THE CITY OF
PITTSBURGH

CITY OF PITTSBURGH
MOBILITY & INFRASTRUCTURE

ten
a DLH company

Energy Analyzation and Maintenance Savings

June 2, 2025

Important definitions referenced throughout this document:

- **Amperes:** (Amps) A measure of electrical current related to voltage and power as: Watts = Volts x Amps
- **Ballast:** An auxiliary piece of equipment required to start and to properly control the flow of current to gas discharge light sources such as fluorescent and high-intensity discharge (HID) lamps.
- **Capacitor:** Device in ballast that stores electrical energy, often used for power factor correction and lamp regulation.
- **Cobrahead Luminaire:** Curved-arm, oblong-headed light fixture that is typically used for outdoor roadway lighting.
- **Department of Mobility and Infrastructure (DOMI):** A department of the City of Pittsburgh's Government, established in 2017. DOMI began as a means of directing attention to, and meeting the needs of, responsible transportation of people and goods throughout Pittsburgh, and for managing the operation of and access to the public right-of-way. DOMI maintains approximately 40,000 streetlights in the City, and other right-of-way infrastructure elements.
- **Direct Energy (DE):** One of the largest retail providers of electricity in the U.S. and the current provider of electricity for the City of Pittsburgh. DE provides electricity for the City, distributed to City assets by Duquesne Light Company.
- **Duquesne Light Company (DLC):** Electric service provider responsible for transmission and distribution of electricity. DLC provides transmission and distribution services to the greater southwestern Pennsylvania area including the City of Pittsburgh and is one of two entities that bill the City for electric service as it relates to streetlighting.
- **Electrical Energy:** The capacity for doing work. In the context of electricity and streetlighting, energy is represented by the movement of charged particles through a conductor. Energy can be expressed in watt-hours (Wh) or kilowatt-hours (kWh).
- **Electrical Power:** The time rate of doing electrical work. Power is expressed in watts or kilowatts. Work is being done at a rate of one-W when a constant current of 1A is maintained through a resistance by an electric magnetic field (emf) of 1-V.
- **High Pressure Sodium (HPS) Lamp:** Lamps that produce light by an electrical discharge through sodium vapor operating at relatively high pressures and temperatures.
- **Joule:** The standard unit of energy in the International System of Units (SI), and it's a way to measure the amount of work or the ability of a system to do work.
- **Kilowatt Hour (kWh):** The standard measure of electrical energy and the typical billing unit used by electrical utilities for electricity use. A 100 watt lamp operated for 10 hours consumes one thousand watt-hours (100 x 10) or one kilowatt-hour. If the utility charges $.10/kWh, then the electricity cost for the 10 hours of operation would be 10 cents (1 x $.10).
- **Light Emitting Diode (LED):** A device that directly converts electrical impulses into light.
- **Lumens (lm):** A unit of luminous flux; overall light output; quantity of light, expressed in lumens. For example, a dinner candle provides about 12 lumens and a 60-watt soft white incandescent lamp provides about 840 lumens.
- **Luminaire:** A light fixture; the complete lighting unit, including lamp, reflector, ballast, socket, wiring, diffuser, and housing.
- **Network Lighting Management System (NLMS):** A system which allows a user to remotely control, and access live information about streetlights. Streetlights must each have a control node installed to access remotely.
- **Streetlight**: A tall roadway post topped with a light used to illuminate vehicle and pedestrian rights-of-way.
- **Tariff:** A pricing structure as defined by the utility providing service. Tariffs exist for different applications, typically depending on load size and type of the electricity purchaser.

- **The Efficiency Network, Inc. (TEN):** A Pittsburgh-based energy services company (ESCO) serving as a consultant to the City of Pittsburgh's DOMI. TEN refers to the staff at The Efficiency Network, Inc. and any other contracted subconsultants who contributed to the development of this project.
- **Volt:** A measure of "electrical pressure" between two points. The higher the voltage, the more current will be pushed through a resistor connected across the points.
- **Voltage:** A measurement of the electromotive force in an electrical circuit or device expressed in volts. Voltage can be thought of as being analogous to the pressure in a waterline.
- **Watt (W) & Kilowatt (kW):** A unit of electrical power equal to one joule per second. Lamps are rated in watts to indicate power consumption. A kilowatt is a measure of electrical power equal to 1,000 watts.

Purpose

This memorandum is to present the City of Pittsburgh's (the City), Department of Mobility & Infrastructure (DOMI) with an overview of the potential savings related to converting existing high-pressure sodium (HPS) streetlights to Light Emitting Diode (LED) streetlights and implementing a network lighting management system citywide. This document will identify the reduction of power (kW) which directly corresponds to energy (kWh), an understanding of how maintenance costs are realized, and an introduction to how a network lighting control system can add additional savings. The City will see adjusted savings monthly as construction progresses with an understanding that the true first-year savings will not be captured until the project is completed in the first quarter of 2027. The overall cobrahead luminaire count to be converted is 36,536 of either HPS (HPS: 33,077) or existing LED (3,459). *This document does not account for any quantity of luminaires that are not subject to replacement under the LED Modernization Project's scope of work.*

The City receives streetlighting energy bills in two parts: distribution services through Duquesne Light Company (DLC) and electricity generation supply services through Direct Energy Business.

- The DLC service rate is a fixed rate of $3.54 per lamp, as described in DLC's current tariff for streetlighting energy[1]. The DLC tariff states that for Standard Dusk to Dawn operation where the City supplies their own control devices, the energy delivered each month shall be the product of the connected load (kWs) as of the 15th day of the respective month at 350 hours per month, the monthly average of the annual burning hours. The connected load shall be the sum of the rated wattages of all lamps connected, included the rated wattages of their individual ballasts, subject to power factor correction, if any.
- The Direct Energy blended energy rate is $0.067907 per kWh. The City participates in the Western Pennsylvania Energy Consortium (WPEC) through which the City contracted with Direct Energy Business for the purchase of electric supply. Invoicing from Direct Energy covers the electricity generation and transmission service charges related to use or monthly energy consumption (kWh). As a member of WPEC, the City receives and monitors commercial electricity price data to secure affordable and reliable electricity supply.

Further breakdown of varying fixture wattages will be presented in tables in this document and include the proposed quantity of new luminaires and their wattages.

Pittsburgh Streetlight Inventory

During "Task 1.0 Data Set Review", TEN was provided with an existing streetlight inventory list from the City which contained over 40,000 assets, including streetlight luminaires, pedestrian luminaires, security lighting, lighting assets and other department- or agency-owned luminaires. This information was gathered through a previous and separate asset audit conducted by Cyclomedia, a vehicular auditing device. TEN reviewed this database and extracted information pertinent to all cobrahead-type streetlight luminaires. TEN also captured luminaires that were not present on the existing

[1] https://duquesnelight.com/service-reliability/service-map/rates/tariff-resources

streetlight inventory list through comprehensive digital and physical auditing of the City's streetlight system. Data verified and collected through database auditing and enrichment include, light pole type, luminaire type, luminaire ownership, wattage, orientation, mast arm length, and neighborhood, among others.

Quantities referenced in this memo reflect only the luminaires identified in the construction documents included in the bid package released by DOMI: https://procurement.opengov.com/portal/pittsburghpa/projects/120325/downloads dated July 9, 2024 associated with the LED Modernization Project. The construction documents are also attached to this document as Exhibit A. These values **only** encompass City-owned cobrahead luminaires and exclude any decorative or non-cobrahead luminaires, non-city owned luminaires, and any inaccessible cobrahead luminaires. Inaccessible cobrahead luminaires are identified as luminaires which are not accessible with a bucket truck, such as those on stairwells or paper streets; these luminaires will require an electric lineman to service and are excluded from the scope of this project.

Utility Bill Analysis

The City's streetlight billing comes in divided into two parts; distribution services and electricity generation supply services, provided separately by DLC and DE, respectively. As part of the utility analysis, TEN reviewed sets of utility bills from both DLC and DE. DLC charges a fixed tariff rate of $3.54 per lamp regardless of luminaire wattage. The tariff calculates energy delivered each month as the product of the connected load in kilowatts as of the 15th day of the month for which billed and 350 hours per month, which is the average of the annual burning hours. The connected load is the sum of the rated wattages of all lamps connected, including the rated wattages of their individual ballasts, subject to power factor correction, if any. The monthly energy value is **provided** to DE where a separate bill is produced, strictly for the generation and transmission service. The City is currently contracted with DE at a blended rate of $0.067907 per kWh.

Table 1 on the following page lists luminaire quantities and wattages as they are billed by DLC. These quantities and wattages should be comprehensive of the entire network of City-owned streetlight, pedestrian, and security lighting luminaires. Please note that some of the 40,521 fixtures in Table 1 will not be replaced under the scope of this LED Modernization Project.

Table 2 on the next page lists the quantities and wattages of existing luminaires to be replaced as part of this project's scope. Many luminaires were excluded from the scope, defined through the database enrichment process to develop a comprehensive and cost-effective project for the City. Excluded fixtures primarily consist of non-cobrahead luminaires, non-city-owned luminaires, and inaccessible luminaires, among others, as described in the streetlight inventory section.

TEN used utility bills and the enriched existing database to estimate the most accurate luminaire quantity and wattage counts of cobrahead luminaires that meet the criteria described for replacement in this project (Table 2). Luminaire quantities and wattages on DLC bills did not accurately reflect field conditions uncovered through streetlight network auditing.

During this database auditing and enrichment task, additional luminaires were identified in the field that are not captured in the City's original Cartegraph database. Also, luminaire wattages may change due to availability of replacement parts at the time of maintenance. Additional luminaires are installed, recorded, and reconciled with DLC at designated intervals. These factors may cause monthly variations of quantities and wattages to appear on the DLC bills. However, following the database enrichment process, TEN identified the current quantity and wattages of existing conditions, noted as the base scope of work. These estimated quantity and wattage counts are used for energy and maintenance savings calculations described later in this document.

DLC Unmetered Usage Information			
Existing Quantity	Type	Total kW	Annual kWh
15	1000W Metal Halide	15.8	66,150
16	100W Incandescent Lamps	3.3	14,016
2	100W Mercury Lamps	0.3	1,067
15,054	100W Sodium Lamps	1,761.3	7,397,536
70	106W LED - Sch B	7.4	31,164
2,301	112W LED - Sch B	257.7	1,082,388
392	135W LED - Sch B	52.9	222,264
94	150W Metal Halide	15.5	65,142
6,705	150W Sodium Lamps	1,341.0	5,632,200
245	165W LED - Sch B	40.4	169,785
233	175W Metal Halide	48.9	205,506
299	175W Mercury Lamps	61.9	259,951
4	175W Mercury Lamps	1.7	7,253
18	200W Incandescent Lamps	7.5	31,536
2,659	200W Sodium Lamps	651.5	2,736,111
51	250W Metal Halide	13.4	56,120
102	250W Mercury Lamp	61.7	259,121
1,998	250W Sodium Lamps	609.4	2,559,438
47	310W Sodium Lamps	17.9	75,012
10	320W Metal Halide	3.4	14,070
12	4000 L Incandescent	3.5	14,515
5	400W Mercury Lamp	4.7	19,798
375	400W Sodium Lamp	174.4	732,375
44	50W Sodium Lamp	2.9	12,197
16	55W Induction Lamps	0.9	3,696
92	59W LED - Sch B	5.4	22,798
1	70W Metal Halide	0.1	307
8,540	70W Sodium Lamps	811.3	3,407,460
988	75W LED - Sch B	74.1	311,220
54	99W LED - Sch B	5.3	22,453
79	Bloomfield Bridge Ramp	27.3	114,720
40,521		6,082.7	25,547,367
Breakdown by Light Source			
404	Metal Halide	97.0	407,295
46	Incandescent	14.3	60,067
412	Mercury	130.3	547,189
35,422	Sodium	5,369.6	22,552,328
16	Induction	0.9	3,696
4,142	LED	443.4	1,862,072
79	Bloomfield Bridge Ramp	27.3	114,720

Table 1: City of Pittsburgh Luminaire breakdown as in DLC bills, encompassing all luminaire types

Existing Cobra Heads To Be Replaced			
Existing Quantity	Type	Total kW	Annual kWh
7,962	70W HPS	724.5	3,043,076
14,206	100W HPS	1,818.4	7,637,146
6,837	150W HPS	1,285.4	5,398,495
2,100	200W HPS	483.0	2,028,600
1,774	250W HPS	523.3	2,197,986
48	310W HPS	17.0	71,568
150	400W HPS	69.8	292,950
18	50W LED	0.9	3,780
5	55W LED	0.3	1,155
6	60W LED	0.4	1,512
3,079	100W LED	307.9	1,293,180
10	110W LED	1.1	4,620
4	120W LED	0.5	2,016
48	134W LED	6.4	27,014
4	139W LED	0.6	2,335
19	140W LED	2.7	11,172
4	145W LED	0.6	2,436
233	150W LED	35.0	146,790
14	160W LED	2.2	9,408
4	165W LED	0.7	2,772
2	237W LED	0.5	1,991
5	250W LED	1.3	5,250
4	267W LED	1.1	4,486
36,536		5,283.3	22,189,738
Breakdown by Light Source			
33,077	HPS	4,921	20,669,821
3,459	LED	362	1,519,917

*Table 2: Enriched Data Set - Cobrahead Streetlight luminaires included in Project Scope, including **annual** usage.*

LED Recommendations

LED streetlighting technology offers drastically reduced energy consumption and increased luminaire lifecycles as compared to existing HPS luminaires. Recommended LED luminaire wattages and quantities are detailed in Table 3.

TEN performed detailed database enrichment with the City provided streetlight infrastructure information. A database was compiled itemizing existing and proposed luminaire types and quantities (including their components such as type and number, elevation, orientation), wattages, and burn hours. Other factors considered in determining these wattage buckets and quantities were LED luminaire product evaluation, photometric models, and equity assessment factors, among other analyses.

Proposed Cobra Heads					
Proposed LED Light	**Quantity**		**Wattage**	**Total kW**	**Annual kWh**
RPS-25W10LED-727-G1-R3M	7,684	A	25	192.1	806,820
RPS-40W10LED-727-G1-R3M	12,788	B	40	511.5	2,148,384
RPS-40W20LED-727-G1-R3M	1,638	C	40	65.5	275,184
RPS-60W30LED-727-G1-R3M	7,100	D	60	426.0	1,789,200
RPS-70W30LED-727-G1-R3M	303	E	70	21.2	89,082
RPM-90W60LED-727-G1-R3M	1,727	F	90	155.4	652,806
RPM-90W80LED-727-G1-R3M	2,577	G	90	231.9	974,106
RPM-105W60LED-727-G1-R3M	40	H	105	4.2	17,640
RPM-130W60LED-727-G1-R3M	2,027	I	130	263.5	1,106,742
RPM-130W80LED-727-G1-R3M	417	J	130	54.2	227,682
RPL-225W90LED-727-G1-R3M	235	K	225	52.9	222,075
TOTAL	**36,536**			**1,978.5**	**8,309,721**
* Wattages based on Construction Documents Lighting Design, 7/9/2024.					

Table 3: Proposed LED cobrahead Replacements, base scope of work.

Utility Savings

Energy cost savings are derived from lowering the luminaire wattage, replacing old and inefficient HPS luminaires with new high-efficiency LEDs. Simply put, this project will reduce the amount of electricity required per luminaire while producing comparable or improved light output.

Energy cost savings will only be realized under DE bills. DE utility costs are relative to energy consumption. Lowering system wattage via LED luminaire installation will result in lower energy consumption; thereby reducing cost. DLC billing is per luminaire, and not dependent on wattage or usage hours. Reducing system wattage will not affect DLC bill costs; however, reducing and/or altering the quantity of luminaires city-wide will affect costs.

Energy savings estimates were developed from the detailed lighting inventory list provided in the DLC utility bills. Operating schedules were based on information provided by DOMI and the utility company (mandated through billing tariffs) and account for a standard 4,200 annual luminaire burn hours.

Considering both the existing and proposed energy consumption for the 36,536 luminaires to be replaced as part of this project, TEN anticipates DOMI and the City will realize a **63 percent reduction** in system wattage, for a **total decrease of 3,305 kW or a reduction of energy use of 13,880,017 kWh per year**, at the completion of the project. Anticipated energy cost savings are estimated at **$942,550 annually**, calculated from a blended rate of the current DE rate of $0.067907 per kWh, as per the DE Business supplier agreement. This rate has recently changed and is attributed to an increased capacity charge from PJM Interconnection, the region's wholesale electricity transmission operator. This will still result in a **37 percent cost reduction** as compared to the existing streetlight system.

Material and Maintenance Savings

HPS luminaires represent the previous generation of streetlight technology. This is partially attributed to the fact that they required little maintenance, as compared to even older technologies. HPS cobrahead luminaires are currently the most common streetlight type in the City. HPS lamps generally last for approximately 25,000 burn-hours, while other internal components usually have a three-to-five-year life span.

LED luminaires improve on the HPS luminaire's lifespan. LEDs are rated to last 50,000 to 100,000 burn-hours and internal components are rated at five or more years of life. This dramatically reduces maintenance needs system wide, with one LED luminaire being rated at two to four times the number of burn-hours as compared to HPS. New LED luminaires also have better resiliency to vibrations and general environmental conditions in addition to their longer lifespan.

Maintenance savings can fluctuate from year to year, occasionally being substantially influenced by unpredictable factors such as severe weather events or transportation incidents. When looking solely at predictable factors, such as the life span and costs of lamps, ballasts, transformers and capacitors, as well as longer warranty periods with LED luminaires, **maintenance savings are estimated at nearly $500,000 during the first year** following the conversion. Additional details can be found in Table 4 (on page 7), which do not account for labor costs to replace failed streetlights or streetlight components. The maintenance savings are only annual material savings from increased equipment lifespans.

Control Recommendations and Savings

A Network Lighting Management System (NLMS) is a map-based graphical user interface, enabling display, configuration, control, and monitoring of all devices in real time; this is in addition to complete scheduling management and customizable alerting systems. An NLMS will provide DOMI and the City with remote monitoring, the ability to record and transmit operational data of individual luminaires, including luminaire status (on/off/alarm), input voltage (V), current drawn (A), power (W), cumulative energy consumed (kWh), power factor, and lamp burn-hours (h), among numerous other datapoints. An NLMS has the capability to record, store, and extract energy consumption data as measured by the control node residing on each fixture. Data is synchronized and stored to allow historical reports and export for more advanced analysis (PDF, CSV, Excel File Format). An NLMS can also provide a variety of other features which relate to special events, allowing for the swift implementation of temporary custom streetlight schedules in desired areas to facilitate evening events (fireworks, music festivals, or other events).

Access to real-time data, enabled by the implementation of an NLMS, can generate significant cost savings for the City. The ability to monitor and control the cobrahead LED streetlight system, as described above, allows DOMI to easily pinpoint and diagnose failures and outages, and assist with troubleshooting.

Currently, DOMI has a maintenance contract with an electrical contractor, Sargent Electric Company, which is scheduled to expire in June 2025. The contract aims to "maintain and keep in good repair and in good working condition all facilities, fixtures and equipment, belonging to The City. Equipment that is serviced and maintained as part of this contract includes everything installed during the term of the contract, including all lighting units for the lighting of public streets, right-of-way, and parks, with all cutouts, fuses, sockets, weatherproof sockets, adapters, wire guards, glassware flanks, wiring, deflectors, owner-approved tags, ballasts, drivers, screens, brackets, poles and bases". The contractor shall use all reasonable means to maintain service to ensure that all streetlights burn continuously during the hours specified in the streetlighting schedule.

The contract consists of four separate activities: complaint reception (citizen, departmental, contractors, etc.); Inspection/Maintenance/Repair/Replacement (including complaint and emergency responses); Patrol / Repair / Replacement; and Pre-authorized additional services.

The streetlight maintenance contract is divided into multiple parts; the savings identified in Table 4 on the following page are associated with Part 1, which consists of specific tasks focusing on three-line items: Line 1, HPS cobrahead luminaires, Line 3, Metal Halide (MH) decorative luminaires, and Line 5, Smithfield Street Bridge.

Tasks covering these three Part 1 subcategories include, but are not limited to: maintaining streetlighting luminaires, poles, bases, etc.; washing and re-lamping street/re-photocell light luminaires; visual inspection of luminaires, poles and bases and other streetlight components; testing of service connections and repair/replacement of defective components; and test/replacement of photocells. Additionally, the maintenance contractor is required to patrol and field inspect the entire streetlight system once every 30 days for proper nighttime operations and prevent daytime burners.

Maintenance contract savings will be found from a reduction in scope for the next iteration of the City's streetlight maintenance contract. Currently, DOMI relies on maintenance contractor patrols, 311, and the streetlight hotline to identify and initiate a process for troubleshooting and repairing streetlight issues. The City pays approximately **$93,500 monthly** for Part 1; the main cost is monthly patrol, inspection, and repairs to the entire streetlight system. Realizing there will still be a need to carry a certain budget for necessary repairs for the remaining decorative and unchanged cobrahead luminaires, we anticipate a cost between 25 and 50 percent of the existing contract value. The annual savings from the potential elimination of the annual maintenance contract will provide additional savings that in turn help shorten the period of return on investment (ROI).

An NLMS will provide DOMI with an opportunity to remotely diagnose lighting events which will help DOMI deploy the appropriate needs through the maintenance contractor for necessary manpower, designated equipment, tools, and materials. The estimated maintenance savings identified in Table 4 are dependent on the purchase and implementation of an NLMS. **The NLMS will eliminate the need for patrolling and visual inspection requirements.** Part 1 repairs and maintenance will be identified by either a new NLMS or depending on constituents, 311, or the streetlight hotline.

The annual Part 1 savings illustrated below are 50 and 75 percent based on the annual services of Line 1, HPS cobra type: streetlighting, Line 3, MH decorative streetlighting, and Line5, Smithfield Street Bridge. This is associated with the continuation of remaining patrolling and the necessary repairs and replacement of existing to remain equipment.

Annual Savings				
Years	Utility *	O&M Material *	Part 1 - Maintenance ** NOTE #1 - NOTE #2	Total Savings
1	$942,550	$499,057	$514,237 - $865,940	$1,955,845 - $2,307,548
2	$970,827	$514,029	$529,664 - $891,919	$2,014,520 - $2,376,775
3	$999,952	$529,450	$545,554 - $918,676	$2,074,956 - $2,448,078
4	$1,029,950	$545,333	$561,921 - $946,237	$2,137,205 - $2,521,520
5	$1,060,849	$561,693	$578,779 - $974,624	$2,201,321 - $2,597,166
6	$1,092,674	$578,544	$596,142 - $1,003,862	$2,267,360 - $2,675,081
7	$1,125,454	$595,901	$614,026 - $1,033,978	$2,335,381 - $2,755,333
8	$1,159,218	$613,778	$632,447 - $1,064,998	$2,405,443 - $2,837,993
9	$1,193,995	$632,191	$651,420 - $1,096,947	$2,477,606 - $2,923,133
10	$1,229,814	$651,157	$670,963 - $1,129,856	$2,551,934 - $3,010,827
Total	**$10,805,283**	**$5,721,133**	**$5,895,154 - $9,927,037**	**$22,421,571 - $26,453,453**
** Table assumes 3% escalation on Ulilty Savings and Material Savings*				
*** Estimated Anticipated Savings based on Annual Maintenance Contract (includes 3% escalation)*				
NOTE #1: Assuming there is still an anticipated cost of 50% of the Part 1, Lines 1, 3, & 5; annually.				
NOTE #2: Assuming there is still an anticipated cost of 25% of the Part 1, Lines 1, 3, & 5; annually.				

Table 4: Overall Savings Summary for LED Streetlighting upgrade

Comparison of Energy Saved to Greenhouse Gas Emissions

A reduction of 13,880,017 kWh annually is the equivalent of about 26,970,298 pounds of carbon dioxide (CO_2)[2]. This is equivalent to greenhouse gas (GHG) emissions from[3]:

2,854 gasoline-powered passenger vehicles driven for one year, or	31,153,391 miles driven by an average gasoline-powered passenger vehicle
	

This is equivalent to CO_2 emissions from:

1,376,564 gallons of **gasoline** consumed 	1,201,721 gallons of **diesel** consumed 
13,589,178 pounds of coal burned 	162 tanker trucks' worth of gasoline 
1,443 homes' energy use for one year 	2,098 homes' electricity use for one year 
67.8 railcars' worth of coal burned 	28,323 barrels of oil consumed 
753,920,317 number of smartphones charged 	

[2] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results

[3] Based on EPA emissions calculations relative to Pittsburgh, PA 15222, as of May 6th, 2025, "Kilowatt-hours avoided".

Formulas for calculating annual energy consumption

- [W] X [Hrs.] = Watt-Hours [W-h]
- [1,000 W-h] / [1 kW / 1,000 W]* = 1 Kilowatt-Hour [kW-h]
- [1 kW-h] X [4,200 Hrs.] = 4,200 kW-h (Annual Consumption)

**Conversion factor between W and kW. Prefix kilo- represents 1,000, thus 1,000 Watts is equivalent to 1-kilowatt*

Example of annual energy consumption calculation

- 100W HPS Lamp with a Magnetic Ballast has a system wattage of 128W.
- The City of Pittsburgh has approximately **14,206** of these luminaires to be replaced under this scope of work.
- [128 W] X [1 Hrs] = 128 W-h
- [128 W-h] X [1 kW / 1,000 W] = 0.128 kW-h
- [0.128 kW-h] X [4,200 Burn Hours / 1 year] = 537.6 kW-h (Annual)
- **14,206** X [537.6 kW-h] = 7,637,145.6 kW-h (Annual)

Exhibit A

Bid Package Construction Documents released by DOMI (July 9, 2024)

No.	Revision/Issue	Date

THE CITY OF
PITTSBURGH

CITY OF PITTSBURGH
DEPARTMENT OF MOBILITY AND INFRASTRUCTURE

DRAWINGS
FOR
CONSTRUCTION
OF

LED MODERNIZATION PROJECT

CITY OF PITTSBURGH
ALLEGHENY COUNTY

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT LAWRENCE MACIOCE
No. PE081954

ROBERT LAWRENCE MACIOCE, PE
DATE: 7/9/2024

Project Name and Area
LED Modernization Project

Citywide

Date
7/9/2024

Sheet
1

Scale
As Noted

Drawings.dwg

No.	Revision/Issue	Date

PROJECT INFORMATION:

PROJECT TITLE:

LED MODERNIZATION PROJECT

PROJECT SPONSOR AND OWNER:

CITY OF PITTSBURGH
DEPARTMENT OF MOBILITY AND INFRASTRUCTURE (DOMI)
CITY COUNTY BUILDING
414 GRANT STREET
PITTSBURGH, PA 15219

PROJECT CONSULTANT:

THE EFFICIENCY NETWORK (TEN)
1501 REEDSDALE STREET #401
PITTSBURGH, PA 15233

GENERAL NOTES

1. WORK TO BE DONE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408/2020 (PDT 408), INCLUDING SUPPLEMENTS ATTACHED HERETO; AND THE STANDARD SPECIFICATIONS, APPROVED DRAWINGS, AND REGULATIONS OF THE DEPARTMENT OF MOBILITY AND INFRASTRUCTURE (DOMI), AND SPECIAL PROVISIONS OF THE PROPOSAL.
2. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES AND SUBCONTRACTORS.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND FIELD CONDITIONS PRIOR TO COMMENCING THE WORK. THE CONTRACTOR IS TO NOTIFY THE ENGINEER OF ANY EXISTING CONDITIONS WHICH ARE DIFFERENT FROM THOSE SHOWN ON THE PLANS.
4. EXCEPT AS NOTED, ALL WORK IS WITHIN THE LEGAL RIGHT-OF-WAY LINES.
5. NO STRUCTURAL WORK IS TO BE PERFORMED ON UNDERGROUND VAULTS, INLETS, MANHOLES, OR OTHER MAJOR UTILITY STRUCTURES UNLESS DIRECTED BY THE CONSULTANT.
6. SHOULD EXCAVATION BECOME REQUIRED, PURSUANT TO THE REQUIREMENTS OF PENNSYLVANIA ACT 287 (1974), AND AS AMENDED, THE CONTRACTOR SHALL CONTACT THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776, AT LEAST 3 WORKING DAYS PRIOR TO EXCAVATION.
7. THE CONTRACTOR MUST VERIFY THE EXACT LOCATION AND DEPTH OF UTILITIES WHEN EXCAVATING. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES OR VAULTS.
6. THE CONTRACTOR SHALL COORDINATE WORK WITH ALL UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION WORK. THE CITY AND THE CONSULTANT ARE NOT RESPONSIBLE FOR ANY DELAYS INCURRED.
7. THE CONTRACTOR SHALL VERIFY ALL EXISTING OVERHEAD UTILITY HEIGHTS AT PROPOSED POLE LOCATIONS TO CHECK THAT OVERHEAD CLEARANCE IS IN ACCORDANCE WITH NATIONAL ELECTRIC SAFETY CODE.
8. FOR PROJECTS ON STATE ROUTES, NOTICE IS HEREBY GIVEN THAT THE RECEIPT OF A PERMIT FROM EITHER THE CITY OF PITTSBURGH, OR THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION DOES NOT IMPLY A PERMIT FROM THE OTHER. ALL PERMITS MUST BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
9. PRIOR TO COMMENCING WORK ON A METAL POLE, THE CONTRACTOR SHALL TEST METAL POLES FOR ELECTRICAL LEAKAGE TO GROUND OR POTENTIAL SHORT CIRCUIT.
10. SALVAGE ALL EXISTING LUMINAIRES TO BE REMOVED. COORDINATE WITH THE CONSULTANT REGARDING THE LUMINAIRES REMOVED TO DETERMINE THE MATERIALS THAT SHALL BE RETURNED TO THE CITY, AND THE MATERIALS THAT MAY BE RECYCLED OR DISPOSED.
11. LUMINAIRES SHALL BE INSTALLED LEVEL (PER TWO DIRECTION BUBBLE INDICATORS).
12. LUMINAIRES SHALL BE INSTALLED SUCH THAT THEY DIRECT LIGHT FOCUSED ON THE CENTER OF THE ROADWAY AT THE LUMINAIRE'S INSTALLATION LOCATION.
13. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE ALL SERVICE CONNECTIONS TO PROPOSED LED COBRA HEAD LUMINAIRES UPON INSTALLATION SUCH THAT THE LUMINAIRE IS OPERATIONAL.
14. CONTRACTOR SHALL INDICATE ON GIS DATABASE INPUT SYSTEM WHICH LUMINAIRE LOCATIONS HAVE ADDITIONAL CONNECTIONS (I.E., POWER TAPS, SEPARATE OR ADDITIONAL CIRCUITS, ETC.).
15. CONTRACTOR SHALL INSTALL AND COMMISSION NETWORK LIGHTING CONTROLLER IN EACH PROPOSED LUMINAIRE. IF CITY NOTIFIES THE CONTRACTOR THE NETWORK LIGHTING CONTROLLER WILL NOT BE PROVIDED, CONTRACTOR SHALL INSTALL PHOTOCELL IN PROPOSED LED LUMINAIRE, IN LIEU OF THE NETWORK LIGHTING CONTROLLER.

Project Name and Area
LED Modernization Project

Citywide

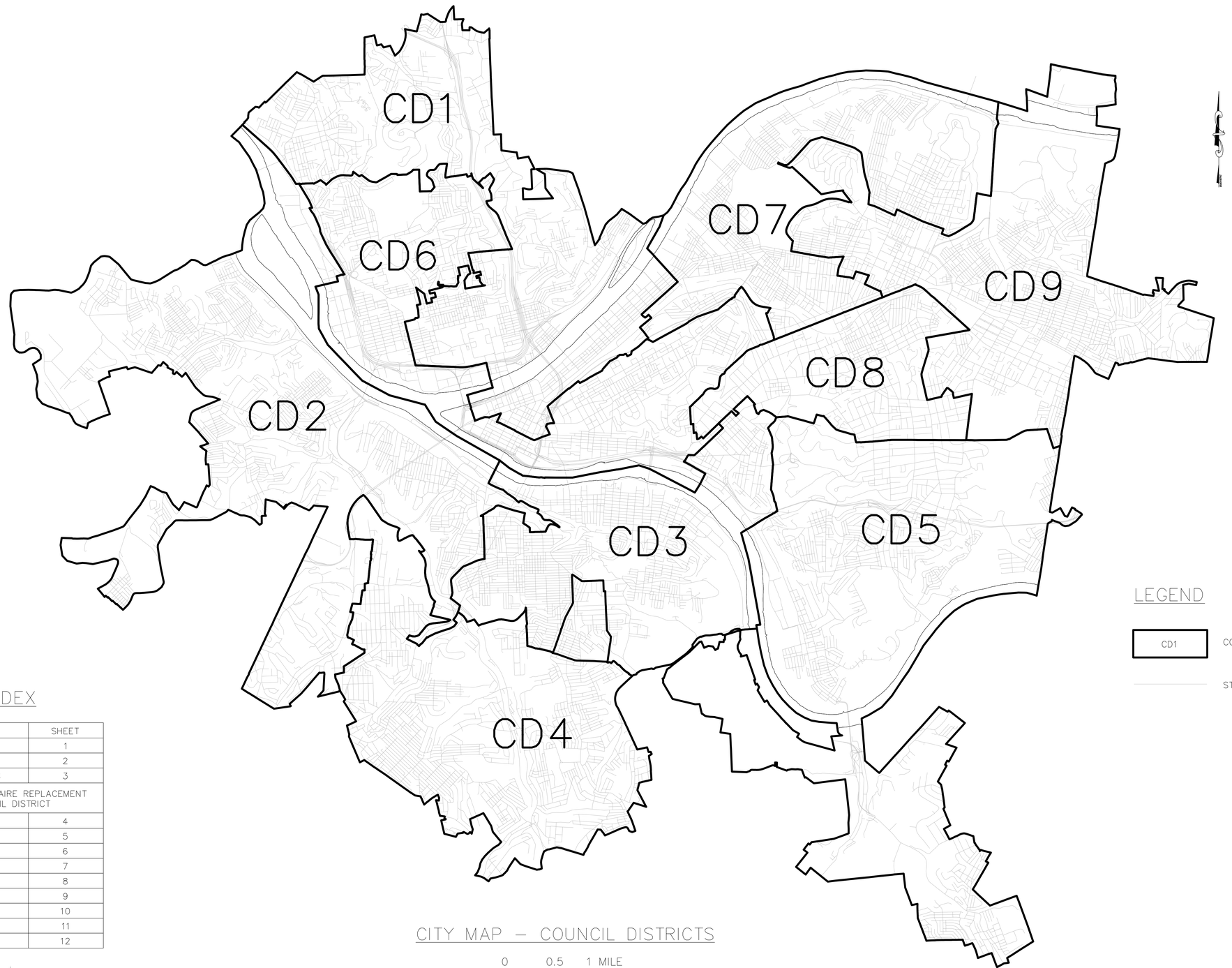
Date
7/9/2024

Sheet
2

Scale
As Noted

Drawings.dwg

No.	Revision/Issue	Date



SHEET INDEX

LEGEND

CD1 — COUNCIL DISTRICT BOUNDARY

STREET

CITY MAP – COUNCIL DISTRICTS

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SCALE

Project Name and Area

LED Modernization Project

Citywide

Date: 7/9/2024

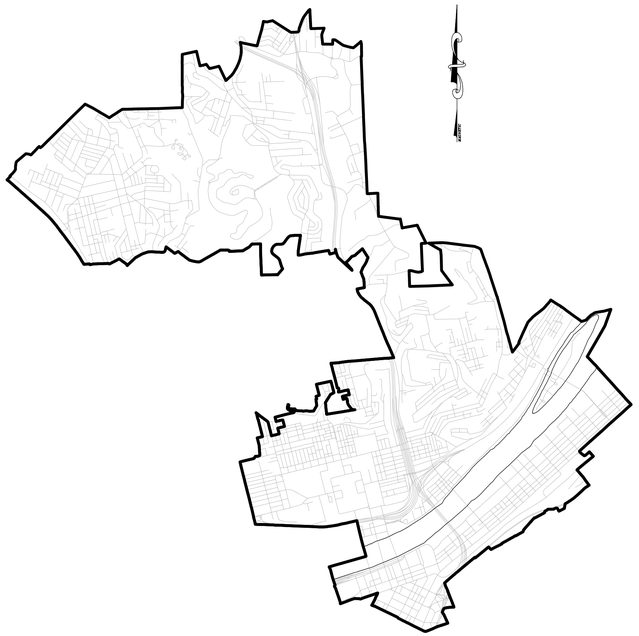
Scale: As Noted

Sheet: 3

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 1
ALLEGHENY CENTER
ALLEGHENY WEST
BRIGHTON HEIGHTS
CALIFORNIA–KIRKBRIDE
CENTRAL BUSINESS DISTRICT
CENTRAL NORTHSIDE
CHATEAU
EAST ALLEGHENY
FINEVIEW
MARSHALL–SHADELAND
NORTH SHORE
NORTHVIEW HEIGHTS
PERRY NORTH
PERRY SOUTH
SPRING GARDEN
SPRING HILL–CITY VIEW
STRIP DISTRICT
SUMMER HILL
TROY HILL



COUNCIL DISTRICT 1

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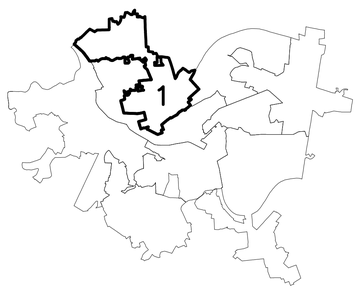
SCALE



KEY MAP

COUNCIL DISTRICT 1 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	650
CLASS B	ARCH–M–PA2–40–727–U–T3	379
CLASS C	ARCH–M–PA2–50–727–U–T3	1301
CLASS D	ARCH–M–PA2–60–727–U–T3	248
CLASS E	ARCH–M–PA2–70–727–U–T3	31
CLASS F	ARCH–M–PA2–80–727–U–T3	646
CLASS G	ARCH–M–PA2–110–727–U–T3	351
CLASS H	ARCH–M–PA2–120–727–U–T3	365
CLASS I	ARCH–M–PA2–140–727–U–T3	66
CLASS J	ARCH–M–PA2–150–727–U–T3	141
CLASS K	ARCH–M–PA2–160–727–U–T3	130
CLASS L	ARCH–L–PA3–170–727–U–T3	86
CLASS M	ARCH–L–PA3–200–727–U–T3	8
CLASS N	ARCH–L–PA3–280–727–U–T3	36
TOTAL		4438

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	898
CLASS B	RPS–40W10LED–727–G1–R3M	1433
CLASS C	RPS–40W20LED–727–G1–R3M	246
CLASS D	RPS–60W30LED–727–G1–R3M	678
CLASS E	RPS–70W30LED–727–G1–R3M	19
CLASS F	RPM–90W60LED–727–G1–R3M	364
CLASS G	RPM–90W80LED–727–G1–R3M	392
CLASS H	RPM–105W60LED–727–G1–R3M	6
CLASS I	RPM–130W60LED–727–G1–R3M	217
CLASS J	RPM–130W80LED–727–G1–R3M	148
CLASS K	RPL–225W90LED–727–G1–R3M	37
TOTAL		4438

LUMINAIRE NOTES

1. DESIGN LUMINAIRES FROM MULTIPLE MANUFACTURERS (COOPER AND LUMEC) WERE USED SEPARATELY TO DESIGN THE PROJECT TO APPROPRIATE LIGHTING LEVELS, THE SPECIFIC MODEL NUMBERS ARE PRESENTED ABOVE WITH THEIR QUANTITIES FOR BOTH MANUFACTURERS' DESIGN LUMINAIRES.
2. ALL PROPOSED LUMINAIRES FURNISHED AND INSTALLED ON THIS PROJECT SHALL BE SOURCED FROM ONE MANUFACTURER. MIXING AND MATCHING LUMINAIRES FROM DIFFERENT MANUFACTURERS SHALL NOT BE ACCEPTABLE.

Project Name and Area
LED Modernization Project

Council District 1

Date
7/9/2024

Sheet
4

Scale
As Noted

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 2
ALLENTOWN
BANKSVILLE
BEECHVIEW
CHARTIERS CITY
CRAFTON HEIGHTS
DUQUESNE HEIGHTS
EAST CARNEGIE
ELLIOT
ESPLEN
FAIRYWOOD
MOUNT WASHINGTON
OAKWOOD
RIDGEMONT
SHERADEN
SOUTH SHORE
WEST END
WESTWOOD
WINDGAP

COUNCIL DISTRICT 2

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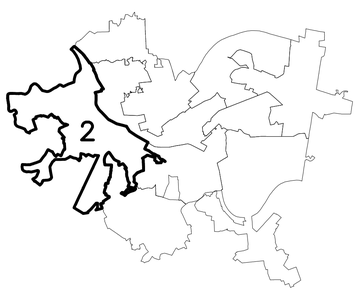
SCALE



KEY MAP

COUNCIL DISTRICT 2 SUMMARY OF 1-FOR-1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH-S-PA1-30-727-U-T3	885
CLASS B	ARCH-M-PA2-40-727-U-T3	459
CLASS C	ARCH-M-PA2-50-727-U-T3	1737
CLASS D	ARCH-M-PA2-60-727-U-T3	158
CLASS E	ARCH-M-PA2-70-727-U-T3	51
CLASS F	ARCH-M-PA2-80-727-U-T3	621
CLASS G	ARCH-M-PA2-110-727-U-T3	265
CLASS H	ARCH-M-PA2-120-727-U-T3	203
CLASS I	ARCH-M-PA2-140-727-U-T3	22
CLASS J	ARCH-M-PA2-150-727-U-T3	56
CLASS K	ARCH-M-PA2-160-727-U-T3	153
CLASS L	ARCH-L-PA3-170-727-U-T3	73
CLASS M	ARCH-L-PA3-200-727-U-T3	0
CLASS N	ARCH-L-PA3-280-727-U-T3	23
TOTAL		4706

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS-25W10LED-727-G1-R3M	1100
CLASS B	RPS-40W10LED-727-G1-R3M	1981
CLASS C	RPS-40W20LED-727-G1-R3M	158
CLASS D	RPS-60W30LED-727-G1-R3M	672
CLASS E	RPS-70W30LED-727-G1-R3M	27
CLASS F	RPM-90W60LED-727-G1-R3M	199
CLASS G	RPM-90W80LED-727-G1-R3M	264
CLASS H	RPM-105W60LED-727-G1-R3M	6
CLASS I	RPM-130W60LED-727-G1-R3M	223
CLASS J	RPM-130W80LED-727-G1-R3M	53
CLASS K	RPL-225W90LED-727-G1-R3M	23
TOTAL		4706

Project Name and Area

LED Modernization Project

Council District 2

Date: 7/9/2024

Scale: As Noted

Sheet: 5

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 3
ALLENTOWN
ARLINGTON
ARLINGTON HEIGHTS
BELTZHOOVER
BON AIR
CARRICK
CENTRAL OAKLAND
GREENFIELD
HAZELWOOD
KNOXVILLE
MOUNT WASHINGTON
MT. OLIVER
NORTH OAKLAND
SOUTH OAKLAND
SOUTH SHORE
SOUTH SIDE FLATS
SOUTH SIDE SLOPES
SQUIRREL HILL SOUTH
ST. CLAIR

COUNCIL DISTRICT 3

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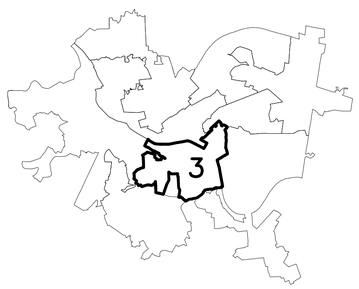
SCALE

COUNCIL DISTRICT 3 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	524
CLASS B	ARCH–M–PA2–40–727–U–T3	396
CLASS C	ARCH–M–PA2–50–727–U–T3	1238
CLASS D	ARCH–M–PA2–60–727–U–T3	313
CLASS E	ARCH–M–PA2–70–727–U–T3	2
CLASS F	ARCH–M–PA2–80–727–U–T3	842
CLASS G	ARCH–M–PA2–110–727–U–T3	146
CLASS H	ARCH–M–PA2–120–727–U–T3	135
CLASS I	ARCH–M–PA2–140–727–U–T3	78
CLASS J	ARCH–M–PA2–150–727–U–T3	10
CLASS K	ARCH–M–PA2–160–727–U–T3	94
CLASS L	ARCH–L–PA3–170–727–U–T3	55
CLASS M	ARCH–L–PA3–200–727–U–T3	4
CLASS N	ARCH–L–PA3–280–727–U–T3	39
TOTAL		3876

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	812
CLASS B	RPS–40W10LED–727–G1–R3M	1346
CLASS C	RPS–40W20LED–727–G1–R3M	313
CLASS D	RPS–60W30LED–727–G1–R3M	844
CLASS E	RPS–70W30LED–727–G1–R3M	53
CLASS F	RPM–90W60LED–727–G1–R3M	127
CLASS G	RPM–90W80LED–727–G1–R3M	179
CLASS H	RPM–105W60LED–727–G1–R3M	2
CLASS I	RPM–130W60LED–727–G1–R3M	148
CLASS J	RPM–130W80LED–727–G1–R3M	13
CLASS K	RPL–225W90LED–727–G1–R3M	39
TOTAL		3876



KEY MAP

Project Name and Area

LED Modernization Project

Council District 3

Date 7/9/2024

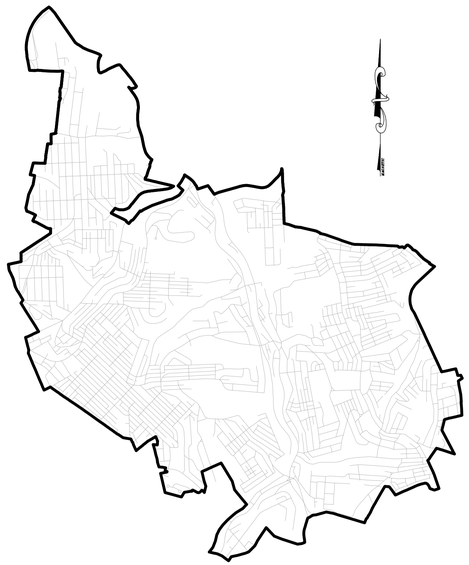
Scale As Noted

Sheet 6

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 4
BEECHVIEW
BELTZHOOVER
BON AIR
BROOKLINE
CARRICK
KNOXVILLE
MOUNT WASHINGTON
OVERBROOK



COUNCIL DISTRICT 4

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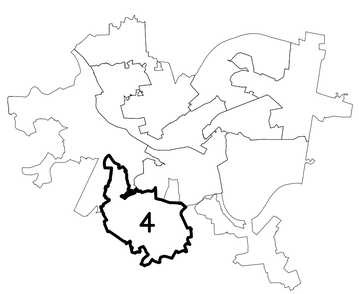
SCALE



KEY MAP

COUNCIL DISTRICT 4 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	449
CLASS B	ARCH–M–PA2–40–727–U–T3	309
CLASS C	ARCH–M–PA2–50–727–U–T3	2224
CLASS D	ARCH–M–PA2–60–727–U–T3	142
CLASS E	ARCH–M–PA2–70–727–U–T3	3
CLASS F	ARCH–M–PA2–80–727–U–T3	654
CLASS G	ARCH–M–PA2–110–727–U–T3	77
CLASS H	ARCH–M–PA2–120–727–U–T3	126
CLASS I	ARCH–M–PA2–140–727–U–T3	4
CLASS J	ARCH–M–PA2–150–727–U–T3	32
CLASS K	ARCH–M–PA2–160–727–U–T3	144
CLASS L	ARCH–L–PA3–170–727–U–T3	3
CLASS M	ARCH–L–PA3–200–727–U–T3	1
CLASS N	ARCH–L–PA3–280–727–U–T3	20
TOTAL		4188

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	607
CLASS B	RPS–40W10LED–727–G1–R3M	2375
CLASS C	RPS–40W20LED–727–G1–R3M	142
CLASS D	RPS–60W30LED–727–G1–R3M	657
CLASS E	RPS–70W30LED–727–G1–R3M	10
CLASS F	RPM–90W60LED–727–G1–R3M	125
CLASS G	RPM–90W80LED–727–G1–R3M	71
CLASS H	RPM–105W60LED–727–G1–R3M	1
CLASS I	RPM–130W60LED–727–G1–R3M	147
CLASS J	RPM–130W80LED–727–G1–R3M	33
CLASS K	RPL–225W90LED–727–G1–R3M	20
TOTAL		4188

Project Name and Area

LED Modernization Project

Council District 4

Date 7/9/2024

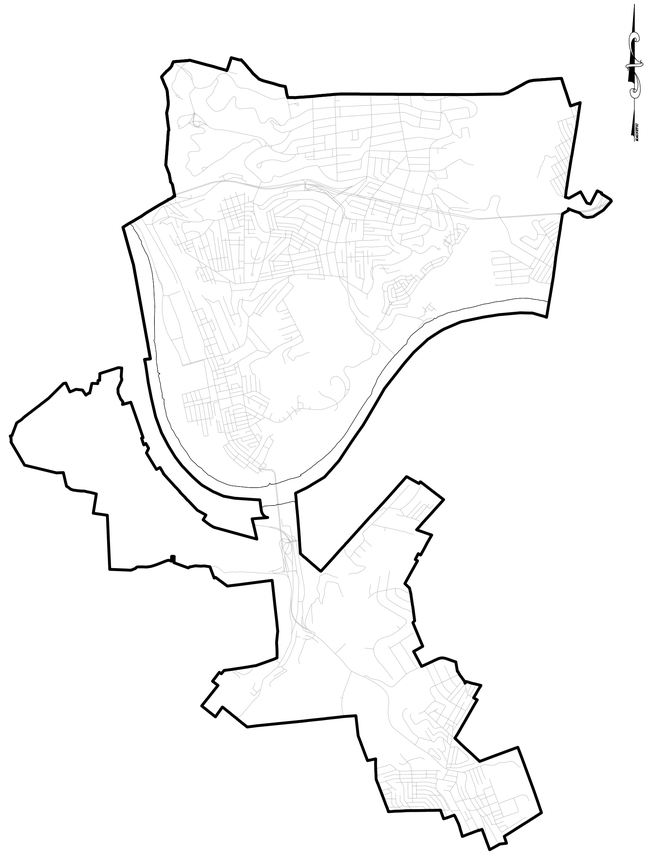
Scale As Noted

Sheet 7

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 5
CENTRAL OAKLAND
GLEN HAZEL
GREENFIELD
HAYS
HAZELWOOD
LINCOLN PLACE
NEW HOMESTEAD
REGENT SQUARE
SQUIRREL HILL NORTH
SQUIRREL HILL SOUTH
SWISSHELM PARK



COUNCIL DISTRICT 5

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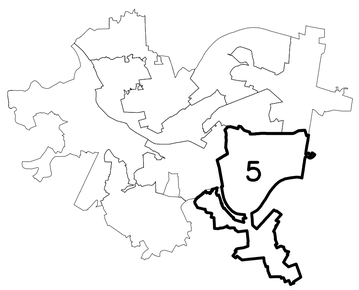


KEY MAP

COUNCIL DISTRICT 5 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	830
CLASS B	ARCH–M–PA2–40–727–U–T3	470
CLASS C	ARCH–M–PA2–50–727–U–T3	1311
CLASS D	ARCH–M–PA2–60–727–U–T3	109
CLASS E	ARCH–M–PA2–70–727–U–T3	13
CLASS F	ARCH–M–PA2–80–727–U–T3	719
CLASS G	ARCH–M–PA2–110–727–U–T3	234
CLASS H	ARCH–M–PA2–120–727–U–T3	122
CLASS I	ARCH–M–PA2–140–727–U–T3	79
CLASS J	ARCH–M–PA2–150–727–U–T3	2
CLASS K	ARCH–M–PA2–160–727–U–T3	337
CLASS L	ARCH–L–PA3–170–727–U–T3	35
CLASS M	ARCH–L–PA3–200–727–U–T3	6
CLASS N	ARCH–L–PA3–280–727–U–T3	11
TOTAL		4278

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	1116
CLASS B	RPS–40W10LED–727–G1–R3M	1495
CLASS C	RPS–40W20LED–727–G1–R3M	109
CLASS D	RPS–60W30LED–727–G1–R3M	732
CLASS E	RPS–70W30LED–727–G1–R3M	20
CLASS F	RPM–90W60LED–727–G1–R3M	120
CLASS G	RPM–90W80LED–727–G1–R3M	295
CLASS H	RPM–105W60LED–727–G1–R3M	2
CLASS I	RPM–130W60LED–727–G1–R3M	374
CLASS J	RPM–130W80LED–727–G1–R3M	4
CLASS K	RPL–225W90LED–727–G1–R3M	11
TOTAL		4278

Project Name and Area

LED Modernization Project

Council District 5

Date: 7/9/2024

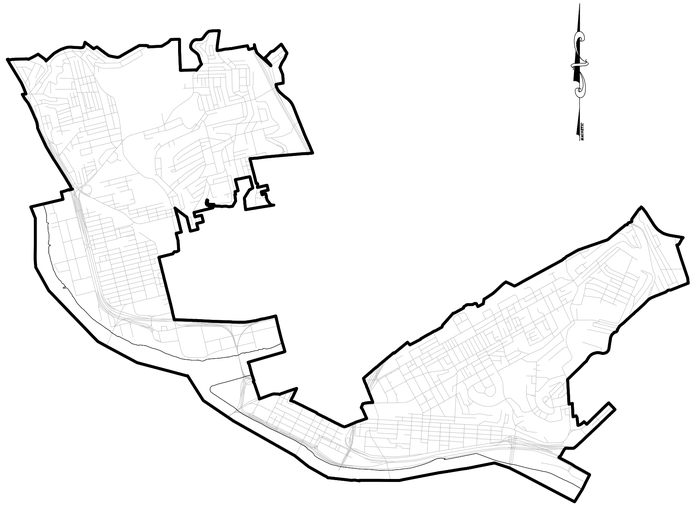
Scale: As Noted

Sheet: 8

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 6
BEDFORD DWELLINGS
BLUFF
BRIGHTON HEIGHTS
CALIFORNIA–KIRKBRIDE
CENTRAL BUSINESS DISTRICT
CENTRAL NORTHSIDE
CENTRAL OAKLAND
CHATEAU
CRAWFORD–ROBERTS
FINEVIEW
MANCHESTER
MARSHALL–SHADELAND
MIDDLE HILL
NORTH OAKLAND
NORTH SHORE
NORTHVIEW HEIGHTS
PERRY SOUTH
POLISH HILL
SOUTH OAKLAND
SPRING HILL–CITY VIEW
STRIP DISTRICT
TERRACE VILLAGE
UPPER HILL
WEST OAKLAND



COUNCIL DISTRICT 6

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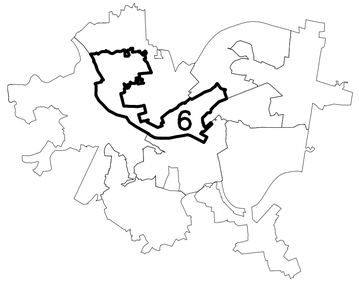
SCALE

COUNCIL DISTRICT 6 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	404
CLASS B	ARCH–M–PA2–40–727–U–T3	402
CLASS C	ARCH–M–PA2–50–727–U–T3	971
CLASS D	ARCH–M–PA2–60–727–U–T3	238
CLASS E	ARCH–M–PA2–70–727–U–T3	31
CLASS F	ARCH–M–PA2–80–727–U–T3	876
CLASS G	ARCH–M–PA2–110–727–U–T3	537
CLASS H	ARCH–M–PA2–120–727–U–T3	283
CLASS I	ARCH–M–PA2–140–727–U–T3	88
CLASS J	ARCH–M–PA2–150–727–U–T3	163
CLASS K	ARCH–M–PA2–160–727–U–T3	256
CLASS L	ARCH–L–PA3–170–727–U–T3	128
CLASS M	ARCH–L–PA3–200–727–U–T3	25
CLASS N	ARCH–L–PA3–280–727–U–T3	64
TOTAL		4467

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	734
CLASS B	RPS–40W10LED–727–G1–R3M	1040
CLASS C	RPS–40W20LED–727–G1–R3M	244
CLASS D	RPS–60W30LED–727–G1–R3M	907
CLASS E	RPS–70W30LED–727–G1–R3M	44
CLASS F	RPM–90W60LED–727–G1–R3M	191
CLASS G	RPM–90W80LED–727–G1–R3M	670
CLASS H	RPM–105W60LED–727–G1–R3M	6
CLASS I	RPM–130W60LED–727–G1–R3M	386
CLASS J	RPM–130W80LED–727–G1–R3M	180
CLASS K	RPL–225W90LED–727–G1–R3M	65
TOTAL		4467



KEY MAP

Project Name and Area

LED Modernization Project

Council District 6

Date 7/9/2024

Scale As Noted

Sheet 9

Drawings.dwg

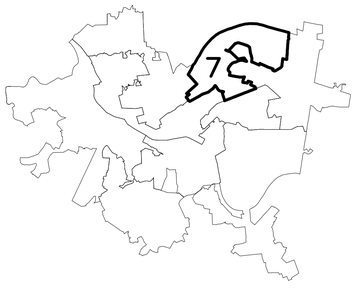
No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 7
BEDFORD DWELLINGS
BLOOMFIELD
CENTRAL BUSINESS DISTRICT
CENTRAL LAWRENCEVILLE
CRAWFORD–ROBERTS
EAST LIBERTY
FRIENDSHIP
HIGHLAND PARK
LINCOLN–LEMINGTON–BELMAR
LOWER LAWENCEVILLE
MORNINGSIDE
POLISH HILL
SHADYSIDE
STANTON HEIGHTS
STRIP DISTRICT
UPPER LAWRENCEVILLE

COUNCIL DISTRICT 7

0 0.5 1 MILE

SCALE



KEY MAP

COUNCIL DISTRICT 7 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	404
CLASS B	ARCH–M–PA2–40–727–U–T3	701
CLASS C	ARCH–M–PA2–50–727–U–T3	1012
CLASS D	ARCH–M–PA2–60–727–U–T3	321
CLASS E	ARCH–M–PA2–70–727–U–T3	39
CLASS F	ARCH–M–PA2–80–727–U–T3	913
CLASS G	ARCH–M–PA2–110–727–U–T3	375
CLASS H	ARCH–M–PA2–120–727–U–T3	219
CLASS I	ARCH–M–PA2–140–727–U–T3	18
CLASS J	ARCH–M–PA2–150–727–U–T3	13
CLASS K	ARCH–M–PA2–160–727–U–T3	149
CLASS L	ARCH–L–PA3–170–727–U–T3	22
CLASS M	ARCH–L–PA3–200–727–U–T3	22
CLASS N	ARCH–L–PA3–280–727–U–T3	7
TOTAL		4215

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	982
CLASS B	RPS–40W10LED–727–G1–R3M	1135
CLASS C	RPS–40W20LED–727–G1–R3M	321
CLASS D	RPS–60W30LED–727–G1–R3M	952
CLASS E	RPS–70W30LED–727–G1–R3M	61
CLASS F	RPM–90W60LED–727–G1–R3M	202
CLASS G	RPM–90W80LED–727–G1–R3M	348
CLASS H	RPM–105W60LED–727–G1–R3M	5
CLASS I	RPM–130W60LED–727–G1–R3M	175
CLASS J	RPM–130W80LED–727–G1–R3M	27
CLASS K	RPL–225W90LED–727–G1–R3M	7
TOTAL		4215

Project Name and Area

LED Modernization Project

Council District 7

Date 7/9/2024

Scale As Noted

Sheet 10

Drawings.dwg

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 8
CENTRAL OAKLAND
NORTH OAKLAND
POINT BREEZE
SHADYSIDE
SQUIRREL HILL NORTH
WEST OAKLAND

COUNCIL DISTRICT 8

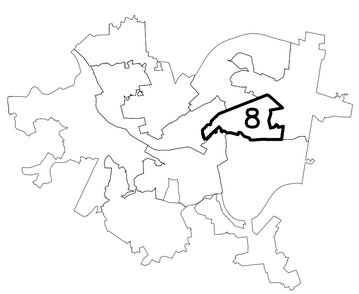
0 0.5 1 MILE

SCALE

COUNCIL DISTRICT 8 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	54
CLASS B	ARCH–M–PA2–40–727–U–T3	197
CLASS C	ARCH–M–PA2–50–727–U–T3	631
CLASS D	ARCH–M–PA2–60–727–U–T3	41
CLASS E	ARCH–M–PA2–70–727–U–T3	3
CLASS F	ARCH–M–PA2–80–727–U–T3	520
CLASS G	ARCH–M–PA2–110–727–U–T3	115
CLASS H	ARCH–M–PA2–120–727–U–T3	164
CLASS I	ARCH–M–PA2–140–727–U–T3	42
CLASS J	ARCH–M–PA2–150–727–U–T3	6
CLASS K	ARCH–M–PA2–160–727–U–T3	106
CLASS L	ARCH–L–PA3–170–727–U–T3	57
CLASS M	ARCH–L–PA3–200–727–U–T3	2
CLASS N	ARCH–L–PA3–280–727–U–T3	13
TOTAL		1951

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	207
CLASS B	RPS–40W10LED–727–G1–R3M	675
CLASS C	RPS–40W20LED–727–G1–R3M	41
CLASS D	RPS–60W30LED–727–G1–R3M	523
CLASS E	RPS–70W30LED–727–G1–R3M	25
CLASS F	RPM–90W60LED–727–G1–R3M	156
CLASS G	RPM–90W80LED–727–G1–R3M	140
CLASS H	RPM–105W60LED–727–G1–R3M	5
CLASS I	RPM–130W60LED–727–G1–R3M	166
CLASS J	RPM–130W80LED–727–G1–R3M	0
CLASS K	RPL–225W90LED–727–G1–R3M	13
TOTAL		1951



KEY MAP

Drawings.dwg

Project Name and Area

LED Modernization Project

Council District 8

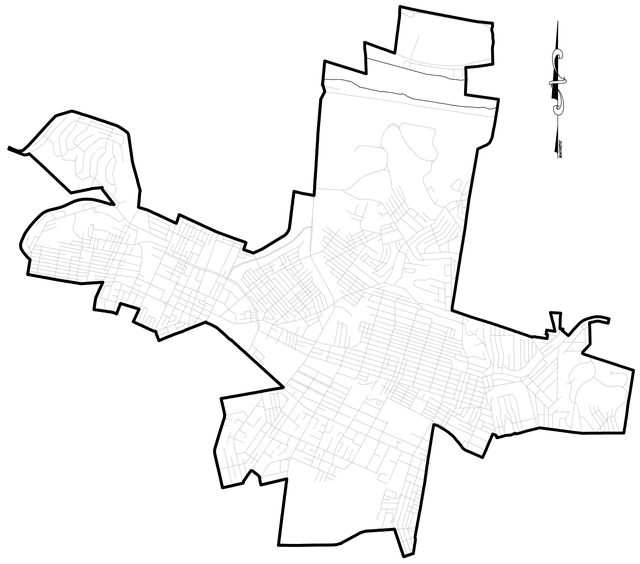
Date 7/9/2024

Scale As Noted

Sheet 11

No.	Revision/Issue	Date

NEIGHBORHOODS WITHIN COUNCIL DISTRICT 9
BLOOMFIELD
CENTRAL LAWRENCEVILLE
EAST HILLS
EAST LIBERTY
FRIENDSHIP
GARFIELD
HIGHLAND PARK
HOMEWOOD NORTH
HOMEWOOD SOUTH
HOMEWOOD WEST
LARIMER
LINCOLN–LEMINGTON–BELMAR
POINT BREEZE
POINT BREEZE NORTH
REGENT SQUARE
STANTON HEIGHTS



COUNCIL DISTRICT 9

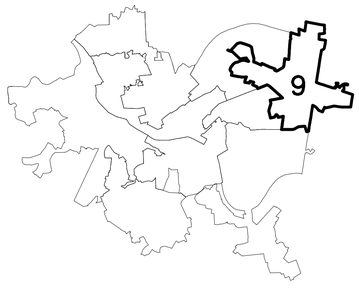
0 0.5 1 MILE

SCALE

COUNCIL DISTRICT 9 SUMMARY OF 1–FOR–1 LUMINAIRE REPLACEMENT QUANTITIES

CLASS	COOPER LUMINAIRE MODEL NO.	QUANTITY
CLASS A	ARCH–S–PA1–30–727–U–T3	620
CLASS B	ARCH–M–PA2–40–727–U–T3	767
CLASS C	ARCH–M–PA2–50–727–U–T3	1320
CLASS D	ARCH–M–PA2–60–727–U–T3	177
CLASS E	ARCH–M–PA2–70–727–U–T3	55
CLASS F	ARCH–M–PA2–80–727–U–T3	1129
CLASS G	ARCH–M–PA2–110–727–U–T3	190
CLASS H	ARCH–M–PA2–120–727–U–T3	257
CLASS I	ARCH–M–PA2–140–727–U–T3	66
CLASS J	ARCH–M–PA2–150–727–U–T3	3
CLASS K	ARCH–M–PA2–160–727–U–T3	194
CLASS L	ARCH–L–PA3–170–727–U–T3	97
CLASS M	ARCH–L–PA3–200–727–U–T3	17
CLASS N	ARCH–L–PA3–280–727–U–T3	20
TOTAL		4912

CLASS	LUMEC LUMINAIRE MODEL NO.	QUANTITY
CLASS A	RPS–25W10LED–727–G1–R3M	1364
CLASS B	RPS–40W10LED–727–G1–R3M	1343
CLASS C	RPS–40W20LED–727–G1–R3M	176
CLASS D	RPS–60W30LED–727–G1–R3M	1185
CLASS E	RPS–70W30LED–727–G1–R3M	50
CLASS F	RPM–90W60LED–727–G1–R3M	243
CLASS G	RPM–90W80LED–727–G1–R3M	219
CLASS H	RPM–105W60LED–727–G1–R3M	7
CLASS I	RPM–130W60LED–727–G1–R3M	292
CLASS J	RPM–130W80LED–727–G1–R3M	13
CLASS K	RPL–225W90LED–727–G1–R3M	20
TOTAL		4912



KEY MAP

Project Name and Area

LED Modernization Project

Council District 9

Date	Sheet
7/9/2024	12
Scale: As Noted	

Drawings.dwg