A RESOLUTION
OF
CALN TOWNSHIP
BOARD OF COMMISSIONERS
CHESTER COUNTY
PENNSYLVANIA

RESOLUTION #2022-33

AGREEMENT FOR INSTALLATION SERVICES

REGIONAL STREETLIGHT PROCUREMENT PROGRAM

THIS AGREEMENT, made this 29TH day of SEPTEMBER 2022, by and between THE BOARD OF COMMISSIONERS OF CALN TOWNSHIP, PENNSYLVANIA, with offices at 253 MUNICIPAL DRIVE. THONRDALE PA 19372, and Armour & Sons Electric, Inc., with offices at 23 East Cabot Blvd, Langhorne, PA 19047, agree as follows:

RECITALS

WHEREAS, the Delaware Valley Regional Planning Commission ("DVRPC") has undertaken the Regional Streetlight Procurement Program, or RSLPP (the "Program') as a professional service to municipalities that choose to participate, and

WHEREAS, participation in the Program allows regional municipalities to improve the performance of municipal street lighting, and specifically to design, procure, install, and finance the transition to light-emitting-diode (LED) street lighting and other street light improvements, and to maintain those improvements, and

WHEREAS, the Program will provide comprehensive technical design assistance and project management support to participating municipalities, and

WHEREAS, pursuant to the Program, DVRPC solicited proposals using a request-for-proposal (RFP) in order to identify and select a design services professional ("DSP"), to provide technical design solutions tailored to the needs of each participating municipality, and

WHEREAS, in response to the RFP, Keystone Lighting Solutions ("KLS") submitted a Proposal, dated October 12, 2018 (the "Proposal"), and

WHEREAS, DVRPC selected KLS to provide technical design solutions for the participating municipalities, and

WHEREAS, pursuant to the Program, DVRPC solicited proposals using a request-for-proposal (RFP) in order to identify and select installers meeting responsiveness and responsibility requirements so that participating municipalities would be able to secure the installation of LED street lighting and other street light improvements; and

WHEREAS, DVRPC selected Armour & Sons Electric, Inc. (the "Installer") to provide for the installation of equipment in compliance with the technical design provided by KLS, and

WHEREAS, participating municipalities including CALN TOWNSHIP, PENNSYLVANIA, are able to utilize cooperative purchasing contracts entered into by DVRPC for design services, equipment acquisition, and installation, in accordance with Chapter 19 of the Commonwealth Procurement Code, 62 Pa.C.S. § 1901 et seq., and

WHEREAS, CALN TOWNSHIP has agreed to participate in the Program on the terms and conditions hereinafter set forth and adopt the contracts created by DVRPC.

NOW THEREFORE, and intending to be legally bound hereby, the parties agree as follows:

1. The CALN TOWNSHIP agrees to purchase equipment acquisition and installation pursuant to the contract or contracts with the Installer held by DVRPC, and the Contract Documents set forth therein, all in accordance with Chapter 19 of the Commonwealth Procurement Code, 62 Pa.C.S. § 1901 et seq.

2. The cooperative purchasing shall be in accordance with the terms and conditions of those contracts.

3. Attached hereto and made a part of the contract are

Attachment A – General Conditions
Attachment B – Roadway, Street & Area Lighting Upgrade Project Specifications & Proposal

4. The price of the equipment purchased and installed in accordance with the Summary Bill of Materials and Schedule of Installation Values is _____ _____ Dollars ($_____), subject to the terms and conditions of the Contract Documents and further subject to additions and deletions to the price based upon the equipment actually installed.

5. Accordingly, CALN TOWNSHIP and the Installer, have formed a separate contract, and a direct contractual relationship.

Armour & Sons Electric, Inc.

_____
Signature

_____
Print name

_____ _____

ATTEST:

Kristen Denne,
Township Secretary

CALN TOWNSHIP
BOARD OF COMMISSIONERS

Paul Mullin, President

Jane Kennedy, Vice President

Joshua B. Young, Commissioner

Lorraine Tindaro, Commissioner

Mark Evans, Commissioner

AGREEMENT FOR INSTALLATION SERVICES

REGIONAL STREETLIGHT PROCUREMENT PROGRAM

THIS AGREEMENT, made this 29th day of September, 2022, by and between Township of Caln, with offices at 253 Municipal Drive Thorndale, PA 19372, and Armour & Sons Electric, Inc., with offices at 23 East Cabot Blvd, Langhorne, PA 19047, agree as follows:

RECITALS

WHEREAS, the Delaware Valley Regional Planning Commission ("DVRPC") has undertaken the Regional Streetlight Procurement Program, or RSLPP (the "Program') as a professional service to municipalities that choose to participate, and

WHEREAS, participation in the Program allows regional municipalities to improve the performance of municipal street lighting, and specifically to design, procure, install, and finance the transition to light-emitting-diode (LED) street lighting and other street light improvements, and to maintain those improvements, and

WHEREAS, the Program will provide comprehensive technical design assistance and project management support to participating municipalities, and

WHEREAS, pursuant to the Program, DVRPC solicited proposals using a request-for-proposal (RFP) in order to identify and select a design services professional ("DSP"), to provide technical design solutions tailored to the needs of each participating municipality, and

WHEREAS, in response to the RFP, Keystone Lighting Solutions ("KLS") submitted a Proposal, dated October 12, 2018 (the "Proposal"), and

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WHEREAS, pursuant to the Program, DVRPC solicited proposals using a request-for-proposal (RFP) in order to identify and select installers meeting responsiveness and responsibility requirements so that participating municipalities would be able to secure the installation of LED street lighting and other street light improvements; and

WHEREAS, DVRPC selected Armour & Sons Electric, Inc. (the "Installer") to provide for the installation of equipment in compliance with the technical design provided by KLS, and

WHEREAS, participating municipalities including the Township of Caln, are able to utilize cooperative purchasing contracts entered into by DVRPC for design services, equipment acquisition, and installation, in accordance with Chapter 19 of the Commonwealth Procurement Code, 62 Pa.C.S. § 1901 et seq., and

Attest: _____ By: _____

Print name: _____ Print name: _____

Print title: _____ Print title_____

GENERAL CONDITIONS FOR INSTALLATION

SCHEDULE OF ARTICLES

CONTENTS

Article 7 - Contract Administration

Article 8 - Construction

Article 9 - Changes in the Work

Article 10 - Contract Completion Time

Article 11 - Payments and Completion

Article 12 - Contract Warranty Period

ARTICLE 1 - GENERAL CONTRACT DEFINITIONS

1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the documents listed in the Agreement and project documents as hereinafter defined or identified. Project documents are used in the completion of the Work and include the Installation Worksheet, the Bill of Materials, Project Schedule, the Schedule of Installation Values, the Notice to Proceed, the Substantial Completion Form and the Final Completion Form and other Documents identified in these General Conditions.

1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements either written or oral.

1.3 OWNER

The Owner is identified in the Agreement and is created and existing under the laws of the Commonwealth of Pennsylvania, hereinafter called the Owner. Delaware Valley Regional Planning Commission and any municipality purchasing installation services pursuant to chapter 19 of the Commonwealth Procurement Code, 62 Pa. C.S. §1901 et seq., may be the "Owner" in these General Conditions. The term, "Owner" includes the Owner's authorized representatives, including the Professional. The Owner will be referred to in the singular and neutral gender.

1.4 PROFESSIONAL

The Professional is lighting design services professional retained by the Owner. The Professional here is identified in the Agreement as Keystone Lighting Solutions, or "KLS." The term "Professional" shall mean the Professional and the Professional's authorized representatives. The Professional will be referred to in the singular and neutral gender.

1.5 CONTRACTOR

The Contractor is the individual, corporation, company, partnership, firm, or other organization that has contracted to perform the Work under the Agreement with the Owner. The Contractor here is identified in the Agreement as the "Installer." The term "Contractor" shall mean the Contractor and the Contractor's authorized representatives. The Contractor must be represented by a designated point person who will be responsible for communication throughout the duration of the Contract with both the Owner and the Professional. The Contractor will be referred to in the singular and neutral gender.

1.6 SUBCONTRACTOR

A Subcontractor is a person or organization who contracts under, or for the performance of part or all of, the Contract between the Owner and the Contractor, and includes sub-subcontractors or whatever tier and materialmen. The subcontract may be direct with the Contractor or with another Subcontractor. The term "Subcontractor" shall mean the Subcontractor and the Subcontractor's authorized representatives. The Subcontractor will be referred to in the singular and neutral gender.

1.7 WORK

The term "Work" shall mean whatever is done by or required of the Contractor to perform and complete its duties under this Contract, including the following: construction of the whole or a designated part of the Project; furnishing of any required surety bonds and insurance; and the provision or furnishing of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, permits and licenses required of the Contractor, fuel, heat, light, cooling and all other utilities as required by this Contract.

1.8 PROJECT

The term "Project" shall be the undertaking and completion of the Work defined by the Contract Documents.

1.9 INSTALLATION WORKSHEET

The Installation Worksheet is a detailed description of work and materials utilized for every fixture within the project scope and will be developed by the Professional. Each line of this worksheet will identify a unique fixture location, the existing fixture information and the upgrade plan including, but not limited to, a general upgrade action description, the new fixture, retrofit kit or lamp manufacturer part number to be installed, general specifications including wattage, distribution type, color temperature, the photocell or other lighting control part number to be installed and dim level settings, if applicable.

1.10 BILL OF MATERIALS AND SCHEDULE OF INSTALLATION VALUES

The Bill of Materials is a summary list of unique part numbers to be installed as part of the project specification and will be developed by the Professional. Each line item in the Bill of Materials will include manufacturer name, manufacturer part #, total project quantity, previously negotiated unit pricing and a total extended price. The Bill of Materials will be the basis for a Purchase Order to be placed with a distribution partner selected by RSLPP.

The Schedule of Installation Values is a summary list of unique installation service items to be utilized in the Project and will be developed by the Professional. Each line item in the Schedule of Installation Values will include installation service item description, total project quantity, previously negotiated unit pricing and a total extended price.

The Bill of Materials and Schedule of Installation Values will define the total project construction costs and the Contract Sum.

1.1.1 THE PROJECT SCHEDULE

The Project Schedule indicates the project start date, project duration (calendar days) and project completion date. The project start date will be defined by the Professional as part of a scheduling effort and confirmed with the Contractor. The project duration is calculated using the summary Schedule of Installation Values and the installation efficiency values (units installed per day per person) for each fixture type and the Contractor installation crew size provided by the Contractor and confirmed in the Contractor Installation Services Agreement. The above information will define the total working days for a project. Assuming two weekend days for every five working days, the total calendar days will be determined. The project completion date will be based on the project start date plus the project duration.

1.12 DAY

Whenever the word "day" is used in the Contract Documents, it shall be interpreted to mean a calendar day unless otherwise noted.

1.13 CONTRACT SUM

The Contract Sum is the total compensation payable to the Contractor for performing the Work as specified in the Contract Documents or subsequently adjusted by modification to the Contract.

1.14 CONTRACT TIME

The Contract Time is the duration to complete the Work stated in Days. The Contract Time is based on installation productivity rates provided by the Contractor. The project start date, project duration and project completion date are reflected in the Project Schedule developed and published by the Professional.

1.15 CLAIM

A Claim is a demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the Contractor.

1.16 STATEMENT OF WORK

The Work includes construction activities that are reasonably contemplated, required, implied or inferable by the Contract Documents, whether or not explicitly contained in the Contract Documents.

1.17 SUBSTANTIAL COMPLETION

Substantial Completion shall mean that stage in the progression of the Work when the Work is sufficiently complete in accordance with this Contract that the Owner can enjoy beneficial use or occupancy of the Work and can utilize the Work for its intended purpose. If Substantial Completion" is achieved but some items in the Work are not completed, they must be documented as part of punch list and completed within a reasonable time.

1.18 PUNCHLIST

Punchlist shall mean the list, prepared during performance or near the completion of the Work, or any portion thereof, indicating items to be furnished, performed, completed or corrected in accordance with the Contract Documents.

ARTICLE 2 - CONTRACT DOCUMENTS

2.1 OWNERSHIP AND USE OF DOCUMENTS

All Contract Documents and other documents of the Work furnished by the Professional are and shall remain the Professional's property. They are not to be used by the Contractor on other projects or for any other purpose without written consent of the Owner and the Professional.

2.2 COPIES FURNISHED - DRAWINGS AND SPECIFICATIONS

The Professional will furnish to the Contractor, free of charge, all Contract Documents required to complete the Work.

2.3 DRAWINGS AND SPECIFICATIONS AT THE SITE

The Contractor shall maintain with each installation crew one copy of the Installation Worksheet.

2.4 INSTALLATION STATUS REPORTING

The Contractor shall as part of its Work provide an installation status for each unique line item on the Installation Worksheet. The Professional will provide the Contractor with a field-based electronic data capture tool that represents all line items on the Installation Worksheet and allows input by the Contractor on installation status and other relevant comments. The Contractor inputs into the field-based electronic data capture tool will be used to generate interim installation status reports/downloads and ultimately a final as-built report/download.

2.5 INTERRELATIONSHIP AND INTENT OF DOCUMENTS

2.5.1 The intent of this Contract is to require complete, correct, and timely execution of the Work. Any Work that may be required, implied, or inferred by the Contract Documents, or any one or more of them, as necessary to produce the intended result shall be provided by the Contractor for the Contract Sum.

2.5.2 This Contract is intended to be an integral whole and shall be interpreted as internally consistent. What is required by any one Contract Document shall be considered as required by the Contract.

2.5.3 When a word, term, or phrase is used in this Contract, it shall be interpreted or construed, first, as defined herein, or in accordance with its generally accepted meaning in the construction industry, or in accordance to its common and customary usage.

2.5.4 The words "include," "includes," or "including," as used in this Contract, shall be deemed to be followed by the phrase, "without limitation."

2.5.5 The specification herein of any act, failure, refusal, omission, event, occurrence or condition as constituting a material breach of this Contract shall not imply that any other, nonspecified act, failure, refusal, omission, event, occurrence, or condition shall be deemed not to constitute a material breach of this Contract.

2.5.6 Words or terms used as nouns in this Contract shall be inclusive of their singular and plural forms, unless the context of their usage clearly requires a contrary meaning.

2.5.7 The Contractor shall have a continuing duty to read, carefully study and compare each of the Contract Documents and shall give written notice to the Owner of any inconsistency, ambiguity, error or omission which the Contractor may discover with respect to these documents before proceeding with the affected Work. The issuance, or the express or implied approval by the Owner or the Professional of the Contract Documents shall not relieve the Contractor of the continuing duties imposed hereby, nor shall any such approval be evidence of the Contractor's compliance with this Contract. The Owner has requested the Professional to only prepare documents for the Project, which are accurate, adequate, consistent, coordinate and sufficient for construction. Neither the Owner nor the Professional makes any representations or warranties of any nature whatsoever to the Contractor concerning such documents. By the execution hereof, the Contractor acknowledges and represents that it has received, reviewed, and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction, and that the Contractor has not, does not, and will not rely upon any representation or warranties by the Owner concerning such documents as no such representation or warranties have been or are hereby made.

2.5.8 Neither the organization of any of the Contract Documents into divisions, sections, paragraphs, articles, (or other categories), nor the organization or arrangement of the Design, shall control the Contractor in dividing the Work or in establishing the extent of the Work to be performed by Subcontractors.

ARTICLE 3 - INSURANCE

3.1 CONTRACTOR'S INSURANCE

3.1.1 Before commencing the Work and as a condition precedent to payment, the Contractor shall procure and maintain the following insurance, in amounts not less than that specified for each type:

3.1.1.1 **Workers' Compensation** for statutory obligations imposed by workers' compensation and occupational disease laws. **Employers' Liability** insurance shall be provided with limits not less than:

a) $500,000 bodily injury by accident per accident
b) $500,000 bodily injury by disease policy limit
c) $500,000 bodily injury by disease per employee

3.1.1.2 **Business Automobile Liability** (bodily injury liability and property damage liability) for all owned, leased, hired, non-owned vehicles with limits not less than $1,000,000 Combined Single Limit.

3.1.1.3 **Commercial General Liability** insurance including coverage for bodily injury, property damage, and personal and advertising injury, for premises and operations, products and completed operations, and contractual liability arising from all operations, written on an occurrence basis with limits not less than:

FOR PROJECTS UNDER $1,000,000

a) Per occurrence: $1,000,000
b) General aggregate: $2,000,000
c) Products/completed operations aggregate: $2,000,000
d) Personal and advertising injury limit: $1,000,000
e) Medical Expense Limit: $10,000

The Contractor shall maintain completed operations liability insurance for not less than one year after Substantial Completion, or as required by the Contract Documents, whichever is longer.

FOR PROJECTS OVER $1,000,000

a) Per occurrence: $5,000,000
b) General aggregate: $5,000,000
c) Products/completed operations aggregate: $5,000,000
d) Personal and advertising injury limit: $5,000,000
e) Medical Expense Limit: $10,000

The Contractor shall maintain completed operations liability insurance for not less than two years after Substantial Completion, or as required by the Contract Documents, whichever is longer.

3.1.1.4 **Pollution Liability** insurance: If the nature of the Work involves professional services, evaluating, testing, remediation, abatement, removal, storage, and transportation of hazardous materials or substances or pollutants, the Contractor and those Subcontractors involved in such work shall obtain Pollution Liability insurance applicable to their work, for bodily injury and property damage with limits not less than:

FOR PROJECTS UNDER $1,000,000

a) Per occurrence or claim: $1,000,000
b) Aggregate: $1,000,000

FOR PROJECTS OVER $1,000,000

a) Per occurrence or claim: $5,000,000
b) Aggregate: $5,000,000

The Pollution Liability insurance must include coverage for completed operations extending three (3) years after final acceptance of the project by the Owner or such longer period as the Contract Documents may require. The definition of property damage shall include clean-up costs. If the insurance is written on a claims-made basis, the policy retroactive date shall be prior to the start of the Contractor's Work, and the renewal policies shall maintain the same retroactive date.

3.1.2 The insurance limits required for the Employers' Liability, Business Automobile Liability and CGL coverage required under Paragraph 3.1.1 may be provided by a combination of primary and Excess or Umbrella Liability policies.

3.1.3 The Owner must be named on the Contractor's Commercial General Liability insurance as an additional insured.

3.1.4 The Contractor shall maintain in effect all insurance coverage required under Article 3 with insurance companies lawfully authorized to do business in the jurisdiction in which the Project is located.

3.1.5 If the Contractor fails to obtain or maintain any insurance coverage required under this Agreement, the Owner may purchase such coverage and charge the expense to the Contractor or terminate this

Agreement.

3.1.6 Insurance policies required under Paragraph 3.1 shall contain a provision that the insurance company or its designee must give the Owner written notice transmitted in paper or electronic format: (a) 30 days before coverage is non-renewed by the insurance company and (b) within 10 business days after cancelation of coverage by the insurance company.

3.1.7 Prior to commencing the Work and upon renewal or replacement of the insurance policies, the Contractor shall furnish the Owner with certificates of insurance until one year after Substantial Completion or longer if required by the Contract Documents. In addition, if any insurance policy required under Paragraph 3.1 is not to be immediately replaced without lapse in coverage when it expires, exhausts its limits, or is to be cancelled, the Contractor shall give Owner prompt written notice upon actual or constructive knowledge of such condition.

3.1.8 The Contractor's insurance shall be primary and non-contributory to the Owner's insurance.

3.1.9 Failure of the Contractor to procure, carry, and maintain the required insurance shall not relieve the Contractor, and any Subcontractor thereof, of any obligation or liability assumed under this Agreement, nor of any obligation or liability imposed by law.

3.1.10 Any self-insured retentions, deductibles, and exclusions in coverage in the insurance required shall be assumed by and at the sole risk of the Contractor.

3.2 PROPERTY INSURANCE

3.2.1 Before commencing the Work, the Owner may at its option obtain and maintain a Builder's Risk Policy upon the entire Project for the full cost of replacement at the time of loss. This insurance shall be written as a Builder's Risk Policy or equivalent form to cover risks of physical loss except those specifically excluded by the policy, and shall insure (a) at least against the perils of fire, lightning, explosion, windstorm, hail, smoke, aircraft (except aircraft, including helicopter, operated by or on behalf of Contractor) and vehicles, riot and civil commotion, theft, vandalism, malicious mischief, debris removal, flood, earthquake, earth movement, water damage, wind damage, testing if applicable, collapse however caused, and (b) damage resulting from defective design, workmanship or material and material or equipment stored offsite, onsite or in transit. This policy shall provide for a waiver of subrogation in favor of the Contractor, Subcontractors, Subsubcontractors, Material Suppliers and Professional. This insurance shall remain in effect until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property to be covered by this insurance, whichever is sooner. Partial occupancy or use of the Work shall not commence until the Owner has secured the consent of the insurance company or companies providing the coverage required in this Paragraph. Before commencing the Work, the Owner shall provide a copy of the property policy or policies obtained in compliance with this Paragraph.

3.2.1.1 The Builder's Risk property insurance may have a deductible. The Contractor shall be responsible for any such deductible, up to the maximum amount of $10,000.

3.2.2 If the Owner does not intend to purchase the Builder's Risk property insurance, the Owner shall give written notice to the Contractor and the Professional before the Work is commenced. The Contractor may then provide insurance to protect its interests and the interests of the Subcontractors, including the coverage of deductibles. The cost of this insurance shall be charged to the Owner in a Change Order. The Owner shall be responsible for all of Contractor's costs reasonably attributed to the Owner's failure or neglect in purchasing or maintaining the coverage described above.

3.2.3 Owner and Contractor waive all rights against each other and their respective employees, agents, subcontractors, and design professionals for damages caused by risks covered by the property insurance except such rights as they may have to the proceeds of the insurance and such rights as the Contractor may have for the failure of the Owner to obtain and maintain property insurance in compliance with Paragraph 3.2.1.

3.2.4 RISK OF LOSS Except to the extent a loss is covered by applicable insurance, risk of loss or damage to the Work shall be upon the Contractor until the Date of Substantial Completion.

3.3 OWNER'S INSURANCE

3.3.1 OWNER'S LIABILITY INSURANCE The Owner shall maintain its own liability insurance for protection against claims arising out of the performance of this Agreement, including loss of use and claims, losses and expenses arising out of the Owner's acts or omissions.

ARTICLE 4 - GOVERNING LAWS

4.1 GOVERNING LAW

The Contract shall be governed by the law of the Commonwealth of Pennsylvania. In the event litigation arises out of this Contract, the parties agree to submit any claim to the competent court of common pleas in the county where the Project is located.

4.2 COMPLIANCE WITH LAWS

4.2.1 The Contractor at all times shall observe and comply with all Federal, State and Local laws, by-laws, ordinances, codes and regulations, in any manner affecting the conduct of the Work or applying to any employees on the Project, as well as all orders or decrees which have been promulgated or enacted by any legal bodies or tribunals having authority or jurisdiction over the Work, materials, employees or the Contract.

4.2.1 Contractor shall indemnify and save harmless the Owner and all its officers, employees and agents from all suits, actions, or claims of any character or description brought for, made on account of, or arising from the violation of any such law, by-law, ordinance, regulation, order or decree by the Contractor.

4.2.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Professional and Owner in writing, and necessary changes shall be accomplished by appropriate modification.

4.2.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Professional and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

4.3 PREVAILING WAGE ACT

4.3.1 The Contractor is hereby notified that this Contract is subject to the provisions, duties, obligations, remedies and penalties of the Pennsylvania Prevailing Wage Act, Act No. 442, August 15, 1961 (P.L. 987), and as amended August 9, 1963, Act No. 342; and said Act and its associated regulations are incorporated herein by reference as fully as though fully set forth.

4.3.2 Prevailing Minimum Wages: The Minimum Wage Rates for Labor performed on the Project as determined by the Commonwealth of Pennsylvania, Department of Labor and Industry, and by inclusion are a part of the Contract. The Contractor shall obtain a copy of the Wage Rates for the various crafts and classifications and post same in a conspicuous place. In submitting each

Application for Payment, the Contractor warrants that no employee of the Contractor, his subcontractors or sub-subcontractors was paid less than the minimum hourly rate as posted for his particular craft or trade or classification for all work performed. The Contractor shall submit, as requested by the Professional, Payroll Classification for the Project on the required form, properly executed and notarized. Failure to submit required forms shall result in the withholding of payments to the Contractor that would otherwise be due.

4.4 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work on portions thereof provided by the Contractor which are legally enacted when proposal was submitted.

4.5 ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees, and defend all suits or Claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such royalties and license fees and loss when a particular design or process, or the product of a particular manufacturer or manufacturers is specified; provided, however, if the Contractor has reason to believe the design, process or product specified constitutes an infringement of a patent, the Contractor shall be responsible for such royalties, license fees and loss unless the Contractor promptly gives such information to the Owner and the Professional.

4.6 FEDERAL CLEAN AIR ACT

The Contractor agrees to fully protect, indemnify, hold harmless and defend the Owner against any and all liability, including assessed violation fines, for failure to comply with the Federal Clean Air Act [42 U.S.C. §7401 et seq., amended 1990], with regards to handling, venting, and/or disposing of any and all refrigerants used in the performance of the Work. A copy of employee(s) or subcontractor(s) Federal Certification numbers shall be provided to the Owner upon request.

ARTICLE 5 – Deleted in these General Conditions

ARTICLE 6 - KNOWLEDGE OF CONTRACT REQUIREMENTS

6.1 NOTICE

The Contractor and its Subcontractors shall consult in detail all Contract Documents for instructions and requirements pertaining to the Work, and at its and their cost shall provide all labor, materials, equipment and services necessary to furnish, install and complete the Work in strict conformance with all provisions thereof.

6.2 EXAMINATION AND CONDITIONS AT THE SITE

The Contractor is responsible for having general knowledge of municipality roadway and area lighting applications and for having informed itself and its Subcontractors of all pertinent local conditions such as location, accessibility, and general character of the site or building, the character and extent of existing Work within and adjacent to the site, any other Work being performed thereon at the time of the submission of the Contractor's proposal, and subsurface conditions. Any failure to do so will not relieve the Contractor from responsibility for successfully performing the Work without additional expense to the Owner.

6.3 EXAMINATION OF CONTRACT DOCUMENTS

6.3.1 The Contractor will be held to have examined the Contract Documents, and Modifications thereto, as they may affect the Work and to have informed itself and its Subcontractors of all provisions thereof affecting the prosecution of the Work.

6.3.2 The Work is not limited to that described in the Installation Worksheet information, but includes all minor items not expressly indicated in the Contract Documents, or as might be found necessary as a result of field conditions, in order to complete the Work as it is intended.

6.3.3 The Contractor shall at once report to the Professional errors, inconsistencies or omissions

discovered. The Contractor shall not be liable to the Owner or Professional for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such error, inconsistency or omission and failed to report it to the Professional. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Professional, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

6.4 LABOR

The Contractor will be held to be thoroughly familiar with all conditions affecting labor in the location of the Project, including, but not limited to, unions, incentive pay, procurement, living and commuting conditions, and to have informed its Subcontractors thereof.

ARTICLE 7 - CONTRACT ADMINISTRATION

7.1 GENERAL ADMINISTRATION

The Professional will provide general administration of the Contract beginning with the execution of the Agreement between the Contractor and the Owner. The Professional shall advise and consult with the Owner and will have authority to act on behalf of the Owner.

7.2 CONTRACT ADMINISTRATION COMMUNICATIONS AND INTERPRETATION

7.2.1 Communications: The Owner's instructions to the Contractor will generally be issued through the Professional except that the Owner reserves the right on appropriate occasions to issue instructions directly to the Contractor through the Owner's representatives.

7.2.2 Interpretation: The Professional shall be, in the first instance, the interpreter of the requirements of the Contract Documents. The Professional will, within a reasonable time, render such interpretation as the Professional may deem necessary for the proper execution or progress of the Work. All interpretations by the Professional shall be defined in writing and/or by drawing and shall be consistent with the intent of the Contract Documents.

7.3 ACCESS TO AND INSPECTION OF THE WORK

7.3.1 The Professional, the Owner and their authorized representatives shall be provided full and safe access to the Work at all times by the Contractor for their observation and/or inspection of same. The Professional is not empowered to authorize deviations from the Contract, except by a written modification to the Contract Documents. Neither is the Professional empowered to undertake responsibility for supervision and construction means, methods, techniques, sequences, procedures or coordination or for safety of persons and property.

7.3.2 The Professional, the Owner and their authorized representatives reserve the right to inspect, at their sources, all materials, supplies or services not manufactured or performed within the Contractor's on-site facility. Such inspection shall not constitute acceptance, nor shall it replace in any way the Contractor's responsibility for inspection or requirement to furnish acceptable materials. The Owner will notify the Contractor of any non-compliance with the Contract Documents and the action required, and the Contractor shall take immediate corrective action.

7.4 SEPARATE CONTRACTS – Deleted in these General Conditions

7.5 CLAIMS AND DISPUTES

7.5.1 Claims: Claims by the Contractor must be made within twenty-one (21) days after occurrence of the first event giving rise to such Claim. Claims must be made by written notice. Pending final resolution of a Claim unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

7.5.2 Claims for Concealed or Unknown Conditions: If conditions are encountered at the site which are concealed physical conditions which differ materially from those indicated in the Contract

Documents or of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the Contractor shall be given to the Professional and the Owner promptly before conditions are disturbed and no later than forty-eight (48) hours after first observance of the conditions. In such circumstances, the Owner shall cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work as an equitable adjustment in the Contract Sum or Contract Time, or both. The failure by the Contractor to make the written notice and claims as provided in this subparagraph shall constitute a waiver by the Contractor of any claim arising out of or relating to such concealed or unknown condition.

7.5.3 Claims for Additional Cost: If the Contractor wishes to make Claim for an increase in the Contract Sum, the Contractor shall give written notice of such claim to the Professional and the Owner within twenty-one (21) days after the occurrence of the event or first appearance of the condition giving rise to such Claim and before proceeding to execute the Work. The failure by the Contractor to give such notice within the time permitted and prior to executing the Work shall constitute a waiver of claim for additional compensation. In connection with any claim by the Contractor against the Owner for compensation in excess of the Contract Sum, any liability of the Owner for the Contractor's costs shall be strictly limited to direct costs incurred by the Contractor and shall in no event include indirect costs or consequential damages of the Contractor.

7.5.4 Claims for Additional Time: If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given to the Professional and the Owner at the time of any Change Order proposal submitted. If the Contractor fails to make such claim as required in this subparagraph within twenty-one (21) days of such occurrence giving rise to the claim, any claim for extension of time shall be waived.

7.5.5 Injury or Damage to Person or Property: If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty-one (21) days after first becoming aware of such injury or damage.

7.5.6 Decision of the Professional: Claims of the Contractor, including those alleging an error or omission by the Professional, shall be referred initially to the Professional for action as provided in Subparagraph 7.5.7. A decision by the Professional, as provided in Subparagraph 7.5.7, shall be required as a condition precedent to litigation of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due.

7.5.7 Resolution of Claims and Disputes: The Professional will review Claims and take one or more of the following preliminary actions within ten (10) days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Professional expects to take action, and (3) reject the Claim in whole or in part, stating reasons for rejection. If a Claim has not been resolved, the Contractor shall, within ten (10) days after the Professional's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Professional, (2) modify the initial Claim or (3) notify the Professional that the initial Claim stands. The Owner promptly thereafter shall render a first-step decision, granting the Claim in whole or in part or denying the Claim.

7.5.8 Second-step Administrative Proceeding: Should the Contractor not be satisfied with Owner's first-step decision regarding a claim or dispute, Contractor may request an administrative determination. Owner shall, within thirty (30) days of a demand for an administrative determination or on its own initiative, designate an individual to serve as Claims Administrator. The parties shall attend administrative conferences at the call of the Claims Administrator. Owner and Contractor shall cooperate fully in the administrative investigation conducted by the Claims Administrator at the administrative conference and at such other times as the Claims Administrator shall determine, and shall furnish documents and other information required by the Claims Administrator. Within thirty (30) days of the completion of the administrative investigation, the Claims Administrator will render a decision and recommendation to the parties. The decision and the recommendation shall not be binding on any party and will not be admissible in any proceeding. Unless the decision and recommendation is accepted, Contractor may submit a claim to the court of common pleas in the county where the Project is

located.

7.6 CONTRACT TERMINATION

7.6.1 Termination by Contractor: If the Work is stopped for a period of ninety (90) days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon ten (10) additional days' written notice to the Owner and the Professional, terminate the Contract and recover from the Owner payment for all Work executed and for any loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit associated with such Work or losses and reasonable expenses resulting from such termination. If the cause of the Work stoppage is removed prior to the end of the ten (10) day notice period, the Contractor may not terminate the Contract.

7.6.2 Termination by Owner: If the Contractor refuses or fails to supply enough properly skilled workmen or proper materials to satisfactorily perform the Work, or disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is in violation of a provision of the Contract Documents, is insolvent, declares bankruptcy, or fails to so prosecute the Work as to insure its completion, within the time, or any extension thereof, specified in this Contract, then the Owner may, without prejudice to any right or remedy and after giving the Contractor and its surety ten (10) days' written notice, terminate the Work and services of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor. In such case, the Contractor shall not be entitled to receive any further payment. The Owner may arrange for completion of the Work and deduct the cost thereof from the unpaid Contract Sum remaining, including the cost of additional professional services made necessary by such default or neglect, in which event no further payment shall then be made by the Owner until all costs of completing the Work shall have been paid.

7.6.3 Termination for Convenience of Owner: Prior to, or during the performance of the Work, the Owner reserves the right to terminate the Contract in its sole discretion. Upon such an occurrence, the following procedures will be adhered to:

7.6.3.1 The Owner will immediately notify the Professional and the Contractor in writing, specifying the effective termination date of the Contract.

7.6.3.2 After receipt of the notice of termination, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due at that point in the Contract:

(1) Stop all Work.
(2) Place no further subcontracts or orders for materials or services.
(3) Cancel all material and equipment orders as applicable.
(4) Take action that is necessary to protect and preserve all property related to this Contract which is in the possession of the Contractor.

The termination shall have the effect of assigning all subcontracts to the Owner.

7.6.4 Written Notice: Written notice shall be considered to have been duly given if delivered to the Owner, Contractor, or other individual for whom it is intended, or sent by United States mail, using the principal address of the individual or entity.

ARTICLE 8 - CONSTRUCTION

8.1 PROJECT SCHEDULE AND SUPERVISION

8.1.1 Project Schedule: The Contractor, promptly after being awarded the Contract, shall commence work according to the Project Schedule (or the "Schedule") provided by the Professional. The commencement date, duration of the work and completion date for the Project will be based on

Contractor's provided productivity rate.

8.1.2 Supervision: The Contractor shall supervise and direct the Work. The Contractor shall be solely responsible for all construction means, methods, techniques, safety, sequences and procedures, and for coordinating all portions of the Work under the Contract. The Contractor shall employ a competent superintendent satisfactory to the Professional and the Owner, and shall not be replaced except with the written approval of the Professional on behalf of the Owner. The superintendent shall represent the Contractor and shall have full authority to act on the Contractor's behalf. All communications given to the superintendent shall be as binding as if given to the Contractor. All oral communications affecting contract time, contract cost and contract interpretation will be confirmed in writing.

8.1.3 Contractor shall comply with all project management, coordination, and compliance and activities as may be reasonably requested by the Professional including, but not limited to, participation in all pre-construction activities, order management reporting requirements, installation reporting requirements and status meetings.

8.2 SUBCONTRACTS

Any subcontractors not previously identified and approved by the Professional, must be approved by the Professional on behalf of the Owner. A change in any approved Subcontractor or the addition of any new Subcontractor may not be made without the written approval of the Professional on behalf of the Owner. The Contractor agrees to bind every Subcontractor, and every Subcontractor agrees to be bound, by the terms of the Contract Documents insofar as they are applicable to the Subcontractor's respective portion of the Work. The Contractor shall further more fully inform each of its Subcontractors, prior to executing an agreement with, conformance with related documents. The Contractor shall indemnify the Owner for any Subcontractor's claim which may result from the failure of the Contractor to incorporate the provisions of this Contract in the Contractor's agreements with any of its Subcontractors.

8.3 PERMITS, FEES AND NOTICES

To the extent required by applicable law, the Contractor shall secure and pay for, with the exception of the building permit, all other permits, fees, licenses and inspections necessary for the proper execution and completion of the Work.

8.4 ACTS AND OMISSIONS

The Contractor shall be responsible for acts and omissions of the Contractor's employees and Subcontractors, their agents and employees and other persons performing portions of the Work under a contract with the Contractor. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Professional in the Professional's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

8.5 PROTECTION OF PERSONS AND PROPERTY

8.5.1 OSHA: It shall be the duty and responsibility of the Contractor and all its Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor to be familiar and comply with all requirements of Public Law
91-596, the Occupational Safety and Health Act of 1970 (OSHA) and all amendments thereto, and to enforce and comply with all of the provisions of this Act.

8.5.2 Emergencies: In an emergency affecting safety of persons or property, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss.

8.5.3 Precautions: The Contractor shall take appropriate precautions for safety of and shall provide necessary protection to prevent damage, injury or loss to:

8.5.3.1 Employees of the Owner at the Work and other persons who may be affected thereby.

8.5.3.2 The Work and materials and equipment to be incorporated therein, whether in

storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors.

8.5.3.3 Other property at the site or adjacent thereto that are not designated for removal, relocation or replacement in the course of construction.

8.5.3.4 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, all necessary safeguards for safety and protection, including posting of danger signs, installing project fencing, and other warnings against hazards.

8.5.4 Lighting Product Waste: The Contractor is responsible for the appropriate disposal of all used lighting materials in accordance with local, state and federal laws. Used lighting materials include, but are not limited to, lighting fixtures, ballasts, drivers, lamps, capacitors, photocells, wiring/cable. When applicable, certificates of recycling or disposal should be provided to the Professional and Owner.

8.5.5 Hazardous Material: Other than the planned lighting product waste, the Contractor and all its Subcontractors and their agents and employees and other persons performing portions of the Work under a contract with the Contractor shall have no responsibility for the discovery, presence, handling, removal or disposal of, or exposure of persons to hazardous materials in any form at the Project site, including but not limited to asbestos, asbestos products, polychlorinated biphenyl (PCB) or other toxic material. If the Contractor encounters or suspects hazardous or toxic material, the Contractor shall advise the Owner immediately. The Work in the affected area shall not be resumed by the Contractor until the hazardous material has been removed or rendered harmless by the Owner.

8.6 MATERIALS AND WORKMANSHIP

8.6.1 The Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

8.6.2 All Work shall be executed in accordance with the Contract Documents, complete in all parts and in accordance with approved practices and customs, the finish specified and of the best workmanship. Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new.

8.6.3 The Contractor shall provide, without extra charge, all incidental items required as a part of the Work, even though not particularly specified nor indicated and, if the Contractor has good reason for objecting to the use of a material, appliance, or method of construction as shown or specified, the Contractor shall register its objections to the Professional, in writing, sending a copy to the Owner; otherwise, the Contractor shall proceed with the Work, with the understanding that a satisfactory job is required.

8.6.4 Use of Site: The Contractor shall confine operations at the site to areas reasonably required to conduct work and shall not unreasonably encumber the site with materials or equipment. Subject to prior approval of the Owner, the Contractor may use spaces within the building or at a defined site location for shops and the storage of materials and equipment. Every space so used shall be repaired, patched, cleaned and restored to new condition by the Contractor.

8.6.5 Utility Work and Safety Requirements: The Contractor shall be responsible for adhering to all PECO work and safety requirements. Failure to meet these requirements and the cost to remedy will be the sole responsibility of the Contractor.

8.6.6 Code Requirements: The Contractor shall be responsible for adhering to all current electrical code requirements. The Contractor is responsible to notify the Professional and Owner of any conditions to be deemed unsafe and to recommend corrective actions. Failure to identify conditions not meeting code or general safety requirements and the cost to remedy

will be the sole responsibility of the Contractor.

8.7 [Deleted in these General Conditions]

8.8 UNCOVERING, REJECTION AND CORRECTION OF WORK

8.8.1 Uncovering of Work: If any portion of the Work is covered contrary to the Professional's request or to the requirements of the Contract Documents, it must, if requested by the Professional, be uncovered for observation. All costs of uncovering, recovering and replacing of Work not installed in accordance with the Contract Documents shall be borne by the Contractor and with no change in Contract Time. The cost of any other portion of the Work requested to be uncovered by the Professional and found to be in accordance with the Contract Documents shall be borne by the Owner by appropriate Change Order.

8.8.2 Rejection and Correction of Work by the Owner: Any Work rejected by the Professional and found not to be in accordance with the Contract Documents shall be corrected promptly by the Contractor at its cost and with no change in Contract Time. If the Contractor fails to correct rejected or nonconforming Work, the Owner may correct it in accordance with Paragraph 8.9.

8.8.3 Acceptance of Nonconforming Work: If the Owner prefers to accept Work found not to be in accordance with the Contract Documents, the Owner may do so, in which case the Contract Sum will be reduced downward appropriately as determined by the Owner and memorialized in a deduct Change Order.

8.9 OWNER'S RIGHT TO STOP AND/OR CARRY OUT THE WORK

8.9.1 Owner's Right to Stop the Work: If the Contractor fails to correct rejected or nonconforming Work as required in Paragraph 8.8 or fails to carry out Work in accordance with the Contract Documents, the Owner may, in writing, order the Contractor to stop the Work or any portion thereof until the proper corrective action has been implemented.

8.9.2 Owner's Right to Carry Out the Work: If the Contractor fails or neglects to carry out the Work in accordance with the Contract Documents, or ceases Work for a period of seven (7) consecutive days, the Owner may, without prejudice to other remedies the Owner may have, perform or cause to be performed the Work. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of performing Work pursuant to this Subparagraph. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

8.10 CLEANUP

The Contractor shall keep the work site clean at all times of dirt, rubbish and debris resulting from the Work, and shall remove rubbish and debris from each installation location. Prior to substantial completion of the Work, the Contractor shall do the final cleaning and polishing of the surfaces of the Contractor's installations as may be required. If the Contractor fails to clean up as outlined above, the Owner may do so and the cost thereof shall be charged to the Contractor.

ARTICLE 9 - CHANGES IN THE WORK

9.1 CHANGES

9.1.1 Except as provided in this article, no order, oral statement or direction of the Professional or the Owner shall be treated as a Change Order or entitle the Contractor to an adjustment to the Contract Sum and/or the Contract Time.

9.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents. If such changes cause an increase or decrease in the Contractor's cost of, and/or time required for, performance of the Contract, an equitable adjustment shall be made and confirmed in writing in a Change Order.

9.1.3 If the Contractor identifies conditions that could justify a change in work, they must give notice in writing to the Professional within (7) days all relevant details pertaining to the condition. The Professional may request the Contractor to prepare a Change Order Request document for the Owner to review and approval if acceptable.

9.2 CHANGE ORDERS

9.2.1 A Change Order is a written order to the Contractor, signed by the Owner and issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum and/or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including the adjustment in the Contract Sum and/or the Contract Time.

9.2.2 It is recognized by the parties hereto and agreed by them that the Contract Documents may or may not be complete or free from errors, omissions and imperfections or require changes or additions in order for the Work to be completed in accordance with the Contract Documents and to the satisfaction of Owner and that, accordingly, it is the express intention of the parties, notwithstanding any other provisions in this Contract, that any errors, omissions or imperfections in such Contract Documents or any changes in or additions to same or to the Work ordered by Owner and any resulting delays in the Work or increases in Contractor's costs and expenses, shall not constitute or give rise to any claim, demand or cause of action of any nature whatsoever in favor of Contractor, whether for breach of contract, quantum meruit, or otherwise; provided, however, that Owner shall be liable to Contractor for the sum stated to be due Contractor in any Change Order approved and signed by both parties, it being agreed hereby that such sum, together with any extension of time contained in said Change Order, shall constitute full compensation to Contractor for all costs, expenses and damages to Contractor, whether direct, consequential or otherwise in any ways incident to, arising out of, or resulting directly or indirectly from the Work performed by Contractor under such Change Order.

9.3 CHANGE ORDER CONTRACT SUM ADJUSTMENTS

Adjustments in the Contract Sum for Work covered by a Change Order shall be computed on the basis of one or more of the following procedures. The Contractor shall have a maximum time of fourteen (14) calendar days to submit change order pricing, unless otherwise directed by the Professional.

9.3.1 Unit Prices: Unit prices if stated in the Contract Documents or if subsequently mutually agreed upon by the Owner and the Contractor for the increase or reduction in the Work or portion thereof. Unit prices shall be inclusive of all costs and shall be applied to units of measure as defined in the Contract Documents for each category of Work.

9.3.2 Lump Sum: A lump sum agreed upon by the Owner and Contractor based on an estimated cost of the increase or reduction in the Work properly itemized and supported by sufficient substantiating data to permit evaluation.

9.3.3 Gross Cost of Increase or Reduction in the Work: Only to the extent that Unit Prices are not required or Unit Prices and Lump Sum are not agreed upon, the Change Order may be based upon the gross cost to the Contractor for the estimated or if available the actual and reasonable cost of the Work and may include an allowance for overhead and profit. The Contractor or Subcontractor actually performing the Work will be allowed a maximum markup for overhead and profit of 10% on labor only and 10% on material and equipment, plus sales tax to the extent applicable. No other costs or markups will be permitted by any other tiered Contractor or Subcontractor.

9.3.4 If no mutual agreement can be reached between the Owner and the Contractor as to the method to complete the Work covered by a Change Order, the change in the Contract Sum, if any, shall then be determined in accordance with the disputes provisions of these General Conditions.

9.3.5 If a Change Order submission is rejected and the work is considered part of the Contract Sum by the Professional, the submission may at Contractor's option be considered a Claim. Pending final resolution of the Claim, the Contractor shall proceed diligently with performance of the Contract. If the Contractor refuses to complete the Work the Owner may terminate the Contract for

cause.

9.3.8 Mark-up on bond premium increases and/or insurance premium increases due to Change Orders is not permitted.

9.4 CHANGE ORDER CONTRACT TIME ADJUSTMENTS

Adjustments in the time required for performance of the Contract for Work covered by a Change Order shall be as agreed upon by the Owner and the Contractor as part of a Change Order. If the parties are unable to agree on the time extension or reduction, the Professional shall make a determination of the time extension or reduction to be allowed. If the request for an increase in the Contract Time is rejected, or if a reduction in the Contract Time is directed by the Professional, the Contractor may proceed in accordance with the disputes provisions of these General Conditions.

9.5 MINOR CHANGES IN THE WORK

The Professional, with the Owner's approval, will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time. Such changes will be effected by written order which the Contractor shall carry out promptly.

9.6 PRE-APPROVED MINOR FIELD CHANGES

The Owner may provide the Contractor pre-approval to conduct field changes up to a defined quantity or cost limit. Unit prices and limits of work for such changes will be established prior to execution of this contract and represented in the Installation Services Schedule of Values.

9.7 NOTICE TO SURETY: CONSENT

The Contractor shall notify and obtain the consent and approval of the Contractor's surety with reference to all Change Orders if such notice, consent or approval are required by the Contractor's surety or by law. The Contractor's execution of the Change Order shall constitute the Contractor's warranty to the Owner that the surety has been notified of and consents to such Change Order, and the surety shall be conclusively deemed to have been notified of such Change Order and to have expressly consented thereto.

9.8 EFFECT OF EXECUTED CHANGE ORDER

The execution of a Change Order by the Contractor shall constitute conclusive evidence of the Contractor's agreement to the ordered changes in the Work, the Contract Sum and the Contract Time. The Contractor, by executing the Change Order, waives and forever releases any claim against the Owner for additional time or compensation for matters relating to or arising out of or resulting from the Work included within or affected by the executed Change Order.

ARTICLE 10 - CONTRACT COMPLETION TIME

10.1 NOTICE TO PROCEED

The Contract Time will begin on the date designated in the Notice to Proceed issued by the Owner. The Contractor is required to complete the Work in the time stated in the Contract Documents.

10.2 PROGRESS AND COMPLETION

Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

10.3 DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Professional, or of an employee of either, or by changes ordered in the Work, or by material delays, severe weather, labor disputes, fire, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner, or by other causes which the

Professional determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Professional may determine with the Owner's approval. Any delay attributable to lack of coordination or cooperation by or between the Contractor and its Subcontractor(s) will not be recognized by the Owner as the basis for any claim for increase in the Contract Sum or Contract Time.

10.4 COMPLETION AND LIQUIDATION DAMAGES

The Contractor shall substantially complete all of the Work included in the Contract Documents ready for the Owner's use and occupancy, in the Contract Time. Pursuant to the provisions of Paragraph 10.4, for each calendar day's delay beyond 150% of the Contract Time, the Contractor shall pay to the Owner, as liquidated damages and not as a penalty, the sum of Five Hundred Dollars ($500) to compensate the Owner for its additional administrative and operational costs.

10.5 SUBSTANTIAL COMPLETION

When the Contractor considers that the Work, or a portion thereof which the Owner wishes or agrees to accept separately, is substantially complete in accordance with Paragraph 1.15, the Contractor shall prepare a Substantial Completion Form. A template for the Substantial Completion Form will be provided by the Professional. The Substantial Completion Form identifies the date that Substantial Completion was achieved and requires signatures from the Contractor and the Professional. If there are items not complete, a punch list of items to be completed or corrected will be attached to the Substantial Completion Form. The failure to include any items on such punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Professional and the Owner, on the basis of an inspection, determine that the Work is substantially complete, the Professional shall sign the Substantial Completion Form.

ARTICLE 11 - PAYMENTS AND COMPLETION

11.1 APPLICATIONS FOR PAYMENT

11.1.1 Contractor applications for payment should utilize AIA Forms G702 and G703. The schedule of values represented on AIA Form G703, should be broken into separate items for Material (#1), Labor (#2). Additional line items can be added for change orders. The Contractor can invoice for stored materials if they provide proof of receipt by distribution partner or Contractor. A 10% retainage will apply to all pay applications until the Project is 50% complete, and a 5% retainage pending the final pay application. The maximum allowed frequency of Contractor pay applications is monthly. Installation progress billing must match the installation status reporting for the indicated pay application time period.

11.1.2 The Professional and Owner agree to review all Contractor pay applications within (14) days of submission. Within (7) days of approval of a Contractor pay application, the Owner will submit the pay application for payment. If the Professional or Owner do not approve the Contractor pay application, written communication of dispute will be provided to the Contractor for correction or resolution.

11.2 FINAL COMPLETION AND FINAL PAYMENT

11.2.1 When the Work is completed, the Contractor shall prepare a Final Completion Form. A template for the Final Completion Form will be provided by the Professional. The Final Completion Form identifies the date that Final Completion was achieved and requires signatures from the Contractor and Owner. When the Professional and the Owner, on the basis of an inspection, determine that the Work is complete, the Professional or Owner sign the Final Completion Form.

11.2.2 The final payment application shall be for retainage only. Final payment will be approved by the Professional and Owner, upon confirmation that all project work, including change orders, is complete and operational.

ARTICLE 12 - CONTRACT WARRANTY PERIOD

12.1 WARRANTY

Except where a longer warranty is specified, the Contractor warrants and guarantees all Work against defects in materials, equipment and/or workmanship for a period of one (1) year from the date of Substantial Completion of the Project. This period of one (1) year shall be extended with respect to portions of the Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This warranty and guarantee is not the exclusive remedy of the Owner but is in addition to the general obligation of the Contractor to faithfully perform the Contract, and it in no way limits the responsibility of the Contractor for faulty materials or workmanship.

12.2 CORRECTION OF DEFECTS

12.2.1 Upon receipt of written or verbal notice from the Owner or Professional of the discovery of any defects in materials, equipment and/or workmanship, the Contractor shall remedy the defects and replace any property damaged therefrom occurring within the warranty and guarantee period. Any defects discovered in materials, equipment and/or workmanship which are included in any manufacturer's written warranty certificate shall be remedied in accordance with the manufacturer's recommendations and procedures.

12.2.2 If any of the Work is found to be not in accordance with the requirements of the Contract Documents, including substitutions not properly approved and authorized, such Work will be considered defective and shall be corrected promptly by the Contractor after receipt of notice from the Professional.

12.2.3 If the Contractor, after notice, fails to proceed promptly and remedy such defects within thirty (30) days or within another period of time which has been agreed to in writing, in compliance with the terms of the warranty and guarantee, the Owner may have the defects corrected and the Contractor and its surety shall be liable for all expenses incurred.

12.3 ONE-YEAR INSPECTION

12.3.1 Prior to the expiration of the one (1) year guarantee period against defective materials, equipment and/or workmanship, the Professional and Owner shall conduct an inspection to determine any other defects in material, equipment and/or workmanship not previously noticed and corrected as outlined in Paragraph 12.2 above.

12.3.2 Should any additional defects be discovered, the Contractor, upon receipt of written notice from the Professional, shall promptly remedy the defects and replace any property damaged therefrom.

12.3.3 If the Contractor, after notice, fails to proceed promptly and remedy such defects within thirty (30) days or within another period of time which has been agreed to in writing, in compliance with the terms of the warranty and guarantee, the Owner may have the defects corrected and the Contractor and its surety shall be liable for all expenses incurred.

ARTICLE 13 - EQUAL EMPLOYMENT OPPORTUNITY

13.1 NON-DISCRIMINATION CLAUSE

During the term of this Contract, Contractor agrees as follows:

13.1.1 Contractor shall not discriminate against any employee, applicant for employment, any independent Contractor or any other person because of race, color, religious creed, ancestry, national origin, service in the uniformed services (as defined in state and federal law), veteran status, age, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas, or any other basis prohibited by law.

Contractor shall take affirmative action to ensure that applicants are employed, and that employees or agents are treated during employment, without regard to their race, color, religious creed, ancestry, national origin, service in the uniformed services (as defined in state and federal law), veteran status, age, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas, or any other basis prohibited by

law. Such affirmative action shall include, but is not limited to, the following: Employment upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training.

Contractor shall post in conspicuous places, available to employees, agents, applicants for employment and other persons, notices to be provided by the contracting agency setting forth the provisions of this non-discrimination clause.

13.1.2 Contractor shall in solicitations or advertisements placed by it or on its behalf state all qualified applicants will receive consideration for employment without regard to race, color, religious creed, ancestry, national origin, age, or sex.

13.1.3 Contractor shall send each labor union or workers' representative with which it has a collective bargaining agreement or other contract or understanding, a notice advising said labor union or workers' representative of its commitment to this non-discrimination clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment. Similar notices shall be sent to every other source of recruitment utilized by Contractor.

13.1.4 It shall be no defense to a finding of a non-compliance with Executive Order 1972-1 or any regulations issued by the Pennsylvania Human Relations Commission or this non- discrimination clause that recipient had delegated some of its employment practices to any union, training program or other source of recruitment which prevents it from meeting its obligations.

13.1.5 Where the practices of a union or any training program or other source of recruitment will result in the exclusion of minority group persons, so that Contractor will be unable to meet its obligations under Executive Order 1972-1 or any regulations issued by the Pennsylvania Human Relations Commission or this non-discrimination clause, the Contractor shall then employ and fill vacancies through other employment procedures without regard to race, color, religious creed, ancestry, national origin, sex, or age, taking affirmative action to obtain qualified minority group persons.

13.1.6 Contractor shall comply with all rules, regulations and orders issued by the Governor, the Attorney General, and the Human Relations Commission relating to laws, prohibiting discrimination in hiring or employment opportunities. In the event of Contractor's non- compliance with the non-discrimination clause of this Contract or with any such rules, regulations or orders, this Contract may be cancelled, terminated or suspended in whole or in part, and recipient may be declared ineligible for further Commonwealth contracts, and such other sanctions may be imposed and remedies invoked as provided by rule, regulation or order of the Governor, Attorney General, or the Human Relations Commission, or as otherwise provided by law.

13.1.7 Contractor shall furnish all information and reports required by the Governor, Attorney General, and the Human Relations Commission and will permit access to its books, records and accounts by the contracting agency and the Human Relations Commission, for purposes of investigation to ascertain compliance with provisions of Executive Order 1972-1 or any regulations issued by the Pennsylvania Human Relations Commission or this non- discrimination clause.

13.1.8 Contractor shall actively recruit minority Subcontractors or Subcontractors with substantial minority representation among their employees.

13.1.9 Contractor shall include the provisions of Paragraphs 13.1.1 through 13.1.10 in every Subcontract or Purchase Order, so that such provisions will be binding upon each Subcontractor or vendor or other person.

13.1.10 The terms used in this non-discrimination clause shall have the same meaning as in the Contract Compliance Regulations issued by the Pennsylvania Human Relations Commission, 16 Pa. Code Ch. 49.

ARTICLE 14 - MISCELLANEOUS PROVISIONS

14.1 RIGHTS AND REMEDIES

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

No actions or failure to act by the Owner, Professional or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

ARTICLE 15 – PERFORMANCE AND PAYMENT BONDS

15.1 At the time of signing the Contract and before it becomes effective, the Contractor and its surety, acceptable to the Owner, shall execute two bonds each in the amount of 100% of the Contract Sum for the Work awarded to the Contractor. The Bonds shall be written by a Surety authorized to do business in the Commonwealth of Pennsylvania and shall be delivered to the Owner prior to award of Contract and within three (3) days of the Owner's request thereof. The Attorney-in-Fact who signs the Bonds must be a resident of the Commonwealth of Pennsylvania and shall file with each Bond a certified and effectively dated copy of the Attorney-in-Fact's Power of Attorney.

15.2 One bond shall be a performance bond covering the faithful performance by the Contractor of all covenants and agreements on the part of the Contractor contained in this Contract.

15.3 The other bond shall be a labor and material payment bond protecting all parties that have performed labor or supplied material on this Contract from suffering any loss due to the failure of the Contractor to pay any or all obligations incurred under this Contract.

15.4 The Contractor shall pay all premiums for all bonds.

15.5 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor or Owner shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 16 - INDEMNITY

To the fullest extent permitted by law, the Contractor shall indemnify, and hold harmless the Owner, Professional, and their officers, officials, representatives, consultants, agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, of whatsoever nature caused in whole or in part by the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Article 16.

In claims against any person or entity indemnified under this Article 16 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Article 16 shall not be limited by a limitation on amount or type of damages, compensation or benefits payment by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

The obligations of the Contractor under this Article 16 shall not extend to the liability of the Professional, the Professional's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Professional, the Professional's consultants, and agents and employees of any of them, provided such giving or failure to give is the primary cause of the injury or damage.

The status of the Contractor in the Work to be performed by it under this Contract is that of an Independent Contractor and as such the Contractor shall properly safeguard against any and all personal injury including death, or damage to the public, to public and private property, materials, and things; and as such, the Contractor alone shall be responsible for any and all damage, loss, or injury to persons or property that may arise or be incurred in or during the conduct or progress of said Work without regard to whether or not the Contractor, its Subcontractors, Agents, or Employees have been negligent; and the Contractor shall keep the Owner and Professional indemnified from and discharged of and from any and

all responsibility and liability for risks and casualties of every description, as provided in the Agreement between the Owner and the Contractor.

GENERAL CONDITIONS OF THE CONTRACT: APRIL 2019

Roadway, Street & Area Lighting Upgrade
Final Project Specification & Proposal

Caln Township

9/1/2022

Prepared by:

Keystone Lighting Solutions
Michael Fuller, President

In Partnership with:

Delaware Valley Regional Planning Commission's
Regional Streetlight Procurement Program

Report Version 9.1.22.A

Table of Contents

Executive Summary

RSLPP Overview

The Delaware Valley Regional Planning Commission's Regional Streetlight Procurement Program (RSLPP) allows regional municipalities to improve the performance of municipal street lighting, and specifically to design, procure, install, and finance the transition to light-emitting-diode (LED) lighting technology, and to maintain those improvements. The RSLPP is organized in four Phases: Phase 1: Feasibility; Phase 2: Project Development; Phase 3: Construction; and Phase 4: Post-Construction Operations and Maintenance. These Phases are described in greater detail in Appendix A.

Keystone Lighting Solutions (KLS) was competitively selected by the RSLPP to serve as the Design Services Professional for all four Phases of the program. In Phase 1, KLS is contracted with DVRPC to provide Feasibility Studies for all participating municipalities. By using existing available information and with financial support from DVRPC and the PA Department of Environmental Protection, the RSLPP is able to offer this study at no-cost to the municipality. In Phases 2-4, KLS is contracted with the municipality to provide project development, project management and post-construction services.

This project specification document will be used throughout Phases 1 and 2 with slight modifications appropriate to each specific phase and associated assumptions.

Phase 1: Feasibility Study Overview & Approach

The Feasibility Study is prepared by KLS. The purpose of this Feasibility Study is to provide an assessment of the opportunity associated with the upgrade of a municipalities existing roadway, street and area lighting systems to LED, which may also include traffic signals. This study will act as a decision-making tool for your municipality to decide whether to proceed to Phase 2 of the RSLPP, Project Development. The Project Development Phase will include comprehensive audits, design and analysis resulting in a final project specification proposal.

Phase 1, Feasibility, is a "data-driven" effort that uses existing available information to assess the opportunity associated with an upgrade to your existing lighting system. No field work has been conducted for the development of this Feasibility Study. General design principals have been used by KLS to identify LED upgrade opportunities, described in the Design Approach and Photometric Analysis section. Round 2 existing vendor partner (i.e. manufacturers, installer and distributor) contracts have been extended and updated for Round 3 for use in developing this financial assessment of the municipalities upgrade opportunity.

Phase 2: Project Development Overview & Approach

Municipalities proceed to Phase 2 of the RSLPP by contracting with KLS to provide Project Development services, including a field audit of lighting equipment, analysis of gathered lighting data and attributes, a preliminary design (reviewed by the municipality), and a final design catered to municipal needs.

Project Development results in the following key deliverables, developed by KLS:

1. All raw data gathered during field auditing, delivered via web map and Excel. Data will have been scrubbed based on municipal feedback for data quality control (e.g. identification of correct boundary fixtures, etc.)
2. Final Project Specifications & Proposal guided by a design process that includes the following two steps. A detailed description of Project Design can be found in the Design Approach and Standardized Upgrade Plan section of this document.
    a. A preliminary design based on roadway classification, key attributes from the field audit process (e.g. pole spacing, lamp type/wattage, location of intersections, etc.) identification of "special need" areas (e.g. high-crash locations), verified by photometric analysis, then
    b. A final design, that replaced preliminary design, based on municipal feedback to preliminary design.
3. A Project Installation Worksheet, detailing a line by line installation schedule - provided at a later date with the final construction contract.
4. A Summary Bill of Material that lists unique products, their quantity, and extended total price – provided as Appendix D of this document.
5. A Schedule of Installation Values that lists unique Installation Items (e.g. cobrahead installation), Quantity, Unit Price & Extended Total Price - provided as Appendix C of this document.
6. A summary of DSP and DVRPC Program Fees – provided as Appendix E of this document.

The Final Project Specification & Proposal is developed during Phase 2 by KLS to serve as the basis of your Construction Contract with the Installation Contractor. DVRPC's contracts with each of the RSLPP selected vendors (Distributor, Manufacturer, and Installer) have been assigned to the Installation Contractor who will hold the construction contract with each municipality. Municipality's "piggy-back" off of DVRPC's Construction Contract using Chapter 19 of the Commonwealth Procurement Code, 62 Pa.C.S. § 1901 et seq. Items 2-5 listed above will form the unique aspects of each municipalities Construction Contract with the selected RSLPP Installation Contractor, and will guide your construction project. Municipalities that enter into a Construction Contract with the Installation Contractor will have their Construction Contract managed by KLS as part of Phase 3 (Construction) services.

Project Goals and Special Applications

The following list of project goals and special applications was developed during discussions between municipality staff/management and KLS as part of your feasibility study. These goals and special applications were applied to the Final Design presented in this report.

- **Project Goals**
  - Reduce Energy Costs
  - Reduce Maintenance Costs
  - Meet or Exceed Existing Lighting System Performance

- **Special Applications**
  - None identified by the municipality at this time
    - Minor scope changes during construction can be considered using available project contingency changes

Project Scope of Work

The following is a list of all possible energy conservation measures (ECMs) presented for the lighting upgrade project. The "In Scope" column indicates which ECMs the municipality has chosen to include in the scope of work for the Final Project Specifications and Proposal:

Upgrade Category	In Scope
PECO Buyback	Yes
Cobrahead Lighting	Yes
Decorative Lighting	Yes
Area Lighting	No
Traffic Signals	No
Control Alternates*	**In Scope**
Manual Fixture Controls	Option
Networked Control System	Option

** Basic photocell or timeclock control is included for all upgrade categories*

The scope included above will be defined as the "Base Upgrade" solution later referenced in this document. Items identified as options will be provided as alternate solutions separately defined for evaluation and consideration.

Executive Financial Summary

Below is an Executive Financial Summary. This summary table provides Total Annual Operating Cost Savings (includes energy and maintenance cost savings), Total Project Costs, and Payback for each Energy Conservation Measure (ECM).

		Capital Expenditure	
Upgrade Options	Annual Operating Cost Savings	Total Net Project Costs	Payback Period
Base Upgrade	$31,032	$98,127	3.2
Base Upgrade + Manual Controls Option	$31,066	$106,896	3.4
Base Upgrade + Network Controls Option	$33,661	$177,538	5.3
Streetscape Retrofit Adder (to above options)	TBD	$14,673	

Notes:

1) Includes costs and savings of ECM upgrade + PECO baseline adjustments

Existing Lighting System

Unmetered Streetlight – PECO Energy and Cost Baseline

The table below represents the current Energy and Cost baseline for Unmetered Streetlights in your municipality, developed using the inventory of equipment that is represented on your unmetered PECO streetlight bill. Any energy cost savings realized from upgrades to the unmetered fixtures installed in your community will be realized through changes to this PECO bill(s). Because the quantities, types, and wattages of fixtures reflected on the PECO bill(s) vary from what is actually installed in the municipality, the table on the following page (Verified Existing Street Lighting System) is used as the basis of the Scope of Work for this project.

PECO Unmetered Streetlight Baseline
(Consolidated Summary of all PECO Streetlight Bills)

Fixture Type Code	Fixture TypeDescription	Location Count	Fixture Quantity	Fixture Watts	Total kW	Annual Operating Hours	Total kWh/ Year	Total Annual Electric Costs
Streetlights								
CH-100W-HPS	Cobrahead, 100W HPS		15	131	2.0	4,092	8,041	$3,443
CH-100W-MV	Cobrahead, 100W MV		57	115	6.6	4,092	26,823	$13,690
CH-150W-HPS	Cobrahead, 150W HPS		10	192	1.9	4,092	7,857	$2,415
CH-175W-MV	Cobrahead, 175W MV		19	191	3.6	4,092	14,850	$5,070
CH-250W-HPS	Cobrahead, 250W HPS		4	294	1.2	4,092	4,812	$1,426
CH-103W-INC	Cobrahead, 103W INC		43	103	4.4	4,092	18,123	$8,818
CH-400W-HPS	Cobrahead, 400W HPS		7	450	3.2	4,092	12,890	$3,105
CH-400W-MV	Cobrahead, 400W MV		7	429	3.0	4,092	12,288	$2,591
Streetlight Totals			**162**		**25.8**		**105,684**	**$40,557**
Decorative								
4SC-70W-HPS	4-Sided Colonial, 70W HPS		4	94	0.4	4,092	1,539	$938
4SC-175W-MV	4-Sided Colonial, 175W MV		33	191	6.3	4,092	25,792	$8,805
4SC-100W-MV	4-Sided Colonial, 100W MV		30	115	3.5	4,092	14,117	$7,205
Decorative Totals			**67**		**10.1**		**41,448**	**$16,948**
Energy Usage Sub-Total			**229**		**36.0**		**147,132**	**$57,505**
Locations	Service Locations	0						$0
Total Electric Bill Costs		**0**						**$57,505**

*For the SL-E "Customer Owner" Tariff the Service Location Distribution Charge (SLDC), also known as the "Tap Fee" is based on $6.89 per location, per month. There are no SLDC specific fees for the SL-S "PECO Owned" Tariff, which would be indicated by the zero Service Locations in the table above. When SLDC fees apply, it is a shown as a fixed charge on your bill, and it is not impacted by the wattage of the fixture at each location. The costs associated with SLDC are expected to stay the same unless the quantity of service locations changes as a result of your RSLPP project. Estimates for any expected changes in SLDC as a result of the project will be modeled in the following section.

Unmetered Streetlight - Audit Verified Inventory and Adjustments

The table below represents the field-audited lighting inventory for all Unmetered Streetlights located in your municipality. This audit information has been analyzed by KLS and the municipality to ensure its accuracy. The inventory presented in the table below lists the quantities and types of fixtures eligible for conversion to LED, and serves as the basis for the scope of work for your project. Any differences from the existing PECO baseline and the field-audited lighting inventory is reflected in the adjustment table at the bottom of the page and will carry forward in the economic analysis in later sections.

Verified Existing Streetlight System
(Based on field audit)

Fixture Type Code	Fixture TypeDescription	Location Count	Fixture Quantity	Fixture Watts	Total kW	Annual Operating Hours	Total kWh/ Year	Total Annual Electric Costs
Cobrahead + Area Lighting								
CH-100W-HPS	Cobrahead, 100W HPS		32	131	4.2	4,092	17,154	$7,346
CH-100W-MV	Cobrahead, 100W MV		38	115	4.4	4,092	17,882	$9,126
CH-150W-HPS	Cobrahead, 150W HPS		12	192	2.3	4,092	9,428	$2,898
CH-175W-MV	Cobrahead, 175W MV		14	191	2.7	4,092	10,942	$3,736
CH-250W-HPS	Cobrahead, 250W HPS		19	294	5.6	4,092	22,858	$6,772
CH-70W-HPS	Cobrahead, 70W HPS		7	94	0.7	4,092	2,693	$1,642
CH-54W-LED	Cobrahead, 54W LED		1	54	0.1	4,092	221	$398
CH-99W-LED	Cobrahead, Undefined Lamp Wattage, LED		2	99	0.2	4,092	810	$856
CH-400W-HPS	Cobrahead, 400W HPS		8	450	3.6	4,092	14,731	$3,548
CH-400W-MV	Cobrahead, 400W MV		3	429	1.3	4,092	5,266	$1,110
CH-143W-LED	Cobrahead, 143W LED		1	143	0.1	4,092	585	$457
SEC-100W-MV	Security Light, 100W MV		1	115	0.1	4,092	471	$240
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts		7	131	0.9	4,092	3,752	$1,607
SEC-103W-INC	Security Light, 103W INC		36	103	3.7	4,092	15,173	$7,383
SEC-99W-HPS	Security Light, Undefined Lamp Type and Watts		3	131	0.4	4,092	1,608	$689
CH-193W-LED	Cobrahead, 193W LED		1	193	0.2	4,092	790	$490
CH-70W-LED	Cobrahead, 70W LED		1	70	0.1	4,092	286	$409
SB-150W-HPS	Shoebox Area Light, 250W HPS		2	192	0.4	4,092	1,571	$483
WP-100W-HPS	Wallpack, 100W HPS		1	131	0.1	4,092	536	$230
Cobrahead + Area Lighting Totals			**189**		**31.0**		**126,758**	**$49,419**
Decorative								
4SC-175W-MV	4-Sided Colonial, 175W MV		32	191	6.1	4,092	25,010	$8,538
4SC-100W-MV	4-Sided Colonial, 100W MV		26	115	3.0	4,092	12,235	$6,244
4SC-100W-HPS	4-Sided Colonial, 100W HPS		4	131	0.5	4,092	2,144	$918
Decorative Totals			**62**	**437**	**9.6**		**39,390**	**$15,701**
Energy Usage Sub-Total			**251**		**40.6**		**166,147**	**$65,120**
Locations	Service Locations							
Total Electric Bill Costs		**0**						**$65,120**

PECO Inventory Adjustment and Impact
(PECO bill impact of differences between PECO baseline and audit of existing fixtures)

Adjustment Type	Location Count	Fixture Quantity	Fixture Watts	Total kW	Annual Operating Hours	Total kWh/ Year	Total Annual Electric Costs
PECO Baseline kWh		229		36.0	4,092	147,132	$57,505
Audit Verified Existing kWh		251		40.6	4,092	166,147	$65,120
kWh Adjustment Savings (+) and Costs (-)		(22)		(4.6)		(19,016)	($7,615)
PECO Baseline Locations	0						$0
Audit Verified Existing Locations	0						$0
Location Adjustment Savings (+) and Costs (-)	0						$0
Total Adjustment Savings (+) and Costs (-)							**($7,615)**

Design Approach and Standardized Upgrade Plan

Design Approach

The following section explains the design approach during Phase 1 and Phase 2 of the RSLPP Project. The goal of the design approach is to create standardized upgrade recommendations for typical applications.

During the manufacturer procurement and evaluation process, KLS conducted photometric analyses for 5 typical lighting applications in order to compare the lighting performance of a "traditional" fixture type and technology (e.g. high-pressure sodium, metal halide, mercury vapor, incandescent) with that of a new fixture using LED technology. When keeping all application details the same (e.g. road width, pole spacing, fixture mounting height, etc.) this analysis identifies LED fixtures that perform equal or better than existing older technology fixtures. An example of this photometric analysis comparison can be seen in Appendix F.

For each typical application analysis KLS evaluates illumination levels and uniformity ratios against IES RP-8 standards. Actual municipality applications will likely not match typical applications (i.e. pole spacing, fixture mounting height) and therefore will not necessarily meet IES RP-8 standards. The design goal and strategy for the RSLPP is to "meet or exceed" existing lighting performance. Performance is not solely based on illumination levels (quantity of light) but is heavily impacted by light distribution, uniformity, glare, cut-off, source-brightness and color temperature. Many of these factors impact a human's perceived visibility of a lit environment.

Upgrade recommendations will also be advised by a less technical, but equally relevant approach, which is to utilize the general knowledge of what upgrades have worked well on previous rounds of the RSLPP and other KLS projects. This secondary assessment is be used as a sanity check to the previous analysis driven approach discussed above.

All of the above design considerations were used as evaluation metrics during the procurement process to select manufacturer solutions that provided the best solution for the lowest long-term total cost of ownership.

Typical Applications include:

- **Cobrahead Roadway Applications**
  - Arterial > Roadways
  - Collector > Roadways
  - Local Residential Street
- **Decorative Street Applications**
  - Commercial District
  - Local Residential Street

Note: *The above list of Typical Applications may be expanded during Phase 2, Project Development. Intersection typical designs will be considered in Phase 2, when fixture location information is available. Typical designs will be provided for high and low volume Local Residential Streets in Phase 2, when roadway volume information is available.*

The project design and specifications for LED lighting fixtures represented in this document were developed using the following general approaches for each phase:

For Phase 1 Feasibility:

1) Utilize available PECO streetlight information to determine the quantity, lamp type, wattage and general location for each unique component (luminaire) type for relevant accounts.

2) Utilize municipal provided additional data for further define luminaire types (e.g. 4-Sided Colonial decorative luminaires). Unless additional detail is available and provided it is assumed that all luminaire types are cobrahead-style.

3) Apply the standardized design matrix in the following table to determine the appropriate LED upgrade solution for each existing component (luminaire) type.

For Phase 2 Project Development:

1) **Gather field audit information** – The design process begins with a field audit to identify the existing locations and attributes of your incumbent street lighting system and when possible match them with pre-existing PECO address information. The locations of your existing streetlights will remain for your LED conversion project, as moving fixtures to new locations would be cost prohibitive and unnecessary to achieve the RSLPP design goals. During the field audit, KLS gathers many key pieces of information on your existing lighting system, including but not limited to the geolocation of the pole, pole type and style, the fixture style (e.g. cobrahead or decorative), the mounting height of the fixture, length of the arm, angle of the arm to the roadway or intersection, and the wattage of the lamp. These attributes inform the rest of the design process. The audit process uses various sources to identify lamp wattage and type, in preference order: municipality confirmed specifications, observed lamp identified tag on fixture, PECO data when record can be matched to existing information, likely wattage given application and adjacent fixtures with known lamp types and wattages.

2) **Identify the correct fixture type for the application** – In most cases the existing fixture style that was identified in the field audit (e.g. cobrahead or decorative) is the appropriate fixture type for the lighting application, and a replacement LED fixture of the same style will be used. If a different fixture style is warranted it will be specified and reviewed with the municipality.

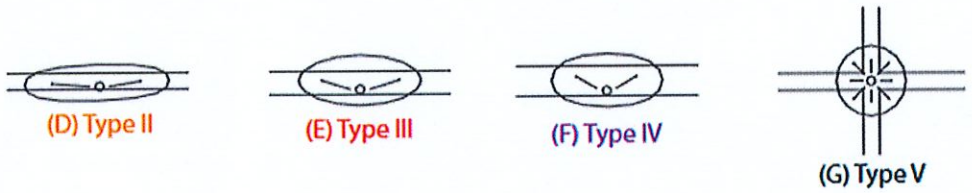
3) **Identify the correct LED wattage and lumen package for proposed fixture** – There are two aspects to identifying the correct replacement wattage and lumen package for the new fixture. The first aspect is to identify a replacement LED fixture that meets or exceeds the illumination levels of the existing fixture. The second aspect is standardizing the replacement fixtures to make sure that similar fixture types and wattages are utilized on similar roadway types defined by traffic volume data or roadway classification and municipal input. See the table in the Standardized Upgrade Plan for an overview of the standardization upgrade strategy applied to RSLPP projects.

   Upgrade recommendations will also be advised by a less technical, but equally relevant approach, which is to utilize the general knowledge of what upgrades have worked well on previous rounds of the RSLPP and other KLS projects. This secondary assessment is be used as a "sanity" check to the previous analysis driven approach discussed above. Some municipalities

may make a decision, possibly consistent with current illumination levels, to have a relatively higher or lower illumination level than the standard recommended by KLS.

For area lighting applications (non-roadway), spaces to be illuminated are highly variable and not subject to standardization, the design approach of meeting or exceeding the lighting performance of the existing fixture is utilized.

4) **Identify the correct fixture distribution type** – All LED fixtures provide options for a distribution type, which is how light spreads out from the fixture to the ground or work surface. These distribution types as defined by the Illumination Engineering Society have the following shapes:



For roadway lighting applications with a fixture and arm, Type II distributions are used for mid-street general roadway applications. For intersections, Type III or V distributions are the options considered. When a single fixture is illuminating an intersection and the arm positioned at an angle (e.g. 45-degree) such that the fixture is in-line with the middle of an intersection a type V distribution is utilized. For all other intersections a Type III distribution will be utilized.

For street lighting applications with a post-top fixture (e.g. 4-Sided Colonial) Type II distributions will be utilized at mid-street locations and Type V at intersections.

For area lighting applications, spaces to be illuminated are highly variable requiring distribution types to be specified on a case by case basis. It is common for forward-throw type IV distributions to be utilized for area lighting applications such as parking lots with fixtures located on the perimeter.

It should be noted that in addition to specifying the correct distribution types that control how light is spread toward the ground, the RSLPP also minimizes uplight through the specification of "cut-off" fixtures. Cut-off fixtures have no uplight (above 90-degrees). All RSLPP cobrahead, shoebox, wallpack types will be specified as "cut-off" fixtures. Due to the nature of the fixture design, decorative fixtures "cut-off" is not typically available for specification, but the RSLPP utilizes fixtures that minimize uplight.

5) **Select the preferred color temperature** – Color temperature is the general perception of the light source color. The metric for color temperature is the Correlated Color Temperature (CCT) measured in Kelvin (K) temperature. Older technology color temperatures could range from yellow (high pressure sodium, CCT = ~2200K) to warm-white (incandescent, ~2700K) to white (metal halide, CCT = ~4000K) and blue-white (mercury vapor, CCT = ~5000K+). LED technology is generally available within a range of white options from 3000K (warm white) to 6500K (blue white). The RSLPP offers CCT options from ~3000K (warm white) to ~4000K (white). Municipalities make their selection of color temperature based on preferences utilizing input from KLS and evaluating previous installation in neighboring municipalities. Color temperatures can be mixed within a municipality utilizing different types in different areas (e.g. residential

neighborhoods, commercial districts, etc.).

6) **Traffic signal lamp and sign upgrades** – LED traffic signal lamp and pedestrian sign upgrades are direct 1-for-1 replacements of the existing lamps and signs. LED upgrades meet the same fit, form and function of the existing lamps and signs while delivering significant operating cost savings for an attractive return on investment.

Standardized Upgrade Plan

Based on the general design approach discussed above, the following standardized upgrade plan has been developed for this lighting upgrade project.

Cobrahead

Local Roadway

Existing Lamp Type	Typical Lamp Wattage	Proposed LED Fixture Watts	Optional Bump Up Wattage[1]	Distribution Type[2]	Color Temperature
High Pressure Sodium	70W or 100W	38W	53W	Mid-Street > Type 2 Intersection > Type 3 or 5	Municipality Choice 3000K or 4000K
Metal Halide	100W or 175W	38W	53W		
Mercury Vapor	100W or 175W	38W	53W		

Collector Roadway

Existing Lamp Type	Typical Lamp Wattage	Proposed LED Fixture Watts	Optional Bump Up Wattage[1]	Distribution Type	Color Temperature
High Pressure Sodium	150W	73W	88W	Mid-Street > Type 2 Intersection > Type 3 or 5	Municipality Choice 3000K or 4000K
Metal Halide	175W or 250W	73W	88W		
Mercury Vapor	175W or 250W	73W	88W		

Major Roadway

Existing Lamp Type	Typical Lamp Wattage	Proposed LED Fixture Watts	Optional Bump Up Wattage[1]	Distribution Type	Color Temperature
High Pressure Sodium	250W or 400W	106W	161W	Mid-Street > Type 2 Intersection > Type 3 or 5	Municipality Choice 3000K or 4000K
Metal Halide	250W or 400W	106W	161W		
Mercury Vapor	250W or 400W	106W	161W		

Notes:

1) Bump up wattage could be selected for overall higher illumination levels (30-40%) throughout a municipality or at intersections. It also would be the recommended specification level when using controls with the expectation of dimming down to the desired design level at time of installation.

2) Type 5 distribution to be used at intersections with a single fixture illuminating the interesection with arm positioned on 45-degree angle toward center of the intersection. All other intersection applications should use Type 3.

4-Sided Colonial

All Roadway Types

Existing Lamp Type	Typical Lamp Wattage	Proposed LED Fixture Watts	Optional Bump Up Wattage[1]	Distribution Type	Color Temperature
High Pressure Sodium	70W or 100W	39W	46W	Mid-Street > Type 2 Intersection > Type 5	Municipality Choice 3000K or 4000K
Metal Halide	100W or 175W	39W	46W		
Mercury Vapor	100W or 175W	39W	46W		

Notes:

1) Bump up wattage could be selected for overall higher illumination levels throughout a municipality or at intersections

Premium Decorative Fixtures (Lanterns & Acorns)

All Roadway Types

Existing Lamp Type	Typical Lamp Wattage	Proposed LED Fixture Watts	Optional Bump Up Wattage[1]	Distribution Type	Color Temperature
High Pressure Sodium	150W	40W	70W	Mid-Street > Type 2 Intersection > Type 5	Municipality Choice 3000K or 4000K
Metal Halide	175W	40W	70W		
Mercury Vapor	175W	40W	70W		

Notes:

1) Bump up wattage could be selected for overall higher illumination levels throughout a municipality or at intersections

Advanced Lighting Control Upgrade Options

Standard control solutions, such as fixture-mounted photocells that are currently being used in the municipality's existing lighting system will be offered as baseline replacement solutions for all new LED fixtures in this project. Retrofit kits will reuse existing photocells. Fixtures that are currently controlled by time clocks and/or master photocells, those centralized control systems will be used to control new LED fixtures. Advanced Lighting Controls can be layered on the standard LED fixture upgrade options in place of or in addition to the standard control solutions. The benefits of Advanced Lighting Control include the potential for additional energy and maintenance savings. There are no additional design costs associated with the specification of advanced lighting controls, but depending on the type of controls specified, there will be additional project costs to purchase and install the controls. The sections below define the available control options that have been identified through the RSLPP procurement process. Savings and project costs for Manual Fixture Controls and Network Control Solutions are provided for consideration in later sections.

Manual Fixture Controls

Manual Fixture Controls are available to control LED cobrahead and 4-sided colonial fixtures solutions selected through the RSLPP, and these would be specified in addition to a standard photocell. A manual fixture control is located in the fixture housing, not visible to the public, and allows for light levels to be adjusted up or down. When this control option is requested, the next higher fixture lumen package is specified and during installation the control is "dialed-down" to the desired wattage and lumen output at the time of installation. This option is not typically used to save energy but rather to provide future flexibility to increase or decrease illumination levels based on application needs. When LED fixtures are dimmed, they do experience longer life, which delivers additional maintenance savings. In Round I of the RSLPP more than 30% of municipalities choose this option. Manual fixture controls are not typically used area lighting fixtures.

Stand-Alone Dimming Controls

Stand-alone dimming controls are typically useful for area lighting fixtures where automatic dimming is desired during the fixture "on" period or where a timeclock is not available to turn lights off during the typical photocell fixture "on" period. Two types of stand-alone dimming controls are available: a **photocell replacement option** or a **separate dimming module** wired as an additional fixture component. These local connected controls allow for "pre-set" dimming schedules to be defined for each fixture. For example, if it is desired for a set of fixtures (e.g. parking lot) to illuminate at dusk, dim down to 30% at 2am and turn off at dawn, the local connected control can be set for this specific dimming strategy. Often these controls can be connected to a local networking technology (e.g. Bluetooth) and re-programmed on-site.

Network Control System

If a municipality wants complete control of a lighting system with remote networked access, then a network control system can be specified and designed. These control systems allow a municipality to manage and remotely modify master dimming schedules for all connected

fixtures. A network control system also monitors the operations of all connected fixtures. Outages or under-performing fixtures can be quickly identified and, in most cases, be included in a proactive reporting to the municipality. This option can be used to save energy but is typically specified for the asset management benefits. In Round I of the RSLPP one municipality choose this option.

For this round of the RSLPP, the network control system selected utilizes fixture mounted nodes that communicate via a mesh network to one or more gateways (municipality size) that communicate to a cloud-based server. Municipalities can access the cloud-based server with a standard internet connection. This control system will likely be eligible for the PECO SL-C tariff which could generate additional energy savings. Municipalities that install a network control system will not also need photocells.

Upgrade Specifications & Savings

Annual Energy Savings – Unmetered Streetlights (Base Upgrade)

The following table shows the energy and cost comparison between the existing streetlight system and the proposed LED upgrade solutions. The resulting annual energy savings associated with the LED upgrade is also shown. If any differences were identified during the Phase 2 audit between the PECO energy and cost baseline and the field audit verified existing streetlight system, those adjustments and associated cost impacts are reflected in the PECO Inventory Adjustment at the bottom of the chart. The cost or savings impact of any service location adjustments (e.g. due to PECO buyback and tariff change) is also shown in this table.

Existing							Upgrade							Savings
Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Annual Energy Cost Savings
Cobrahead + Shoebox Streetlighting														
CH-100W-HPS	Cobrahead, 100W HPS	131	5	0.7	2,680	$1,148	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	5	0.5	2,169	$141	$1,007
CH-100W-HPS	Cobrahead, 100W HPS	131	10	1.3	5,361	$2,296	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	106	10	1.1	4,338	$282	$2,014
CH-100W-HPS	Cobrahead, 100W HPS	131	8	1.0	4,288	$1,837	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	8	0.3	1,244	$81	$1,756
CH-100W-HPS	Cobrahead, 100W HPS	131	2	0.3	1,072	$459	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	2	0.1	311	$20	$439
CH-100W-HPS	Cobrahead, 100W HPS	131	1	0.1	536	$230	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$219
CH-100W-HPS	Cobrahead, 100W HPS	131	1	0.1	536	$230	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$210
CH-100W-HPS	Cobrahead, 100W HPS	131	2	0.3	1,072	$459	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	2	0.1	597	$39	$420
CH-100W-HPS	Cobrahead, 100W HPS	131	3	0.4	1,608	$689	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	73	3	0.2	896	$58	$630
CH-100W-MV	Cobrahead, 100W MV	115	14	1.6	6,588	$3,362	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	14	1.5	6,073	$395	$2,967
CH-100W-MV	Cobrahead, 100W MV	115	2	0.2	941	$480	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	106	2	0.2	868	$56	$424
CH-100W-MV	Cobrahead, 100W MV	115	12	1.4	5,647	$2,882	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	12	0.5	1,866	$121	$2,761
CH-100W-MV	Cobrahead, 100W MV	115	6	0.7	2,823	$1,441	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	6	0.2	933	$61	$1,380
CH-100W-MV	Cobrahead, 100W MV	115	3	0.3	1,412	$721	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	3	0.1	466	$30	$690
CH-100W-MV	Cobrahead, 100W MV	115	1	0.1	471	$240	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$221

Annual Energy Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing							Upgrade							Savings
Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Annual Energy Cost Savings
Cobrahead + Shoebox Streetlighting														
CH-150W-HPS	Cobrahead, 150W HPS	192	1	0.2	786	$241	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$213
CH-150W-HPS	Cobrahead, 150W HPS	192	1	0.2	786	$241	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$213
CH-150W-HPS	Cobrahead, 150W HPS	192	4	0.8	3,143	$966	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	106	4	0.4	1,735	$113	$853
CH-150W-HPS	Cobrahead, 150W HPS	192	1	0.2	786	$241	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$231
CH-150W-HPS	Cobrahead, 150W HPS	192	1	0.2	786	$241	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$231
CH-150W-HPS	Cobrahead, 150W HPS	192	2	0.4	1,571	$483	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	2	0.1	597	$39	$444
CH-150W-HPS	Cobrahead, 150W HPS	192	2	0.4	1,571	$483	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	2	0.1	597	$39	$444
CH-175W-MV	Cobrahead, 175W MV	191	2	0.4	1,563	$534	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	2	0.2	868	$56	$477
CH-175W-MV	Cobrahead, 175W MV	191	1	0.2	782	$267	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$239
CH-175W-MV	Cobrahead, 175W MV	191	5	1.0	3,908	$1,334	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	5	0.2	777	$51	$1,284
CH-175W-MV	Cobrahead, 175W MV	191	4	0.8	3,126	$1,067	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	4	0.2	622	$40	$1,027
CH-175W-MV	Cobrahead, 175W MV	191	1	0.2	782	$267	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$257
CH-175W-MV	Cobrahead, 175W MV	191	1	0.2	782	$267	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$247
CH-250W-HPS	Cobrahead, 250W HPS	294	16	4.7	19,249	$5,702	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	16	1.7	6,940	$451	$5,251
CH-250W-HPS	Cobrahead, 250W HPS	294	1	0.3	1,203	$356	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$328
CH-250W-HPS	Cobrahead, 250W HPS	294	1	0.3	1,203	$356	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$346
CH-250W-HPS	Cobrahead, 250W HPS	294	1	0.3	1,203	$356	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$346

Annual Energy Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing							Upgrade							Savings
Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Annual Energy Cost Savings
Cobrahead + Shoebox Streetlighting														
CH-70W-HPS	Cobrahead, 70W HPS	94	1	0.1	385	$235	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$224
CH-70W-HPS	Cobrahead, 70W HPS	94	1	0.1	385	$235	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$224
CH-70W-HPS	Cobrahead, 70W HPS	94	4	0.4	1,539	$938	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	4	0.3	1,195	$78	$861
CH-70W-HPS	Cobrahead, 70W HPS	94	1	0.1	385	$235	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$215
CH-54W-LED	Cobrahead, 54W LED	54	1	0.1	221	$398	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$370
CH-99W-LED	Cobrahead, Undefined Lamp Wattage, LED	99	1	0.1	405	$428	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$418
CH-99W-LED	Cobrahead, Undefined Lamp Wattage, LED	99	1	0.1	405	$428	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$409
CH-400W-HPS	Cobrahead, 400W HPS	450	2	0.9	3,683	$887	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	2	0.2	868	$56	$831
CH-400W-HPS	Cobrahead, 400W HPS	450	4	1.8	7,366	$1,774	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	4	0.4	1,735	$113	$1,661
CH-400W-HPS	Cobrahead, 400W HPS	450	1	0.5	1,841	$444	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$433
CH-400W-HPS	Cobrahead, 400W HPS	450	1	0.5	1,841	$444	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$424
CH-400W-MV	Cobrahead, 400W MV	429	3	1.3	5,266	$1,110	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	3	0.3	1,301	$85	$1,026
CH-143W-LED	Cobrahead, 143W LED	143	1	0.1	585	$457	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$429
SEC-100W-MV	Security Light, 100W MV	115	1	0.1	471	$240	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	1	0.0	155	$10	$230
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	131	2	0.3	1,072	$459	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	2	0.2	868	$56	$403
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	131	3	0.4	1,608	$689	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	3	0.1	466	$30	$658
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	131	2	0.3	1,072	$459	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	2	0.1	597	$39	$420
SEC-103W-INC	Security Light, 103W INC	103	16	1.6	6,744	$3,281	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	16	0.6	2,488	$162	$3,119
SEC-103W-INC	Security Light, 103W INC	103	3	0.3	1,264	$615	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	3	0.1	466	$30	$585
SEC-103W-INC	Security Light, 103W INC	103	5	0.5	2,107	$1,025	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	5	0.2	777	$51	$975
SEC-103W-INC	Security Light, 103W INC	103	8	0.8	3,372	$1,641	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	8	0.6	2,390	$155	$1,485
SEC-103W-INC	Security Light, 103W INC	103	1	0.1	421	$205	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	1	0.1	299	$19	$186
SEC-103W-INC	Security Light, 103W INC	103	3	0.3	1,264	$615	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	73	3	0.2	896	$58	$557
SEC-99W-HPS	Security Light, Undefined Lamp Type and Watts	131	3	0.4	1,608	$689	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	3	0.1	466	$30	$658
CH-193W-LED	Cobrahead, 193W LED	193	1	0.2	790	$490	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$462
CH-70W-LED	Cobrahead, 70W LED	70	1	0.1	286	$409	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	1	0.1	434	$28	$381
SB-150W-HPS	Shoebox Area Light, 250W HPS	192	2	0.4	1,571	$483	SB-71W-LED-T5-4K (+PC)	Shoebox, 71W, LED, Type 5, 4000K	71	2	0.1	581	$38	$445
WP-100W-HPS	Wallpack, 100W HPS	131	1	0.1	536	$230	WP-100W-HPS	Wallpack, 100W HPS	131	1	0.1	536	$230	$0
							Service Location Impact of PECO Buyback (75%)						$15,627	($15,627)
Cobrahead + Shoebox Streetlighting Total			189	31.0	126,758	$49,419				189	13.4	54,800	$19,386	$30,034

Annual Energy Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing							Upgrade							Savings
Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kW	Total kWh/ Year	Annual Electric Costs	Annual Energy Cost Savings
Decorative														
4SC-175W-MV	#REF!	191	26	5.0	20,321	$6,937	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	39	26	1.0	4,149	$270	$6,667
4SC-175W-MV	4-Sided Colonial, 175W MV	191	6	1.1	4,689	$1,601	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	39	6	0.2	958	$62	$1,539
4SC-100W-MV	4-Sided Colonial, 100W MV	115	24	2.8	11,294	$5,764	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	39	24	0.9	3,830	$249	$5,515
4SC-100W-MV	4-Sided Colonial, 100W MV	115	2	0.2	941	$480	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	39	2	0.1	319	$21	$460
4SC-100W-HPS	4-Sided Colonial, 100W HPS	131	1	0.1	536	$230	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	39	1	0.0	160	$10	$219
4SC-100W-HPS	4-Sided Colonial, 100W HPS	131	3	0.4	1,608	$689	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	39	3	0.1	479	$31	$658
							Service Location Impact of PECO Buyback (50%)						$5,126	($5,126)
Decorative Total			62	9.6	39,390	$15,701				62	2.4	9,894	$5,770	$9,931
Existing and Upgrade Totals			251	40.6	166,147	$65,120				251	15.8	64,695	$25,156	$39,965
Baseline Adjustments														
kWh Adjustment	PECO Inventory kWh Adjustment													($7,615)
Locations Adjustment	PECO Inventory Locations Adjustment													
Baseline Adjustments Total				0.0	0	$0					0.0	0	$0	($7,615)
Streetlight Total			251	40.6	166,147	$65,120				251	15.8	64,695	$25,156	$32,350

PECO Streetlight Bill Comparison – Unmetered Streetlights (Base Upgrade)

The following table provides a comparison of what how the existing PECO streetlight bill compares to the proposed PECO streetlight bill and the resulting project savings.

Existing Bill						Upgrade Bill						Project Savings	
Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kWh/ Year	Annual Electric Costs	Fixture Type Code	Fixture Type Description	Watts/ Fixture	Fixture Quantity	Total kWh/ Year	Annual Electric Costs	Annual kWh Savings	Annual Energy Cost Savings
Streetlights						**Cobrahead + Shoebox Streetlighting**							
CH-100W-HPS	Cobrahead, 100W HPS	131	15	8,041	$3,443	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	106	32	13,880	$903		
CH-100W-MV	Cobrahead, 100W MV	115	57	26,823	$13,690	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	106	23	9,976	$649		
CH-150W-HPS	Cobrahead, 150W HPS	192	10	7,857	$2,415	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	106	17	7,374	$480		
CH-175W-MV	Cobrahead, 175W MV	191	19	14,850	$5,070	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	38	52	8,086	$526		
CH-250W-HPS	Cobrahead, 250W HPS	294	4	4,812	$1,426	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	38	18	2,799	$182		
CH-400W-HPS	Cobrahead, 400W HPS	450	7	12,890	$3,105	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	38	11	1,710	$111		
CH-400W-MV	Cobrahead, 400W MV	429	7	12,288	$2,591	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	73	17	5,078	$330		
CH-103W-INC	Cobrahead, 103W INC	103	43	18,123	$8,818	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	73	8	2,390	$155		
4SC-70W-HPS	4-Sided Colonial, 70W HPS	94	4	1,539	$938	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	73	8	2,390	$155		
4SC-100W-MV	4-Sided Colonial, 100W MV	115	30	14,117	$7,205	SB-71W-LED-T5-4K (+PC)	Shoebox, 71W, LED, Type 5, 4000K	71	2	581	$38		
4SC-175W-MV	4-Sided Colonial, 175W MV	191	33	25,792	$8,805	WP-100W-HPS	Wallpack, 100W HPS	131	1	536	$230		
						Cobrahead + Shoebox Streetlighting Sub-Total			189	54,800	$3,759		
						Decorative							
						4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	39	51	8,139	$529		
						4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	39	11	1,755	$114		
						Decorative Sub-Total			62	9,894	$644		
Streetlight Energy			229	147,132	$57,505	**Streetlight Energy**			251	64,695	$4,403	82,437	$53,102
Streetlight Locations			0		$0	**Streetlight Locations**			251		$20,753		($20,753)
Streetlight Total Bill					$57,505	**Streetlight Total Bill**					$25,156		$32,350

Annual Maintenance Savings – Unmetered Streetlights (Base Upgrade)

The following table shows the annual maintenance savings for each existing fixture type and the upgrade recommendation. Average annual maintenance expenses were modeled for both the existing and proposed fixture types. Average annual maintenance expenses for proposed fixtures were further reduced to reflect a 1-year labor warranty and a 10-year parts warranty. The assumptions used to estimate Annual Maintenance savings are provided in Appendix B, Project Assumptions.

Existing				Upgrade				Savings
Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Annual Maintenance Savings
Cobrahead + Area Streetlighting								
CH-100W-HPS	Cobrahead, 100W HPS	5	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	5	$21	($21)
CH-100W-HPS	Cobrahead, 100W HPS	10	$0	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	10	$43	($43)
CH-100W-HPS	Cobrahead, 100W HPS	8	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	8	$32	($32)
CH-100W-HPS	Cobrahead, 100W HPS	2	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$8	($8)
CH-100W-HPS	Cobrahead, 100W HPS	1	$0	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-100W-HPS	Cobrahead, 100W HPS	1	$0	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-100W-HPS	Cobrahead, 100W HPS	2	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$8	($8)
CH-100W-HPS	Cobrahead, 100W HPS	3	$0	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
CH-100W-MV	Cobrahead, 100W MV	14	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	14	$60	($60)
CH-100W-MV	Cobrahead, 100W MV	2	$0	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	2	$9	($9)
CH-100W-MV	Cobrahead, 100W MV	12	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	12	$48	($48)
CH-100W-MV	Cobrahead, 100W MV	6	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	6	$24	($24)
CH-100W-MV	Cobrahead, 100W MV	3	$0	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
CH-100W-MV	Cobrahead, 100W MV	1	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)

Annual Maintenance Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing				Upgrade				Savings
Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Annual Maintenance Savings
Cobrahead + Area Streetlighting								
CH-150W-HPS	Cobrahead, 150W HPS	1	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-150W-HPS	Cobrahead, 150W HPS	1	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-150W-HPS	Cobrahead, 150W HPS	4	$0	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	4	$17	($17)
CH-150W-HPS	Cobrahead, 150W HPS	1	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-150W-HPS	Cobrahead, 150W HPS	1	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-150W-HPS	Cobrahead, 150W HPS	2	$0	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	2	$8	($8)
CH-150W-HPS	Cobrahead, 150W HPS	2	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$8	($8)
CH-175W-MV	Cobrahead, 175W MV	2	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$9	($9)
CH-175W-MV	Cobrahead, 175W MV	1	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-175W-MV	Cobrahead, 175W MV	5	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	5	$20	($20)
CH-175W-MV	Cobrahead, 175W MV	4	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	4	$16	($16)
CH-175W-MV	Cobrahead, 175W MV	1	$0	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-175W-MV	Cobrahead, 175W MV	1	$0	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-250W-HPS	Cobrahead, 250W HPS	16	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	16	$69	($69)
CH-250W-HPS	Cobrahead, 250W HPS	1	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-250W-HPS	Cobrahead, 250W HPS	1	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-250W-HPS	Cobrahead, 250W HPS	1	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)

Annual Maintenance Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing				Upgrade				Savings
Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Annual Maintenance Savings
Cobrahead + Area Streetlighting								
CH-70W-HPS	Cobrahead, 70W HPS	1	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-70W-HPS	Cobrahead, 70W HPS	1	$0	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-70W-HPS	Cobrahead, 70W HPS	4	$0	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	4	$17	($17)
CH-70W-HPS	Cobrahead, 70W HPS	1	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-54W-LED	Cobrahead, 54W LED	1	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-99W-LED	Cobrahead, Undefined Lamp Wattage, LED	1	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-99W-LED	Cobrahead, Undefined Lamp Wattage, LED	1	$0	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-400W-HPS	Cobrahead, 400W HPS	2	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$9	($9)
CH-400W-HPS	Cobrahead, 400W HPS	4	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	4	$17	($17)
CH-400W-HPS	Cobrahead, 400W HPS	1	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-400W-HPS	Cobrahead, 400W HPS	1	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-400W-MV	Cobrahead, 400W MV	3	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	3	$13	($13)
CH-143W-LED	Cobrahead, 143W LED	1	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
SEC-100W-MV	Security Light, 100W MV	1	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	2	$0	CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	2	$9	($9)
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	3	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
CH-99W-HPS	Cobrahead, Undefined Lamp Type and Watts	2	$0	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	2	$8	($8)
SEC-103W-INC	Security Light, 103W INC	16	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	16	$65	($65)
SEC-103W-INC	Security Light, 103W INC	3	$0	CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
SEC-103W-INC	Security Light, 103W INC	5	$0	CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	5	$20	($20)
SEC-103W-INC	Security Light, 103W INC	8	$0	CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	8	$33	($33)
SEC-103W-INC	Security Light, 103W INC	1	$0	CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
SEC-103W-INC	Security Light, 103W INC	3	$0	CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
SEC-99W-HPS	Security Light, Undefined Lamp Type and Watts	3	$0	CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	3	$12	($12)
CH-193W-LED	Cobrahead, 193W LED	1	$0	CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
CH-70W-LED	Cobrahead, 70W LED	1	$0	CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	1	$4	($4)
SB-150W-HPS	Shoebox Area Light, 250W HPS	2	$0	SB-71W-LED-T5-4K (+PC)	Shoebox, 71W, LED, Type 5, 4000K	2	$10	($10)
WP-100W-HPS	Wallpack, 100W HPS	1	$0	WP-100W-HPS	Wallpack, 100W HPS	1	$0	$0
Cobrahead + Area Streetlighting Total		**189**	**$0**			**189**	**$782**	**($782)**

Annual Maintenance Savings – Unmetered Streetlights (Base Upgrade) – *Continued*

Existing				Upgrade				Savings
Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Fixture Type Code	Fixture Type Description	Fixture Quantity	Annual Maintenance Costs	Annual Maintenance Savings
Decorative								
4SC-175W-MV	4-Sided Colonial, 175W MV	26	$0	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	26	$225	($225)
4SC-175W-MV	4-Sided Colonial, 175W MV	6	$0	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	6	$52	($52)
4SC-100W-MV	4-Sided Colonial, 100W MV	24	$0	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	24	$207	($207)
4SC-100W-MV	4-Sided Colonial, 100W MV	2	$0	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	2	$17	($17)
4SC-100W-HPS	4-Sided Colonial, 100W HPS	1	$0	4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	1	$9	($9)
4SC-100W-HPS	4-Sided Colonial, 100W HPS	3	$0	4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	3	$26	($26)
Decorative Total		**62**	**$0**			**62**	**$536**	**($536)**
Existing and Upgrade Totals		**251**	**$0**			**251**	**$1,317**	**($1,317)**

Bill of Material and Project Costs (Base Upgrade)

The following table shows the bill of material (BOM) for proposed upgrade scope of work. In addition to material and installation costs, a summary of DSP Fees and Program Fees are included – all per unit costs associated with, material, installation, DSP fees, and Program fees are further defined in Appendix C. Rebates from PECO and PJM (regional transmission organization) are also included in this table and further defined in Appendix B.

Fixture Type Code	Fixture Type Description	Fixture Quantity	Buyback Costs	Material Costs	Install Costs	Rebates	KLS Fees	DVRPC Program Fees	Contingency	Financing Costs	Total Project Costs
Cobrahead											
CH-106W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	32		$7,033	$2,802	($3,560)	$1,088	$349	$1,335		$9,047
CH-106W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	23		$5,055	$2,014	($858)	$782	$251	$960		$8,204
CH-106W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	17		$3,736	$1,488	($13)	$578	$186	$709		$6,685
CH-38W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	52		$8,324	$4,553	($2,952)	$1,768	$475	$1,704		$13,871
CH-38W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	18		$2,881	$1,576	($1,026)	$612	$164	$590		$4,797
CH-38W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	11		$1,761	$963	($621)	$374	$100	$360		$2,938
CH-73W-LED-T2-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	17		$3,383	$1,488	($244)	$578	$175	$656		$6,037
CH-73W-LED-T3-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	8		$1,592	$700	($360)	$272	$82	$309		$2,595
CH-73W-LED-T5-4K-SP2 (+PC)	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	8		$1,592	$700	($123)	$272	$82	$309		$2,833
SB-71W-LED-T5-4K (+PC)	Shoebox, 71W, LED, Type 5, 4000K	2		$569	$258	($234)	$68	$28	$111		$800
WP-100W-HPS	Wallpack, 100W HPS	1		$0	$0	$0	$34	$2	$0		$36
Buyback	Buyback Costs	0	$2,757	$0	$0	$0	$1,145	$57	$0		$3,959
Audit Only	Audit Only DSP & Program Fees	94		$0	$0	$0	$1,692	$85	$0		$1,777
Cobrahead Total		**283**	**$2,757**	**$35,926**	**$16,542**	**($9,990)**	**$9,263**	**$2,037**	**$7,043**	**$0**	**$63,578**
Decorative											
4SC-39W-LED-T2-4K (+PC)	4-Sided Colonial, 39W, LED	51		$20,013	$4,465	($2,913)	$1,734	$821	$3,448		$27,568
4SC-39W-LED-T5-4K (+PC)	4-Sided Colonial, 39W, LED	11		$4,317	$963	($630)	$374	$177	$744		$5,945
ACAP-100W-MV	Acorn with Cap, 100W MV	2		$0	$0	$0	$68	$3	$0		$71
ACAP-175W-MV	Acorn with Cap, 175W, MV	2		$0	$0	$0	$68	$3	$0		$71
ACAP-99W-HPS	Acorn with Cap, Undefined Lamp Type & Wattage	16		$0	$0	$0	$544	$27	$0		$571
A-100W-HPS	Acorn, 100W, HPS	9		$0	$0	$0	$306	$15	$0		$321
Decorative Total		**91**	**$0**	**$24,330**	**$5,428**	**($3,543)**	**$3,094**	**$1,047**	**$4,192**	**$0**	**$34,548**
BOM Total		**374**	**$2,757**	**$60,256**	**$21,970**	**($13,533)**	**$12,357**	**$3,085**	**$11,235**	**$0**	**$98,127**

Financial Analysis & Summary

Payback Analysis Matrix (Base Upgrade + Alternate Options)

The payback analysis matrix is provided as a decision-making tool to assess the opportunity of ECMs available and to define a project scope that best meets the needs of the municipality. If a PECO buyback is planned prior to this project being implemented, we show the payback associated with that activity. If the Phase 2 field audit identified differences between the unmetered PECO inventory and what is verified to be existing, those adjustments are reflected below as "PECO Inventory Adjust." The PECO Inventory Adjust amount will occur for all cobrahead or decorative ECMs, and therefore this amount is included in these ECMs values shown in the table below. A separate payback calculation is made for each ECM as well as for common control alternates to be considered. The full-implementation total includes the total payback calculations if all ECMs are completed.

	Annual Operating Cost Savings			*Project Costs and Rebates*							*Capital Expenditure*	
Upgrade Options	Annual Energy Cost Savings	Annual Maintenance Savings	Annual Operating Cost Savings	Buyback Cost	Material Costs	Install Costs	DSP Fees	Program Fees	Contingency	Rebates	Total Net Project Costs	Payback Period
Base Upgrade	$32,350	-$1,317	**$31,032**	$2,757	$60,256	$21,970	$12,357	$3,085	$11,235	-$13,533	**$98,127**	**3.2**
Base Upgrade + Manual Controls Option	$32,383	-$1,316	**$31,066**	$2,757	$67,688	$21,970	$12,357	$3,308	$12,350	-$13,533	**$106,896**	**3.4**
Base Upgrade + Network Controls Option	$35,342	-$1,681	**$33,661**	$2,757	$127,553	$21,970	$12,357	$5,104	$21,330	-$13,533	**$177,538**	**5.3**
Streetscape Retrofit Adder (to above options)	Not owned by Caln Township	TBD	**TBD**	$0	$6,776	$5,227	$986	$409	$1,539	-$264	**$14,673**	

Notes:

1) Includes costs and savings of ECM upgrade
2) In Phase 2, following streetlight inventory verification resulting from an audit, PECO baseline adjustments are identified and included in this analysis

Cash Flow Analysis

The cash flow analysis shows how the project savings offset project costs, resulting in little to no capital outlay for this project.

Project Cash Flow (Base Upgrade with No Financing)

Project Summary	
Construction Cost	$82,226
Buyback Cost	$2,757
DSP Fees (KLS)	$12,357
Program Fees (DVRPC)	$3,085
Contingency	$11,235
Financing Costs	$0
Total Project Cost	$111,660
Capital Contribution (e.g. LFF)	$0
Max Project Cost	$111,660
Financed Amount	$0
Loan Rate	0.00%
Loan Term (Years)	0
Loan Payment	#NUM!
Interest Paid	#NUM!

ECM	In Scope
PECO Buyback	Yes
Cobrahead Lighting	Yes
Decorative Lighting	Yes
Area Lighting	No
Traffic Signals	No
Manual Fixture Controls	No
Network Control System	No

Construction	In Scope
Construction Start Date	TBD
Construction Duration (calendar days)	13

Period	Energy Cost Savings	Maintenance Cost Savings	Rebates	Total Savings	Project Payments		Balance
Design					($7,069)		($7,069)
Construction					($104,591)		($104,591)
1	$32,350	($1,317)	$13,533	$44,565			$44,565
2	$32,350	($1,317)		$31,032			$31,032
3	$32,350	($1,317)		$31,032			$31,032
4	$32,350	($1,317)		$31,032			$31,032
5	$32,350	($1,317)		$31,032			$31,032
6	$32,350	($1,317)		$31,032			$31,032
7	$32,350	($1,317)		$31,032			$31,032
8	$32,350	($1,317)		$31,032			$31,032
9	$32,350	($1,317)		$31,032			$31,032
10	$32,350	($1,317)		$31,032			$31,032
11	$32,350	($1,317)		$31,032			$31,032
12	$32,350	($1,317)		$31,032			$31,032
13	$32,350	($1,317)		$31,032			$31,032
14	$32,350	($1,317)		$31,032			$31,032
15	$32,350	($1,317)		$31,032			$31,032
16	$32,350	($1,317)		$31,032			$31,032
17	$32,350	($1,317)		$31,032			$31,032
18	$32,350	($1,317)		$31,032			$31,032
19	$32,350	($1,317)		$31,032			$31,032
20	$32,350	($1,317)		$31,032			$31,032
Total	**$646,993**	**($26,349)**	**$13,533**	**$634,178**	**($111,660)**		**$522,518**

Project Cash Flow (Base Upgrade + Manual Controls with No Financing)

Project Summary	
Construction Cost	$89,658
Buyback Cost	$2,757
DSP Fees (KLS)	$12,357
Program Fees (DVRPC)	$3,308
Contingency	$12,350
Financing Costs	$0
Total Project Cost	$120,430
Capital Contribution (e.g. LFF)	$0
Max Project Cost	$120,430
Financed Amount	$0
Loan Rate	0.00%
Loan Term (Years)	0
Loan Payment	#NUM!
Interest Paid	#NUM!

ECM	In Scope
PECO Buyback	Yes
Cobrahead Lighting	Yes
Decorative Lighting	Yes
Area Lighting	No
Traffic Signals	No
Manual Fixture Controls	Yes
Network Control System	No

Construction	In Scope
Construction Start Date	TBD
Construction Duration (calendar days)	13

Period	Energy Cost Savings	Maintenance Cost Savings	Rebates	Total Savings	Project Payments		Balance
Design					($7,069)		($7,069)
Construction					($113,361)		($113,361)
1	$32,383	($1,316)	$13,533	$44,600			$44,600
2	$32,383	($1,316)		$31,066			$31,066
3	$32,383	($1,316)		$31,066			$31,066
4	$32,383	($1,316)		$31,066			$31,066
5	$32,383	($1,316)		$31,066			$31,066
6	$32,383	($1,316)		$31,066			$31,066
7	$32,383	($1,316)		$31,066			$31,066
8	$32,383	($1,316)		$31,066			$31,066
9	$32,383	($1,316)		$31,066			$31,066
10	$32,383	($1,316)		$31,066			$31,066
11	$32,383	($1,316)		$31,066			$31,066
12	$32,383	($1,316)		$31,066			$31,066
13	$32,383	($1,316)		$31,066			$31,066
14	$32,383	($1,316)		$31,066			$31,066
15	$32,383	($1,316)		$31,066			$31,066
16	$32,383	($1,316)		$31,066			$31,066
17	$32,383	($1,316)		$31,066			$31,066
18	$32,383	($1,316)		$31,066			$31,066
19	$32,383	($1,316)		$31,066			$31,066
20	$32,383	($1,316)		$31,066			$31,066
Total	**$647,652**	**($26,325)**	**$13,533**	**$634,860**	**($120,430)**		**$514,431**

Project Cash Flow (Base Upgrade + Network Controls with No Financing)

Project Summary	
Construction Cost	$149,523
Buyback Cost	$2,757
DSP Fees (KLS)	$12,357
Program Fees (DVRPC)	$5,104
Contingency	$21,330
Financing Costs	$0
Total Project Cost	$191,071
Capital Contribution (e.g. LFF)	$0
Max Project Cost	$191,071
Financed Amount	$0
Loan Rate	0.00%
Loan Term (Years)	0
Loan Payment	#NUM!
Interest Paid	#NUM!

ECM	In Scope
PECO Buyback	Yes
Cobrahead Lighting	Yes
Decorative Lighting	Yes
Area Lighting	No
Traffic Signals	No
Manual Fixture Controls	No
Network Control System	Yes

Construction	In Scope
Construction Start Date	TBD
Construction Duration (calendar days)	13

Period	Energy Cost Savings	Maintenance Cost Savings	Rebates	Total Savings	Project Payments		Balance
Design					($7,069)		($7,069)
Construction					($184,002)		($184,002)
1	$35,342	($1,681)	$13,533	$47,194			$47,194
2	$35,342	($1,681)		$33,661			$33,661
3	$35,342	($1,681)		$33,661			$33,661
4	$35,342	($1,681)		$33,661			$33,661
5	$35,342	($1,681)		$33,661			$33,661
6	$35,342	($1,681)		$33,661			$33,661
7	$35,342	($1,681)		$33,661			$33,661
8	$35,342	($1,681)		$33,661			$33,661
9	$35,342	($1,681)		$33,661			$33,661
10	$35,342	($1,681)		$33,661			$33,661
11	$35,342	($1,681)		$33,661			$33,661
12	$35,342	($1,681)		$33,661			$33,661
13	$35,342	($1,681)		$33,661			$33,661
14	$35,342	($1,681)		$33,661			$33,661
15	$35,342	($1,681)		$33,661			$33,661
16	$35,342	($1,681)		$33,661			$33,661
17	$35,342	($1,681)		$33,661			$33,661
18	$35,342	($1,681)		$33,661			$33,661
19	$35,342	($1,681)		$33,661			$33,661
20	$35,342	($1,681)		$33,661			$33,661
Total	**$706,831**	**($33,621)**	**$13,533**	**$686,743**	**($191,071)**		**$495,672**

Phase 2 Action Items

During the Phase 2 Project Development, field audits are conducted, final design is completed and a final project specifications, analysis and financial results are generated. All of this project development work is reflected in this document. This final project specification and proposal acts as a decision-making tool for your municipality to decide whether to proceed to Phase 3 Construction and Phase 4 Post-Construction with the RSLPP project.

The following is a list of action items that have been or should be completed for consideration and action on moving to Phase 3 of the project.

Staff/Management Action Items

- ☐ KLS – complete comprehensive field audits, preliminary designs and draft project results for consideration by municipality staff/management
- ☐ Municipal Staff/Management – review preliminary analysis, designs and financial results and provide KLS with input as required to finalize all project specifications.
- ☐ KLS – finalize all analysis, design and project specifications as reflected in the Final Project Specifications & Proposal
- ☐ Municipal Staff/Management – approval of Final Project Specifications & Proposal
- ☐ Municipal Staff/Management – establish position on agenda for relevant committee or council, BOS or BOC meetings
- ☐ Municipal Staff/Management – prepare packet information with Final Project Specification & Proposal for relevant committee or council meetings
- ☐ Municipal Staff/Management – continue to build awareness and provide preliminary updates to other municipality staff and management as well as council members

Council Action Items

- ☐ KLS – present summary of Final Project Specifications & Proposal to relevant committee or council meetings
- ☐ Municipality Solicitor – Review resolutions and contracts required to proceed to the Phase 3 Construction and Phase 4 Post-Construction
- ☐ Council/BOC/BOS – Review, analyze and discuss Final Project Specifications & Proposal with municipality staff/management and KLS
- ☐ Council/BOC/BOS – Take action via resolution to approve or reject decision to continue to Phase 3 Construction and Phase 4 Post-Construction and authorize municipality management to sign Installation Services Agreement with Armour & Sons (program installation partner).

Appendix A:
RSLPP Phase Overview

Phase 1: Feasibility: Data-driven analysis of upgrade opportunities resulting in a no-cost Feasibility Study.

- Municipalities received a data-driven, no-cost Feasibility Study showing estimated savings, project costs, rebates and financial payback. This study is developed by KLS using data, information, and input provided by the municipality.
- **Municipalities used the Feasibility Study as a tool to decide whether to proceed to Phase 2 and contract with KLS for Project Development Services.**
- The RSLPP Project Team provides a contract form and resolution for municipalities to proceed to Phase 2.

Phase 2: Project Development: Field audits, design and analysis resulting in a final design project proposal.

- KLS conducted field audits of the municipality's existing lighting system showing GPS location and attributes of each fixture. KLS also conducted a comprehensive and standardized design of upgraded lighting system.
- KLS developed and DVRPC issues solicitations and contracts for materials, distributor, and installation contractor for the purpose of arranging cooperative purchasing agreements that municipalities are able to piggyback off of.
- The RSLPP Project Team organized a pool of financing for municipalities who wish to finance their projects.
- KLS prepared final design proposal showing forecasted savings, final project costs, rebates, and financial payback.
- **Municipalities use the Final Design Proposal as a tool to decide whether to proceed to Phase 3, Construction.**
- The RSLPP Project Team provides a contract form and resolution for contracting between municipality and installation contractor for construction (the construction contract). Municipalities piggyback off of DVRPC's installation contract for construction.
- Municipalities that finance participate in the pool of financing arranged by the RSLPP.

Phase 3: Construction: Comprehensive Installation Services and Project Management of Installation including reporting and issue resolution during construction.

- Construction, including the procurement of all equipment, is provided by the RSLPP selected installation contractor according to the municipality's construction contract.
- KLS provides robust project management services ensuring consistent communication of progress and issue resolution.
- KLS manages the municipality's PECO Bill Updates and the applicable rebate application processes.

Phase 4: Post Construction Operations and Maintenance Confirmation of project savings and strategies for on-going maintenance.

- KLS provides the municipalities strategies for maintaining new system and on-going standardization, verification of project savings, and (if desired) prepare and/or update municipality lighting ordinances.

Appendix B:
Project Assumptions

The following assumptions were used in the development of this Project Specification and Proposal:

1) **Energy Use**
    a. **Un-metered:**
        i. **Streetlights:** Energy use for un-metered streetlight service is calculated by PECO using the following algorithm:
            1. kWh = Billed Wattage of fixture x quantity of fixture x 4092 (annual operating hours)/1000
        ii. **Traffic Signals:** Energy use for un-metered traffic signal service is calculated by PECO using the following algorithm:
            1. kWh = Billed Wattage of fixture x quantity of fixture x annual operating hours (yellow = 175.2 hours; green = 3766.8 hours; red = 4819 hours)/1000.
    b. **Metered:** Energy use for metered fixtures is calculated using the estimated wattage of each fixture X annual operating hours (4092 hours assumed for all metered streetlight fixtures and area lighting, while a lower number of hours may be used for other outdoor lighting types if provided or indicated by the municipality)/1000.
2) **Energy Costs:**
    a. Across the entire RSLPP, energy costs were estimated according to the following PECO rates included in PECO's Current Electric Tariff effective October 1, 2021.
        i. SL-E, SL-S, SL-C, TSLS, and GS.
    b. KLS used the generation supply rate listed for each PECO account on the utility bills supplied by the municipality.
3) **Maintenance Cost Savings**
    a. Average annual maintenance expenses were modeled for both the existing and proposed fixture types.
        i. Maintenance expenses are based on the probability a component (e.g. lamp, ballast/driver, fixture, photocell) will fail multiplied by the material and labor replacement cost. Failure probability is based on the annual operating hours of a component divided by the component's published rated or expected life.
    b. Use of average annual maintenance expenses assumes that both the existing and new lighting systems have a standard distribution of fixture and component ages. Average annual maintenance expenses for proposed LED fixtures were further reduced by 50% to reflect a 1-year labor warranty, a 10-year parts warranty and the expected life of a new fixture and its components.
4) **Project rebates:** There are two rebate types available to municipalities in the RSLPP:
    a. **PECO Smart Ideas:** Through Phase 4 of Act 129, PECO's offers lighting rebates to municipal customers. These rebates vary from $55 - $165 per streetlight and vary from $55 - $165 for metered area lighting depending on the watts reduced by each fixture conversion. Rebates have been estimated in Phase 2 based on the scope of work included in this document. Municipalities that proceed to Phase 2 will have a pre-application submitted on their behalf by the KLS to PECO based on the scope of work defined in the municipality's Final Design Proposal. Submitting a pre-application will "reserve" rebates for municipalities that proceed to Phase 3, construction.

b. **PJM:** PJM, the Regional Transmission Operator for this region offers rebates for outdoor lighting projects through its Capacity Market. Energy efficiency projects can receive PJM Capacity Market rebates for the first four years that a project is installed based on the kW reductions of the project, and the price/kW of this rebate is determined by a "forward auction" in each utility territory within PJM. The current rate for these incentives in PECO territory ranges from $18.70-$28.90 per kW reduced depending on the year. The PJM Capacity Market rebate has been estimated based on the scope of work defined in this document, the associated kW reduction and a $15.00 per kW rebate. Municipalities that proceed to Phase 3 (Construction) of the RSLPP will have the opportunity to have receive this rebate through a RSLPP-arranged aggregator.

5) Project Contingency

a. For project cost development we used a **10%** construction cost contingency plus an additional 5% contingency on the material costs for use with attic stock or other purposes.

6) Material, Distributor, and Installation Costs

a. All material and Installation Costs shown in this Final Project Specification and Proposal FPSP were the result of the procurement process established for Round 2 of the RSLPP through which KLS developed and DVRPC issued Request for Proposals on behalf of municipalities participating in the RSLPP for Manufacturer Product Solutions (materials), Distribution Partner Services (distributor), and installation contractor. For more information on these solicitations, please visit DVRPC.org/consultant.

Appendix C:
Project Summary Bill of Material
(Base Upgrade Only)

The Project Summary Bill of Material represents the pricing obtained through the RSLPP procurement process. Material Unit Prices include negotiated manufacturer costs, distributor markup and contractor markup.

Fixture Type Code	Manufacturer	Part #	Fixture Type Description	Fixture Quantity	Fixture Unit Price	Fixture Total Cost
Cobrahead						
CH-106W-LED-T3-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	32	$219.78	$7,033
CH-106W-LED-T2-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	23	$219.78	$5,055
CH-106W-LED-T5-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	17	$219.78	$3,736
CH-38W-LED-T2-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	52	$160.07	$8,324
CH-38W-LED-T3-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	18	$160.07	$2,881
CH-38W-LED-T5-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	11	$160.07	$1,761
CH-73W-LED-T2-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	17	$199.01	$3,383
CH-73W-LED-T3-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	8	$199.01	$1,592
CH-73W-LED-T5-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	8	$199.01	$1,592
SB-71W-LED-T5-4K (+PC)	Acuity	ATB0 P203 MVOLT R5 MP P7 UMS-BZ	Shoebox, 71W, LED, Type 5, 4000K	2	$284.68	$569
Cobrahead Total				**188**		**$35,926**
Decorative						
4SC-39W-LED-T2-4K (+PC)	Acuity	247L P40 AS 40K R2 AY	4-Sided Colonial, 39W, LED	51	$392.41	$20,013
4SC-39W-LED-T5-4K (+PC)	Acuity	247L P40 AS 40K R5 AY	4-Sided Colonial, 39W, LED	11	$392.41	$4,317
Decorative Total				**62**	**$784.82**	**$24,330**
BOM Total				**250**		**$60,256**

Appendix D:
Project Schedule of Installation Values
(Base Upgrade Only)

The Project Schedule of Installation Values represents the pricing obtained through the RSLPP procurement process. Installation Unit Prices are an all-inclusive turnkey unit price including installation contractor prevailing wage costs, equipment costs, bonding costs, overhead and profit.

Fixture Type Code	Manufacturer	Part #	Fixture Type Description	Fixture Quantity	Installation Unit Price	Fixture Total Cost	Construction Duration (Working Days)
Cobrahead							
CH-106W-LED-T3-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	32	$88	$2,802	1.6
CH-106W-LED-T2-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	23	$88	$2,014	1.2
CH-106W-LED-T5-4K-SP2 (+PC)	Signify	RFM-108W48LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 106W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	17	$88	$1,488	0.9
CH-38W-LED-T2-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	52	$88	$4,553	2.6
CH-38W-LED-T3-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	18	$88	$1,576	0.9
CH-38W-LED-T5-4K-SP2 (+PC)	Signify	RFS-35W16LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 38W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	11	$88	$963	0.6
CH-73W-LED-T2-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-R2M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 2, 4000K, 20kV SP, 7-Pin, Gray	17	$88	$1,488	0.9
CH-73W-LED-T3-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-R3M-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 3, 4000K, 20kV SP, 7-Pin, Gray	8	$88	$700	0.4
CH-73W-LED-T5-4K-SP2 (+PC)	Signify	RFM-72W32LED4K-G2-5-UNV-DMG-SP2-RCD7-GY3	Cobrahead, LED, 73W, Type 5, 4000K, 20kV SP, 7-Pin, Gray	8	$88	$700	0.4
SB-71W-LED-T5-4K (+PC)	Acuity	ATB0 P203 MVOLT R5 MP P7 UMS-BZ	Shoebox, 71W, LED, Type 5, 4000K	2	$129	$258	0.2
Cobrahead Total				**188**		**$16,542**	**9.5**
Decorative							
4SC-39W-LED-T2-4K (+PC)	Acuity	247L P40 AS 40K R2 AY	4-Sided Colonial, 39W, LED	51	$88	$4,465	2.6
4SC-39W-LED-T5-4K (+PC)	Acuity	247L P40 AS 40K R5 AY	4-Sided Colonial, 39W, LED	11	$88	$963	0.6
Decorative Total				**62**		**$5,428**	**3.1**
Installation Schedule Total				**250**		**$21,970**	**12.6**

Appendix E:
DSP & Program Fees Breakdown

Design Service Professional (KLS) Unit Pricing & DVRPC Program Fees

DVRPC conducted a comprehensive RFP process to identify and select a design services professional to support all four Phases of the RSLPP. Municipalities are able to "piggy-back" off the DVRPC's cooperative purchasing agreement for DSP services. The table below not only defines the final DSP unit priced fee structure but also shows the assumed volume for your project and the total associated fees. The finance resolution provided for RSLPP municipalities who wish to proceed to Phase 2, Project Development, includes provisions for reimbursement of Project Development Phase fees with a financing package put in place for the Construction Phase.

DSP Unit Price Schedule and Payment Milestones

DSP Service Item	KLS Unit Price (Fee) Schedule	KLS Billing Milestones	Fixture & Signal Quantity	KLS Fees	DVRPC Program Fees	Total KLS & DVRPC Fees
Project Development (Phase II)						
Field Audit	$9/Fixture	100% at Completion of audit (if less than 1 month); Otherwise on monthly auditing progress	374	$3,366	$168	$3,534
Field Audit (Traffic Signals)	$8/Signal (not lamp)		0	$0	$0	$0
Mapping	$1/Fixture or Signal		374	$374	$19	$393
Design	$7/Fixture or Signal	50% at Preliminary Design Review; 50% at Final Design Review	374	$2,618	$131	$2,749
Design (Traffic Signals)	$6/Signal (not lamp)		0	$0	$0	$0
Utility bill update & rebate processes	$1/Fixture or Signal	50% at Final Utility Bill Update; 50% at Final Rebate Submittal	374	$374	$19	$393
Project Development Sub-Total				$6,732	$337	$7,069
Construction Project Management (Phase III)						
Project Management Services	$10/Fixture or Signal	20% at Pre-Construction Meeting; Remainder on Monthly Installation Progress Billing	280	$2,800	$2,607	$5,407
PECO Buyback	$5/Fixture (with max fee of $5,000 and min fee of $1,000)	At Buyback Completion	229	$1,145	$57	$1,202
Field deployable installation data capture	$3/Fixture or Signal	Monthly Installation Progress Billing	280	$840	$42	$882
Project Management Sub-Total				$4,785	$2,706	$7,491
Post-Construction Services (Phase IV)						
Project annual Energy and Operational Savings Report	$1/Fixture or Signal	100% at Report Delivery	280	$280	$14	$294
Operations and Maintenance Plan for a municipality's new LED system.	$1/Fixture or Signal	100% at Plan Delivery	280	$280	$14	$294
Development of Operation and Maintenance Manual	$1/Fixture or Signal	100% at Manual Delivery	280	$280	$14	$294
Development or update of a lighting ordinance	$1,000/municipality (minimum)	Estimated Cost Between $1,000 - $10,000	0	$0	$0	$0
Post-Construction Sub-Total				$840	$42	$882
Total Fees				**$12,357**	**$3,085**	**$15,442**

Notes:
1) All unit prices above are "not to exceed" as defined in the municipalities DSP contract.
2) DVRPC program fees are based on the RSLPP LOI signed by each participating muncipality.

DVRPC Program Fees

The following Program Fees have been established by DVRPC to allow DVRPC to recoup the upfront costs DVRPC has incurred for program development, program management, and for the development and issuance of contracts and solicitations associated with material, distributor, installation contractor, and finance. These fees are reflected throughout this document as "Program Fees":

- 5% of DSP Total Fees

- Up to 3% of Construction Costs (Material & Installation costs only).
    - 3% has been used as a conservative estimate for this proposal.