 13% of the site's electricity usage annually. Additional information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,026,148 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 72**, which can host a solar PV system with a technical potential of 111 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 131,109 kWh per year and offset 13% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 20** below shows a summary of the production from each reviewed section.

Table 20: **LaSalle-Backus Education Campus Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	215°	2,734	29
2	215°	1,829	19
3	215°	6,090	64
Technical Potential		10,653	111
Maximum Production (kWh)			131,109
Recommended System Size (kW)			**111**
Recommended System Output (kWh)			**131,109**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 72**. The main breaker amperage rating is 1600A and voltage is 480/277V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 73** shows, there is limited space available in the electrical room for additional electrical equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to accommodate wiring from the output of the panel array to the inverter, main switch board and then on to the main meter located in the basement.

Figure 73: Limited available space in the electrical room

Shading

There are minimal shading issues at this site for the recommended sections. Section 3 is two stories taller than Section 2; thus, portions of this area are unsuitable for solar. The identified usable areas are designed to avoid shading from the surrounding structures. Section 1 is also taller than Section 2, but not enough to significantly impact the usable area of Section 2. The trees to the south of Section 1 are far enough away from the building that they do not impact the usable area.

Figure 74: North-facing view of Section 3

Figure 75: South-facing view of Section 1

DGS31 Luke C. Moore High School

Site Address	1001 Monroe Street NE, Washington DC 20017
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,133,392 kWh
Maximum System Size	59 kW-DC
Maximum System Output	68,005 kWh
Recommended System Size	59 kW-DC
Recommended System Output	68,005 kWh
Energy Offset	10%
Issues	Low energy offset; Limited space usable space available
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 5th Ward, the Luke C. Moore High School is a two-story building that was modernized in 2006 and has a modified bitumen roof layer that was installed in 2004 and is in good condition. There are a total of five rooftops that are usable for solar PV with and approximately 6,900 square feet of usable roof space. The northwestern rooftops (Sections 1 and 2) have HVAC equipment that limit the usable space. **Figure 76** shows the usable areas at the site.

Figure 76: Luke C. Moore High School Usable Area

Recommendation

All Sections highlighted in **Figure 76** are recommended at this site. Optony recommends a solar PV system of 59 kW-DC, which would produce 68,005 kWh per year and offset 10% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,133,392 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are five usable sections at this site, as shown in **Figure 76**, which can host a solar PV system with a technical potential of 59 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 68,005 kWh per year and offset 10% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 21** below shows a summary of the production from each reviewed section.

Table 21: **Luke C. Moore High School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	175°	295	3
2	175°	644	6
3	175°	402	4
4	175°	1,960	17
5	175°	3,598	31
Technical Potential		6,900	59
Maximum Production (kWh)			68,005
Recommended System Size (kW)			**59**
Recommended System Output (kWh)			**68,005**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. Building voltage is 480/277 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 77** shows, space is available in the main electrical room and an alternative location is not required for the PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Figure 77: Space is available in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures.

Figure 78: Example of Roof Material and Obstructions

DGS34 Miner Elementary School

Site Address	601 15th Street NE, Washington DC 20002
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,015,564 kWh
Maximum System Size	194 kW-DC
Maximum System Output	232,575 kWh
Recommended System Size	194 kW-DC
Recommended System Output	232,575 kWh
Energy Offset	23%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 6th Ward, Miner Elementary School is a newly modernized two-story building with approximately 18,500 square feet of usable roof space. There are a total of two rooftop areas that were upgraded in 2003 using built-up membrane roofing material, consisting of a tar layer and additional loose gravel. Section 2 has two maintenance rooms on either side of the roof. **Figure 79** shows the usable areas at the site.

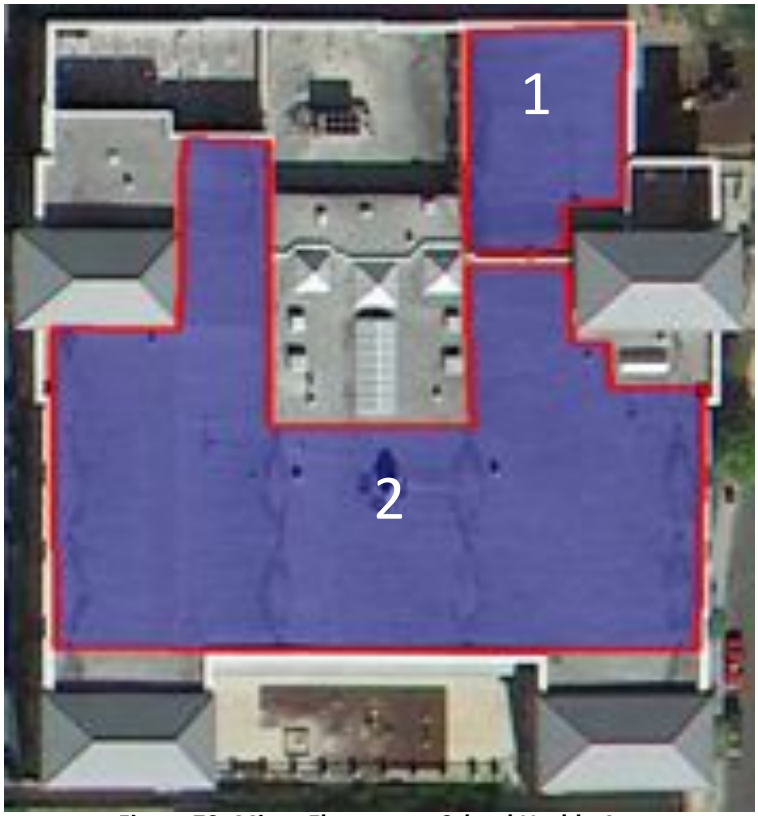


Figure 79: Miner Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 79** are recommended at this site. Optony recommends a solar PV system of 194 kW-DC, which would produce 232,575 kWh per year and offset 23% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,015,564 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 79**, which can host a solar PV system with a technical potential of 194 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 232,575 kWh per year and offset 23% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 22** below shows a summary of the production from each reviewed section.

Table 22: **Miner Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	2,510	26
2	180°	16,051	168
Technical Potential		18,561	194
Maximum Production (kWh)			232,575
Recommended System Size (kW)			**194**
Recommended System Output (kWh)			**232,575**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor of the building. Building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment appears suitable for a PV system without major upgrades.

There is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures.

Figure 80: Example of roof material and obstructions

DGS35 Moten Elementary School

Site Address	1565 Morris Road SE, Washington DC 20020
Type of PV System	Rooftop (Carport potential not assessed)
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	926,329 kWh
Maximum System Size	84 kW-DC
Maximum System Output	100,123 kWh
Recommended System Size	84 kW-DC
Recommended System Output	100,123 kWh
Energy Offset	11%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 8th Ward, Moten Elementary School is a newly modernized four-story building with approximately 8,000 square feet of usable roof space. The thermoplastic roofing material was installed in 2012 across the entire rooftop and is in great condition. **Figure 81** shows the usable rooftop areas at the site, but does not show the new parking lot that now exists to the south of the building. The parking area, shown in **Figure 81**, is fenced in and usable for solar carport canopies; however, this opportunity is not quantified in this report due to the inability to take measurements.

Figure 81: Moten Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 81** are recommended at this site. Optony recommends a solar PV system of 84 kW-DC, which would produce 100,123 kWh per year and offset 11% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the 12 months of fiscal year 2012-2013, the average annual electricity usage at this site was 926,329 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 81**, which can host a solar PV system with a technical potential of 84 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 100,123 kWh per year and offset 11% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 23** below shows a summary of the production from each reviewed section.

Table 23: **Moten Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	2,226	23
2	180°	2,587	27
3	180°	830	9
4	180°	2,348	25
Technical Potential		7,991	84
Maximum Production (kWh)			100,123
Recommended System Size (kW)			**84**
Recommended System Output (kWh)			**100,123**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the ground floor of the building, as shown by the yellow and black electrical sign in **Figure 81**. Building voltage is 480/277V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 82** shows, there is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Figure 82: No available space in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures.

Figure 83: Example of roof material and obstruction

Figure 84: Aerial view of new parking lot south of school

DGS36 Municipal Warehouse

Site Address	2000 Adams Place NE, Washington DC 20018
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	839,803 kWh
Maximum System Size	377 kW-DC
Maximum System Output	425,878 kWh
Recommended System Size	377 kW-DC
Recommended System Output	425,878 kWh
Energy Offset	51%
Issues	Multiple vent obstructions limit usable rooftop area; Aging electrical equipment
Opportunities	Easy roof access for tours & maintenance

Located in Washington's 5th Ward, the Municipal Warehouse is a four-story building with approximately 36,000 square feet of usable roof space. The modified bitumen roofing material was installed in 2008 and is in good condition. The usable area of Section 1 is limited due to the multiple vent obstruction, but Section 2 is largely free of obstructions. **Figure 85** shows the usable areas at the site.

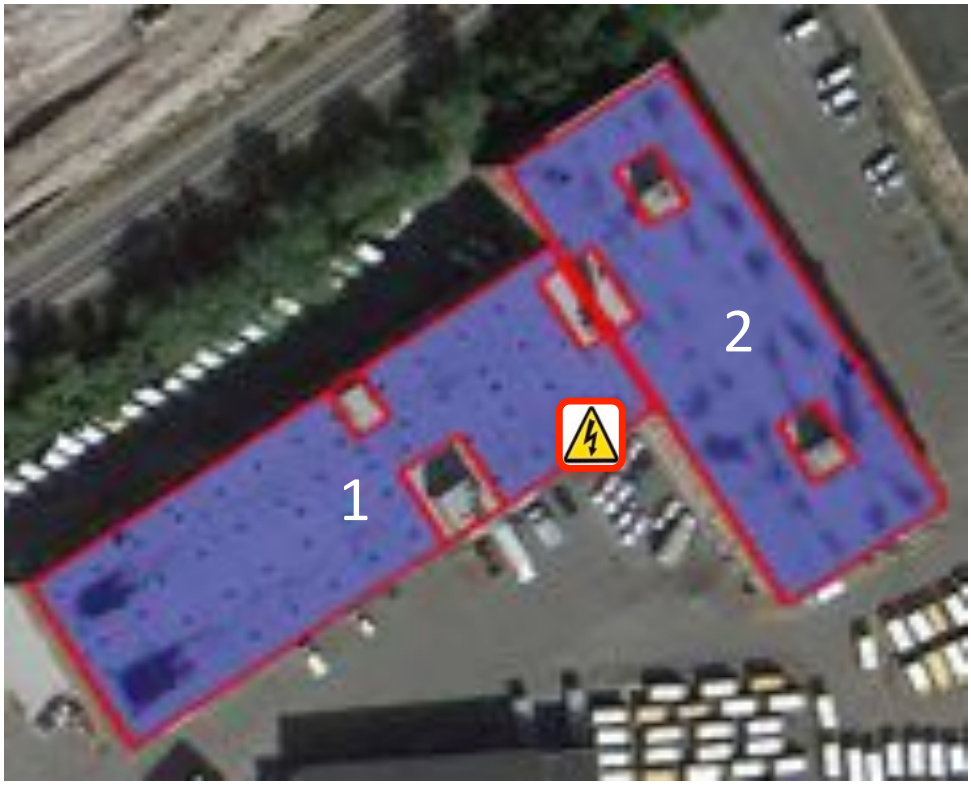


Figure 85: Municipal Warehouse Usable Area

Recommendation

All Sections highlighted in **Figure 85** are recommended at this site. Optony recommends a solar PV system of 377 kW-DC, which would produce 425,878 kWh per year and offset 51% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 839,803 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 85**, which can host a solar PV system with a technical potential of 377 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 425,878 kWh per year and offset 51% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 24** below shows a summary of the production from each reviewed section.

Table 24: **Municipal Warehouse Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	150°	16,269	170
2	150°	19,811	207
Technical Potential		36,080	377
Maximum Production (kWh)			425,878
Recommended System Size (kW)			**377**
Recommended System Output (kWh)			**425,878**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located in the basement of the building, as shown by the yellow and black electrical sign in **Figure 85**. The main breaker amperage rating for the "School Warehouse" is 600A and voltage is 120/208V. The main breaker amperage rating for the "P BG Warehouse" is 800A with a voltage rating of 120/208V.

As **Figure 86** shows, the electrical service panels at this site appear to be quite old and although they appear to be properly functioning it is possible that a service upgrade could be needed in order to support a solar PV system. Further investigation of the electrical system is recommended. There is plenty of space available in the electrical room for inverters and additional solar PV equipment

Figure 86: Aging elec. equipment may need upgrade

Shading

There are a few shading issues at this site for the recommended sections. There are four roof access structures as well as a chimney that pose shading threats. While the multiple roof vents limit the usable area for solar PV in Section 1, they do not pose a shading threat.

Figure 87: Southwest view of Section 1 obstructions

Figure 88: South-facing view of Section 2

DGS37 Nalle Elementary School

Site Address	219 50th Street SE, Washington DC 20019
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,216,799 kWh
Maximum System Size	150 kW-DC
Maximum System Output	179,452 kWh
Recommended System Size	150 kW-DC
Recommended System Output	179,452 kWh
Energy Offset	15%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 7th Ward, Nalle Elementary School is a three-story building with approximately 14,300 square feet of usable roof space that was modernized in 2012. The modified bitumen roofing material was installed in 2005 across the entire rooftop and is in good condition. There are six usable areas at this site, but usable area is limited due to new, large HVAC systems. **Figure 89** shows the usable areas at the site.

Figure 89: Nalle Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 89** are recommended at this site. Optony recommends a solar PV system of 150 kW-DC, which would produce 179,452 kWh per year and offset 15% of the site's electricity usage annually. Additional information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,216,799 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are six usable sections at this site, as shown in **Figure 89**, which can host a solar PV system with a technical potential of 150 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 179,452 kWh per year and offset 15% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 25** below shows a summary of the production from each reviewed section.

Table 25: **Nalle Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	190°	1,159	12
2	190°	3,156	33
3	190°	480	5
4	190°	1,152	12
5	190°	2,343	25
6	190°	6,057	63
Technical Potential		14,347	150
Maximum Production (kWh)			179,452
Recommended System Size (kW)			**150**
Recommended System Output (kWh)			**179,452**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as shown by the yellow and black electrical sign in **Figure 89**. Building voltage is 120/208V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system.

As shown in **Figure 90**, there is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Figure 90: No space for additional elec. equipment

Shading

There are a few shading issues at this site for the recommended sections, but the identified usable areas are designed to avoid shading from the surrounding structures—primarily the four large HVAC systems.

Figure 91: Example of HVAC obstructions near Section 2

Figure 92: West-facing view of Sections 5 and 6

DGS40 Patterson Elementary School

Site Address	4399 South Capitol Street SW, Washington DC 20032
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	872,686 kWh
Maximum System Size	195 kW-DC
Maximum System Output	233,593 kWh
Recommended System Size	195 kW-DC
Recommended System Output	233,593 kWh
Energy Offset	27%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Wide-open unobstructed roof areas

Located in Washington's 8th Ward, the Patterson Elementary School is a newly modernized two-story building with approximately 18,600 square feet of usable roof space. The modified bitumen roofing material was installed in 2005 and is in good condition. **Figure 93** shows the usable areas at the site.

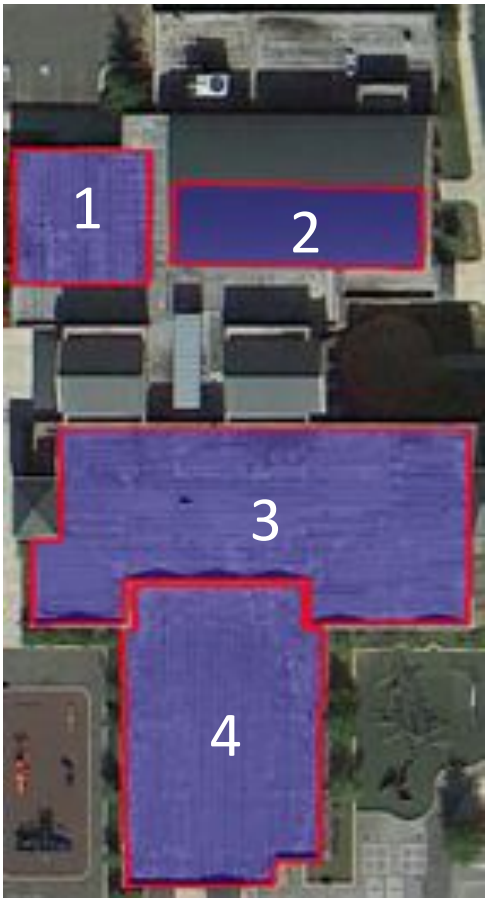


Figure 93: Patterson Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 93** are recommended at this site. Optony recommends a solar PV system of 195 kW-DC, which would produce 233,593 kWh per year and offset 27% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 872,686 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 93**, which can host a solar PV system with a technical potential of 195 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 233,593 kWh per year and offset 27% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 26** below shows a summary of the production from each reviewed section.

Table 26: Patterson Elementary School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,987	21
2	180°	2,209	23
3	180°	8,177	86
4	180°	6,270	66
Technical Potential		18,642	195
Maximum Production (kWh)			233,593
Recommended System Size (kW)			**195**
Recommended System Output (kWh)			**233,593**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. The building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 1200A. Current electrical equipment appears suitable for a PV system without major upgrades.

Limited space is available in the main electrical room for additional electrical PV equipment. Inverters and additional PV equipment will need to be installed against the outside walls of the buildings, where sufficient space is available. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 94: Example of roof material and obstructions

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures.

DGS41 Payne Elementary School

Site Address	305 15th Street SE, Washington DC 20003
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	445,188 kWh
Maximum System Size	290 kW-DC
Maximum System Output	340,328 kWh
Recommended System Size	290 kW-DC
Recommended System Output	340,328kWh
Energy Offset	76%
Issues	Aging electrical equipment
Opportunities	High energy offset; Solar energy curriculum integration; Easy roof access

Located in Washington's 6th Ward, the Payne Elementary School is a three-story building with approximately 26,700 square feet of usable roof space. According to school staff, the building is scheduled to be modernized in 2013. However, the thermoplastic membrane roofing material was installed in 2011 and is in great condition. **Figure 95** shows the usable areas at the site.

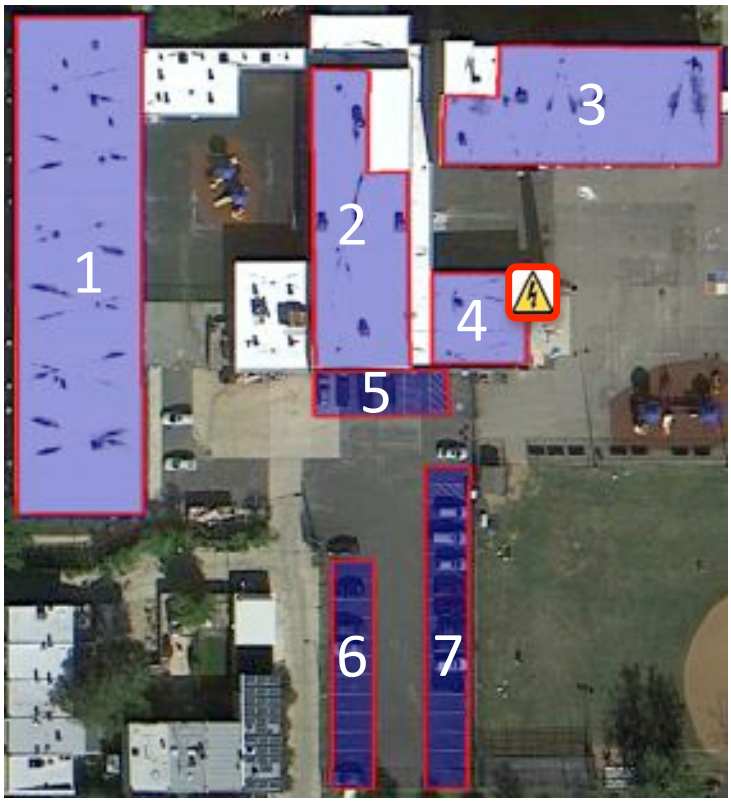


Figure 95: Payne Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 95** are recommended at this site. Optony recommends a solar PV system of 290 kW-DC, which would produce 340,328 kWh per year and offset 76% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 445,188 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are seven usable sections at this site, as shown in **Figure 95**, which can host a solar PV system with a technical potential of 290 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 340,328 kWh per year and offset 76% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 27** below shows a summary of the production from each reviewed section.

Table 27: **Payne Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	9,993	105
2	180°	3,872	41
3	180°	4,787	50
4	180°	1,376	14
5	180°	1,350	16
6	270°	2,142	26
7	270°	3,236	39
Technical Potential		26,756	290
Maximum Production (kWh)			340,328
Recommended System Size (kW)			**290**
Recommended System Output (kWh)			**340,328**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the old generator control room, as shown by the yellow and black electrical sign in **Figure 95**. The building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker amperage rating is 800A. Current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system.

Limited space is available in the main electrical room for additional electrical PV equipment. Inverters and additional PV equipment will need to be installed against the outside walls of the buildings, where sufficient space is available. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Shading

There are no significant shading issues at this site for the recommended sections. Section 3 is taller than Section 2 and the structure casts a shadow, but the identified usable area of Section 2 was designed to take this into account. Minimal tree trimming may be needed in the parking areas for the southern most solar carport structures. There is a tall, old smokestack on site that casts a shadow toward Section 3, but it is not tall enough to shade Section 3.

Figure 96: West-facing view of Section 1

Figure 97: South-facing view from Section 3

DGS42 Plummer Elementary School

Site Address	4601 Texas Avenue SE, Washington DC 20019
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	467,755 kWh
Maximum System Size	151 kW-DC
Maximum System Output	180,699 kWh
Recommended System Size	151 kW-DC
Recommended System Output	180,699 kWh
Energy Offset	39%
Issues	Low energy offset; Aging electrical equipment
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 7th Ward, Plummer Elementary School is a three-story building that, according to school staff, is scheduled to undergo modernization in 2014. There are a total of three rooftops that are usable for solar PV with approximately 14,500 square feet of usable roof space. The modified bitumen roofing material was installed in 2006 and is in good condition. **Figure 98** shows the usable areas at the site.

Figure 98: Plummer Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 98** are recommended at this site. Optony recommends a solar PV system of 151 kW-DC, which would produce 180,699 kWh per year and offset 39% of the site's electricity usage annually. Additional information is presented in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 467,755 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 98**, which can host a solar PV system with a technical potential of 151 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 180,699 kWh per year and offset 39% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 28** below shows a summary of the production from each reviewed section.

Table 28: **Plummer Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	3,420	36
2	180°	8,910	93
3	180°	2,092	22
Technical Potential		14,421	151
Maximum Production (kWh)			180,699
Recommended System Size (kW)			**151**
Recommended System Output (kWh)			**180,699**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the first floor of the buildings, as shown by the yellow and black electrical sign in **Figure 98**. The building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker amperage rating is 800A. Current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system.

There is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Shading

There are a few minor shading issues at this site for the recommended sections. Section 2 has 2 chimneys that cast shadows on otherwise usable roof areas. Section 2 is one story taller than Section 3, which has a shading effect in the afternoon. Additionally, Section 2 is shaded from neighboring trees to the east and a small chain-link fence to the south. The identified usable areas are designed to avoid shading from the surrounding structures.

Figure 99: North-facing view of Section 2

Figure 100: East-facing view of Section 3

DGS44 Randle Highlands Elementary School

Site Address	1650 30th Street SE, Washington DC 20020
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,448,813 kWh
Maximum System Size	170 kW-DC
Maximum System Output	203,732 kWh
Recommended System Size	170 kW-DC
Recommended System Output	203,732 kWh
Energy Offset	14%
Issues	Low energy offset; Shading from HVAC equipment and surrounding vegetation
Opportunities	Solar energy curriculum integration

Located in Washington's 7th Ward, Randle Highlands Elmentary School is a recently renovated, multi-building campus. The school has potential for solar PV on two of the three buildings with approximately 16,300 square feet of usable roof space. The modified bitumen roofing layer was installed in 2008 and is in good condition. **Figure 101** shows the usable areas at the site.

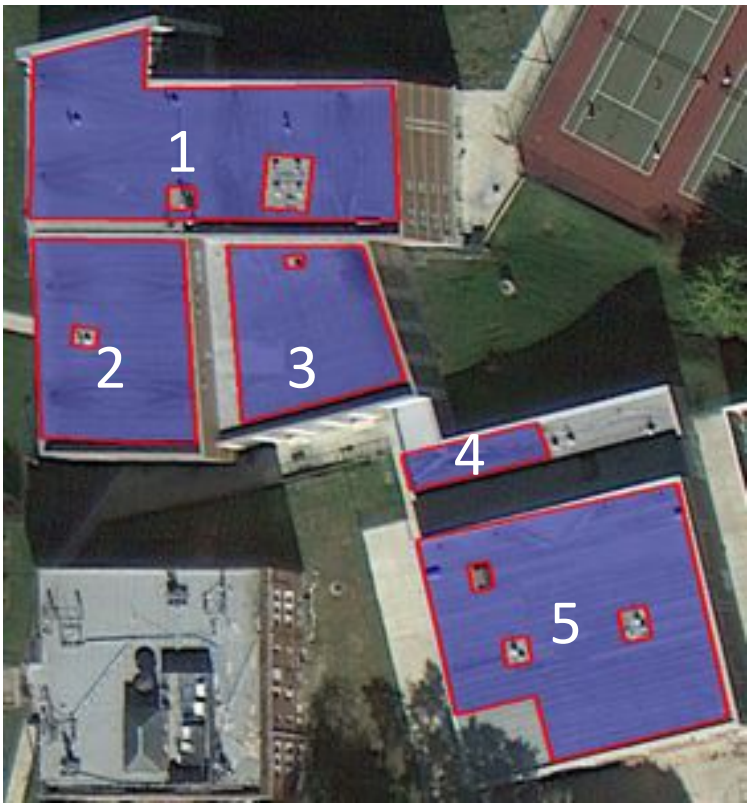


Figure 101: Randle Highlands Elmentary School Usable Area

Recommendation

All Sections highlighted in **Figure 101** are recommended at this site. Optony recommends a solar PV system of 170 kW-DC, which would produce 203,732 kWh per year and offset 14% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,448,813 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are five usable sections at this site, as shown in **Figure 101**, which can host a solar PV system with a technical potential of 170 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 203,732 kWh per year and offset 14% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 29** below shows a summary of the production from each reviewed section.

Table 29: **Randle Highlands Elmentary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	4,589	48
2	180°	2,777	29
3	180°	2,567	27
4	165°	469	5
5	165°	5,858	61
Technical Potential		16,300	170
Maximum Production (kWh)			203,732
Recommended System Size (kW)			**170**
Recommended System Output (kWh)			**203,732**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the main school building. Building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2500A. Current electrical equipment appears suitable for a PV system without major upgrades.

Space is available in the main electrical room for additional electrical PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Shading

The identified usable areas are designed to avoid shading from the surrounding structures and vegetation. The usable areas of Sections 1 and 2 are of the same height and separated by a roof wall. Section 3 is one story shorter than Sections 1 and 2, which reduces its usable area due to minor shading from Section 2 in the afternoon. Similarly Section 4's usable area is affected by the Section 5's height. Finally, tree shading to the south of Section 5 would require significant trimming or an adjustment in the solar PV system design.

Figure 102: Roof material and obstructions

DGS45 Raymond Education Campus

Site Address	915 Spring Road NW, Washington DC 20010
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	701,846 kWh
Maximum System Size	262 kW-DC
Maximum System Output	307,309 kWh
Recommended System Size	262 kW-DC
Recommended System Output	307,309 kWh
Energy Offset	44%
Issues	Low energy offset; HVAC and chimney roof obstructions
Opportunities	Solar energy curriculum integration

Located in Washington's 4th Ward, the Raymond Education Campus consists of a K-8 school and recreation center. The Raymond Recreation Center was constructed in 2012 and is attached to the existing school. Section 1 of the school has a modified bitumen roof layer that was installed in 2005 and is in good condition. Section 2 of the school has a modified bitumen roof layer that would likely need to be replaced prior to the installation of a solar PV system. The recreation center has a brand new thermoplastic membrane roof layer that was installed in 2012. The parking area for the school is fenced in for added security. **Figure 103** shows the usable areas at the site.

Figure 103: Raymond Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 103** are recommended at this site. Optony recommends a solar PV system of 262 kW-DC, which would produce 307,309 kWh per year and offset 44% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 701,846 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are five usable sections at this site, as shown in **Figure 103**, which can host a solar PV system with a technical potential of 262 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 307,309 kWh per year and offset 44% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 30** below shows a summary of the production from each reviewed section.

Table 30: **Raymond Education Campus Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	200°	8,109	85
2	200°	3,937	41
3	200°	3,823	40
4	200°	5,963	62
5	235°	2,857	34
Technical Potential		24,689	262
Maximum Production (kWh)			307,309
Recommended System Size (kW)			**262**
Recommended System Output (kWh)			**307,309**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two electric meters at this site; one in the school and one in the new recreation center, as shown by the yellow and black electrical signs in **Figure 103**. The main breaker amperage rating for the school is 1200A and voltage is 208/120V. Its current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system. The main breaker amperage rating for the recreation center is 1600A and voltage is 480/277V. The electrical equipment was recently installed and appears suitable for a PV system without major upgrades.

There is no space available in the electrical room of either building for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside walls of the buildings, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures. There is a tall chimney at the school that reduces the usable area of the western most building.

Figure 104: View of Section 1 roofing material

Figure 105: View of Section 2 roofing material

Figure 106: Structural design of recreation center gym

Figure 107: Aerial view of recreation center gym

DGS46 Savoy Elementary School

Site Address	2400 Shannon Place SE, Washington DC 20020
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,257,171 kWh
Maximum System Size	174 kW-DC
Maximum System Output	187,376 kWh
Recommended System Size	174 kW-DC
Recommended System Output	187,376 kWh
Energy Offset	15%
Issues	Low energy offset; Shading from HVAC equipment screens
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 8th Ward, Savoy Elementary School is a three-story building that was modernized in 2009 and has approximately 18,900 square feet of usable roof space. The building has two different roof materials laid out at different sections of the roof. The roofing work for both was completed in 2007. The main building (Section 1) and its adjacent eastern buildings have ceramic roof tiles as the final layer. The gymnasium roof (Section 5) and adjacent southern roofs have a white membrane roof finish. **Figure 108** shows the usable areas at the site.

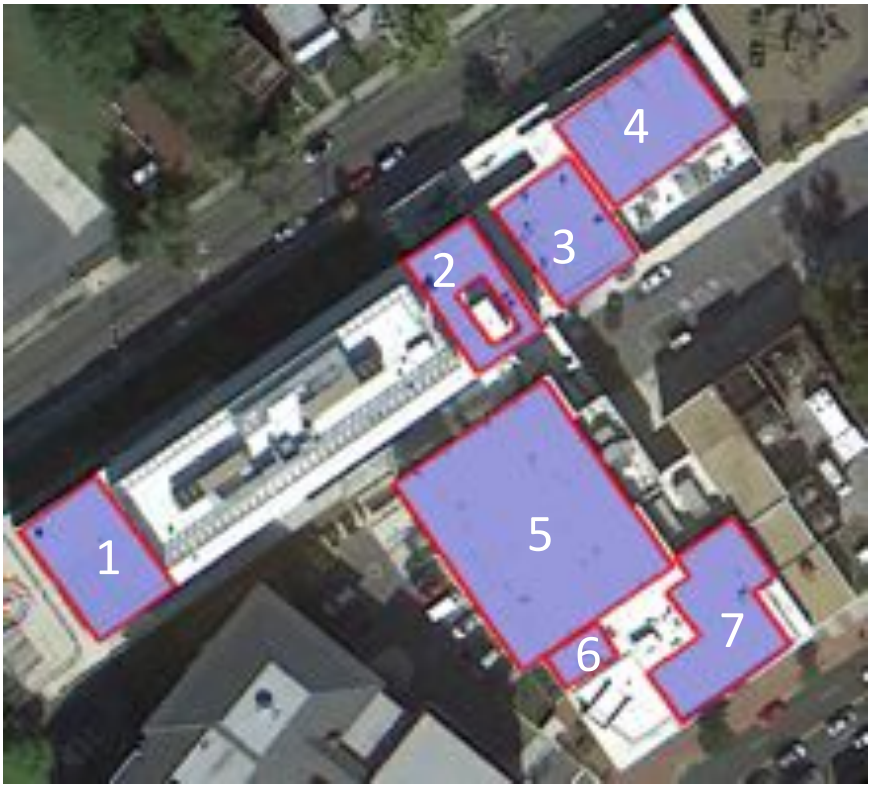


Figure 108: Savoy Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 108** are recommended at this site. Optony recommends a solar PV system of 174 kW-DC, which would produce 187,376 kWh per year and offset 15% of the site's electricity usage annually. Additional information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,257,171 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are seven usable sections at this site, as shown in **Figure 108**, which can host a solar PV system with a technical potential of 174 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 187,376 kWh per year and offset 15% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 31** below shows a summary of the production from each reviewed section.

Table 31: **Savoy Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	145°	2,818	23
2	145°	623	396
3	145°	1,197	2311
4	145°	2,469	1223
5	145°	8,602	79
6	145°	374	4
7	145°	3,117	29
Technical Potential		18,900	174
Maximum Production (kWh)			187,376
Recommended System Size (kW)			**174**
Recommended System Output (kWh)			**187,376**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of this building. Building voltage is 277/480 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears suitable for a PV system without major upgrades.

Figure 109: Limited available space in the electrical room

As **Figure 109** shows, there is limited space available in the electrical room for additional electrical equipment. It is recommended that inverters and additional PV equipment will need to be installed in the room adjacent to the electrical room, where sufficient space is available. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Shading

The identified usable areas are designed to avoid shading from the surrounding structures. Due to shading from surrounding buildings and existing HVAC equipment screens the entire roof surface is not suitable for a solar PV system. The main building has a 12-foot screen that surrounds the HVAC equipment. Additionally, the usable area of Section 3 is limited due to shading issues from Section 2.

Figure 110: Ceramic tile roof material on Sections 1-4

Figure 111: White membrane roof material on Sections 5-7

DGS48 Shepherd Elementary School

Site Address	7800 14th Street NW, Washington DC 20012
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	467,658 kWh
Maximum System Size	90 kW-DC
Maximum System Output	108,292 kWh
Recommended System Size	90 kW-DC
Recommended System Output	108,292 kWh
Energy Offset	23%
Issues	Low energy offset; Shading issues from adjacent vegetation
Opportunities	Solar energy curriculum integration

Located in Washington's 4th Ward, Shepherd Elementary School is a three-story building that was constructed in 1940 and has approximately 8,600 square feet of usable roof space. The school has not yet undergone modernization, but the modified bitumen roofing material was installed in 2005 and is in good condition. **Figure 112** shows the usable areas at the site.

Figure 112: Shepherd Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 112** are recommended at this site. Optony recommends a solar PV system of 90 kW-DC, which would produce 108,292 kWh per year and offset 23% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 467,658 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 112**, which can host a solar PV system with a technical potential of 90 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 108,292 kWh per year and offset 23% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 32** below shows a summary of the production from each reviewed section.

Table 32: **Shepherd Elementary School Solar PV System Summary**

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,927	21
2	180°	3,046	32
3	180°	3,670	39
Technical Potential		8,632	90
Maximum Production (kWh)			108,292
Recommended System Size (kW)			**90**
Recommended System Output (kWh)			**108,292**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as shown by the yellow and black electrical sign in **Figure 112**. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 800A. Current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system.

As **Figure 113** shows, there is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Figure 113: Limited available space in the electrical room

Shading

The identified usable areas are designed to avoid shading from the trees to the south, but minimal tree trimming may be needed for all sections. There is modest tree shading in Section 1 that limits the potential for this site. The satellite at the north end of Section 2 does not pose a shading concern. While Section 2 appears to be heavily shaded in **Figure 116**, it is not significantly impacted throughout the day. The photo was taken in the early morning.

Figure 114: North-facing view of Section 3

Figure 115: View of satellite on Section 2

Figure 116: South-facing view of Section 2 (Early AM)

DGS50 Sousa Middle School

Site Address	3650 Ely Place SE, Washington DC 20019
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,726,409 kWh
Maximum System Size	301 kW-DC
Maximum System Output	356,310 kWh
Recommended System Size	301 kW-DC
Recommended System Output	356,310 kWh
Energy Offset	21%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 7th Ward, Sousa Middle School is a three-story building that was modernized in 2008 and has a modified bitumen roof layer that was installed in 2003. The roof is scheduled to be upgraded in 2014 in order to receive the solar PV system. The facility has two usable rooftops and a parking area with an area of approximately 32,000 square feet suitable for solar PV arrays. This site has an existing demo solar PV system, indicated by the white circle in **Figure 117**. The parking area at this site is fenced in for additional security. **Figure 117** shows the usable areas at the site.

Figure 117: Sousa Middle School Usable Area

Recommendation

All Sections highlighted in **Figure 117** are recommended at this site. Optony recommends a solar PV system of 301 kW-DC, which would produce 356,310 kWh per year and offset 21% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,726,409 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 117**, which can host a solar PV system with a technical potential of 301 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 356,310 kWh per year and offset 21% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 33** below shows a summary of the production from each reviewed section.

Table 33: Sousa Middle School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	10,944	100
2	180°	18,056	165
3	190°	1,468	18
4	190°	1,562	19
Technical Potential		32,030	301
Maximum Production (kWh)			356,310
Recommended System Size (kW)			**301**
Recommended System Output (kWh)			**356,310**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the buildings, as indicated by the yellow and black electrical sign in **Figure 117**. The main breaker amperage rating is 3000A and voltage is 480/277V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 118** shows, there is space available in the electrical room for additional electrical equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Figure 118: Available space in the electrical room

Shading

There are few minor shading issues from HVAC and chimney structures at this site for the recommended sections, but the identified usable areas are designed to avoid shading from the various obstructions. The two rooftops are independent of each other and do not contribute to any shading effect. Parking area lampposts would likely need to be relocated and/or integrated into solar carport structures.

Figure 119: View of Section 2 obstructions

Figure 120: View of Section 1 obstructions

Figure 121: View of recommended parking area

Figure 122: Existing demo solar PV system

DGS51 Stoddert Elementary School

Site Address	4001 Calvert Street NW, Washington DC 20007
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,425,424 kWh
Maximum System Size	169 kW-DC
Maximum System Output	202,211 kWh
Recommended System Size	169 kW-DC
Recommended System Output	202,211 kWh
Energy Offset	14%
Issues	Low energy offset; Shading from adjacent vegetation
Opportunities	Solar energy curriculum integration

Located in Washington's 3rd Ward, the Stoddert Elementary School is a newly renovated multi-story building with approximately 18,000 square feet of usable roof space. Due to its recent modernization, this school has various energy efficiency and geothermal temperature control measures installed within the building. The building's thermoplastic membrane roof layer was installed in 2010 and is in good condition. Due to existing HVAC equipment, surrounding buildings, and vegetation, the entire roof surface is not suitable for a solar PV system. **Figure 123** shows the usable areas at the site.

Figure 123: Stoddert Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 123** are recommended at this site. Optony recommends a solar PV system of 169 kW-DC, which would produce 202,211 kWh per year and offset 14% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,425,424 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 123**, which can host a solar PV system with a technical potential of 169 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 202,211 kWh per year and offset 14% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 34** below shows a summary of the production from each reviewed section.

Table 34: Stoddert Elementary School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	6,401	60
2	180°	638	6
3	180°	7,578	71
4	180°	3,384	32
Technical Potential		18,000	169
Maximum Production (kWh)			202,211
Recommended System Size (kW)			**169**
Recommended System Output (kWh)			**202,211**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 124** shows, there is limited space available in the main electrical room for additional electrical PV equipment, but ample space is available in the adjacent storage room for inverters and additional PV equipment.

Figure 124: Limited available space in the electrical room

Shading

There are few shading issues at this site for the recommended sections. Section 4 has a tree that overhangs on the roof, resulting in a reduction of its usable area. Similarly, Section 1 has HVAC equipment and vents that reduces the usable area. Lastly, the southern area of Section 2 is reduced as it experiences shading from the main school building.

Figure 125: Example of roofing material and obstructions

DGS52 Takoma Education Campus

Site Address	7010 Piney Branch Road NW, Washington DC 20012
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	1,685,888 kWh
Maximum System Size	165 kW-DC
Maximum System Output	194,435 kWh
Recommended System Size	165 kW-DC
Recommended System Output	194,435 kWh
Energy Offset	12%
Issues	Low energy offset; Security concerns for solar carport structures
Opportunities	Solar energy curriculum integration

Located in Washington's 4th Ward, the Takoma Education Campus is a three-story building that was modernized in 2011 and has a thermoplastic membrane roof layer that was installed in 2011 and is in great condition. The facility has abundant roof HVAC roof obstructions, which leave the majority of the main building's rooftop unsuitable for solar. However, the gymnasium rooftop (Sections 1-2) and parking area are suitable for solar. The parking area at this site is not fenced in. **Figure 126** shows the usable areas at the site.

Figure 126: Takoma Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 126** are recommended at this site. Optony recommends a solar PV system of 165 kW-DC, which would produce 194,435 kWh per year and offset 12% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,685,888 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are 12 usable sections at this site, as shown in **Figure 126**, which can host a solar PV system with a technical potential of 165 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 194,435 kWh per year and offset 12% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 35** below shows a summary of the production from each reviewed section.

Table 35: Takoma Education Campus Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,421	17
2	180°	627	8
3	210°	1,737	21
4	210°	776	9
5	210°	949	10
6	210°	3,196	33
7	210°	1,102	12
8	210°	792	8
9	180°	1,553	16
10	180°	1,483	16
11	180°	662	7
12	180°	884	9
Technical Potential		15,179	165
Maximum Production (kWh)			194,435
Recommended System Size (kW)			**165**
Recommended System Output (kWh)			**194,435**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as shown by the yellow and black electrical sign in **Figure 126**. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 3000A. There is an additional submeter in the gym at 225A and 208/120V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 127** shows, there is limited space available in the main electrical room for additional electrical PV equipment, but ample space is available in the adjacent storage room for inverters and additional PV equipment.

Figure 127: No available space in the elec. room

Shading

There are a few shading issues at this site for the recommended sections. There is a large, mature tree to the south of Section 5 that casts a slight shadow on parts of Section 5 during winter months, but the Section has over 90% solar access averaged across the year. Additionally, there are some shading issues in the parking area, but the identified usable areas are designed to avoid shading from the surrounding trees.

Security

There are security concerns for the recommended carport sections, which could be mitigated through the installation of fencing around the parking area or other security measures.

Figure 128: West-facing view of Section 5

Figure 129: West-facing view of Sections 1 & 2

DGS53 3rd District Police Station

Site Address	1620 V Street NW, Washington DC 20009
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	808,906 kWh
Maximum System Size	232 kW-DC
Maximum System Output	265,838 kWh
Recommended System Size	232 kW-DC
Recommended System Output	265,838 kWh
Energy Offset	33%
Issues	Low energy offset
Opportunities	High visibility solar carports from street & surrounding commercial buildings

Located in Washington's 1st Ward, the 3rd District Police Station is a two-story building with a two-story parking garage attached, together offering approximately 20,000 square feet of usable area for solar PV arrays. Constructed in 1950, the building's modified bitumen roofing material was installed in 2000 and is scheduled to be upgraded in 2014 in order to receive the solar PV system. This is especially true for the retired helipad area. **Figure 130** shows the usable areas at the site.

Figure 130: 3rd District Police Station Usable Area

Recommendation

All Sections highlighted in **Figure 130** are recommended at this site. Optony recommends a solar PV system of 232 kW-DC, which would produce 265,838 kWh per year and offset 33% of the site's electricity usage annually. Additional information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 808,906 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are 11 usable sections at this site, as shown in **Figure 130**, which can host a solar PV system with a technical potential of 232 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 265,838 kWh per year and offset 33% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 36** below shows a summary of the production from each reviewed section.

Table 36: 3rd District Police Station Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	5,035	53
2	180°	1,087	11
3	180°	739	8
4	180°	1,778	21
5	270°	3,231	39
6	270°	1,779	21
7	270°	1,602	19
8	270°	2,858	34
9	180°	560	7
10	180°	634	8
11	180°	1.044	12
Technical Potential		20,351	232
Maximum Production (kWh)			265,838
Recommended System Size (kW)			**232**
Recommended System Output (kWh)			**265,838**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 130**. The main breaker amperage rating is 2000A and voltage is 120/208V. Current electrical equipment does not appear to have been recently upgraded, but is properly functioning. Further investigation of potential necessary electrical upgrades is recommended prior to the installation of a solar PV system.

As **Figure 131** shows, there is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would need to be installed against the outside wall of the

Figure 131: No space in electrical room

building, where sufficient space is available. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room in the basement would need to be installed.

Shading

There are no significant shading issues at this site for the recommended sections. Minimal tree trimming may be needed on the western edge of Section 1, but the identified usable areas are designed to avoid shading from the surrounding structures. Existing lampposts on the top level of the parking garage would likely need to be integrated into the recommended solar carport canopy structure.

Figure 132: Northeast-facing view of helipad

Figure 133: South-facing view of parking garage

DGS54 Trinidad Recreation Center

Site Address	1310 Childress Street NE, Washington DC 20002
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GS D
Annual Energy Usage	241,510 kWh
Maximum System Size	86 kW-DC
Maximum System Output	99,513 kWh
Recommended System Size	86 kW-DC
Recommended System Output	99,513 kWh
Energy Offset	41%
Issues	Low energy offset; Security concerns for solar carport
Opportunities	Easy roof access for tours & maintenance

Located in Washington's 5th Ward, the Trinidad Recreation Center is a two-story building that was constructed in 2007 with a thermoplastic membrane roof layer that is in good condition. The building also has a vegetative roof layer and abundant roof HVAC equipment, which leaves the gymnasium rooftop and the small parking area as the building's only suitable areas for solar PV. The parking area is not fenced in, which poses security concerns for solar carport structures. **Figure 134** shows the usable areas at the site.

Figure 134: Trinidad Recreation Center Usable Area

Recommendation

All Sections highlighted in **Figure 134** are recommended at this site. Optony recommends a solar PV system of 86 kW-DC, which would produce 99,513 kWh per year and offset 41% of the site's electricity usage annually. Additional information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 241,510 kWh. This site is on Pepco's Non-Residential MPS-GS D rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 134**, which can host a solar PV system with a technical potential of 86 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 99,513 kWh per year and offset 41% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 37** below shows a summary of the production from each reviewed section.

Table 37: Trinidad Recreation Center Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	210°	5,489	57
2	120°	2,366	28
Technical Potential		7,855	86
Maximum Production (kWh)			99,513
Recommended System Size (kW)			**86**
Recommended System Output (kWh)			**99,513**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the ground floor at the site, as indicated by the yellow and black electrical sign in **Figure 134**. The main breaker amperage rating is 1200A and voltage is 120/208V. Current electrical equipment appears suitable for a PV system without major upgrades. There is no space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment will need to be installed against the outside wall of the building, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections.

Security

There are security concerns for the recommended carport section and the installation of fencing around the parking area may not be a viable option.

Figure 135: North-facing view of Section 1

Figure 136: Example of roof obstructions

DGS55 Turner Elementary School

Site Address	3264 Stanton Road SE, Washington DC 20020
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,543,524 kWh
Maximum System Size	196 kW-DC
Maximum System Output	231,154 kWh
Recommended System Size	196 kW-DC
Recommended System Output	231,154 kWh
Energy Offset	15%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration; High visibility for solar carport

Located in Washington's 8th Ward, the Turner Elementary School is a three-story building that serves as both an elementary school and recreation center. The buildings were modernized in 2012 and the rooftops have a thermoplastic membrane roof layer installed in 2012 that is in great condition. There are multiple HVAC equipment obstructions, leaving approximately 20,000 square feet of roof area usable for solar PV. The parking area is fenced in for additional security. **Figure 137** shows the usable areas at the site.

Figure 137: Turner Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 137** are recommended at this site. Optony recommends a solar PV system of 196 kW-DC, which would produce 231,154 kWh per year and offset 15% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the 12 months of fiscal year 2012-2013, the average annual electricity usage at this site was 1,543,524 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are five usable sections at this site, as shown in **Figure 137**, which can host a solar PV system with a technical potential of 196 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 231,154 kWh per year and offset 15% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 38** below shows a summary of the production from each reviewed section.

Table 38: Turner Elementary School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	165°	5,618	27
2	165°	3,466	59
3	165°	1,158	36
4	165°	5,871	12
5	255°	2,294	61
Technical Potential		23,332	196
Maximum Production (kWh)			231,154
Recommended System Size (kW)			**196**
Recommended System Output (kWh)			**231,154**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 137**. Building voltage is 480/277V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 1600A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 138** shows, there is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would likely need to be installed against the outside walls of the buildings, where sufficient space is available. Standing water was discovered in the main electrical room during the site visit, which is being remedied by the District.

Figure 138: Limited space available in elec. room

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures. Existing lampposts on the top level of the parking garage would likely need to be integrated into the recommended solar carport canopy structure.

Figure 139: HVAC obstruction on Section 2

Figure 140: HVAC obstruction on Section 3

DGS57 Walker-Jones Education Campus

Site Address	1125 New Jersey Avenue NW, Washington DC 20001
Type of PV System	Rooftop and carport
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	2,897,224 kWh
Maximum System Size	110 kW-DC
Maximum System Output	129,682 kWh
Recommended System Size	110 kW-DC
Recommended System Output	129,682 kWh
Energy Offset	4%
Issues	Low energy offset; Tree shading; Security concerns for solar carport structure
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 6th Ward, the Walker-Jones Education Campus is three-story building that was modernized in 2009 and has a thermoplastic membrane roof layer that is in great condition. The building also has a vegetative roof layer and abundant roof HVAC equipment. The two buildings evaluated as Sections 1 and 2 appear to be a library and recreation center; thus, it is uncertain whether these opportunities would be under the purview of DGS. Nonetheless, the parking area is not fenced in, which poses security concerns for a solar carport structure despite the potential high visibility. **Figure 141** shows the usable areas at the site.

Figure 141: Walker-Jones Education Campus Usable Area

Recommendation

All Sections highlighted in **Figure 141** are recommended at this site. Optony recommends a solar PV system of 110 kW-DC, which would produce 129,682 kWh per year and offset 4% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 2,897,224 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 141**, which can host a solar PV system with a technical potential of 110 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 129,682 kWh per year and offset 4% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels for rooftop areas are assumed to be tilted at a 10° tilt and those for carport areas are assumed to be tilted at a 5° tilt. **Table 39** below shows a summary of the production from each reviewed section.

Table 39: Walker-Jones Education Campus Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	2,961	27
2	180°	5,539	50
3	180°	2,770	33
Technical Potential		11,270	110
Maximum Production (kWh)			129,682
Recommended System Size (kW)			**110**
Recommended System Output (kWh)			**129,682**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the building. Building voltage is 480/277V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As Figure 2 shows, space is available in the main electrical room for additional electrical PV equipment. Conduit runs that go from the roof to the basement electrical room would need to be been installed to house electrical wires from PV panels to main meter via inverter.

Figure 142: Space is available in the electrical room

Shading

There are potential shading issues at this site for the recommended sections. The newly planted trees to the south of the Sections 2 and 3 may require tree relocation in order to maximize energy generation potential.

Security

There are security concerns for the recommended carport section and the installation of fencing around the parking area may not be a viable option.

Figure 143: Example of roof material and obstructions

Figure 144: Example of roof material and obstructions

DGS60 J.O. Wilson Elementary School

Site Address	660 K Street NE, Washington DC 20002
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential MPS-GT
Annual Energy Usage	1,213,479 kWh
Maximum System Size	171 kW-DC
Maximum System Output	204,690 kWh
Recommended System Size	171 kW-DC
Recommended System Output	204,690 kWh
Energy Offset	17%
Issues	Low energy offset; Shading from HVAC equipment and screens
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 6th Ward, the J.O. Wilson Elementary School is a series of three multi-story buildings built in 1960 that have not yet undergone modernization. However, the modified bitumen roof layer with approximately 18,800 square feet of usable roof space for solar PV was installed in 2010 and is in good condition. **Figure 145** shows the usable areas at the site.

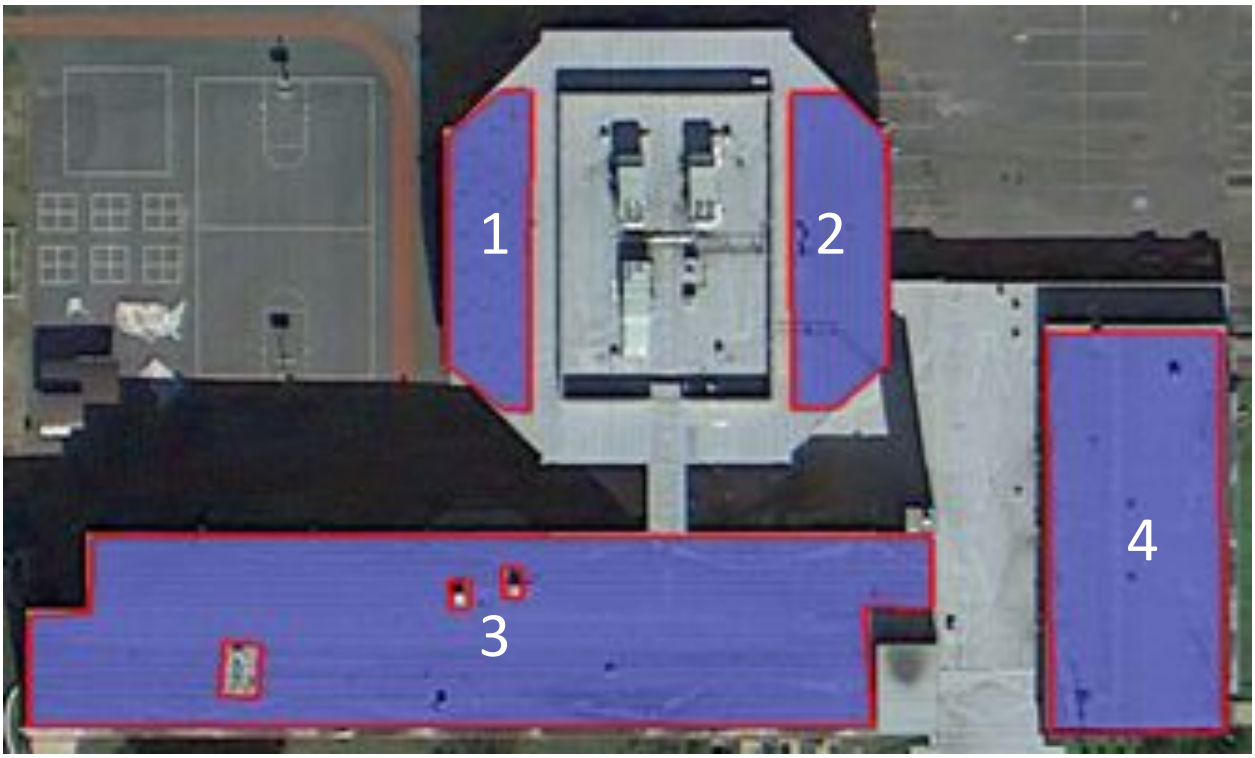


Figure 145: J.O. Wilson Elementary School Usable Area

Recommendation

All Sections highlighted in **Figure 145** are recommended at this site. Optony recommends a solar PV system of 171 kW-DC, which would produce 204,690 kWh per year and offset 17% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,213,479 kWh. This site is on Pepco's Non-Residential MPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are four usable sections at this site, as shown in **Figure 145**, which can host a solar PV system with a technical potential of 171 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 204,690 kWh per year and offset 17% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 40** below shows a summary of the production from each reviewed section.

Table 40: J.O. Wilson Elementary School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,619	15
2	180°	1,594	15
3	180°	11,032	100
4	180°	4,555	41
Technical Potential		18,800	171
Maximum Production (kWh)			204,690
Recommended System Size (kW)			**171**
Recommended System Output (kWh)			**204,690**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located in the basement of the buildings. Building voltage is 120/208 V, 3-phase, 4-wire, and the main breaker and enclosure amperage ratings are 2000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 146** shows, there is limited space is available in the main electrical room for additional electrical PV equipment. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 146: Limited available space in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections, as the identified usable areas are designed to avoid shading from the surrounding structures. Due to the screen on northern rooftop, Sections 1 and 2 have limited usable space. Sections 3 and 4 have some shading concerns due to antennas and vents but they are not that significant when compared to usable area 1 and 2.

Figure 147: Example of roof material and obstructions on Section 3

DGS61 Wilson High School

Site Address	3950 Chesapeake Street NW, Washington DC 20016
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	4,501,019 kWh
Maximum System Size	119 kW-DC
Maximum System Output	141,987 kWh
Recommended System Size	119 kW-DC
Recommended System Output	141,987 kWh
Energy Offset	3%
Issues	Low energy offset
Opportunities	Solar energy curriculum integration

Located in Washington's 3rd Ward, the Wilson High School is a series of multi-story buildings that were modernized in 2010. The Wilson Aquatic Center is also located at this site, but it is managed by a different agency and has its own electric meter; thus it's treated as a separate site (see DGS62). The roofing material on the auditorium (Section 1) is modified bitumen and the roofing material on Sections 2 and 3 are a thermoplastic membrane roof layer, all of which is in great condition. This site has three areas that are suitable for solar, which offers approximately 11,300 square feet of usable roof area for solar PV. **Figure 148** shows the usable areas at the site.

Figure 148: Wilson High School Usable Area

Recommendation

All Sections highlighted in **Figure 148** are recommended at this site. Optony recommends a solar PV system of 119 kW-DC, which would produce 141,987 kWh per year and offset 3% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 4,501,019 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are three usable sections at this site, as shown in **Figure 148**, which can host a solar PV system with a technical potential of 119 kW-DC. Optony recommends a solar PV system size of the full technical potential, which would produce 141,987 kWh per year and offset 3% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 41** below shows a summary of the production from each reviewed section.

Table 41: Wilson High School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	6,327	66
2	180°	2,454	26
3	160°	2,563	27
Technical Potential		11,344	119
Maximum Production (kWh)			141,987
Recommended System Size (kW)			**119**
Recommended System Output (kWh)			**141,987**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 148**. The main breaker amperage rating of the newer electric panel is 4000A and voltage is 480/277V, and the main breaker amperage rating for the older panel is 1600A and voltage is 120/208V. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 149** shows, despite the boxes there is plenty of space available in the electrical room for additional electrical equipment. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 149: Space available in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. There is an HVAC system with 10-foot screens around it that pose minimal shading threats for those sections, but the identified usable areas are designed to avoid shading from the screens.

Figure 150: West-facing view of Section 1

Figure 151: North-facing view of Section 3

DGS62 Wilson Aquatic Center

Site Address	4551 Fort Drive NW, Washington DC 20016
Type of PV System	Rooftop
Pepco Rate Schedule	Non-Residential GT
Annual Energy Usage	95,250 kWh
Maximum System Size	154 kW-DC
Maximum System Output	182,596 kWh
Recommended System Size	81 kW-DC
Recommended System Output	95,145 kWh
Energy Offset	100%
Issues	Difficult roof access due to absence of fixed latter
Opportunities	100% energy offset potential

Located in Washington's 3rd Ward, the Wilson Aquatic Center is a one-story building that was built in 2009 with a thermoplastic membrane roof that is in great condition. The aquatic center is located at the same site as Wilson High School, but because the two facilities are managed by different agencies and have separate electric meters they have been evaluated separately for the purposes of this report (see DGS61). Finally, the building has an existing 36.7 kW solar PV system. It is unclear why the existing solar PV system wasn't sized to offset more of the facility's electricity usage. **Figure 152** shows the usable area at the site.

Figure 152: Wilson Aquatic Center Usable Area

Recommendation

The Section highlighted in **Figure 152** is recommended at this site. Optony recommends a solar PV system of 81 kW-DC, which would produce 95,145 kWh per year and offset 100% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the 12 months of fiscal year 2011-2012, the average annual electricity usage at this site was 95,250 kWh. This site is on Pepco's Non-Residential GT rate schedule and is not on Pepco's secondary network.

Energy Production

There is one usable section at this site, as shown in **Figure 152**, which can host a solar PV system with a technical potential of 154 kW-DC. However, due to current net excess generation limitations, Optony recommends a solar PV system of 81 kW-DC, which would produce 95,145 kWh per year and offset 100% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 42** below shows a summary of the production from each reviewed section.

Depending on the forthcoming rule writing associated with the passage of the Community Renewable Energy Act of 2013, this site may be able to virtually credit net excess generation beyond 100% offset to another DGS electricity account. Alternatively, a long wire run to the neighboring Wilson High School could offset net excess generation. However, due to the uncertainty related to the forthcoming rules and potentially long wire runs, this feasibility study does not recommend the maximum capacity that this site could host.

Table 42: Wilson Aquatic Center Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	210°	14,768	154
Technical Potential		14,768	154
Maximum Production (kWh)			182,596
Recommended System Size (kW)			**81**
Recommended System Output (kWh)			**95,145**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There is a single meter located on the ground floor of the building, as shown by the yellow and black electrical sign in **Figure 152**. The main breaker amperage rating is 2500A and voltage is 480/277V. Current electrical equipment appears suitable for a PV system without major upgrades.

There is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would need to be installed outside of the electrical room in the enclosed hallway, where sufficient space is available.

Shading

There are no significant shading issues at this site for the recommended sections. There are a few large mature trees to the south of the recommended usable roof area for solar PV, but its impact on energy generation would be insignificant based on Solmetric Suneye solar access readings greater than 95%.

Figure 153: East-facing view of Section 1

Figure 154: Existing 36 kW solar PV system

Figure 155: View of mounting system & DC disconnects

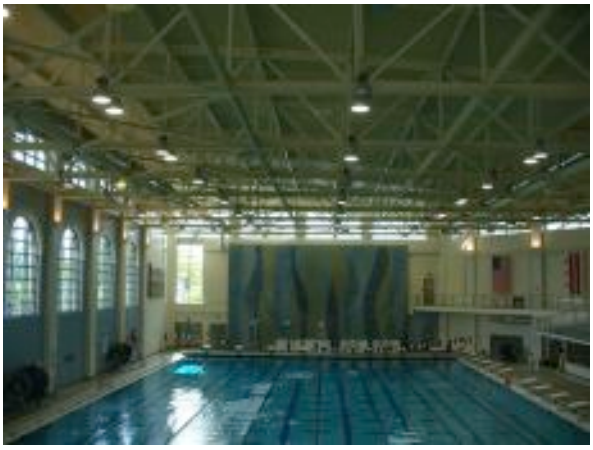


Figure 156: Structural support above Section 1

DGS63 John A. Wilson Building

Site Address	1350 Pennsylvania Avenue NW, Washington DC 20004
Type of PV System	Rooftop
Pepco Rate Schedule	Hourly Priced HPS-GT
Annual Energy Usage	6,284,310 kWh
Maximum System Size	20 kW-DC
Maximum System Output	23,525 kWh
Recommended System Size	20 kW-DC
Recommended System Output	23,525 kWh
Energy Offset	0.4%
Issues	Very low offset; Roof access requires climbing ladder
Opportunities	High visibility potential for solar monitoring displays in building lobbies and tours

Located in Washington's 2nd Ward, the John A. Wilson Building is an historic five-story building that serves as the District of Columbia's City Hall, housing the Executive Office of the Mayor and the Council of the District of Columbia. The building was built in 1937 and has a modified bitumen roof layer that was installed in 1998 and is scheduled to be upgraded in 2014 in order to receive the solar PV system. While this site does not represent a great opportunity in terms of power generation potential, due to abundant HVAC equipment and outriggers for window washing, it does provide great visibility due to its service as City Hall. However, the roof is not easily accessible for tours and could be a challenge for some. **Figure 157** shows the usable area at the site.

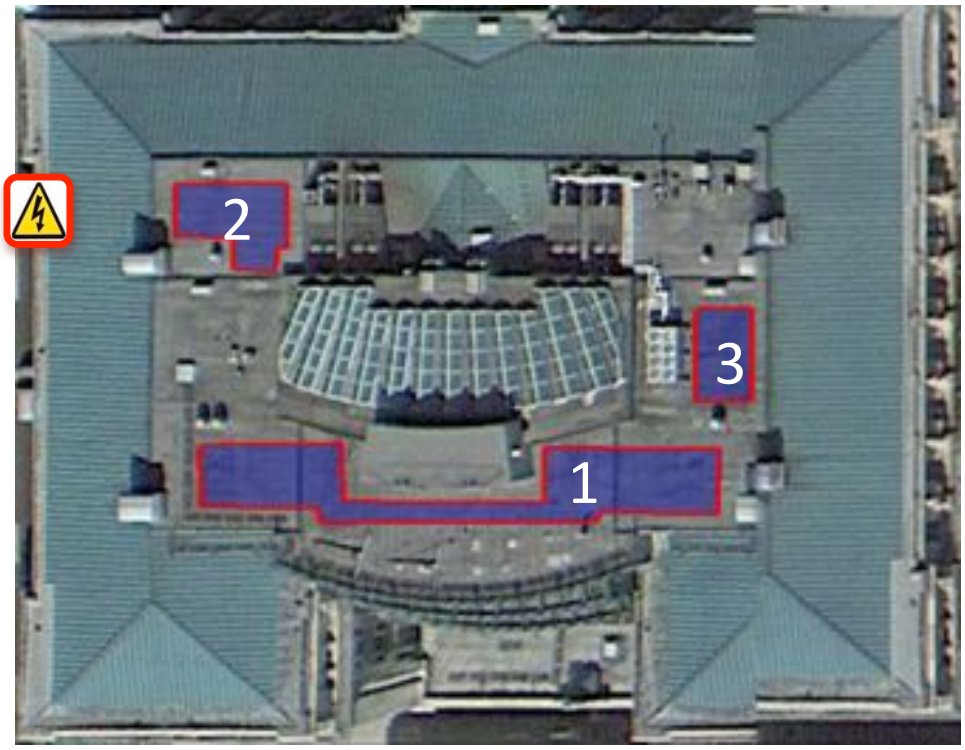


Figure 157: John A. Wilson Building Usable Area

Recommendation

The Section highlighted in **Figure 157** is recommended at this site. Optony recommends a solar PV system of 20 kW-DC, which would produce 23,525 kWh per year and offset 0.4% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 20 months, the average annual electricity usage at this site was 6,284,310 kWh. This site is on Pepco's Hourly Priced HPS-GT rate schedule and is not on Pepco's secondary network.

Energy Production

There are two usable sections at this site, as shown in **Figure 157**, which can host a solar PV system with a technical potential of 20 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 23,525 kWh per year and offset 0.4% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 43** below shows a summary of the production from each reviewed section.

Table 43: John A. Wilson Building Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	1,251	13
2	180°	373	4
3	180°	253	3
Technical Potential		1,877	20
Maximum Production (kWh)			23,525
Recommended System Size (kW)			**20**
Recommended System Output (kWh)			**23,525**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

There are two meters located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 157**. Building voltage is 480/277 V, 3-phase, 4-wire, and both main breaker and enclosure amperage ratings are 4000A. Current electrical equipment appears suitable for a PV system without major upgrades.

As **Figure 158** shows, there is space available in the main electrical room for additional electrical PV equipment. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room at the basement needs to be installed.

Figure 158: Space available in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. There is some HVAC equipment scattered throughout the roof area, but its impact on energy generation would be insignificant based on Solmetric Suneye solar access readings.

Figure 160: West facing view of SW corner

Figure 159: East facing view of Section 1

DGS64 Saint Elizabeth's Hospital

Site Address	1100 Alabama Avenue SE, Washington, DC 20032
Type of PV System	Rooftop (Carport potential not assessed)
Pepco Rate Schedule	TBA
Annual Energy Usage	12,101,001 kWh
Maximum System Size	798 kW-DC
Maximum System Output	936,928 kWh
Recommended System Size	798 kW-DC
Recommended System Output	936,928 kWh
Energy Offset	8%
Issues	Low electricity offset
Opportunities	Easy roof access for tours & maintenance

Located in Washington's 8th Ward, Saint Elizabeth's Hospital moved into a new 450,000 ft^2, state-of-the-art facility in 2010 that incorporates best practices in modern, in patient mental health care with an environmentally sensitive design and sustainable strategies. The new building's therapeutic design includes bright and airy living and treatment areas, green spaces off each patient unit, and enclosed courtyards. The roofing material (rubberized asphalt protected membrane) was installed in 2009 and is in good condition. **Figure 161** shows the usable area at the site.

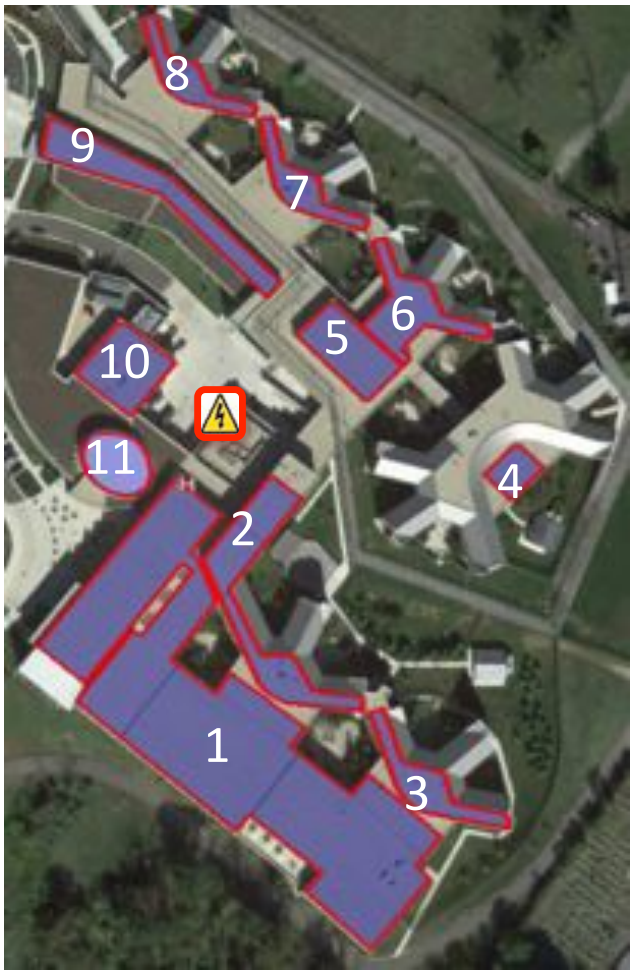


Figure 161: Saint Elizabeth's Hospital Usable Area

Recommendation

The Sections highlighted in **Figure 161** are recommended at this site. Optony recommends a solar PV system of 798 kW-DC, which would produce 936,928 kWh per year and offset 8% of the site's electricity usage annually. There may be solar carport potential in the parking lot, as shown in **Figure 162**, but due to the curved orientation and newly planted tree saplings throughout the parking area this was not assessed. However, bidders are encouraged to proposed solar carport structures, if deemed feasible.

Figure 162: Potential solar carport potential

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 12,101,001 kWh. It has been determined that the site it not on Pepco's secondary network, but the rate schedule is not yet known.

Energy Production

There are 11 usable sections at this site, as shown in **Figure 161**, which can host a solar PV system with a technical potential of 798 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 936,928 kWh per year and offset 8% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 44** below shows a summary of the production from each reviewed section.

Table 44: Saint Elizabeth's Hospital Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	220°	40,163	420
2	180°	6,218	65
3	180°	2,653	28
4	180°	1,316	14
5	180°	3,953	41
6	180°	4,099	43
7	180°	2,638	28
8	180°	2,650	28
9	180°	5,967	62
10	180°	4,001	42
11	130°	2,609	27
Technical Potential		76,266	798
Maximum Production (kWh)			936,928
Recommended System Size (kW)			**798**
Recommended System Output (kWh)			**936,928**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

According to Pepco, electricity is supplied through a customer vault and there is no limitation to solar power generation at the site.

There are two feeders supplying 13 kV to the facility, with 4 substations in the electrical room indicated by the yellow and black electrical sign in **Figure 161**. Building voltage is stepped down to 480/277 V, 3-phase, and both main breaker and enclosure amperage ratings are 4000A. Current electrical equipment is new and appears suitable for a PV system without major upgrades.

As **Figure 163** shows, there is ample space available in the facility's electrical room for additional electrical PV equipment.

Figure 163: Space available in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. There is some HVAC equipment scattered throughout the roof area, but its impact on energy generation would be insignificant based on Solmetric Suneye solar access readings.

Figure 165: Southeast-facing view of SE corner

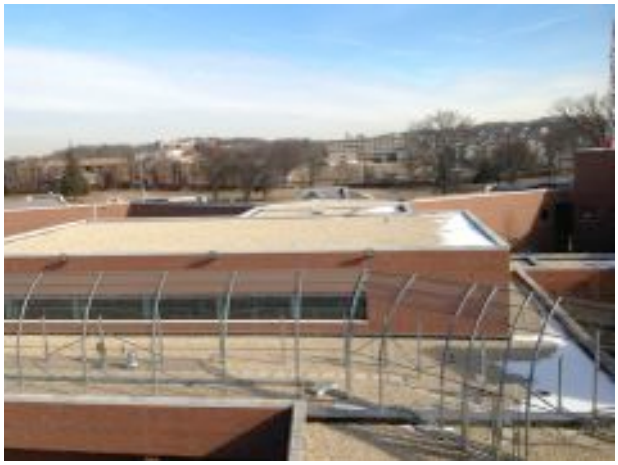


Figure 164: Northeast-facing view of Section 5

DGS65 Brookland Middle School

Site Address	1150 Michigan Avenue NE, Washington DC 20017
Type of PV System	Rooftop
Pepco Rate Schedule	TBA
Annual Energy Usage	1,442,463 kWh (estimated)
Maximum System Size	136 kW-DC
Maximum System Output	162,899 kWh
Recommended System Size	136 kW-DC
Recommended System Output	162,899 kWh
Energy Offset	11%
Issues	Low electricity offset
Opportunities	Support LEED certification; Solar energy curriculum integration

Located in Washington's 5th Ward, the future Brookland Middle School is currently undergoing full modernization and the anticipated completion date is January 2015. The renovation of the existing high school using an adaptive re-use approach modernization that will include; exterior restoration, roofing, systems replacement, ADA improvements, phased occupancy, technology enhancements, and sustainable design initiatives. The ~100,000 ft^2 facility is targeting LEED Gold certification or higher and will incorporate "solar-ready" building design principles. **Figure 166** shows the usable area at the site.

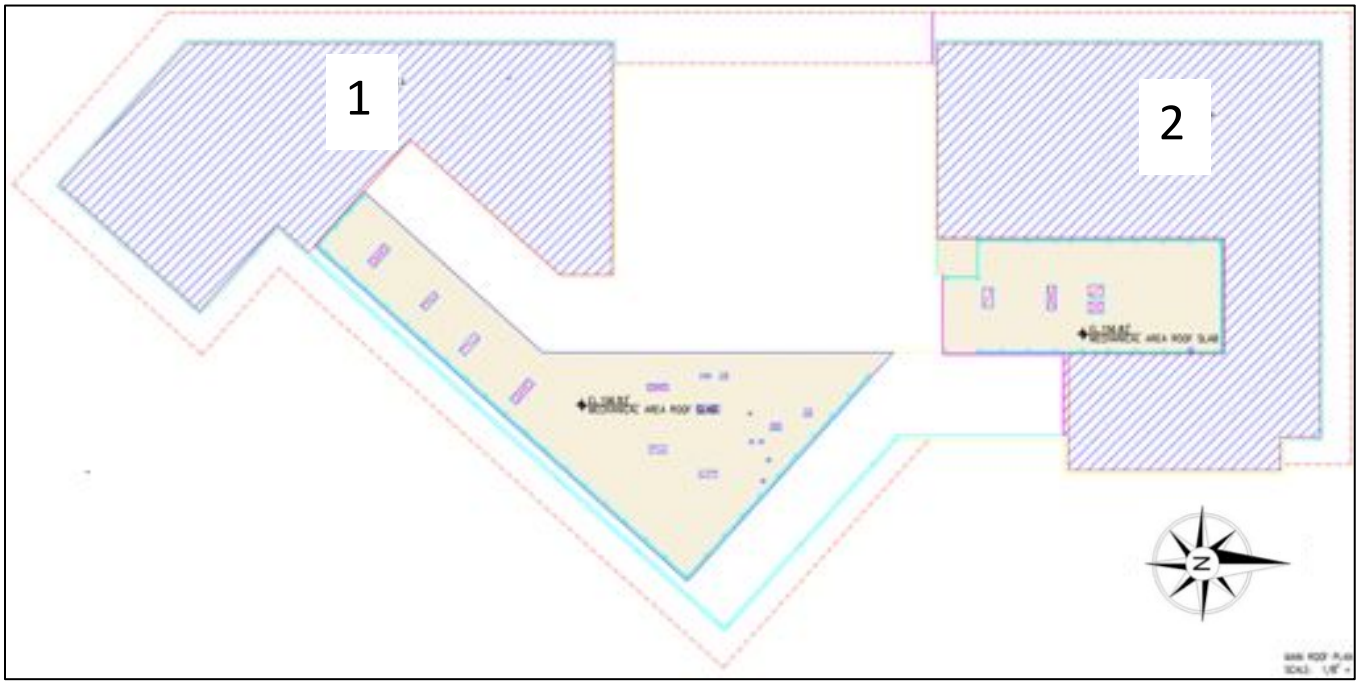


Figure 166: Brookland Middle School Usable Area

Recommendation

Both Sections highlighted in **Figure 166** are recommended at this site. Optony recommends a solar PV system of 136 kW-DC, which would produce 162,899 kWh per year and offset 11% of the site's electricity usage annually.

Energy Consumption

According to the project architect, the average annual electricity usage at this site is expected to be 1,442,463 kWh. It has been determined that the site is not on Pepco's secondary network, but the future rate schedule is not yet known.

Energy Production

There are two usable sections at this site, as shown in **Figure 166**, which can host a solar PV system with a technical potential of 136 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 162,899 kWh per year and offset 11% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 45** below shows a summary of the production from each reviewed section.

Table 45: Brookland Middle School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	8,475	62
2	180°	10.106	74
Technical Potential		18,581	136
Maximum Production (kWh)			162,899
Recommended System Size (kW)			**136**
Recommended System Output (kWh)			**162,899**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

As the building is currently under construction, final electrical system details are not yet available. However, as the school is expected to achieve LEED Gold certification or higher and is incorporating "solar-ready" building design principles, the facility's electrical system will be able to accommodate the recommended solar PV installation.

Shading

As the building is currently under construction, future shading impacts are unclear. However, as the school is expected to achieve LEED Gold certification or higher and is incorporating "solar-ready" building design principles, there are no expected shading issues at this site for the recommended sections.

DGS66 Ballou Senior High School

Site Address	3401 4th Street SE, Washington DC 20032
Type of PV System	Rooftop
Pepco Rate Schedule	TBA
Annual Energy Usage	5,192,867 kWh (estimated)
Maximum System Size	623 kW-DC
Maximum System Output	730,741 kWh
Recommended System Size	623 kW-DC
Recommended System Output	730,741 kWh
Energy Offset	14%
Issues	Low electricity offset
Opportunities	Support LEED certification; Solar energy curriculum integration

Located in Washington's 8th Ward, the future Ballou Senior High School is currently undergoing full modernization and the anticipated opening date is Fall 2014. Sustainable design is a key feature of this facility, which is targeting LEED Gold certification or higher. According to available project information, notable design features include a geothermal water-source heat pump for heating and cooling, energy recovery units, exterior shading, high efficiency glazing, photovoltaic arrays, rainwater harvesting, and enhanced lighting controls. The new facility will accommodate a general student population of 1,400 plus 900 STAY Academy students. **Figure 167** shows the usable area at the site.

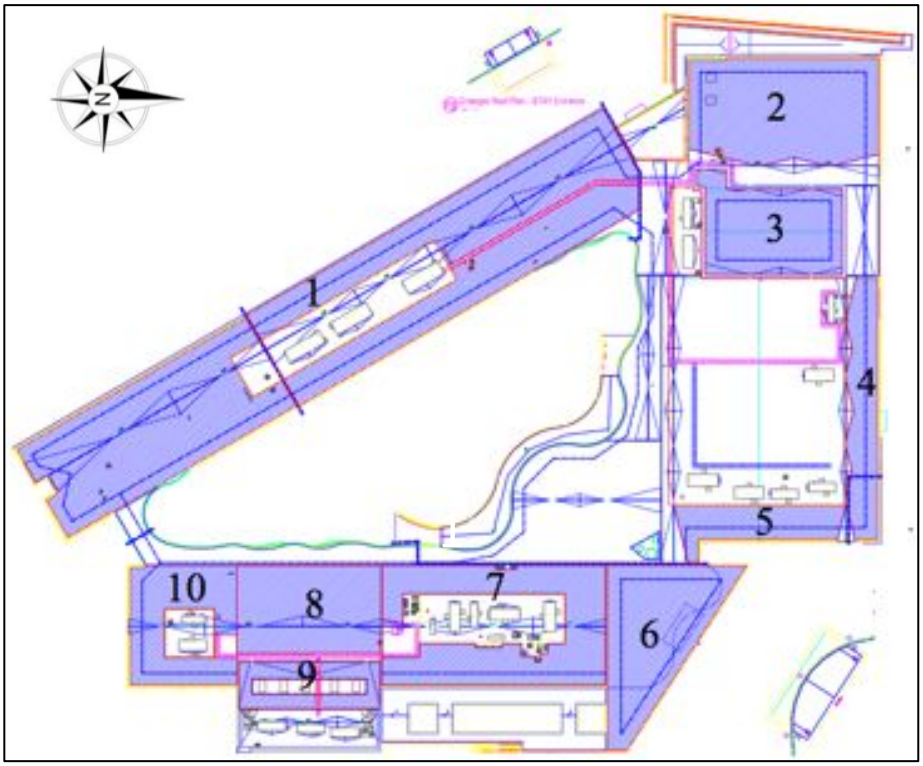


Figure 167: Ballou Senior High School Usable Area

Recommendation

All Sections highlighted in **Figure 167** are recommended at this site. Optony recommends a solar PV system of 623 kW-DC, which would produce 730,741 kWh per year and offset 14% of the site's electricity usage annually.

Energy Consumption

The average annual electricity usage at this site is estimated to be 5,192,867 kWh for this ~360,000 ft^2 facility. This estimate is based on the forecasted electricity use intensity of Brookland Middle School (14.43 kWh/ft2/year), which is also currently under construction and targeting LEED Gold certification or higher. It has been determined that the site is not on Pepco's secondary network, but the future rate schedule is not yet known.

Energy Production

There are 10 usable sections at this site, as shown in **Figure 167**, which can host a solar PV system with a technical potential of 623 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 730,741 kWh per year and offset 14% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 46** below shows a summary of the production from each reviewed section.

Table 46: Ballou Senior High School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	150°	30,374	223
2	180°	10,079	74
3	180°	6,518	48
4	180°	3,865	28
5	180°	3,127	23
6	180°	7,728	56
7	180°	9,074	66
8	180°	6,691	49
9	180°	2,470	18
10	180°	5,138	38
Technical Potential		85,064	623
Maximum Production (kWh)			730,741
Recommended System Size (kW)			**623**
Recommended System Output (kWh)			**730,741**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

According to Pepco, the school is on a single network transformer with no network limitation to solar, but Pepco would need to disable transformer network protector if it hasn't been already. As the building is currently under construction, final building-level electrical system details are not yet available. However, as the school is targeting LEED Gold certification or higher and is incorporating "solar-ready" building design principles, the facility's electrical system will be able to accommodate the recommended solar PV installation.

Shading

As the building is currently under construction, future shading impacts are unclear. However, as the school is targeting LEED Gold certification or higher and is incorporating "solar-ready" building design principles, there are no expected shading issues at this site for the recommended sections.

DGS67 Kramer Middle School

Site Address	1700 Q St SE, Washington, DC 20020
Type of PV System	Rooftop
Pepco Rate Schedule	TBA
Annual Energy Usage	1,499,646 kWh
Maximum System Size	184 kW-DC
Maximum System Output	220,896 kWh
Recommended System Size	184 kW-DC
Recommended System Output	220,896 kWh
Energy Offset	15%
Issues	Low electricity offset
Opportunities	Solar energy curriculum integration; Easy roof access for tours & maintenance

Located in Washington's 8th Ward, Kramer Middle School is a four-story building that was built in 1948 and will be modernized during the summer of 2014. The roofing material is rubberized asphalt protected membrane. This site has two areas that are suitable for solar, which offer approximately 17,600 square feet of usable roof area for solar PV. **Figure 168** shows the usable area at the site.

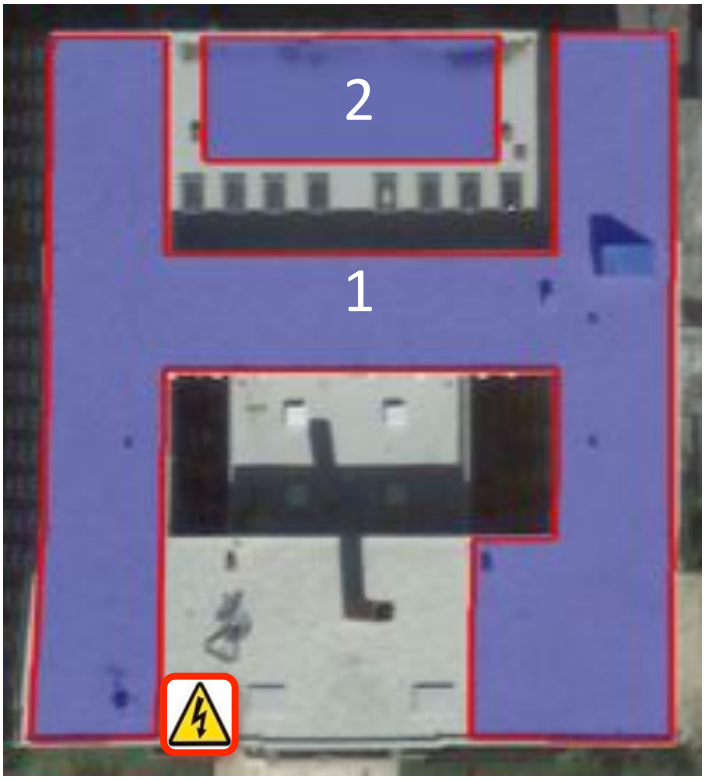


Figure 168: Kramer Middle School Usable Area

Recommendation

The Section highlighted in **Figure 168** is recommended at this site. Optony recommends a solar PV system of 184 kW-DC, which would produce 220,896 kWh per year and offset 15% of the site's electricity usage annually. More information is contained in the following sections.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 1,499,646 kWh. It has been determined that the site is not on Pepco's secondary network, but the future rate schedule is not yet known.

Energy Production

There are two usable sections at this site, as shown in **Figure 168**, which can host a solar PV system with a technical potential of 184 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 220,896 kWh per year and offset 15% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 47** below shows a summary of the production from each reviewed section.

Table 47: Kramer Middle School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	15,123	158
2	180°	2,507	26
Technical Potential		17,630	184
Maximum Production (kWh)			220,896
Recommended System Size (kW)			**184**
Recommended System Output (kWh)			**220,896**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

According to Pepco, electricity is supplied through customer vault, but on 4 kV feeder. The feeder limit could restrict solar capacity to about 200 kW, which wouldn't have an impact on this particular system.

The electric meter is located in the basement of the building, as indicated by the yellow and black electrical sign in **Figure 168**. Building voltage is 208/120, 3-phase, 4-wire, and both main breaker and enclosure amperage ratings are 3000A. Current electrical equipment appears to be original, thus, further investigation of the integrity of the electrical system is recommended prior to the installation of a solar PV system.

As **Figure 169** shows, there is limited space available in the electrical room for additional electrical equipment. Inverters and additional PV equipment would need to be installed against the outside wall of the building, where sufficient space is available. Conduit runs containing wires from the PV system array's output to the main meter in the electrical room in the basement would need to be installed.

Figure 169: No space in the electrical room

Shading

There are no significant shading issues at this site for the recommended sections. There are several skylights, a chimney and an antenna scattered throughout the roof area, but its impact on energy generation would be insignificant based on Solmetric Suneye solar access readings.

Figure 170: Southwest-facing view of atrium & chimney

Figure 171: West-facing view of Section 2

DGS68 Roosevelt High School

Site Address	4301 13th Street NW, Washington DC 20011
Type of PV System	Rooftop
Pepco Rate Schedule	TBA
Annual Energy Usage	3,995,876 kWh
Maximum System Size	304 kW-DC
Maximum System Output	363,565 kWh
Recommended System Size	304 kW-DC
Recommended System Output	363,565 kWh
Energy Offset	9%
Issues	Low electricity offset
Opportunities	Support LEED certification; Curriculum integration; Solar bleacher canopy (not assessed)

Located in Washington's 4th Ward, Roosevelt High School is currently undergoing full modernization and the anticipated opening date is Fall 2015. Sustainable design is a key feature of this facility, which is targeting LEED Gold certification or higher. Furthermore, daylighting is expected to be incorporated into Section 4 and may reduce the amount of usable roof area in this Section. The facility's roof will be upgraded and is expected to be ready to receive solar panels in early 2015. The recommended roof sections are all flat. **Figure 172** shows the usable area at the site. There may be additional solar potential in the form of a solar canopy structure over the bleachers of the sports field. This opportunity was not assessed, but developers are encouraged to include in proposal if deemed feasible. The building located to the northeast is MacFarland Middle School and its rooftop was not considered suitable due to an unfavorable roof condition.

Figure 172: Roosevelt High School Usable Area

Recommendation

All Sections highlighted in **Figure 172** are recommended at this site. Optony recommends a solar PV system of 304 kW-DC, which would produce 363,565 kWh per year and offset 9% of the site's electricity usage annually.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 3,995,876 kWh. However, with the modernization the electricity usage at this site will likely change. The future rate schedule is not yet known.

Energy Production

There are 4 usable sections at this site, as shown in **Figure 167**, which can host a solar PV system with a technical potential of 304 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 363,565 kWh per year and offset 9% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 48** below shows a summary of the production from each reviewed section.

Table 48: Roosevelt High School Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	14,036	102
2	180°	3,849	28
3	180°	7,938	58
4	180°	15,628	114
Technical Potential		41,451	304
Maximum Production (kWh)			363,565
Recommended System Size (kW)			**304**
Recommended System Output (kWh)			**363,565**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Figure 174: South-facing view of Section 3

Figure 173: Northeast-facing view of Section 1

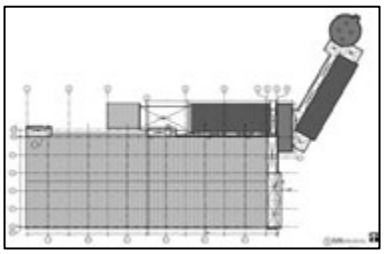
Electrical Information

As the building is currently under construction, final building-level electrical system details are not yet available. However, as the school is targeting LEED Gold certification or higher and is incorporating "solar-ready" building design principles. Thus, there will likely be room for inverters in the electrical room. Finally, according to modernization staff the facility is expected to have a 4000A main breaker and will be designed to receive solar power generation.

Shading

The modernization of this facility incorporates "solar-ready" building design principles, and despite architectural changes to the existing facility there are no significant shading issues expected at this site for the recommended sections. Section 3 has an annual solar access rating approximately 85-90%.

DGS66 Southeast Training and Learning Center



Site Address	701 Mississippi Avenue SE, Washington DC 20032
Type of PV System	Rooftop
Pepco Rate Schedule	TBA
Annual Energy Usage	543,076 kWh
Maximum System Size	159 kW-DC
Maximum System Output	190,089 kWh
Recommended System Size	159 kW-DC
Recommended System Output	190,089 kWh
Energy Offset	35%
Issues	Low electricity offset
Opportunities	New roof with limited installation obstructions

Located in Washington's 8th Ward, the Southeast Tennis and Learning center is currently undergoing renovations and modernizations that are scheduled to begin March 2014. There will be a 129'x336' size metal building for the interior courts which is expected to be installed by October 2014. The roof ridge will run east-west, which will offer the south-facing half of the roof for solar PV. The building will be constructed to be able to structurally support a solar PV system. **Figure 175** shows the usable area at the site.

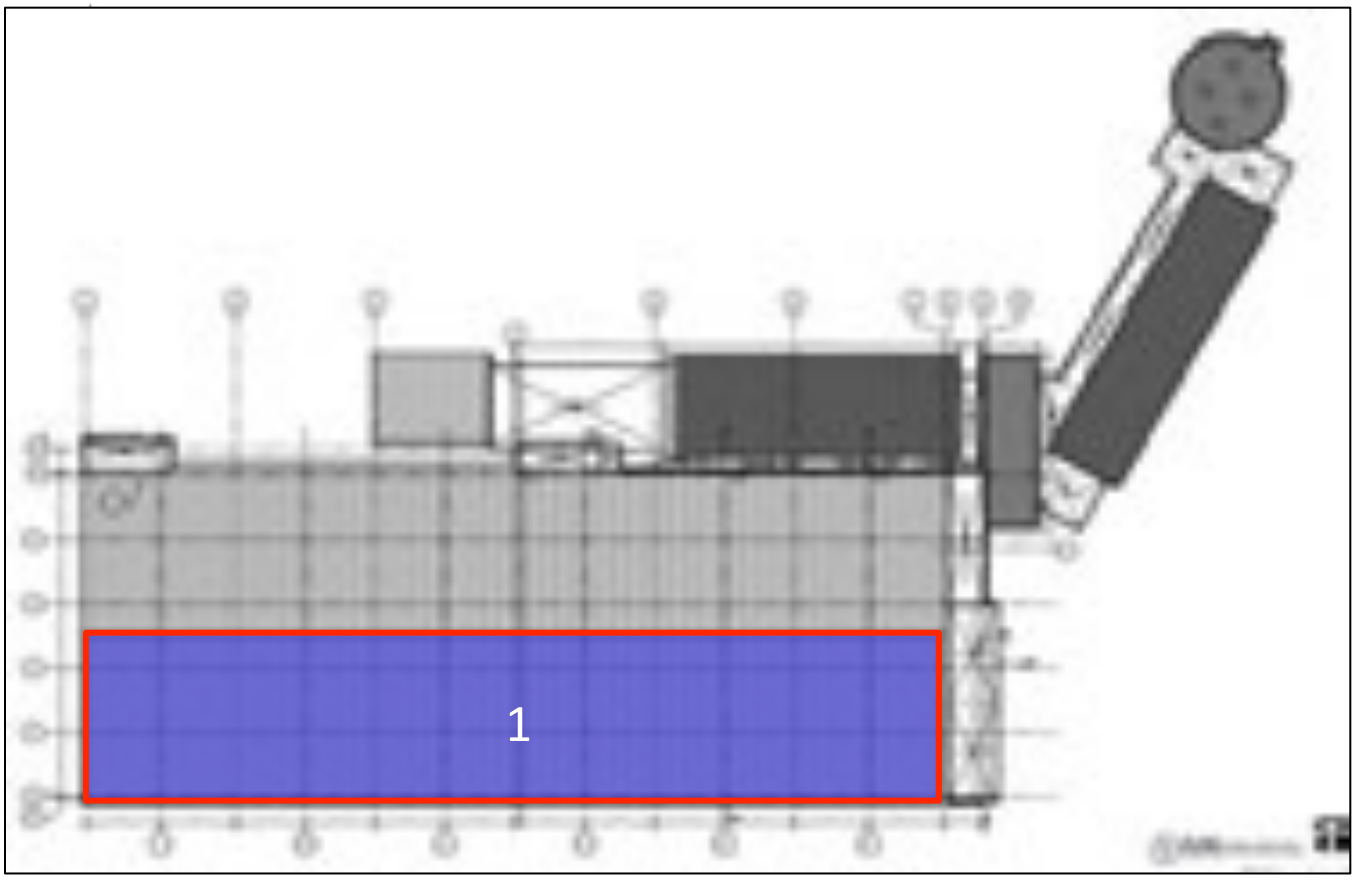


Figure 175: Southeast Tennis and Learning Center Usable Area

Recommendation

All Sections highlighted in **Figure 175** are recommended at this site. Optony recommends a solar PV system of 159 kW-DC, which would produce 543,076 kWh per year and offset 35% of the site's electricity usage annually.

Energy Consumption

In the previous 24 months, the average annual electricity usage at this site was 543,076 kWh. It has been determined that the site is not on Pepco's secondary network, but the future rate schedule is not yet known.

Energy Production

There is 1 usable section at this site, as shown in **Figure 175**, which is expected to be able to host a solar PV system with a technical potential of 159 kW-DC. Optony recommends a solar PV system size of the full techical potential, which would produce 190,089 kWh per year and offset 35% of the site's electricity usage annually. To maximize system production with limited available space, all of the panels are assumed to be tilted at a 10° tilt. **Table 49** below shows a summary of the production from each reviewed section.

Table 49: Southeast Tennis and Learning Center Solar PV System Summary

Section	Azimuth	Area (Sq. Ft.)	Size (kW-DC)
1	180°	15,170	159
Technical Potential		15,170	159
Maximum Production (kWh)			190,089
Recommended System Size (kW)			**159**
Recommended System Output (kWh)			**190,089**

Under the District's current net metering policy, the energy produced by the PV system during daylight hours flows into the load at the meter, reducing the need to purchase electricity from the utility. Excess energy is passed directly onto the utility grid, building up energy credits for the site. These credits are used up at night when the solar system is not generating electricity.

Electrical Information

As the building is currently under construction, final building-level electrical system details are not yet available. However, as the facility is the facility is being constructed with a future solar PV system in mind, the facility's electrical system will be able to accommodate the recommended solar PV installation. According to Pepco, the facility is on a Radial 13 kV supply with no network limitation to solar.

Shading

There are no expected shading concerns at this site.

District of Columbia, Department of General Services (DC DGS)
RFP for On-Site Solar Power Purchasing Agreement at Various Municipal
Solicitation Number: DCAM-14-CS-0123
Attachment A.3 - Site Historical Electricity Usage

ADDRESS (as of Feb 6, 2013)	ID#	Display Name	Type	Dist	Gen/Trans	Tariff	FY11-12 Usage (kWh)	FY12-13 Usage (kWh)	FY11-13 Annual Avg (kWh)	24-Month Electricity Usage Trend	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	24 Month Total
1805 BLADENSBURG ROAD NE	DGS02	5th District Headquarters	Police	Pepco	Washington Gas Energy Services	N-R GT	999,306		999,306		89,014	77,071	80,040	80,054	72,687	37,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	436,066
1601 16TH STREET SE	DGS04	Anacostia High School	High School	Pepco	Washington Gas Energy Services	N-R GT	3,414,342	3,189,511	3,301,927		241,893	235,737	253,328	306,641	258,072	216,343	209,634	265,234	308,190	391,797	386,542	340,931	262,363	241,648	250,910	243,160	222,389	249,970	264,493	286,578	283,126	313,530	285,163	286,181	6,603,853
1300 NICHOLSON STREET NW	DGS06	Brightwood Elementary	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,679,250	1,341,175	1,510,213		135,464	99,153	116,947	112,911	107,166	127,177	101,543	149,349	154,703	212,363	195,349	167,125	131,767	111,789	109,497	91,717	85,681	95,958	96,112	107,476	125,043	128,971	123,488	133,676	3,020,425
801 DIVISION AVENUE NE	DGS07	Burrville Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,087,484	1,111,706	1,099,595		98,794	81,744	78,415	75,412	72,220	70,699	78,327	101,332	99,652	109,120	116,315	105,454	83,796	72,673	80,093	77,368	70,735	82,380	88,425	106,729	110,201	109,457	115,691	114,158	2,199,190
2525 17TH STREET NW	DGS10	H.D. Cooke Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	885,600		885,600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6315 5TH STREET NW	DGS11	Coolidge High School	High School	Pepco	Washington Gas Energy Services	N-R MPS GT	2,457,416	2,201,942	2,329,679		184,285	167,092	171,674	185,006	173,669	164,022	153,021	199,678	246,168	295,503	279,524	237,774	180,705	175,092	170,466	171,036	161,699	185,832	180,122	186,920	183,809	190,719	212,026	203,516	4,659,358
4665 BLUE PLAINS DRIVE SW	DGS12	Police Training Academy	Police	Pepco	Washington Gas Energy Services	N-R GT	2,007,725	1,771,500	1,889,613		156,091	145,056	147,141	140,379	136,255	144,719	133,805	169,890	201,113	232,367	223,543	177,366	148,073	121,803	126,881	129,670	135,886	140,502	150,503	162,096	164,802	132,153	190,807	168,324	3,779,225
3815 FORT DRIVE NW	DGS13	Deal Middle School	Middle School	Pepco	Washington Gas Energy Services	N-R GT	3,611,869	3,426,927	3,519,398		493,848	460,200	433,704	270,582	229,065	267,644	262,286	230,950	238,200	246,906	247,211	231,273	257,916	312,261	322,670	322,670	167,811	185,791	179,798	296,316	352,955	352,052	361,081	315,606	7,038,796
1350 49TH STREET NE	DGS14	Deanwood Recreation Center	Community Center	Pepco	Washington Gas Energy Services	N-R GT	1,350,869	1,379,076	1,364,973		89,109	94,736	107,010	90,320	93,830	100,355	106,829	124,886	134,727	149,830	134,736	124,501	124,900	102,990	100,000	99,335	85,796	96,900	105,171	124,985	128,962	138,364	143,723	127,950	2,729,945
1700 EAST CAPITOL STREET NE	DGS15	Eastern High School	High School	Pepco	Washington Gas Energy Services	N-R GT	3,920,511	4,381,189	4,150,850		331,260	309,261	316,735	322,516	296,502	296,900	280,308	309,444	328,910	372,261	392,696	363,718	348,436	340,325	351,399	356,253	338,463	376,910	374,268	381,240	361,720	372,587	398,835	380,753	8,301,700
17 DC VILLAGE LANE SW	DGS18	Evidence & Property Control Facility	Warehouse	Pepco	Washington Gas Energy Services	N-R MPS GT	151,752	872,294	512,023		12,625	11,733	13,038	14,633	13,556	13,920	9,813	8,835	13,811	14,929	15,899	8,960	13,451	13,387	14,493	14,735	40,923	119,503	112,766	106,789	107,757	128,210	118,774	81,506	1,024,046
1200 S STREET NW	DGS20	Garrison Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R GT	470,436	436,895	453,666		42,266	36,172	36,472	40,104	38,840	36,836	32,335	38,870	38,156	40,033	48,164	42,188	36,034	37,481	36,637	36,979	35,886	38,318	34,002	36,218	33,492	31,164	40,554	40,130	907,331
301 53RD STREET SE	DGS23	CW Harris Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	526,984	551,331	539,158		36,160	34,699	37,906	38,706	37,230	36,423	34,139	47,756	57,933	65,620	57,685	42,727	40,207	41,677	38,637	37,448	36,200	38,028	37,920	48,549	56,706	56,428	59,531	60,000	1,078,315
5500 EADS STREET NE	DGS24	Woodson High School	High School	Pepco	Washington Gas Energy Services	N-R MPS GT	3,728,895	3,600,740	3,664,818		348,014	296,448	291,197	259,476	262,601	290,417	280,758	330,662	337,692	354,136	360,571	316,923	300,088	287,487	294,932	291,172	251,127	279,558	280,343	332,183	331,500	341,388	311,397	299,565	7,329,635
425 CHESAPEAKE STREET SE	DGS25	Hendley Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	541,427	459,703	500,565		47,366	44,940	40,636	39,633	40,034	37,671	34,228	42,262	49,969	58,757	59,646	46,285	41,261	42,128	43,495	41,375	39,416	39,682	37,709	43,822	47,079	32,246	30,535	20,955	1,001,130
3100 DENVER STREET SE	DGS26	Hillcrest Recreation Center	Community Center	Pepco	Washington Gas Energy Services	N-R MPS GT	368,476	314,561	341,519		27,912	27,304	29,493	30,443	27,723	29,766	28,354	31,258	33,050	40,423	32,321	30,429	28,743	27,568	29,178	29,986	28,182	28,727	28,629	27,605	21,671	24,043	22,949	17,280	683,037
301 49TH STREET NE	DGS27	Kelly Miller Middle School	Middle School	Pepco	Washington Gas Energy Services	N-R GT	2,127,370	1,829,695	1,978,533		153,848	133,916	128,915	132,399	136,710	145,105	143,796	182,680	204,363	256,437	290,329	218,872	159,823	122,940	109,528	106,670	102,217	124,472	131,786	174,352	187,411	207,362	221,547	181,587	3,957,065
3200 6TH STREET SE	DGS28	Martin Luther King Jr. Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	772,232	715,127	743,680		55,367	53,950	55,767	55,645	52,752	56,195	54,710	63,476	78,914	88,859	84,543	72,054	57,468	56,170	59,262	57,130	53,959	60,317	57,537	56,212	66,257	66,720	60,670	63,425	1,487,359
101 T STREET NE	DGS29	Langley School	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R GT	772,450	819,542	795,996		64,873	61,227	63,795	64,040	51,504	61,000	62,620	55,495	62,575	71,142	73,820	80,359	68,278	62,665	66,870	56,238	52,913	54,794	59,337	74,057	76,618	83,072	85,975	78,725	1,591,992
501 RIGGS ROAD NE	DGS30	LaSalle Elementary	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R MPS GT	909,146	1,143,150	1,026,148		76,480	77,721	68,688	69,522	63,508	69,729	56,616	90,024	86,388	81,375	74,041	95,054	97,488	90,150	86,746	91,572	80,042	82,959	79,313	150,593	66,062	113,809	102,096	102,320	2,052,296
1001 MONROE STREET NE	DGS31	Luke C. Moore Academy	High School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,134,176	1,132,607	1,133,392		77,675	70,786	79,441	87,994	85,871	77,160	77,409	98,751	114,650	136,325	134,396	93,718	71,995	75,017	81,038	86,976	77,760	81,887	78,157	93,140	118,546	133,218	124,593	110,280	2,266,783
601 15TH STREET NE	DGS34	Miner Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,029,374	1,001,754	1,015,564		80,282	66,368	67,853	68,326	63,846	67,531	77,181	94,332	107,287	117,557	124,411	94,400	74,649	63,160	64,034	63,600	61,408	62,597	61,444	85,677	115,067	122,463	123,045	104,610	2,031,128
1565 MORRIS ROAD SE	DGS35	Moten Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT		926,329	926,329		-	-	-	-	-	-	-	-	-	-	-	-	86,539	33,454	32,845	22,679	28,085	56,338	54,521	56,338	83,437	176,068	153,300	142,725	926,329
2000 ADAMS PLACE NE	DGS36	Municipal Warehouse	Warehouse	Pepco	Washington Gas Energy Services	N-R GT	811,703	867,902	839,803		76,498	77,527	74,149	69,843	66,545	66,167	57,381	50,474	57,007	75,057	78,233	62,822	52,770	62,829	71,166	80,057	72,219	69,323	60,184	63,132	73,547	90,615	94,188	77,872	1,679,605
219 50TH STREET SE	DGS37	Nalle Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	670,986	1,762,612	1,216,799		51,343	49,142	49,787	51,867	50,921	50,161	44,830	52,682	50,234	45,185	43,464	131,370	213,667	129,126	132,104	139,755	131,744	140,108	135,646	146,074	151,581	151,893	146,763	144,151	2,433,598
4399 SOUTH CAPITOL TERRACE SW	DGS40	Patterson Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	855,708	889,664	872,686		74,670	51,573	67,291	75,320	62,926	67,847	69,167	81,119	79,272	79,855	77,708	68,960	65,883	71,168	88,273	81,706	56,595	64,546	78,023	96,378	77,540	75,371	76,651	57,530	1,745,372
305 15TH STREET SE	DGS41	Payne Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	451,882	438,493	445,188		38,461	35,387	35,398	30,378	26,022	37,719	37,493	40,490	39,184	40,490	45,286	45,574	34,928	33,136	34,514	33,733	31,865	34,521	31,368	36,246	39,879	37,943	44,435	45,925	890,375
4601 TEXAS AVENUE SE	DGS42	Plummer Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	456,561	478,949	467,755		32,579	34,293	35,599	36,473	35,207	38,710	31,394	36,603	36,565	44,001	50,401	44,736	34,356	33,030	34,979	32,036	30,753	39,312	32,066	35,510	41,500	54,322	57,304	53,781	935,510
1650 30TH STREET SE	DGS44	Randle Highlands Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,262,795	1,634,831	1,448,813		170,679	78,058	78,478	82,117	77,942	90,943	87,763	118,217	113,823	115,143	125,689	123,943	114,664	126,656	145,076	118,883	81,021	90,080	114,557	142,363	168,727	184,153	179,901	168,750	2,897,626
915 SPRING ROAD NW	DGS45	Raymond Elementary	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R MPS GT	667,547	736,145	701,846		50,753	42,182	41,679	43,477	41,766	37,143	35,371	53,374	72,955	84,594	85,571	78,682	59,644	48,886	52,069	52,101	43,997	46,052	40,302	63,050	90,541	88,852	69,680	80,971	1,403,692
2400 SHANNON PLACE SE	DGS46	Savoy Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R GT	1,273,714	1,240,627	1,257,171		119,159	90,700	94,196	94,987	88,548	95,756	89,577	103,330	120,315	133,712	130,784	112,650	97,706	89,934	95,398	98,237	93,513	109,668	106,131	109,668	106,131	109,668	113,815	110,758	2,514,341
7800 14TH STREET NW	DGS48	Shepherd Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	452,035	483,280	467,658		35,604	32,699	40,325	35,980	31,942	32,769	31,643	37,220	42,595	46,625	43,850	40,783	33,404	32,033	37,561	35,019	36,370	38,873	34,705	36,659	55,097	49,998	35,151	58,410	935,315
3650 ELY PLACE SE	DGS50	Sousa Middle School	Middle School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,763,928	1,688,890	1,726,409		146,940	117,960	115,630	117,182	115,890	116,004	128,120	172,024	174,331	191,528	194,648	173,671	145,692	119,693	111,687	120,149	110,186	119,985	118,654	165,898	166,365	174,688	167,562	168,331	3,452,818
4001 CALVERT STREET NW	DGS51	Stoddert Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R GT	1,232,454	1,618,394	1,425,424		53,786	45,429	104,618	115,794	108,323	115,794	114,391	103,035	98,100	123,298	128,000	121,886	124,888	139,559	138,721	149,968	138,395	132,232	124,050	142,785	131,483	128,308	131,236	136,769	2,850,848
7010 PINEY BRANCH ROAD NW	DGS52	Takoma Educational Center	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R GT	1,731,379	1,640,397	1,685,888		49,269	93,104	171,345	167,482	158,389	146,164	122,451	149,678	169,950	172,356	178,464	152,727	113,150	102,094	104,058	126,497	113,700	117,900	129,643	135,415	142,800	212,090	176,550	166,500	3,371,776
1620 V STREET NW	DGS53	3rd District Headquarters	Police	Pepco	Washington Gas Energy Services	N-R GT	812,747	805,064	808,906		64,206	51,122	51,983	54,455	49,718	49,162	52,339	71,350	89,360	105,364	98,908	74,780	55,726	46,286	49,175	51,032	46,083	50,972	55,125	71,488	88,659	104,634	101,630	84,254	1,617,811
1310 CHILDRESS STREET NE	DGS54	Trinidad Recreation Center	Recreation Center	Pepco	Washington Gas Energy Services	N-R MPS GT	237,889	245,130	241,510		18,653	14,912	15,801	16,727	18,876	20,586	18,319	22,273	23,084	23,854	23,854	20,950	17,011	19,267	18,945	18,332	16,472	17,568	14,875	18,608	26,036	29,988	27,259	20,769	483,019
3264 STANTON ROAD SE	DGS55	Turner Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT		1,543,524	1,543,524		-	-	-	-	-	-	-	-	-	-	-	-	435,994	99,179	88,339	89,280	80,640	89,109	86,223	96,688	112,328	133,029	120,470	112,245	1,543,524
1125 NEW JERSEY AVENUE NW	DGS57	Walker-Jones Elementary	Elementary and Middle School	Pepco	Washington Gas Energy Services	N-R GT	2,969,273	2,825,174	2,897,224		249,880	190,217	164,175	173,054	194,196	242,160	214,622	282,155	288,056	352,631	338,745	279,382	238,933	186,150	167,705	171,797	150,197	205,427	237,631	283,810	309,687	297,162	299,081	277,594	5,794,447
660 K STREET NE	DGS60	J.O. Wilson Elementary	Elementary School	Pepco	Washington Gas Energy Services	N-R MPS GT	1,290,014	1,136,943	1,213,479		95,557	76,116	68,097	69,979	73,953	86,638	97,463	128,852	143,734	158,474	160,837	130,314	88,914	70,570	43,985	53,543	63,829	70,373	75,341	113,614	138,808	146,255	148,613	123,098	2,426,957
3950 CHESAPEAKE STREET NW	DGS61	Woodrow Wilson High School	High School	Pepco	Washington Gas Energy Services	N-R GT	5,376,523	3,625,514	4,501,019		458,846	443,350	458,128	456,966	427,343	427,279	238,484	548,364	557,764	346,696	541,928	471,375	426,900	414,595	364,981	260,701	227,125	242,319	227,969	266,971	288,210	340,333	304,691	260,719	9,002,037
4551 FORT DRIVE NW	DGS62	Wilson Pool	Recreation Center	Pepco	Washington Gas Energy Services	N-R GT	95,250		95,250		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1350 PENNSYLVANIA AVENUE NW	DGS63	Wilson Building	Office	Pepco	Washington Gas Energy Services	HPS-GT	6,177,220	6,391,399	6,284,310		490,659	470,451	462,819	450,537	419,413	546,153	571,299	559,060	533,038	569,998	574,041	529,752	501,423	447,357	527,302	549,046	494,889	505,387	469,488	562,714	570,674	589,697	617,346	556,076	12,568,619
1100 ALABAMA AVENUE SE	DGS64	Saint Elizabeth's Hospital	Other	Pepco	Washington Gas Energy Services	TBA	11,550,473	12,651,529	12,101,001		967,562	961,901	1,049,709	1,072,309	881,102	165,296	1,008,524	1,118,781	1,110,185	1,176,280	1,164,593	874,231	820,485	1,298,269	1,077,147	1,071,989	1,010,879	1,130,142	1,039,209	1,079,347	1,098,260	1,218,290	711,142	1,096,370	24,202,002
1150 MICHIGAN AVENUE NE	DGS65	Brookland Elementary	Elementary School	Pepco	Washington Gas Energy Services	TBA	229,992	342,286	286,139		20,735	19,965	20,472	20,477	19,177	20,542	19,836	21,489	17,553	15,763	16,156	17,827	18,406	37,219	43,539	37,778	31,644	33,542	31,548	1,052	25,060	28,126	29,013	25,359	572,278
3401 4TH STREET SE	DGS66	Ballou High School	High School	Pepco	Washington Gas Energy Services	TBA	3,094,709	3,143,511	3,119,110		242,944	233,049	233,085	237,649	222,220	226,076	204,776	246,647	289,078	333,280	331,511	294,394	248,603	235,594	232,976	239,256	237,322	268,639	259,973	268,639	259,973	282,873	320,580	289,083	6,238,220
1700 Q STREET SE	DGS67	Kramer Middle School	Middle School	Pepco	Washington Gas Energy Services	TBA	1,541,576	1,457,716	1,499,646		102,296	131,065	138,222	153,983	135,617	116,730	100,410	110,869	121,449	166,513	147,757	116,665	105,763	107,192	145,472	150,548	142,138	153,990	101,829	93,294	105,900	123,429	118,811	109,350	2,999,292
4301 13TH STREET NW	DGS68	Roosevelt High School	High School	Pepco	Washington Gas Energy Services	TBA	4,290,579	3,701,173	3,995,876		357,748	300,104	307,215	327,389	302,701	311,652	299,611	382,134	410,385	442,410	451,127	398,103	322,783	288,930	292,325	297,499	297,221	306,688	288,002	318,144	359,999	376,926	368,121	184,535	7,991,752
701 MISSISSIPPI AVENUE SE	DGS69	Southeast Tennis & Learning Center	Recreation Center	Pepco	Washington Gas Energy Services	TBA	536,807	549,344	543,076		32,127	38,714	42,007	52,761	49,257	37,589	49,805	45,195	47,005	50,577	48,354	43,416	49,698	46,652	48,600	51,052	49,706	52,039	48,769	43,591	39,992	43,855	38,880	36,510	1,086,151
						Totals	**83,780,834**	**84,505,245**	**86,368,044**		**6,843,580**	**6,264,334**	**6,538,403**	**6,491,928**	**5,971,635**	**5,491,852**	**5,942,781**	**7,170,579**	**7,581,473**	**8,229,424**	**8,411,651**	**7,299,104**	**7,035,371**	**6,717,269**	**6,615,708**	**6,537,763**	**5,945,081**	**6,610,218**	**6,433,667**	**7,329,013**	**7,690,998**	**8,326,522**	**7,784,653**	**7,478,982**	**166,741,989**

ATTACHMENT B

PRICING PROPOSAL AND PRODUCTION FORM

A live copy of the pricing proposal and production form can be downloaded using the following link: https://www.box.com/shared/static/ucl6ecfr79zc65zlzwr5.XLSX.

District of Columbia, Department of General Services (DC DGS)
RFP for On-Site Solar Power Purchasing Agreement at Various Municipal Facilities
Solicitation Number: DCAM-14-CS-0123
Attachment B - Pricing Proposal and Production Form

OFFEROR:

Legend	
Provided Data	
Formula	
Required Data	

Notes
Bidder shall enter PV Installation Type (e.g. Roof, Carport, Ground-mount) and quantities and models of major components into yellow-highlighted cells below.
Bidder shall also enter Year 1 Production Estimates into yellow-highlighted cells in Production Estimates tab of this worksheet.
Bidder shall enter PPA pricing (with and without SRECs) and escalation rate in yellow-highlighted cells below.
No alterations or changes of any kind to sites, formulas, or formatting are permitted. Bid responses that do not comply will be subject to rejection in total.
Prices quoted below shall include all taxes and all other charges, including travel expenses.
Bundle pricing should anticipate +/- 10% site movement within the Bundle

Proposal Summary Data

									Modules			Inverters			Inverters			Inverters			Inverters		
Bundle #	Site #	Sites	PV Installation Type	System Size (kW DC)	Yr 1 Production (kWh)	Yield (kWh/kW DC)	Site Usage (kWh)	Load Offset (%)	Model	Nameplate (Watts DC)	Quantity	Model	Nameplate (kW)	Quantity	Model	Nameplate (kW)	Quantity	Model	Nameplate (kW)	Quantity	Model	Nameplate (kW)	Quantity
B1	DGS63	John A. Wilson Building		-	-	#DIV/0!	6,284,310	0%														
B1	DGS13	Deal Middle School		-	-	#DIV/0!	3,519,398	0%														
B1	DGS29	Langley Education Campus		-	-	#DIV/0!	795,996	0%														
B1	DGS10	H.D. Cooke Elementary School		-	-	#DIV/0!	885,600	0%														
B1	DGS62	Wilson Aquatic Center		-	-	#DIV/0!	95,250	0%														
B1	DGS35	Moten Elementary School		-	-	#DIV/0!	926,329	0%														
B1	DGS54	Trinidad Recreation Center		-	-	#DIV/0!	241,510	0%														
B1	DGS48	Shepherd Elementary School		-	-	#DIV/0!	467,658	0%														
B1	DGS31	Luke C. Moore High School		-	-	#DIV/0!	1,133,392	0%														
B1	DGS06	Brightwood Education Campus		-	-	#DIV/0!	1,510,213	0%														
B1	DGS57	Walker-Jones Education Campus		-	-	#DIV/0!	2,897,224	0%														
B1	DGS30	LaSalle-Backus Education Campus		-	-	#DIV/0!	1,026,148	0%														
B1	DGS26	Hillcrest Recreation Center		-	-	#DIV/0!	341,519	0%														
B1	DGS61	Wilson High School		-	-	#DIV/0!	4,501,019	0%														
B1	DGS02	5th District Police Station		-	-	#DIV/0!	999,306	0%														
B1	DGS11	Coolidge High School		-	-	#DIV/0!	2,329,679	0%														
B2	DGS25	Hendley Elementary School		-	-	#DIV/0!	500,565	0%														
B2	DGS37	Nalle Elementary School		-	-	#DIV/0!	1,216,799	0%														
B2	DGS42	Plummer Elementary School		-	-	#DIV/0!	467,755	0%														
B2	DGS28	King Elementary School		-	-	#DIV/0!	743,680	0%														
B2	DGS52	Takoma Education Campus		-	-	#DIV/0!	1,685,888	0%														
B2	DGS46	Savoy Elementary School		-	-	#DIV/0!	1,257,171	0%														
B2	DGS51	Stoddert Elementary School		-	-	#DIV/0!	1,425,424	0%														
B2	DGS44	Randle Highlands Elem. School		-	-	#DIV/0!	1,448,813	0%														
B2	DGS60	J.O. Wilson Elementary School		-	-	#DIV/0!	1,213,479	0%														
B2	DGS04	Anacostia High School		-	-	#DIV/0!	3,301,927	0%														
B2	DGS18	Evidence Control Branch		-	-	#DIV/0!	512,023	0%														
B2	DGS67	Kramer Middle School		-	-	#DIV/0!	1,499,646	0%														
B2	DGS34	Miner Elementary School		-	-	#DIV/0!	1,015,564	0%														
B2	DGS40	Patterson Elementary School		-	-	#DIV/0!	872,686	0%														
B2	DGS23	C.W. Harris Elementary School		-	-	#DIV/0!	539,158	0%														
B2	DGS55	Turner Elementary School		-	-	#DIV/0!	1,543,524	0%														
B2	DGS53	3rd District Police Station		-	-	#DIV/0!	808,906	0%														
B2	DGS14	Deanwood Recreation Center		-	-	#DIV/0!	1,364,973	0%														
B2	DGS15	Eastern High School		-	-	#DIV/0!	4,150,850	0%														
B2	DGS45	Raymond Education Campus		-	-	#DIV/0!	701,846	0%														
B2	DGS20	Garrison Elementary School		-	-	#DIV/0!	453,666	0%														
B2	DGS41	Payne Elementary School		-	-	#DIV/0!	445,188	0%														
B2	DGS50	Sousa Middle School		-	-	#DIV/0!	1,726,409	0%														
B2	DGS27	Kelly Miller Middle School		-	-	#DIV/0!	1,978,533	0%														
B2	DGS07	Burrville Elementary School		-	-	#DIV/0!	1,099,595	0%														
B2	DGS36	Municipal Warehouse		-	-	#DIV/0!	839,803	0%														
B2	DGS24	H.D. Woodson High School		-	-	#DIV/0!	3,664,818	0%														
B2	DGS12	Police Training Academy		-	-	#DIV/0!	1,889,613	0%														
B2	DGS64	St. Elizabeth's Hospital		-	-	#DIV/0!	12,101,001	0%														
B3	DGS65	Brookland Middle School		-	-	#DIV/0!	286,139	0%														
B3	DGS69	Southeast Tennis and Learning Center		-	-	#DIV/0!	543,076	0%														
B3	DGS68	Roosevelt High School		-	-	#DIV/0!	3,995,876	0%														
B3	DGS66	Ballou Senior High School		-	-	#DIV/0!	3,119,110	0%														

PPA PRICE (per kWh)

Seller keeps SRECs for specified term; Seller keeps local incentives, if applicable

Bundle #	Bundle Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Buyout	LCOE ($/kWh)
B1	Small Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
B2	Large Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
B3	Innovation Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
	Fixed Annual Escalation Rate:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

Seller proposes to keep SRECS for Term of 0 **Years** (e.g. 3, 5, 10, 20)

DC DGS (Buyer) keeps all SRECs; Seller keeps local incentives, if applicable

Bundle #	Bundle Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Buyout	LCOE ($/kWh)
B1	Small Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
B2	Large Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
B3	Innovation Bundle	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	FMV	#REF!
	Fixed Annual Escalation Rate:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

District of Columbia, Department of General Services (DC DGS)
RFP for On-Site Solar Power Purchasing Agreement at Various Municipal FOFFEROR:
Solicitation Number: DCAM-14-CS-0123
Attachment B - Pricing Proposal and Production Form

PRODUCTION ESTIMATES

PRODUCTION DATA (kWh) - Include Year 1 PVwatts Calculator Output for Each Site

Bundle #	Site #	Sites	Size (kW DC)	Year 1 *	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 1 Energy Yield (kWh/kW DC)
B1	DGS63	John A. Wilson Building	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS13	Deal Middle School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS29	Langley Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS10	H.D. Cooke Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS62	Wilson Aquatic Center	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS35	Moten Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS54	Trinidad Recreation Center	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS48	Shepherd Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS31	Luke C. Moore High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS06	Brightwood Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS57	Walker-Jones Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS30	LaSalle-Backus Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS26	Hillcrest Recreation Center	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS61	Wilson High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS02	5th District Police Station	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1	DGS11	Coolidge High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B1		TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS25	Hendley Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS37	Nalle Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS42	Plummer Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS28	King Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS52	Takoma Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS46	Savoy Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS51	Stoddert Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS44	Randle Highlands Elem. School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS60	J.O. Wilson Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS04	Anacostia High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS18	Evidence Control Branch	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS67	Kramer Middle School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS34	Miner Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS40	Patterson Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS23	C.W. Harris Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS55	Turner Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS53	3rd District Police Station	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS14	Deanwood Recreation Center	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS15	Eastern High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS45	Raymond Education Campus	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS20	Garrison Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS41	Payne Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS50	Sousa Middle School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS27	Kelly Miller Middle School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS07	Burrville Elementary School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS36	Municipal Warehouse	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS24	H.D. Woodson High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS12	Police Training Academy	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2	DGS64	St. Elizabeth's Hospital	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B2		TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B3	DGS65	Brookland Middle School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B3	DGS69	Southeast Tennis and Learning Center	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B3	DGS68	Roosevelt High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B3	DGS66	Ballou Senior High School	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!
B3		TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#DIV/0!

Annual Degradation Rate **: 0.5%

* Must match estimated output from attached PVwatts Calculator (http://pvwatts.nrel.gov/) outputs for each site in Bid Bundle. Sample output below

** Assigned as 0.5% per year for all proposals to standardize responses. Deviations may be evaluated based on documented prior performance and/or actual warranties offered.

B1 Total Production: - kWh
B1 Combined System Capacity: - kW DC
B1 20-Year Energy Yield: #DIV/0! kWh/kW DC

B2 Total Production: - kWh
B2 Combined System Capacity: - kW DC
B2 20-Year Energy Yield: #DIV/0! kWh/kW DC

B3 Total Production: - kWh
B3 Combined System Capacity: - kW DC
B3 20-Year Energy Yield: #DIV/0! kWh/kW DC

NREL

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at http://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

YOU AGREE TO INDEMNIFY DOE/NREL/ALLIANCE, AND ITS AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO YOUR USE, RELIANCE, OR ADOPTION OF THE MODEL FOR ANY PURPOSE WHATSOEVER. THE MODEL IS PROVIDED BY DOE/NREL/ALLIANCE "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL DOE/NREL/ALLIANCE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, WHICH MAY RESULT FROM ANY ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE MODEL.

RESULTS

234,653 kWh per Year

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Energy Value ($)
January	2.32	11,276	1,315
February	3.04	13,765	1,606
March	4.16	20,575	2,400
April	5.54	25,324	2,954
May	5.09	23,362	2,725
June	6.16	26,747	3,120
July	5.97	26,426	3,083
August	5.59	24,888	2,903
September	4.64	20,549	2,397
October	4.21	19,827	2,313
November	2.49	11,208	1,307
December	2.28	10,707	1,249
Annual	4.29	234,653	$ 27,372

Location and Station Identification

Requested Location	1350 pennsylvania ave nw
Weather Data Source	WASHINGTON DC REAGAN AP, VA (TMY3)
Latitude	38.87° N
Longitude	77.03° W

PV System Specifications *(Residential)*

DC Rating	200 kW
DC to AC Derate Factor	0.81
Array Type	Fixed (open rack)
Array Tilt	10°
Array Azimuth	180°

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.12 $/kWh
Cost of Electricity Generated by System	0.25 $/kWh

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

ATTACHMENT C

EXPERIENCE FORM

Attachment C: Experience Form

The Department reserves the right to verify all information provided in this Experience Form. Offeror ("Prime Firm") will be automatically disqualified if all sections are not completed.

PART I: INFORMATION ABOUT THE PROJECT TEAM

1. Provide the contact information for the Prime Firm. Also briefly describe the role of the Prime Firm.

Prime Firm Name: _____
Role of Prime Firm: _____
Prime Contact Person: _____
Prime Address: _____
Prime Phone: _____ Fax: _____
Prime Email Address: _____
Federal Tax ID (EIN): _____
Date Incorporated: _____
LSDBE Certification ID: _____
Size of Business Entity in DC: _____

2. Identify and provide contact information for all other firms associated with designing, building and/or operating and maintaining the Projects (excluding PPA investor and/or other financing firms if a separate organization) with which your firm may partner or subcontract. Identify, and if necessary, describe each firm's role (e.g., project integrator, system designer, construction management, post construction operations and maintenance, etc.). If needed, please add additional pages.

Firm 1.

Entity Name: _____
Role of Entity: _____
Contact Person: _____
Address: _____
Phone: _____ Fax: _____
Email Address: _____
Year first solar project completed: _____

Firm 2.

Entity Name: _____
Role of Entity _____
Contact Person: _____
Address: _____
Phone: _____ Fax: _____
Email Address: _____
Year first solar project completed: _____

Firm 3.

Entity Name: _____
Role of Entity _____
Contact Person: _____
Address: _____
Phone: _____ Fax: _____
Email Address: _____
Year first solar project completed: _____

Firm 4.

Entity Name: _____
Role of Entity _____
Contact Person: _____
Address: _____
Phone: _____ Fax: _____
Email Address: _____
Year first solar project completed: _____

Firm 5.

Entity Name: _____
Role of Entity _____
Contact Person: _____
Address: _____
Phone: _____ Fax: _____
Email Address: _____
Year first solar project completed: _____

PART II: ESSENTIAL REQUIREMENTS FOR THE PROJECT TEAM

NOTE: Prime Firm will be automatically disqualified if the answer to any of questions 1 - 7 is "No." All questions below MUST be answered. Information provided will be used in the RFP evaluation for qualified offerors.

1. Has the Prime Firm provided a list of five (5) project references for which at least one team member from Part I has participated as part of a project team, which totals at least two (2) MW?

   ☐ Yes ☐ No

   If yes, please provide the following summary and reference information on these projects:

Project Experience Summary Table

	# Projects	kW-DC	Financing Type
District of Columbia			
Mid-Atlantic			
National			
TOTAL			

Project 1

Location: _____
Size (kW-DC): _____
Client: _____
Client Type (Commercial, Government, Other): _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
List partner firm(s) and role from Part I that worked on this project: _____

Project 2

Location: _____
Size (kW-DC): _____
Client: _____
Client Type (Commercial, Government, Other): _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____

List partner firm(s) and role from Part I that worked on this project: _____

Project 3:

Location: _____
Size (kW-DC): _____
Client: _____
Client Type (Commercial, Government, Other): _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
List partner firm(s) and role from Part I that worked on this project: _____

Project 4:

Location: _____
Size (kW-DC): _____
Client: _____
Client Type (Commercial, Government, Other): _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
List partner firm(s) and role from Part I that worked on this project: _____

Project 5:

Location: _____
Size (kW-DC): _____
Client: _____
Client Type (Commercial, Government, Other): _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
List partner firm(s) and role from Part I that worked on this project: _____

2. Has the client for at least one of the projects listed above been a public sector agency in the Mid-Atlantic region?

   ☐ Yes ☐ No

3. Has the **Prime Firm**, listed above in Part I, been regularly and continuously engaged in the business of providing solar electric power generation systems for at least five (5) years?

   ☐ Yes ☐ No

4. Does the **Prime Firm**, listed above in Part I, have experience with at least three (3) completed and operational installations of solar energy power generation systems at municipal or public facilities?

   ☐ Yes ☐ No

5. Has the **Construction Management Entity**, listed above in Part I (if difference from Prime Firm), completed at least three (3) operational installations of solar energy power generation systems at municipal or public facilities? (If the Construction Management Entity is the Prime Firm, please answer, *Yes*).

   ☐ Yes ☐ No

6. Does the Prime Firm or one of the entities listed above in Part I hold any active and relevant contractor licenses in the District of Columbia?

   ☐ Yes ☐ No

   If Yes, provide Contractor's District of Columbia Contractors License Number, the name under which license is held, and expiration date:

Name of License Holder: _____
District of Columbia Contractors License Number: _____
License Type: _____
Expiration Date of License: _____
Role of Licensed Holder in Project Team (Part I): _____

7. Does the Post Construction Operations and Maintenance Entity, listed above in Part I, have experience with at least three (3) completed and operational installations of solar energy power generation systems at municipal or public facilities?

   ☐ Yes ☐ No

PART III: FINANCING PARTNERS

A requirement of the Prime Firm is the submission of a minimum of one (1) Letter of Interest from PPA financial investor ("Financier") which has successfully delivered projects. Alternatively, if the offeror "self-finances" and does not use outside financier, please provide a letter that demonstrates the sufficiency of your self-financing.

NOTE: Offeror will be automatically disqualified if the answer to questions 1 – 3 below is "No."

1. Has the Prime Firm submitted one (1) Letter of Interest from Financier or a letter regarding self-financing?

   ☐ Yes ☐ No

2. Has the financier submitted Letter of Interest or the Prime Firm (if self-financing) successfully financed at least three (3) operational projects in the past five (5) years?

   ☐ Yes ☐ No

   If yes, please identify reference projects (add additional pages if needed):

Financier #1 or Prime Firm

Project Financing 1

Location: _____
Size (kW-DC): _____
Client: _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
Prime Firm: _____
Financing Firm Contact: _____

Project Financing 2

Location: _____
Size (kW-DC): _____
Client: _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
Prime Firm: _____
Financing Firm Contact: _____

Project Financing 3

Location: _____
Size (kW-DC): _____
Client: _____
Client Financing Type: _____
Project Contact Name: _____
Project Contact Email: _____
Project Contact Phone: _____
Prime Firm: _____
Financing Firm Contact: _____

3. Does Prime Firm have experience with at least five (5) power purchase agreement contracts with total contracts representing at least $3 million in project construction costs?

☐ Yes ☐ No

PART IV: PRIOR EXPERIENCE

NOTE: Prime Firm will be automatically disqualified if the answer to any of questions 1 - 7 is "Yes." All questions below MUST be answered.

1. Has the Prime Firm or any of the partners listed above that are associated with designing, building and/or operating and maintaining the projects ever defaulted on a design, construction or operations and maintenance contract?

☐ Yes ☐ No

2. Within the last five (5) years, has a surety firm completed a contract on behalf of the Prime Firm or any of its partners listed above, or paid for project completion because one of the members was in default?

☐ Yes ☐ No

3. At the time of submitting this Form, has the Prime Firm or any of its partners listed above been ineligible to bid on or be awarded a public works contract, or perform as a sub-contractor on a public works contract due to District of Columbia Labor Code?

☐ Yes ☐ No

4. At any time during the last five (5) years, has the Prime Firm or any of its partners listed above been convicted of a crime involving the awarding of a contract of a government construction project, or a crime relating to the bidding or performance of a government contract?

☐ Yes ☐ No

5. Has the Prime Firm or any of the non-financial partners listed above, including any of their owners or officers, ever been found liable in a civil suit or found guilty in a criminal action for making any false claim or material misrepresentation to any public agency or entity?

   ☐ Yes ☐ No

6. Has the Prime Firm or any of the non-financial partners listed above, including any of their owners or officers, ever been convicted of a crime involving any federal, state, or local law related to construction?

   ☐ Yes ☐ No

7. Has the Prime Firm or any of the non-financial partners listed above, including any of their owners or officers, ever been convicted of a federal or state crime of fraud, theft, or any other act of dishonesty?

   ☐ Yes ☐ No

PART V: CERTIFICATION

I, the undersigned, am authorized to make this verification on behalf of the Prime Firm, _____. I have read the foregoing Form. I am familiar with its contents and, based upon information available to me, the contents are true and correct. I declare under penalty of perjury under the laws of the District of Columbia that the foregoing is true and correct.

Executed at		,		on	
	(City)		(State)		(Date)

(Signature) _____

(Printed Name) _____

(Firm) _____

(Title) _____

ATTACHMENT D

FORM OF OFFER LETTER

Attachment D: Form of Offer Letter

[Offeror's Letterhead]

[Insert Date]

District of Columbia Department of General Services
2000 14th Street, N.W.
Washington, D.C. 20009

Att'n: Mr. Brian J. Hanlon Director

Reference: Request for Proposals
On-Site Solar Power Purchasing Agreement at Various Municipal Facilities

Dear Mr. Hanlon:

On behalf of [INSERT NAME OF BIDDER] (the "Offeror"), I am pleased to submit this proposal in response to the above-referenced Request for Proposals (the "RFP") issued by the Department of General Services' (the "Department" or "DGS"). The Offeror has reviewed the RFP and the attachments thereto, and any addenda thereto (collectively, the "Bid Documents") and has conducted such due diligence and analysis as the Offeror, in its sole judgment, has deemed necessary in order to submit its proposal in response to the RFP. The Offeror's proposal and the cost components set forth on the attached spreadsheet are based on the Bid Documents as issued and assume no material alteration of the terms of the Bid Documents. (Collectively, the proposal and the cost components on the attached spreadsheet are referred to as the "Offeror's Bid".)

The Offeror's Bid is based on and subject to the following conditions:

1. The Offeror agrees to hold its proposal open for a period of at least one hundred twenty (120) days after the close of Phase 2 of this solicitation.

2. The Offeror represents that, based on the information set forth in the Bid Documents, the prices set forth in the Offeror's Bid represent prices at which the Offeror would be willing to enter into a transaction with the Department. The Offeror acknowledges that the Offeror's Bid is one of the factors the Department will use to shortlist bidders for Phase 2 of this Solicitation.

3. Both the Offeror and the undersigned represent and warrant that the undersigned has the full legal authority to submit this bid form and bind the Offeror to the terms of the Offeror's Bid. The Offeror further represents and warrants that no further action or approval must be obtained by the Offeror in order to authorize the terms of the Offeror's Bid.

4. The Offeror and its principal team members hereby represent and warrant that they have not: (i) colluded with any other group or person that is submitting a proposal in response to the

RFP in order to fix or set prices; (ii) acted in such a manner so as to discourage any other group or person from submitting a proposal in response to the RFP; or (iii) otherwise engaged in conduct that would violate applicable anti-trust law.

5. The Offeror hereby certifies that neither it nor any of its team members have entered into any agreement (written or oral) that would prohibit any contractor, subcontractor or sub-consultant that is certified by the District of Columbia Office of Department of Small and Local Business Development from participating in the work if another company is awarded the contract.

6. This bid form and the Offeror's Bid are being submitted on behalf of [INSERT FULL LEGAL NAME, TYPE OF ORGANIZATION, AND STATE OF FORMATION FOR THE OFFEROR].

Sincerely,

By: _____

Name: _____

Its: _____

ATTACHMENT E

DISCLOSURE FORM

Attachment E: Disclosure Form

The Offeror and each of its principal team members, if any, must submit a statement that discloses any past or present business, familiar or personal relationship with any of the following individuals:

A. D.C. Department of General Services:

Brian J. Hanlon, Director

Scott Burrell, Chief Operating Officer

JW Lanum, Associate Director Contracts and Procurement Division

Sam Brooks, Associate Director Energy & Sustainability Division

Camille Sabbakhan, General Counsel

Charles J. Brown, Jr., Deputy General Counsel

Please identify any past or present business, familiar, or personal relationship in the space below. Use extra sheets if necessary.

_____
_____
_____
_____
_____

B. Leftwich & Ludaway, LLC: Thomas D. Bridenbaugh

Please identify any past or present business, familiar, or personal relationship in the space below. Use extra sheets if necessary.

_____
_____
_____
_____
_____

C. DC Community Energy Partners LLC dba New City Energy: Steven Boyd

Please identify any past or present business, familiar, or personal relationship in the space below. Use extra sheets if necessary.

_____
_____
_____
_____

_____

D. Optony Inc.: Tyler Espinoza

Please identify any past or present business, familiar, or personal relationship in the space below. Use extra sheets if necessary.

_____
_____
_____
_____
_____

E. Bluefin, LLC: Paul Lanning, Richard Rast

Please identify any past or present business, familiar, or personal relationship in the space below. Use extra sheets if necessary.

_____
_____
_____
_____
_____

This is to certify that, to the best of my knowledge and belief and after making reasonable inquiry, the above represents a full and accurate disclosure of any past or present business, familiar, or personal relationship with any of the individuals listed above. The undersigned acknowledges and understands that this Disclosure Statement is being submitted to the False Claims Act and that failure to disclose a material relationship(s) may constitute sufficient grounds to disqualify the Offeror.

OFFEROR:

By: _____

Name: _____

Title: _____

Date: _____

ATTACHMENT F

TAX AFFIDAVIT

GOVERNMENT OF THE DISTRICT OF COLUMBIA

Office of the Chief Financial Officer

Office of Tax and Revenue

TAX CERTIFICATION AFFIDAVIT

THIS AFFIDAVIT IS TO BE COMPLETED ONLY BY THOSE WHO ARE REGISTERED TO CONDUCT BUSINESS IN THE DISTRICT OF COLUMBIA.

Date _____

Authorized Agent
Name of Organization/Entity
Business Address (include zip code)
Business Phone Number

Authorized Agent
Principal Officer Name and Title
Square and Lot Information
Federal Identification Number
Contract Number
Unemployment Insurance Account No.

I hereby authorize the District of Columbia, Office of the Chief Financial Officer, Office of Tax and Revenue to release my tax information to an authorized representative of the District of Columbia agency with which I am seeking to enter into a contractual relationship. I understand that the information released will be limited to whether or not I am in compliance with the District of Columbia tax laws and regulations solely for the purpose of determining my eligibility to enter into a contractual relationship with a District of Columbia agency. I further authorize that this consent be valid for one year from the date of this authorization.

I hereby certify that I am in compliance with the applicable tax filing and payment requirements of the District of Columbia. The Office of Tax and Revenue is hereby authorized to verify the above information with the appropriate government authorities.

Signature of Authorizing Agent _____ **Title** _____

The penalty for making false statement is a fine not to exceed $5,000.00, imprisonment for not more than 180 days, or both, as prescribed by D.C. Official Code §47-4106.

ATTACHMENT G

EXCEPTIONS TO TERMS AND CONDITIONS

Attachment G: Exceptions Form
PPA Exceptions, Clarifications, Amendments

Bidder Name: _____

List below requests for clarifications, exceptions and amendments, if any, to the RFP and associated Bid Documents, and submit with your bid response.

The Department is under no obligation to accept any exceptions and such exceptions may be a basis for bid disqualification.

Reference to:			**Description**
Page No.	Section	Item No.	
p. 23	**D**	**1.c.**	***Offeror takes exception to…***

**Print additional pages as necessary*