



August 30, 2013

Ms. Luly Massaro
Clerk of the Commission
Rhode Island Public Utilities Commission
89 Jefferson Boulevard.
Warwick, RI 02888

Re: RIPUC DOCKET NO. 4368
Request for an LED Street Light Incentive for the 2013 DSM
Program and to submit the final report on the LED Street Lights

Dear Ms. Massaro:

On behalf of the Pascoag Utility District (Pascoag or the District), we herewith file an original and nine copies of its request for an LED Street Light Incentive for 2013 program.

The District is seeking a 50% rebate of the labor/fixture cost on the LED street lights. A complete report of the LED Pilot Program has been included in this submittal.

If you have any questions please do not hesitate to contact me.

Very truly yours,

Harle Round
Customer Service Supervisor/DSM Coordinator

Cc: Karen Lyons, Esquire
Cc: Mr. William Bernstein, Esquire

Led Street Light Report:



Host Sites: Pascoag Main Street, South Main Street, Harrisville Main Street, Chapel Street, & East Avenue.

Final Report Prepared by Harle Round

Project background:

Program overview

The Pascoag Utility District received permission from the Rhode Island Public Utility Commission (RIPUC), in 2012, to conduct an LED Street light Pilot program. The District reached out to a couple of Energy Engineering firms, Prime Solutions Inc. and New England Energy Management, Inc. (NEEM). Prime Solutions, Inc. provided us with a quote for a study to install a total of twelve LED luminaries, chiefly replacing the 50W and 70W High Pressure Sodium (HPS) luminaries, which are the most common types for the Utility. The cost of the study would include 12 LED luminaries including both new LED fixtures and LED retrofits kits, the data collection for power measurements, light patterns, installation time, and community feedback for at total of \$14,000. NEEM never submitted a proposal.

Bill Guertin, the Assistant General Manager, contacted the sales representative from Stuart Irby Company, a lighting distributor. A meeting was set up with a the regional utility sales manager of Acuity Brands who brought a sample of their LED lighting fixtures and the product spec sheet on the LED street light fixtures. It was determined that the Autobahn Series ATBO Roadway Lighting from American Electric Lighting would meet our needs; the ATBO20ALED700MA 50W LED would be equivalent to our 70W HPS and the ATBO20ALED350MA 25W LED would be equivalent 50W HPS. The District was able to purchase with the permission of the RIPUC a total of thirty-two 25W LEDs, twenty-four 50W LEDs, and 56 photo controls for a total of \$13,311.84 utilizing funds from the Demand Side Management Program. Four of the 25W LEDs were free per a one-time promotion.

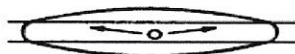
No. of Lights	Performance Package	Driver Current (mA)	Input Watts	Optics Roadway Type	Delivered Lumens	Efficacy LPW Im/W	Equivalent to:
32	20 A Chips	350	26	R3	2111	81	50 HPS
24	20 A Chips	700	51	R3	3816	75	70 HPS

See Autobahn Series ATBO Roadway Lighting Spec sheets Attachment #1.

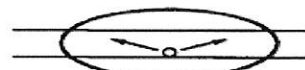
Light Distribution Patterns: The District chose the optic roadway type III lighting pattern.



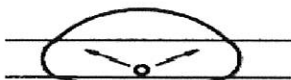
Type I



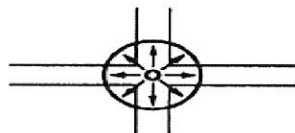
Type II



Type III



Type IV



Type V

Energy Measurements:

Power usage was tested using a Kill-A-Watts™ EZ P4460 Power Meter to calculate the power usage of our existing High Pressure Sodium Street lights:

Type of fixture	Date started	Run time in hours	Voltage	kWh	Watts	Watts per hour
50 W HPS	1-11-13	103	119.0	6.79	6790	65.92
70W HPS	3-22-13	139	119.03	12.17	12170	87.55
100W HPS	2-25-13	50	118.9	6.49	6490	129.80
150 W HPS	2-20-13	123	118.4	23.70	23700	192.60

Please see Kill A Watt™ EZ manual, Attachment # 2.

The Kill-A-Watts™ EZ P4460 was used to calculate the power usage of the following LED Street Lights:

Type of fixture	Date started	Run Time in hours	Voltage	kWh	Watts	Watts per hour
25W LED	1-22-13	23	119.0	.59	590	25.65
	1-24-13	50.1	120.4	1.3	1300	25.95
	1-29-13	175	119.6	4.52	4520	25.83
	2-1-13	245	119.1	6.31	6310	25.76
50W LED	1-5-13	16.3	119.7	.83	830	50.92
	1-6-13	20	119.7	.98	980	49.0
	1-10	41.11	119.7	2.03	2030	49.38

Based on this power usage as determined by using the Kill-A-Watts™ EZ P4460 the District would realize the following saving by replacing the following HPS with LED Street Lights:

Replacing the following:	kWh saved per month /per year	Dollars saved per month/ per year (.09167)
50W HPS with 25W LED	14.41/172.92	\$1.32/\$15.85
70W HPS with 25W LED	22.34/268.03	\$2.05/ \$24.57
100W HPS with 25W LED	37.47/449.59	\$3.43/ \$41.21
70W HPS with 50W LED	13.22/158.65	\$1.21/\$14.54
100W HPS with 50W LED	28.35/340.22	\$2.60/ \$31.19
150W HPS with 50W LED	51.05/612.57	\$4.68/\$56.15

Replacing the following continued:	kWh saved per month/ per year	Dollars saved per month/ per year (.09167)
150W HPS with 25W LED	60.16/721.94	\$5.52/\$66.18

Please reference Spread Sheet HPS vs. LED Street Lights Energy Cost, attachment # 3.

LED Street Light Tariff:

The District needed to create an advisory street light tariff to include the new 25W LED/2111 Lumens and the 50W LED/3819 Lumens. The approved rates were \$2.87 monthly and \$34.44 annually on the 25W LED; \$3.71 monthly and \$44.52 annually on the 50W LED. The rate was based on the following assumptions: The cost of the fixtures and the photo eyes at \$254.64 with a cost recovery period of 20 years will cost \$1.06 per month. The installation of the street lights using two men and a bucket truck at 1 hour each for a total of \$137.70 with cost recovery period of 20 years will cost \$0.57 per month. A washing maintenance per street light of \$82.32 with a cost recovery of 20 years will cost \$0.34 per month. A 2% failure rate of \$8.40 with a cost recovery of 20 years will cost \$0.03 per month. The total fixed cost of the street lights is \$2.01 per fixture. The final component is the energy cost. A 25W LED using 26 watts per hour with an average run time of 360.25 hours per month will use 9.37 kWh per month times a rate of \$0.09167 will cost \$0.86 monthly for energy component. A 50 W Led using 51.30 watts per hour with an average run time of 360.25 hours per month will use 18.48 kWh times a rate of \$0.09167 will cost \$1.69 monthly for the energy component. ***Please reference the RIPUC Docket No. 606 effective 4-1-13 and the "Determination of Lighting Charges", Schedule 1 through Schedule 6 for a detailed breakdown of the rates, attachment # 4.***

Street Light Placements and Considerations:

The District is comprised of residential streets, which are made up of two lanes and are classified by the ANSI/IESNA RP-8 standards as local roads, with low pedestrian/vehicle conflict category. The higher traffic areas with higher pedestrian areas in the village of Pascoag and Harrisville have decorative street lighting which have been installed by the Town Burrillville and were not considered for replacement at this time. Many of the current High Pressure Sodium (HPS) and mercury street lights were placed into service many years ago and no longer served their intended purpose. Therefore the District evaluated the need and the size of the LED Street Lights for this pilot program. The District took into consideration and identified the following needs, including the security needs of police and fire departments, traffic safety to signal the location of intersections of major public roads, higher-traffic streets, and dangerous or blind curves. The roads in our community are local roads in residential areas, with limited traffic and pedestrian usage at night, therefore lower levels of lights are sufficient for safety and sense of security. The District chose main roads in the Village of Harrisville and Pascoag to use for the Pilot Program, in order to get better exposure for the purpose of doing a survey and getting customer feedback. ***Please see the LED Street Light Pilot Program Placement, attachment # 5.***

The LED luminaries we chose for the pilot program consist of 20 LED Chips which are a multiple point -source of light that are better at directing the light where it is needed. These small sources of light allow the optics of the LED luminaries to distribute the light more effectively than luminaries used in a High intensity Discharge bulb. They offer several advantages and improve the overall lighting quality as compared to our current HPS Street lights.

The first advantage is uniformity due to the many arrays of LED chips that produce a point-source of light versus the HPS which are high intensity near-point sources that cause the area directly below the luminaire to have a much higher illumination than areas further away causing hot spots of illumination. This leads to a higher wattage HPS to light the intended area. The District replaced five 150W HPS street lights with 50W LEDs on Pascoag Main Street and replaced ten 100W HPS with 50W LED on East Avenue, in the Village of Harrisville. The 50W LEDs are equivalent to a 70W HPS and the 25W LED is equivalent to a 50W HPS, but because the light is directed down and is more uniform, we have not received any complaints, in fact, Harrisville & Pascoag Fire District were very pleased with the brightness of the lights on the roadway and the sidewalks leading to the Bridgeway in Pascoag and the High School in Harrisville. This allows us to use a lower wattage LED to effectively light the same area. With the LEDs we are also able to eliminate light trespassing without the use of a shield and made it possible to light the intended target with little or no light directed in adjacent properties. The LEDs will reduce light pollution and wasted light by providing light only where needed, they will also make for a more dark-sky-friendly environment.

The second improvement was with the correlated color temperature (CCT). A HPS lamp has a CCT of around 2,000 Kelvin and produces a yellow-orange light color whereas the LEDs we chose produce a CCT of 4,000 Kelvin and produce a bright white to bluish-white light.

The third improvement is with the color rendering index (CRI), which is the ability of a light source to show color of an object. HPS lamps have a very poor CRI of around 22 whereas the LEDs have a minimum CRI of 70. Under lights with poor CRI there is little or no contrast between colors and visual performance is decreased. The truer white light quality of the LEDs, leads to better color rendering allowing colors to seem more natural and are more comfortable to the human eye.

The fourth improvement is in the start up speed of the street lights which was reduced from 10 minutes for the HPS to 2 seconds on the LEDs. Another notable change was the fact that the LEDs which have a direct current drive do not flicker on and off like the HPS lamps.

Energy Savings:

The expected energy savings for a LED conversion is as follows:

- 42% energy savings to convert from a 70W HPS with a 50W LED (equivalent)
- 61% energy savings to convert from a 50W HPS light with a 25W LED (equivalent)
- 22% energy savings to convert from a 50 W HPS to a 50W LED (increase in lighting)

- 60% energy savings to convert from a 100W HPS to a 50W LED (decrease in lighting)
- 71 % energy savings to convert from a 70W HPS to a 25W LED (decrease in lighting)
- 73.5% energy saving to convert from a 150W HPS to a 50W LED (decrease in lighting)
- 80% energy saving to convert from a 100W HPS to a 25W LED (decrease in lighting)

Street Light Assessment per the Cost of Service in 2012 with the existing HPS/Mercury both private and public:

Lamp Type	Lamp Count	Monthly kwh	Monthly rate	Maintenance Cost fixed cost: Monthly/Yearly
175 W Mercury	58	63 kWh	\$8.47	\$2.76/\$33.12
50 W HPS	512	20 kWh	\$4.58	\$2.76/\$33.12
70 W HPS	253	27 kWh	\$5.20	\$2.76/\$33.12
100 W HPS	73	40 kWh	\$6.37	\$2.76/\$33.12
150 W HPS	64	59 Kwh	\$8.13	\$2.76/\$33.12
250 W HPS	92	90 kWh	\$10.96	\$2.76/\$33.12
400 W HPS	95	142 Kwh	\$15.74	\$2.76/\$33.12
Total:	1147 St Lights			\$37,989 per year

The fixed monthly cost would drop from \$2.76 for the HPS to \$2.01 for the 25W and 50W LED fixture replacements. The HPS Street light fixtures are replaced on average every 10 years and the bulbs replaced every four years. Please see the following charts showing the 20 year comparison per fixture of a 50W & 70W HPS verses a 25W & 50W LED.

Cost comparison HPS vs. LED fixtures over a twenty year period:

<i>HPS Street Light/Bulbs</i>		<i>LED Street Lights</i>	
50 & 70 watt HPS fixtures 10 year life Average cost (\$80.00 x 2)	\$160.00	25W & 50W Led Street Light 100,000 hr. life (20 + years)	\$237.00
50 & 70 watt bulbs \$8.50 x 4 in 20 years	\$ 34.00	Bulbs n/a	\$ 0.00
Photo eyes 10 year life (7.50 x2)	<u>\$ 15.00</u>	Photo Eye (90,000 hrs 20 year life)	<u>\$ 17.64</u>
HPS total cost:	\$209.00	LED total cost	\$254.64

Total cost & maintenance comparison over a 20 year period:

	HPS Street Lights	LED Street Lights
Cost of fixtures, bulbs, & photo eyes	\$209.00	\$254.65
Cost of Maintenance	\$738.60 *	\$82.35 washing maint. See " Calculation of Washer

		Maintenance" Schedule 3
kWh used in 20 years	5,707.20 kWh (50 W HPS)	2,248.80 kWh (25W LED)
Cost of energy (\$0.09167)	<u>\$523.20</u>	<u>\$206.40</u>
Total cost (20 years)	\$1,470.80	\$543.39
LED \$ Savings (20 yrs)		\$927.41

*Lamp replacement labor \$137.70 (1 hour 2 men at \$48.85/hr & \$40 truck hr) & \$10 HPS lamp cost / 4 years = \$36.93 per year x 20 years. The existing HPS street lights require new bulbs and ballast every four years, which means we will revisit the streetlight four times in a 20 year period.

Return on Investment:

Replacing:	Return on investment
50W HPS vs. 25W LED	4.82 years
70W HPS vs. 50W LED	4.95 years
70W HPS vs. 25W LED	4.14 years
100W HPS vs. 25 LED	3.26 years
100W HPS vs. 50W LED	3.74 years
150W HPS vs. 50 W LED	2.74 years

Please see Lighting- Savings Calculation sheets 1-6, see attachment # 6.

LED Pilot Program Energy Savings:

LED SL	Replacing HPS	Number of fixtures	Kwh Savings per fixture/Year	kWh saved per year x no. of fixtures	Total kWh over 20 years kWh savings per year x 20 Years
25 W LED	50 W HPS	24	172.92	4150.08	83,001.06
25 W LED	100 W HPS	7	449.59	3147.13	62,942.62
50 W LED	50 W HPS	1	176.4	176.4	3,528.00
50 W LED	100 W HPS	18	340.22	6123.96	12,2479.20
25 W LED	150 W HPS	1	2004	2004	40,080.00
50 W LED	150 W HPS	5	612.57	3062.85	61,257.00
TOTAL		56 Fixtures	4,024.94 kWh	18,664.42 kwh	373,288.40

Street Light Survey results:

A survey was included as an insert in the June billing with a total of 61 surveys were being returned as of August 2013. Over all, the results were very positive with 97% of the people surveyed saying they believe the new LED Street lights have improved road/sidewalk visibility, and 95% preferring the white light of the LED brightness over the existing yellow High Pressure Sodium's. **Please see the Street light Survey Results for a complete overview of the question**

and answers conducted in the survey, attachment # 7. There is also a section for additional comments regarding the evaluation.

Conclusion:

The District has been very pleased with the LED Street Light Pilot Program. Converting to high efficiency lighting would be a highly visible efficiency project that would demonstrate the Districts' commitment to energy efficiency, climate change mitigation, and fiscal responsibility. The District would like to start by replacing the existing HPS as they fail and would concentrate on the public street lights first. The District is seeking a rebate of 50% of the labor/fixture cost which is \$137.70 for labor plus \$254.65 for the LED street light and photo eye for a total of \$392.35. A rebate of \$196.18 is proposed for the 25 W and 50 W LEDs. The lower street light fees will benefit all of the District's customers through lower rates while providing the most efficient lighting available. The District has \$5,000 allocated to a line item called LED Street Light Incentives in the 2013 approved budget and if approved by Commission, the District will seek to purchase thirty-five 50 W LEDs and thirty five 25 W LEDs. The DSM rebate would total \$13,732.60 for 70 LED street lights. The District will seek to allocate funds collected from Danielle International Inc.(DPI), that were not included in 2013 approved budget because of a question of when they would move out of our service territory. The District has collected an additional \$9,460 from DPI through August of 2013.

Attachment # 1

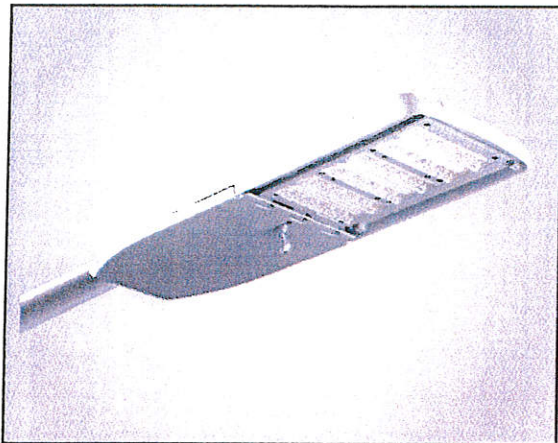


Consistent with LEED® goals & Green Globes® criteria for light pollution reduction

Autobahn Series ATB0

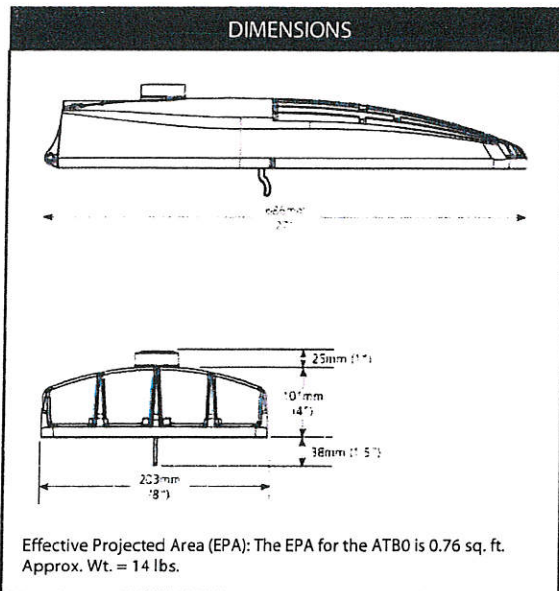
Roadway Lighting

PRODUCT OVERVIEW



Applications:

- Roadways
- Off ramps
- Residential streets
- Parking lots



Features:

OPTICAL

Same Light: Performance is comparable to 70-150W HPS roadway luminaires.

White Light: Average correlated color temperature (CCT) is 4000K or 5000K with a minimum CRI of 70

Unique IP66 rated LED light engines provided 0% uplight and restrict backlight to within sidewalk depth, providing optimal application coverage and optimal pole spacing. Available in Type II, III, IV, and V roadway distributions

ELECTRICAL

Long Life: LED light engines are rated >100,000 hours at 25°C, L70. Electronic driver has a rated life of 100,000 hours at a 25°C ambient

Lower Energy: Saves an average of 40-50% over comparable HPS platforms.

Robust Surge Protection: Acuity's proprietary SPD provides IEEE/ANSI C62.41 Category C (10kV/5kA) level of protection

MECHANICAL

Easy to Maintain: Includes standard AEL lineman-friendly features such as tool-less entry, tool-less NEMA photocontrol receptacle, terminal block and quick disconnects. Bubble level located inside the electrical compartment for easy leveling at installation. The electrical platform and durable housing materials provide superior longevity and reduce the need for maintenance

Rugged die-cast aluminum housing is polyester powder-coated for durability and corrosion resistance. Rigorous five-stage pre-treating and painting process yields a finish that achieves a scribe creepage rating of 8 (per ASTM D1654) after over 1000 hours exposure to salt fog chamber (operated per ASTM B117)

Mast arm mount provides easy, secure installation and is adjustable for arms from 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter. Wildlife shield is cast into the housing (not a separate piece)

Die-cast trigger latch on doorframe allows for tool-less entry and enables easy and secure opening with one hand

CONTROLS

NEMA photocontrol receptacle is standard; tool-less "lift and turn" receptacle makes photocontrol orientation easy

Dimming version (available with DE option) uses proprietary Acuity Brands components to enable continuous 0-10V dimming down to 10% output via the ROAM® smart controls system (sold separately)

Photocontrol for solid-state lighting (available with PCSS option) meets ANSI C136.10 criteria.

WARRANTY & STANDARDS

All electrical components warranted for 5 years

Rated for -40°C to 40°C ambient

CSA Certified to U.S. and Canadian standards

Complies with ANSI: C136.2, C136.10, C136.14, C136.31, C136.15, C136.37

Data is considered accurate as of the revision date shown. Information is subject to change without notice.

Autobahn Series ATB0

Roadway Lighting

ORDERING INFORMATION

Example: ATB0 20ALEDE70 MVOLT R2

Series	Performance Packages	Voltage	Optics
ATB0 Autobahn LED Roadway, Small	20ALEDE35 20A Chips, 350 mA Driver 20ALEDE53 20A Chips, 525 mA Driver 20ALEDE70 20A Chips, 700 mA Driver 20BLEDE53 20B Chips, 525 mA Driver 20BLEDE70 20B Chips, 700 mA Driver 20BLEDE10 20B Chips, 1000 mA Driver 30BLEDE53 30B Chips, 525 mA Driver 30BLEDE70 30B Chips, 700 mA Driver	120 120V MVOLT Multi-volt, 120-277V 347 347V 480 480V	R2 Roadway Type II R3 Roadway Type III R4 Roadway Type IIII R5 Roadway Type V

Options

Color Temperature (CCT)

(blank) 4000K (standard)
5K 5000K

Misc.

HS House-Side Shield
BL External Bubble Level

Mounting

(blank) 2-bolt Internal (standard)

Paint

(blank) Gray (standard)
GI Graphite
BK Black
BZ Bronze
DDB Dark Bronze
WH White
UP Unpainted

Controls

(blank) NEMA Photocontrol Receptacle (standard)
NR No Photocontrol Receptacle
PCSS Solid State Lighting Photocontrol (120-277V)
SH Shorting Cap
DE Dimming Enabled (0-10V)¹

Terminal Block

(blank) Terminal Block (standard)
T2 Wired to L1 and L2 Position

Notes:

¹ Dimming controlled via ROAM system (sold separately). Contact factory for details.

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Autobahn Series ATB0

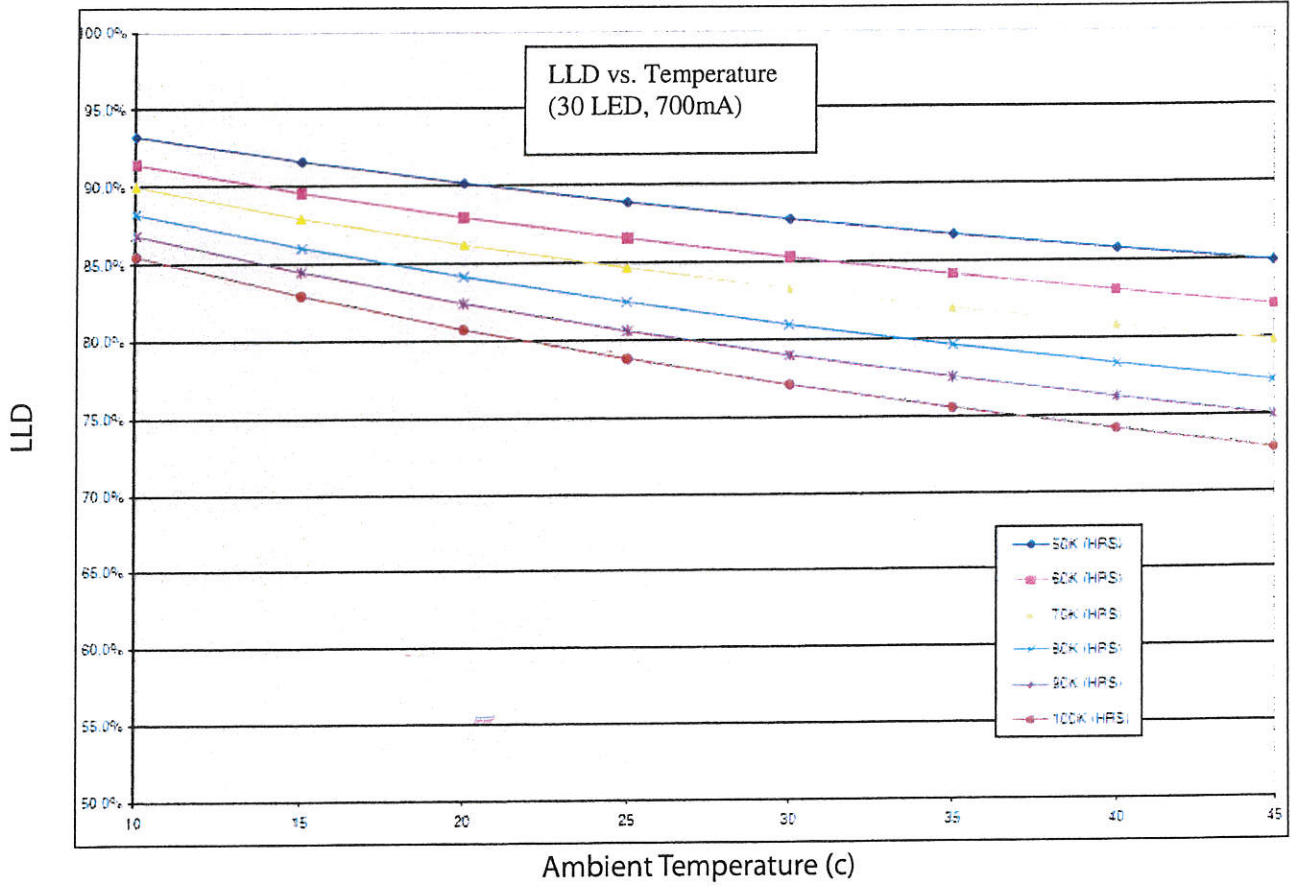
Roadway Lighting

DESIGN DATA

Performance Package	Drive Current (mA)	Input Watts	Optic	4000K CCT	
				Delivered Lumens	Efficacy (LPW)
20A	350	26	R2	2175	84
	525	37		2999	81
	700	51		3932	77
	350	26	R3	2111	81
	525	37		2910	79
	700	51		3816	75
	350	26	R4	2188	84
	525	37		3017	82
	700	51		3956	78
	350	26	R5	2086	80
	525	37		2876	78
	700	51		3771	74
20B	525	34	R2	3082	91
	700	48		4071	85
	1000	67		5432	81
	525	34	R3	2991	88
	700	48		3951	82
	1000	67		5272	79
	525	34	R4	3100	91
	700	48		4096	85
	1000	67		5465	82
	525	34	R5	2956	87
	700	48		3905	81
	1000	67		5210	78
30B	525	48	R2	4833	101
	700	71		6391	90
	525	48	R3	4690	98
	700	71		6203	87
	525	48	R4	4862	101
	700	71		6429	91
	525	48	R5	4635	97
	700	71		6192	87

* Manufacturer's projected life calculations are correlated from LM-80 chip data and in situ luminaire thermal testing.

DESIGN DATA



Data is considered accurate as of the revision date shown. Information is subject to change without notice.

Use these factors to estimate differences in lumen output with variations in ambient temperature. Values shown in the table below are taken in a 25°C ambient; therefore 25°C = 1.00.

Lumen Ambient Temperature (LAT) Factors							
Performance Package	15°C	20°C	25°C	30°C	35°C	40°C	45°C
All	1.02	1.01	1.00	0.99	0.99	0.98	0.98

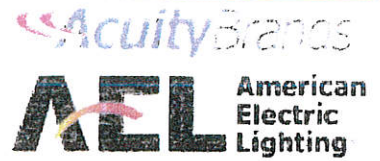


American Electric Lighting
 Acuity Brands Lighting, Inc.
 3825 Columbus Rd. S.W., Granville, OH 43023
 Phone: 800-754-0463 Fax: 740-587-6114
 www.americanelectriclighting.com

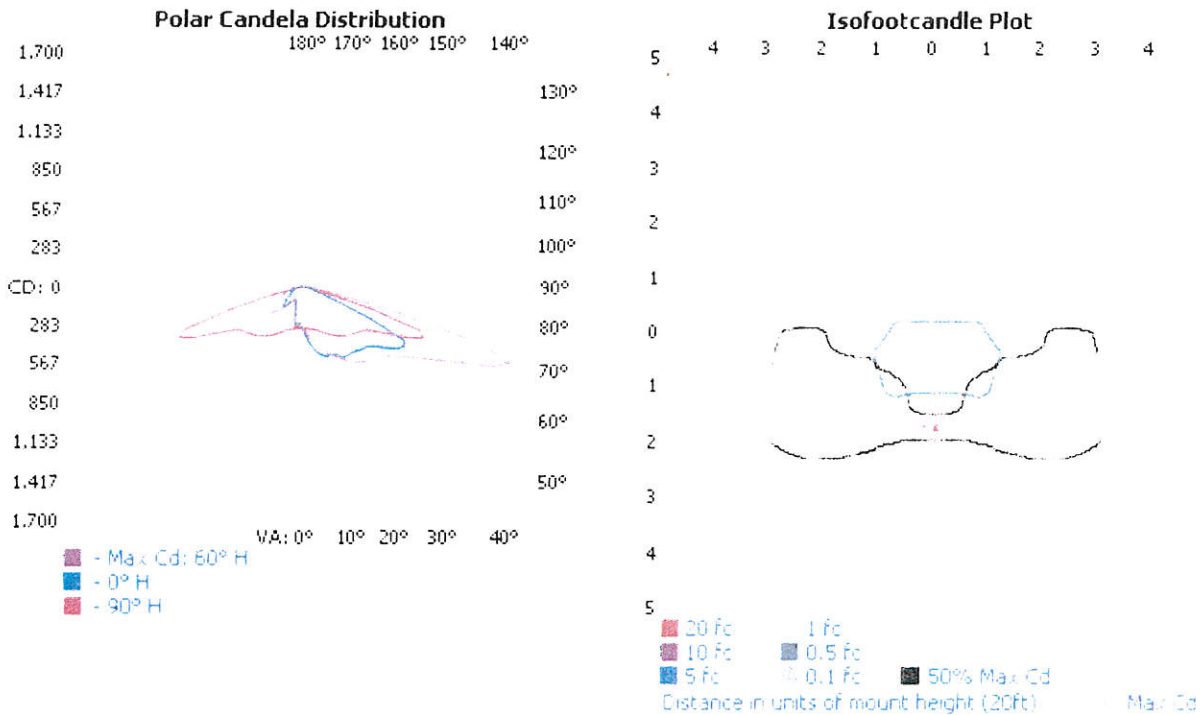
OUTDOOR PHOTOMETRIC REPORT

CATALOG: ATB0 20A LED E35 XXXXX R3

TEST # 501571
 TEST LAB ACUITY BRANDS LIGHTING GRANVILLE LAB
 ISSUE DATE 1/7/2013
 CATALOG # ATB0 20A LED E35 XXXXX R3
 LUMINAIRE ATB0 SERIES 25W LED 350MA TYPE 3 4000K CCT
 LAMP CAT # 20 4K LED ARRAY
 LAMP 20A 4K LED ARRAY
 LAMP OUTPUT 1 LAMP, TOTAL LUMINAIRE LUMENS: 2412.4
 BALLASTCAT XI075C070V105DNY1
 BALLAST PHILIPS ADVANCE 120-277V 350MA LED DRIVER
 INPUT WATTAGE 24.6
 LUMINOUS OPENING POINT



MAX CD 1,624.0 AT HORIZONTAL: 60°, VERTICAL: 70°
 ROADWAY CLASS MEDIUM, TYPE III



*TEST BASED ON ABSOLUTE PHOTOMETRY WHERE LAMP LUMEN OUTPUT IS 2412.4
 *CUTOFF CLASSIFICATION AND EFFICIENCY CANNOT BE REPRODUCED FROM THIS DATA FILE

VISUAL PHOTOMETRIC TOOL 1.2.42 COPYRIGHT 2013, ACUITY BRANDS LIGHTING
 REPORTED DATA CALCULATED FROM MANUFACTURER'S DATA FILE, BASED ON IESNA RECOMMENDED METHODS.

OUTDOOR PHOTOMETRIC REPORT
 CATALOG: ATB0 20A LED E35 XXXXX R3



ZONAL LUMEN SUMMARY

ZONE	LUMENS	% LUMINAIRE
0-30	298.9	12.4%
0-40	558.3	23.1%
0-60	1,447.3	60%
60-90	965.2	40%
70-100	331.0	13.7%
90-120	0	0%
0-90	2,412.4	100%
90-180	0	0%
0-180	2,412.4	100%

LUMENS PER ZONE

ZONE	LUMENS	% TOTAL	ZONE	LUMENS	% TOTAL
0-10	30.9	1.3%	90-100	0	0%
10-20	99.4	4.1%	100-110	0	0%
20-30	168.7	7.0%	110-120	0	0%
30-40	259.3	10.7%	120-130	0	0%
40-50	375.8	15.6%	130-140	0	0%
50-60	513.2	21.3%	140-150	0	0%
60-70	634.2	26.3%	150-160	0	0%
70-80	276.9	11.5%	160-170	0	0%
80-90	54.0	2.2%	170-180	0	0%

ROADWAY SUMMARY

DISTRIBUTION:	TYPE III, MEDIUM	
MAX CD 90 DEG VERT:	0	
MAX CD 30 TO <90 DEG	202.0	
	LUMENS	% LAMP
DOWNWARD STREET SIDE:	1,818.3	75.4%
DOWNWARD HOUSE SIDE:	594.2	24.6%
DOWNWARD TOTAL:	2,412.4	100%
UPWARD STREET SIDE:	0	0%
UPWARD HOUSE SIDE:	0	0%
UPWARD TOTAL:	0	0%
TOTAL LUMENS:	2,412.4	100%

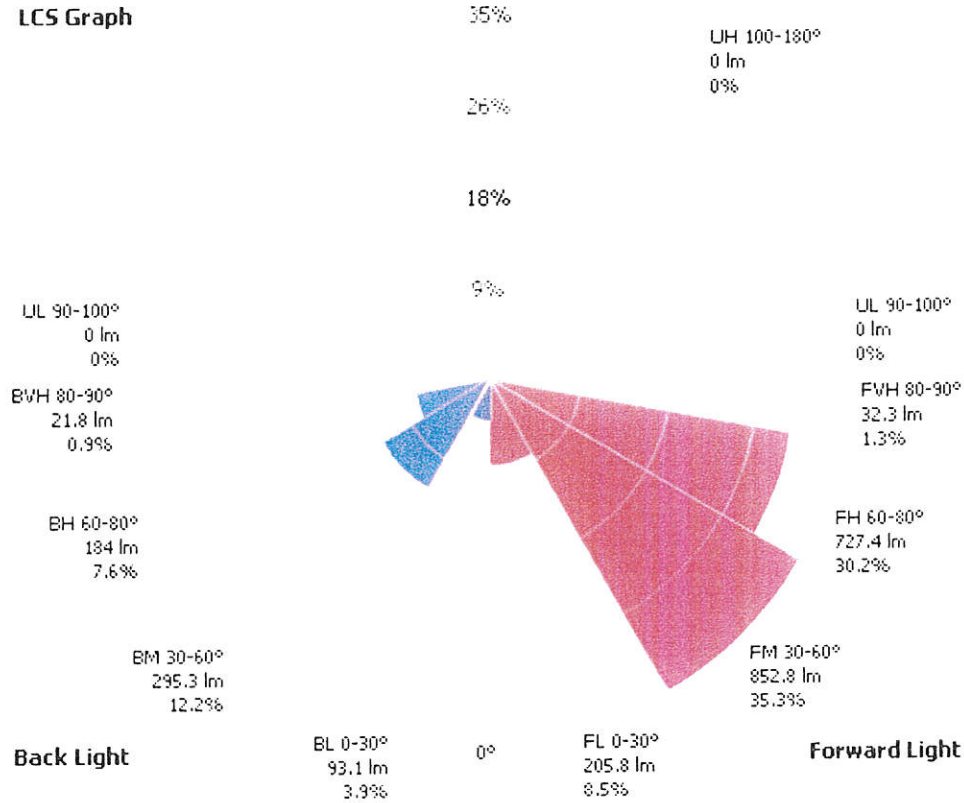
LCS TABLE

BUG RATING	B1 - U0 - G1	
FORWARD LIGHT	LUMENS	LUMENS %
LOW(0-30):	205.8	8.5%
MEDIUM(30-60):	852.8	35.3%
HIGH(60-80):	727.4	30.2%
VERY HIGH(80-90):	32.3	1.3%
BACK LIGHT		
LOW(0-30):	93.1	3.9%
MEDIUM(30-60):	295.3	12.2%
HIGH(60-80):	184.0	7.6%
VERY HIGH(80-90):	21.8	0.9%
UPLIGHT		
LOW(90-100):	0	0%
HIGH(100-180):	0	0%
TRAPPED LIGHT:	0	0%

OUTDOOR PHOTOMETRIC REPORT
 CATALOG: ATB0 20A LED E35 XXXXX R3



LCS Graph



Scale = Max LCS %

○ Trapped Light: 0lm, 0%

OUTDOOR PHOTOMETRIC REPORT
 CATALOG: ATB0 20A LED E35 XXXXX R3



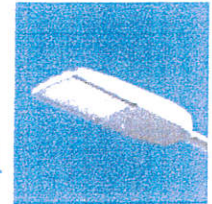
CANDELA TABLE - TYPE C

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
0	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
5	363	363	359	353	345	337	327	316	311	303	293	287	276	264	250	230	210	181	161	143
10	453	453	446	436	420	399	375	350	326	304	276	251	224	191	150	110	77	43	14	0
15	513	513	509	502	491	471	436	392	351	319	284	242	190	128	74	29	0	0	0	0
20	545	546	547	543	542	526	500	443	381	337	288	233	170	105	41	0	0	0	0	0
25	546	550	556	567	574	578	556	511	426	368	311	248	181	112	51	0	0	0	0	0
30	601	603	597	580	591	624	618	567	477	401	328	252	176	116	61	0	0	0	0	0
35	617	622	638	644	627	648	675	622	530	439	357	271	188	126	71	0	0	0	0	0
40	625	631	648	677	696	685	718	682	576	471	385	298	216	153	81	0	0	0	0	0
45	649	656	690	735	762	751	741	730	608	497	411	323	234	146	91	0	0	0	0	0
50	687	688	736	837	886	850	786	779	640	526	435	346	256	165	101	0	0	0	0	0
55	795	781	813	987	1070	986	892	843	665	553	455	342	251	161	111	0	0	0	0	0
60	878	873	925	1177	1297	1145	1052	960	748	637	523	390	271	177	121	0	0	0	0	0
65	555	629	800	1196	1530	1430	1324	1209	967	878	790	622	487	285	191	152	125	99	87	87
70	132	143	202	451	1200	1518	1624	1426	1085	923	770	579	409	282	158	133	130	81	58	58
75	78	88	114	162	269	531	718	491	391	268	117	122	181	133	124	114	73	52	41	41
80	37	45	66	87	131	183	202	160	93	57	65	94	112	96	94	79	51	35	26	26
85	26	31	46	58	71	87	89	89	47	23	32	50	62	63	59	41	27	17	13	13
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

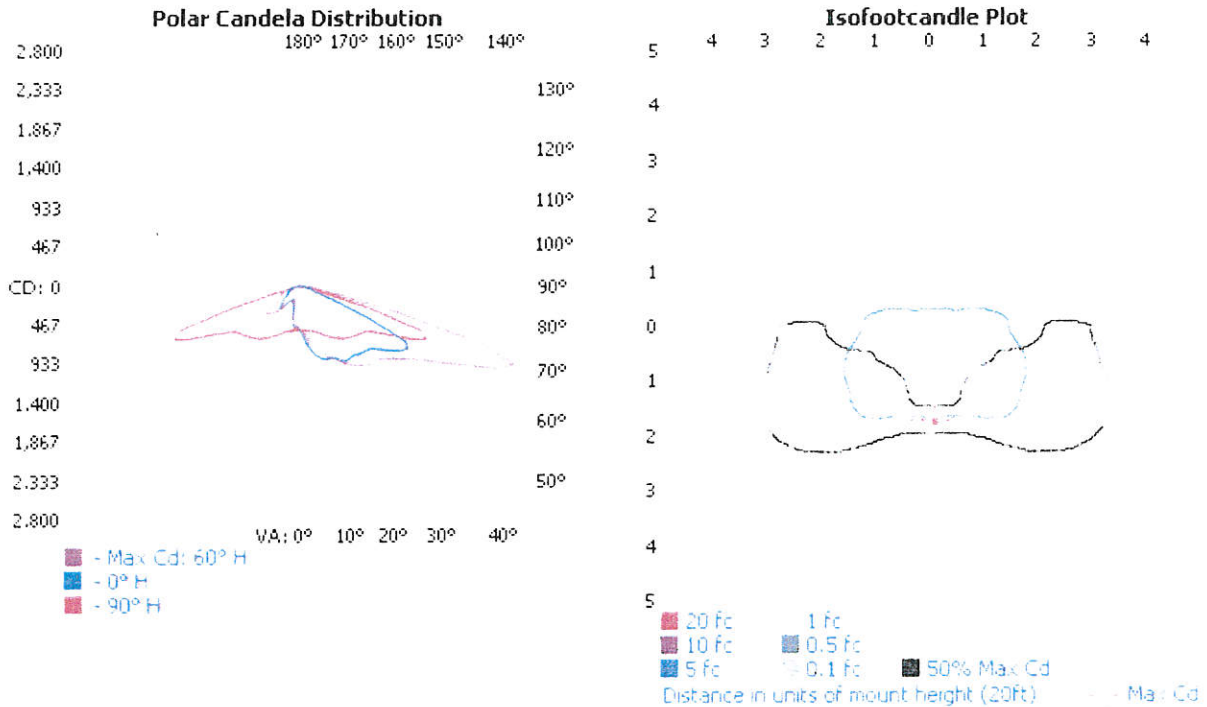
OUTDOOR PHOTOMETRIC REPORT

CATALOG: ATB0 20A LED E70 XXXXX R3

TEST # 501573
 TEST LAB ACUITY BRANDS LIGHTING GRANVILLE LAB
 ISSUE DATE 1/7/2013
 CATALOG # ATB0 20A LED E70 XXXXX R3
 LUMINAIRE ATB0 SERIES 50W LED 700MA TYPE 3 4000K CCT
 LAMP CAT # 20 4K LED ARRAY
 LAMP 20A 4K LED ARRAY
 LAMP OUTPUT 1 LAMP, TOTAL LUMINAIRE LUMENS: 4110.7
 TEST BASED ON ABSOLUTE PHOTOMETRY
 BALLASTCAT XI075C070V105DNY1
 BALLAST PHILIPS ADVANCE 120-277V 700MA LED DRIVER
 INPUT WATTAGE 48.6
 LUMINOUS OPENING POINT



MAX CD: 2,748.0 AT HORIZONTAL: 60°, VERTICAL: 70°
 ROADWAY CLASS: MEDIUM, TYPE III



*TEST BASED ON ABSOLUTE PHOTOMETRY WHERE LAMP LUMENS AND MOUNT DATA
 CUTOFF CLASSIFICATION AND EFFICIENCY CANNOT BE PROPERLY CALCULATED. SEE IESNA 9-09-01 FOR PHOTO METERING

VISUAL PHOTOMETRIC TOOL 1.2.39 COPYRIGHT 2013, ACUITY BRANDS LIGHTING
 REPORTED DATA CALCULATED FROM MANUFACTURER'S DATA FILE, BASED ON IESNA RECOMMENDED METHODS.

OUTDOOR PHOTOMETRIC REPORT
 CATALOG: ATB0 20A LED E70 XXXXX R3



ZONAL LUMEN SUMMARY

ZONE	LUMENS	% LUMINAIRE
0-30	513.4	12.5%
0-40	958.9	23.3%
0-60	2,481.1	60.4%
60-90	1,629.6	39.6%
70-100	552.1	13.4%
90-120	0	0%
0-90	4,110.7	100%
90-180	0	0%
0-180	4,110.7	100%

LUMENS PER ZONE

ZONE	LUMENS	% TOTAL	ZONE	LUMENS	% TOTAL
0-10	53.1	1.3%	90-100	0	0%
10-20	170.6	4.1%	100-110	0	0%
20-30	289.7	7.0%	110-120	0	0%
30-40	445.5	10.8%	120-130	0	0%
40-50	644.7	15.7%	130-140	0	0%
50-60	877.5	21.3%	140-150	0	0%
60-70	1,077.5	26.2%	150-160	0	0%
70-80	464.1	11.3%	160-170	0	0%
80-90	88.0	2.1%	170-180	0	0%

ROADWAY SUMMARY

DISTRIBUTION:	TYPE III, MEDIUM	
MAX CD, 90 DEG VERT:	0	
MAX CD, 80 TO <90 DEG:	337.0	
	LUMENS	% LAMP
DOWNWARD STREET SIDE:	3,098.5	75.4%
DOWNWARD HOUSE SIDE:	1,012.2	24.6%
DOWNWARD TOTAL:	4,110.7	100%
UPWARD STREET SIDE:	0	0%
UPWARD HOUSE SIDE:	0	0%
UPWARD TOTAL:	0	0%
TOTAL LUMENS:	4,110.7	100%

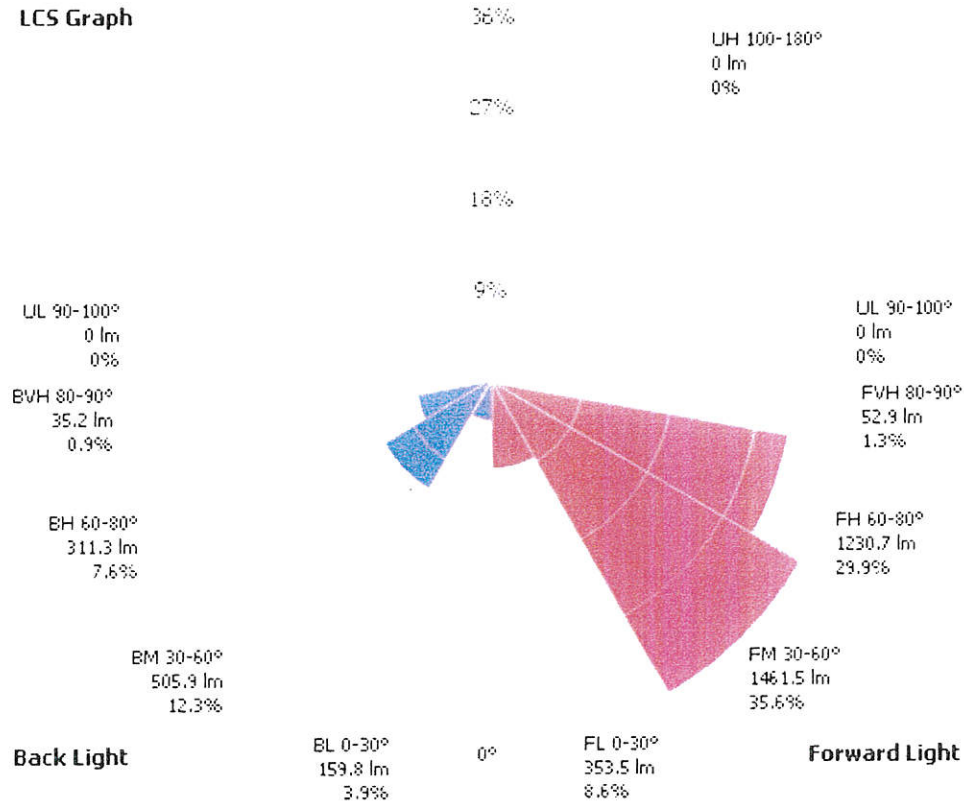
LCS TABLE

BUG RATING	B1 - U0 - G1	
FORWARD LIGHT	LUMENS	LUMENS %
LOW(0-30):	353.5	8.6%
MEDIUM(30-60):	1,461.5	35.6%
HIGH(60-80):	1,230.7	29.9%
VERY HIGH(80-90):	52.9	1.3%
BACK LIGHT		
LOW(0-30):	159.8	3.9%
MEDIUM(30-60):	505.9	12.3%
HIGH(60-80):	311.3	7.6%
VERY HIGH(80-90):	35.2	0.9%
UPLIGHT		
LOW(90-100):	0	0%
HIGH(100-180):	0	0%
TRAPPED LIGHT:	0.0	0%

OUTDOOR PHOTOMETRIC REPORT
CATALOG: ATB0 20A LED E70 XXXXX R3



LCS Graph



Back Light

Forward Light

Scale = Max LCS %

Trapped Light: 0lm, 0%

OUTDOOR PHOTOMETRIC REPORT
 CATALOG: ATB0 20A LED E70 XXXXX R3



CANDELA TABLE - TYPE C

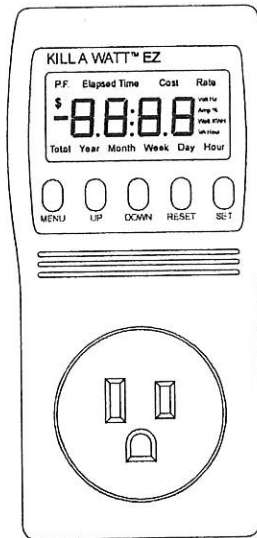
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5	624	624	617	607	594	580	564	548	531	520	508	499	481	483	481	481	481	481	481	481
10	778	775	755	748	721	685	645	604	568	532	509	502	486	488	494	494	487	488	488	488
15	880	879	873	859	842	808	750	672	604	549	522	513	513	476	485	484	489	496	496	496
20	935	936	939	941	929	903	859	764	657	581	548	539	480	479	495	233	195	180	177	177
25	939	944	955	972	985	990	954	876	735	633	592	553	415	276	191	173	173	173	173	174
30	1033	1036	1024	996	1016	1073	1060	975	822	692	651	637	549	200	186	188	192	195	196	196
35	1060	1068	1095	1105	1079	1114	1158	1070	912	755	716	649	534	216	215	223	234	243	243	244
40	1074	1082	1114	1162	1196	1177	1233	1171	993	812	764	629	502	264	273	320	394	432	432	432
45	1113	1125	1184	1261	1306	1288	1272	1251	1044	854	808	669	561	351	422	431	415	411	411	411
50	1177	1179	1261	1433	1518	1456	1346	1333	1098	901	814	657	569	451	522	511	386	386	386	386
55	1362	1335	1393	1689	1829	1684	1525	1441	1140	947	794	613	461	315	410	464	265	195	165	165
60	1501	1492	1579	2005	2212	1953	1795	1639	1280	1122	893	694	560	316	534	302	243	186	155	155
65	918	1045	1345	2034	2598	2435	2256	2058	1649	1492	831	678	559	450	326	258	212	169	148	148
70	223	241	339	748	2011	2564	2748	2410	1836	1558	458	304	354	308	267	225	221	136	97	97
75	131	147	192	273	452	884	1181	817	490	350	197	205	172	224	208	191	121	87	67	67
80	61	73	110	146	219	306	337	268	154	94	107	157	186	161	156	130	83	56	41	41
85	40	49	75	95	116	145	148	147	75	34	51	80	102	104	97	66	42	25	19	19
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

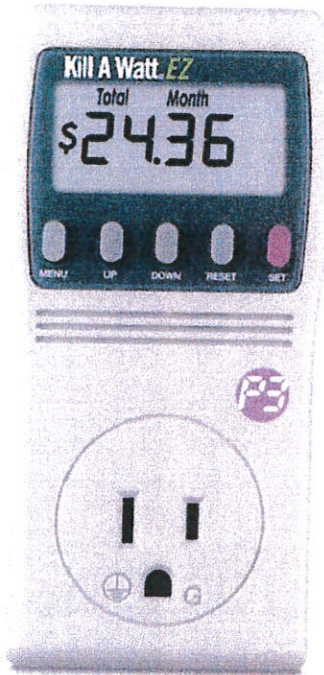
Attachment # 2

Kill A Watt™ EZ

Operation Manual

P4460





Home > Products > Smart, So. > P4460 Kill A Watt EZ

Kill A Watt® EZ

Empowers you to save \$100's on electric bills!

[Click for Kill A Watt Comparison Chart](#)

Now you can cut your energy costs and find out what appliances are actually worth keeping plugged in. Simply connect these appliances to the Kill A Watt® EZ, and it will assess how efficient they really are. Large LCD display will count consumption by the Killowatt-hour, same as your local utility.

- Shows the operating costs of your household appliances
- Accurate to within 0.2%
- Large LCD Display
- Calculates cost and forecasts by week, month and year
- Built-in battery backup
- Displays eight critical units of measure

Downloads available:



Specifications

Model:	P4460
Operating Voltage:	115 VAC
Max Voltage:	125 VAC
Max Current:	15A
Max Power:	1875 VA
Weight:	5.02
Dimensions:	5.19" H x 2.1/2" W x 1.12" D



Installation:

1. Remove the protective film (if any) covering the LCD meter display by pulling the tab marked "REMOVE BEFORE USE".
2. Turn off the appliance and remove the power cord from the outlet. Connect the Kill A Watt™ EZ unit to the outlet and the appliance to the unit. If the outlet is in an inconvenient location first connect a quality extension cord that is rated for the application.
3. Turn the appliance back on and confirm normal operation. If the appliance does not function, please recheck your installation.
4. Press and hold the RESET key on the unit. After a few seconds, "rEST" will appear momentarily on the LCD. Release the RESET key. This indicates that previous measurements have been deleted and that the total accumulated KWH, Elapsed Time and Cost measurements have been reset to zero.

Rate setting:

1. To accurately calculate the actual cost of electricity consumed and to project future costs, first you must set your local utility's electric rate into the unit. The rate is typically charged as dollars (or cents) per kilowatt-hour (KWH). You can find this rate on your last utility bill or you can contact the utility's customer service department to determine your rate. Some utilities charge two or more rates depending on consumption, time of day, or season. Use the rate that more closely reflects your actual use patterns, or average the two rates to suit your needs.
2. Press and hold the SET rate key on the unit. "Rate" will be displayed and the currently set rate will flash.
3. Press the UP and DOWN key to set your desired rate. If you hold the UP or DOWN key, the displayed rate will rapidly change. The range of settings is from \$0.000 to \$9.999. For example, if your utility charges you 10.6 cents per KWH, set the rate until the unit displays \$0.106.
4. Press the SET key again. "SAVE" will appear briefly in the display as the desired rate is set. The unit will return to the Measurements mode.

Cost display:

1. To display the actual cost of power consumed or projected cost, press the MENU key until "Cost" is displayed in the LCD.
2. Initially the actual total cost will appear. "Total" will be displayed. This dollar amount represents the total cost of power consumed by the attached appli-

ance since the last reset. This cost is calculated based on the total consumed power in KWH and the utility rate that you have set.

3. Don't be surprised if the total cost display is 0.00 initially. It will take some time to accumulate cost.
4. Pressing the UP and DOWN key will cycle through the cost projection periods. "Hour", "Day", "Week", "Month", and "Year" will display on the LCD to indicate the selected period. The numeric display will indicate the projected cost to run the attached appliance for the selected period. For example if the display indicates \$2.34 and "Month", the unit is projecting that the attached appliance will consume \$2.34 worth of electricity at the programmed rate in one month.
5. These projections are based on real time and historical measurements of actual consumption of the attached appliance. The longer the appliance remains attached to the unit, the more accurate the projection will be. This is especially true for appliances that cycle on and off. Examples include refrigerators, televisions, etc. Measurements conducted over long periods will accurately reflect true usage of the appliance. For example if a television is used 4 hours a day, it is important to measure the 20 hours a day the appliance is not in use to get a true projection of the cost.
6. For an appliance that cycles on and off, the projections cannot be accurate until the unit has measured some full on and off cycles. Otherwise the projection will be skewed. For example, if a connected television is powered on and you reset the Kill A Watt™ EZ, the unit will begin measuring the power consumption of a powered television. The only data available to the unit is power consumption when the television is turned on. Initial projections of cost will be high as the unit has not had the opportunity to measure power consumption during the off cycle. If you observe the cost projection while the television is turned off, you will see it decline over time. After the unit has been able to measure several typical use cycles, the cost projections will settle to an accurate projection based on real usage.
7. For a device that is never turned off (e.g. a computer server) the cost projections will take less time to settle. You can observe accurate cost projections within minutes. It is still best to let the unit measure power consumption over an extended period. There can be power consumption variations even in devices that are never turned off.

Measurement display:

1. To display the various available power measurements press the MENU key until "Volt" is displayed on the LCD. In the Measurement display mode, the

LCD can display meter readings such as Volts, Current, Watts, Frequency, Power Factor, and VA.

2. To cycle through the various measurements press the UP and DOWN key as desired. The measurement unit currently selected will be indicated in the display.
3. Volts are displayed in Volts (true RMS), Current is displayed in Amps (true RMS), Watts are displayed in active power Watts, VA is displayed in apparent power VA ($VA = V_{rms} * A_{rms}$), Frequency is displayed in Hertz (Hz), Power Factor (P.F.) is displayed as ($Watts / V_{rms} * A_{rms}$).

Rate display:

1. To display the current programmed rate used in cost calculations, press the MENU key until "Rate" is indicated in the display.
2. The current programmed rate is displayed in dollars and cents. For example a programmed rate of 10.6 cents per KWH will be displayed as \$0.106.
3. To change the programmed rate, please refer to the section on "Rate setting".

Kilowatt-Hour display:

1. To display the total consumed power in Kilowatt-Hours, press the MENU key until "KWH" is indicated in the display.
2. Consumption will be displayed in Kilowatt-Hours (from 0.01 KWH to 9999 KWH). As KWH accumulate, the decimal point in the display will shift to accommodate a full reading.
3. To reset the accumulated KWH measurement, press and hold the RESET key on the unit. After a few seconds, "rEST" will appear momentarily on the LCD. Release the RESET key. This indicates that previous measurements have been deleted and that the total accumulated KWH, Elapsed Time and Cost measurements have been reset to zero.

Elapsed Time display:

1. To display the total elapsed time that the Kill A Watt™ EZ has been connected to power since the last reset, press the MENU key until "Elapsed Time" is indicated in the display.
2. Time will initially be displayed as Hours:Minutes (from 00:00) and then switch to Hours only (to 9999) to accommodate a full reading.
3. To reset the elapsed time measurement, press and hold the RESET key on the unit. After a few seconds, "rEST" will appear momentarily on the LCD.

Release the RESET key. This indicates that previous measurements have been deleted and that the total accumulated KWH, Elapsed Time and Cost measurements have been reset to zero.

Retained measurements:

1. When power to the Kill A Watt™ EZ is interrupted, the display will go blank and the unit will stop measuring consumption and elapsed time. However all accumulated measurements including KWH, Elapsed Time, and actual total cost will be retained.
2. This allows the user to take measurements anywhere and relocate the unit to a more convenient location to read the display. When the unit is plugged back in, the display will become active and the accumulated data can be retrieved by using the keys. Data should be retrieved immediately as the Elapsed Time counter will restart and potentially skew the data as time with no load elapses.
3. To reset the accumulated measurements, press and hold the RESET key on the unit. After a few seconds, "rEst" will appear momentarily on the LCD. Release the RESET key. This indicates that previous measurements have been deleted and that the total accumulated KWH, Elapsed Time and Cost measurements have been reset to zero.

Specifications:

Function	Range	Accuracy	
		Typ.	Max.
RMS Voltage	85-125 Vrms	0.2%	1%
RMS Current	0.00~15.00 Arms	0.3%	1%
Active Power	0~1875 Watt	0.5%	2%
Apparent Power	0~1875 VA	0.5%	2%
Line Frequency	47.0~63 Hz	0.1 Hz	2%
Power Factor	0.00~1.00	0.01	0.03
Power Quantity	0.00~9999 KWH	0.5%	2%
Time Quantity	00:00~9999	30ppm	
Display Update	1 Sec	-	
Power Consumption	10 Wmax	-	

Typical: V=90V~125V, A=0.2A~15A

Attachment # 3

ATTACHMENT 3

A	B	C	D	E	F
HPS vs LED Street Lights ENERGY COST					
1					
2	Lamp Size	Watts per Month 360.25 hrs average	KWh Per month	Month Lamp Energy cost (.09167)	Energy Saved
3	50 Watt HPS	66	23776.50	23.78 \$	2.18
4	70 Watt HPS	88	31702.00	31.70 \$	2.91
5	100 Watt HPS	130	46832.50	46.83 \$	4.29
6	150 Watt HPS	193	69528.25	69.53 \$	6.37
7					
8	Lamp Size	Watts per Month 360.25 hrs average	KWh Per month	Month Lamp Energy cost (.09167)	
9	25W LED	26	9366.5	9.37 \$	0.86
10	50 W LED	51.3	18480.825	18.48 \$	1.69
11					
12	Comparisons	Watts per Month 360.25 hrs average	KWh Per month	Month Lamp Energy cost (.09167)	
13	50 Watt HPS	66	23776.50	23.78 \$	2.18
14	25W LED	26	9366.5	9.37 \$	0.86
15	SAVINGS per month	40	14410.00	14.41 \$	1.32
16	Savings per year	480	172920	172.92 \$	15.85
17					61%
18	50 Watt HPS	66	23776.50	23.78 \$	2.18
19	50W LED	51.3	18480.825	18.48 \$	1.69
20	SAVINGS per month	14.7	5295.68	5.30 \$	0.49
21	Savings per year	176.4	63548.1	63.55 \$	5.83
22					22%
23					
24	70 Watt HPS	88	31702.00	31.70 \$	2.91
25	50 W LED	51.3	18480.83	18.48 \$	1.69
26	Savings per month	36.7	13221.18	13.22	1.21
27	Savings per year	440.4	158654.1	158.65 \$	14.54
28					42%
29	70 Watt HPS	88	31702.00	31.70 \$	2.91
30	25W LED	26	9366.5	9.37 \$	0.86
31	SAVINGS per month	62	22335.5	22.34	2.05
32	Savings per year	744	268026	268.03 \$	24.57
33					70%
34	100 Watt HPS	130	46832.50	46.83 \$	4.29
35	25 W LED	26	9366.5	9.37 \$	0.86
36	SAVINGS per month	104	37466	37.47	3.43
37	Savings per year	1248	449592	449.59 \$	41.21
38					80%
39					
40					
41					

	A	B	C	D	E	F
	Comparisons	Watts per hour	Watts per Month 360.25 hrs average	KWh Per month	Month Lamp Energy cost (.09167)	
42						
43	100 Watt HPS	130	46832.50		46.83 \$	4.29
44	50 W LED	51.3	18480.825		18.48 \$	1.69
45	Savings per month	78.7	28351.68		28.35	2.60
46	Savings per year	944.4	340220.10		340.72 \$	31.19
47						61%
48	150 Watt HPS	193	69528.25		69.53 \$	6.37
49	50 W LED	51.3	18480.83		18.48 \$	1.69
50	Savings per month	141.7	51047.43		51.05 \$	4.68
51	Savings per year	1700.4	612569.1		612.57 \$	56.15
52						73%
53	150 Watt HPS	193	69528.25		69.53 \$	6.37
54	25 W LED	26	9366.50		9.37 \$	0.86
55	Savings per month	167	60161.75		60.16 \$	5.52
56	Savings per year	2004	721941		721.94 \$	66.18
						87%

Attachment # 4

RIPUC No. 606
Cancelling RIPUC No. 605

PUBLIC AND PRIVATE LIGHTING RATE

<u>Lamp Size</u>	<u>Monthly Rate</u>	<u>Annual Rate</u>
Mercury:		
175 Watt	\$8.47	\$101.64
Sodium:		
50 Watt	\$4.58	\$54.96
70 Watt	\$5.20	\$62.40
100 Watt	\$6.37	\$76.44
150 Watt	\$8.13	\$97.56
250 Watt	\$10.96	\$131.52
400 Watt	\$15.74	\$188.88
LED:		
<u>25W LED/2111 Lumens</u>	<u>\$2.87</u>	<u>\$34.44</u>
<u>50 W LED/ 3816 Lumens</u>	<u>\$3.71</u>	<u>\$44.52</u>

The rates, as specified above, are applicable to all street lights within the Pascoag Utility District's Electric Department service territory for both public and private lights.

The rate for the 175 watt mercury vapor street light is applicable only to such lights currently in service, since such a fixture is no longer offered to PUD customers.

The total cost for public street lighting, in service in PUD's service territory within the Village of Harrisville, will be assessed to the Harrisville Fire District.

The total cost for public street lighting, in service in PUD's service territory within the Village of Pascoag, will be assessed to all classes of electric customers equally. Rhode Island sales tax will be charged where applicable.

The methodology utilized to determine the amount billed monthly to the customers in the Village of Pascoag will be as follows:

Number of Public Street Lights multiplied by the applicable rate per light, as stated herein, divided by the number of customers.

In all cases, both Public and Private lighting assessments will include energy and maintenance.

The Pascoag Utility District will be responsible for the location, size, style and number of fixtures within the Village of Pascoag.

The Harrisville Fire District will be responsible for the location, size, style and number of fixtures within the Village of Harrisville.

Filing Date: February 20, 2013
Effective Date: April 1, 2013

Determination of Street Lighting Charges
Pascoag Utility District

Schedule 1

Monthly Fixed Cost

	Annual	Monthly	
LED/ photo controls Cost	\$ 254.64		See Schedule 5
Cost Recovery Period (years)	20		
Cost Per Fixture	<u>\$ 12.73</u>	<u>\$ 1.06</u>	
Installation per street light	\$ 137.70		See Schedule 5
Cost Recovery Period (years)	20		
Cost Per Fixture	<u>\$ 6.89</u>	<u>\$ 0.57</u>	
Washing Maintenance per street light	\$ 82.32		See Schedule 3
Cost Recovery Period (years)	20		
Cost Per Fixture	<u>\$ 4.12</u>	<u>\$ 0.34</u>	
2% Failure Cost recovery	\$ 8.40		See Schedule 4
Cost Recovery Period (years)	20		
Cost Per Fixture	<u>\$ 0.42</u>	<u>\$ 0.03</u>	
Monthly Rate per Lamp		<u><u>\$ 2.01</u></u>	

Monthly Lamp energy Cost

Lamp Wattage and Type	Lamp Op Watt	Monthly Op Hours (Schedule 2)	Monthly Energy Use (kWh)	Average Utility Energy COS (\$/kWh)	Monthly Lamp Energy Cost (\$)
25W LED/ 2111 Lumens	26.00	360.25	9.37	\$ 0.09167	\$ 0.86
50W LED/ 3816 Lumens	51.30	360.25	18.48	\$ 0.09167	\$ 1.69

Total Street Lighting Charge

Lamp Wattage and Type	Monthly Lamp Energy Cost (\$)	Monthly Fixed Cost (\$)	Monthly Lamp Rate (\$)	Annual Lamp Rate (\$)
25W LED/ 2111 Lumens	\$ 0.86	\$ 2.01	\$ 2.87	\$ 34.44
50W LED/ 3816 Lumens	\$ 1.69	\$ 2.01	\$ 3.71	\$ 44.52

Street Lighting Average Monthly Burning Hours
Pascoag Utility District

Schedule 2

<u>Month</u>	<u>Hours</u>
January	449
February*	341
March	373
April	318
May	292
June	264
July	283
August	317
September	347
October	454
November	426
December	<u>459</u>
	4,323

* 338 hours (Leap year 12 additional hours; 12hrs/ 4years= 3hrs

4323 / 12 = 360.25 average run time per month

Reference Darkness Duration Table @ http://aa.usno.navy.mil/cgi-bin/aa_durtablew.pl

Darkness Duration Table for One Year
Pascoag, Rhode Island Eastern Standard Time
Astronomical Application Dept. U. S. Naval Observatory

Calculation of Washing Maintenance

Schedule 3

Pascoag Utility District

Real Discount Rate		1.0%
Labor	2013-2032	3.0%
Truck Rate	2013-2032	3.0%

<u>Year</u>		<u>Labor</u>	<u>Total</u>	<u>Present Value</u>	<u>Hours</u>	<u>Cost</u>
1	2013	\$ 48.85				
2	2014	\$ 50.32				
3	2015	\$ 51.82				
4	2016	\$ 53.38				
5	2017	\$ 54.98				
6	2018	\$ 56.63				
7	2019	\$ 58.33	\$ 58.33	\$ 54.40	28	\$ 1,523.34
8	2020	\$ 60.08				
9	2021	\$ 61.88				
10	2022	\$ 63.74				
11	2023	\$ 65.65				
12	2024	\$ 67.62				
13	2025	\$ 69.65				
14	2026	\$ 71.74	\$ 71.74	\$ 62.41	28	\$ 1,747.46
15	2027	\$ 73.89				
16	2028	\$ 76.11				
17	2029	\$ 78.39				
18	2030	\$ 80.74				
19	2031	\$ 83.16				
20	2032	\$ 85.66				
						<u>\$ 3,270.80</u>
<u>Year</u>		<u>Truck</u>				
1	2013	\$ 40.00				
2	2014	\$ 41.20				
3	2015	\$ 42.44				
4	2016	\$ 43.71				
5	2017	\$ 45.02				
6	2018	\$ 46.37				
7	2019	\$ 47.76	\$ 47.76	\$ 44.55	14	\$ 623.68
8	2020	\$ 49.19				
9	2021	\$ 50.67				
10	2022	\$ 52.19				
11	2023	\$ 53.76				
12	2024	\$ 55.37				
13	2025	\$ 57.03				
14	2026	\$ 58.74	\$ 58.74	\$ 51.10	14	\$ 715.44
15	2027	\$ 60.50				
16	2028	\$ 62.32				
17	2029	\$ 64.19				
18	2030	\$ 66.11				
19	2031	\$ 68.10				
20	2032	\$ 70.14				
						<u>\$ 1,339.12</u>
Total Washing Maintenance						\$ 4,609.92
Total Number of Fixtures						<u>56</u>
Total Washing Maintenance per Fixture						<u>\$ 82.32</u>

Calculation of Costs due to Street Light Failure
Pascoag Utility District

Schedule 4

Page 1 of 2

Cost of 1 LED Street Light	\$ 237.00	See Schedule 5
Cost of 1 Photo Control	<u>\$ 17.64</u>	See Schedule 5
Total Cost to replace Fixture	\$ 254.64	
Average Installation costs for Replacement	<u>\$ 165.30</u>	See Schedule 4 (page 2 of 2)
Total Replacement Cost	\$ 419.94	
Potential Failure rate	<u>2%</u>	See Schedule 5
2% Failure Cost recovery	<u><u>\$ 8.40</u></u>	

Please note: The Cost to replace Fixture was not indexed to inflation like the installation costs were due to the potential costs for these fixtures in the future may become cheaper due to improved production or increase of use in the industry.

Calculation of Costs due to Street Light Failure

Pascoag Utility District

Real Discount Rate		1.0%
Labor	2013-2032	3.0%
Truck Rate	2013-2032	3.0%

Year	Labor	Present Value	20 year average	Hours	Cost	
1	2013	\$ 48.85				
2	2014	\$ 50.32				
3	2015	\$ 51.82				
4	2016	\$ 53.38				
5	2017	\$ 54.98				
6	2018	\$ 56.63				
7	2019	\$ 58.33				
8	2020	\$ 60.08				
9	2021	\$ 61.88				
10	2022	\$ 63.74				
11	2023	\$ 65.65				
12	2024	\$ 67.62				
13	2025	\$ 69.65				
14	2026	\$ 71.74				
15	2027	\$ 73.89				
16	2028	\$ 76.11				
17	2029	\$ 78.39				
18	2030	\$ 80.74				
19	2031	\$ 83.16				
20	2032	\$ 85.66				
		<u>\$ 1,312.62</u>	<u>\$1,173</u>	\$58.64	2	<u>\$ 117.29</u>

Year	Truck	Present Value	20 year average	Hours	Cost	
1	2013	\$ 40.00				
2	2014	\$ 41.20				
3	2015	\$ 42.44				
4	2016	\$ 43.71				
5	2017	\$ 45.02				
6	2018	\$ 46.37				
7	2019	\$ 47.76				
8	2020	\$ 49.19				
9	2021	\$ 50.67				
10	2022	\$ 52.19				
11	2023	\$ 53.76				
12	2024	\$ 55.37				
13	2025	\$ 57.03				
14	2026	\$ 58.74				
15	2027	\$ 60.50				
16	2028	\$ 62.32				
17	2029	\$ 64.19				
18	2030	\$ 66.11				
19	2031	\$ 68.10				
20	2032	\$ 70.14				
		<u>\$ 1,074.81</u>	<u>\$960</u>	\$48.02	1	<u>\$ 48.02</u>

Average Installation costs for Replacement

\$ 165.30

Assumptions
Pascoag Utility District

All Electrical Components are warranted for 5 years.

Unlike HPS Streetlights the LED's do not normally fail by burning out after long periods of time LED's will gradually become dimmer. The ones that we chosen have an L70 factor, which means over the 20 year life they will still produce 70% of their initial light after 100,000 hours.

The power supplies are typically rated for 100,000 hour life and the expectation is that replacement will be less than 1% ; we will use less than 2% over the 100,000 hour life of the system. It will be more practical to replace the entire luminaire rather than stock the power supplies; first, because of the 5 year manufacturer's warranty and second, because the LED streetlights may be outdated or better and cheaper LED SL's may be available after the 5 year warranty.

1 Led Street light @\$237

The photo controls we have purchased are Long Life Photo Cells which are rated for 90,000 hrs. and are warranted for 10 year from the date of sale.

We will use the less than 2% failure rate for the photo cells also.

1 photo control@\$17.64

Total cost per fixture

	<u>Cost</u>
1 Led Street light	\$ 237.00
1 photo control	\$ 17.64
	<u>\$ 254.64</u>

Installation of a streetlight and photo cell

2 men (\$48.85 Per hour)* @ 1 hour each plus truck (\$40hr)**

	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
2 Men	2	\$ 48.85	\$ 97.70
1 Truck	1	\$ 40.00	\$ 40.00
<i>Installation of a streetlight and photo cell</i>			<u>\$ 137.70</u>

2% Failure Cost recovery

See Schedule 4 (page 2 of 2)

Luminary Cleaning

See Schedule 3

LED Street lights are subject to dirt that will reduce the light output over time. Given the lack of data regarding cleaning of luminaires the District would suggest a cleaning Maintenance program to wash the lenses with a soft cloth after 7 years and again 14 years from the date of insulation.

2 men 15 min per light =28 hours. We will wash the lens 2 times in 20 years for a total of 56 hours.
14 hours for the Bucket Truck. We will wash the lens 2 times in 20 years for a total of 28 hours.

*LABOR = \$35 X 1.31=\$48.85

**Bucket Truck rate is \$40 per hour

Proof of Revenues
Pascoag Utility District

Schedule 6

	<u>Count or Usage</u>	<u>Proposed Rate</u>	<u>Annual Proposed Revenue</u>
<hr/> <i>LED Street Lighting (per month rate)</i> <hr/>			
25W LED/ 2111 Lumens	32	\$ 2.87	\$ 1,102.08
50W LED/ 3816 Lumens	24	\$ 3.71	\$ 1,068.48
TOTAL REVENUE	<u>56</u>		<u>\$ 2,170.56</u>

<hr/> <i>LED Street Lighting (Revenue Requirement)</i> <hr/>				Annual per Fixture (See Schedule 1)
<i>Fixture Cost recovery</i>	(20 years)	56	\$ 12.73	\$ 712.99
<i>Installation Cost recovery</i>	(20 years)	56	\$ 6.89	\$ 385.56
<i>Maintenance Cost recovery</i>	(20 years)	56	\$ 4.12	\$ 230.50
<i>2% Failure Cost recovery</i>	(20 years)	56	\$ 0.42	\$ 23.52
<i>Energy Usage</i>		(See Calculation Below)		\$ 817.62
<i>Revenue Required</i>				<u>\$ 2,170.19</u>
Variance				\$ 0.37


<hr/> <i>Calculation of Energy Usage</i> <hr/>					
	<u>Lamp Count</u>	<u>Monthly Energy Use (kWh)</u>	<u>Total Yearly Energy Use (kWh)</u>	<u>Monthly Lamp Energy Cost (\$)</u>	<u>Total Yearly Lamp Energy Revenue</u>
25W LED/ 2111 Lumens	32	9.37	3598.08	\$ 0.86	\$ 329.71
50W LED/ 3816 Lumens	24	18.80	5414.40	\$ 1.69	\$ 487.91
	<u>56</u>		<u>9012.48</u>		<u>\$ 817.62</u>

Pascoag Utility District
RIPUC Docket No.: _____ – LED Street Light Tariff Advice Filing
Service List – 2013

<u>Name</u>	<u>E-mail</u>	<u>Phone/Fax</u>
Michael R. Kirkwood General Manager Pascoag Utility District P O Box 107 Pascoag, RI 02859	mkirkwood@pud-ri.org	(401) 568-6222 (401) 568-0066
Judith R. Allaire Assistant General Manager Pascoag Utility District P O Box 107 Pascoag, RI 02859	jallaire@pud-ri.org hround@pud-ri.org	(401) 568-6222 (401) 568-0066
William L. Bernstein, Esq. 627 Putnam Pike Greenville, RI 02828	wblaw@verizon.net	(401) 949-2228 (401) 949-1680
Karen Lyons, Esq. Dept. of Attorney General 150 South Main Street Providence, RI 02903	klyons@riag.ri.gov David.stearns@ripuc.state.ri.us steve.scialabba@ripuc.state.ri.us jmunoz@riag.ri.gov dmacrae@riag.ri.gov	(401) 222-2424
Original & nine (9) copies file with: Luly E. Massaro Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02889	Lmassaro@puc.state.ri.us plucarelli@puc.state.ri.us SCCamara@puc-state-ri.us Nucci@puc.state.ri.us Dshah@puc.state.ri.us	(401) 941-4500

CERTIFICATE OF SERVICE

I hereby certify that copy/copies of this LED Street Light Tariff Advice Filing were served electronically on the individuals named in the above List of Recipients of Filing, this 20 day of February, 2013.

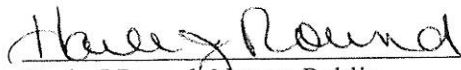


Harle J. Round, Notary Public
My commission expires 7-10-2013

Pascoag Utility District – LED Street Light Tariff Advice
 Service List updated 2/20/13

Name/Address	E-mail	Phone
Michael R. Kirkwood, General Mgr./CEO Pascoag Utility District 253 Pascoag Main St. PO Box 107 Pascoag, RI 02859	mkirkwood@pud-ri.org	401-568-6222
Harle Round Pascoag Utility District 253 Pascoag Main St. PO Box 107 Pascoag, RI 02859	Hround@pud-ri.org	401-568-6222
William L. Bernstein, Esq. 627 Putnam Pike Greenville, RI 02828	wlblaw@verizon.net	401-949-2228
Karen Lyons, Esq. Dept. of Attorney General 150 South Main St. Providence, RI 02903	klyons@riag.ri.gov	401-222-2424
	Al.contente@ripuc.state.ri.us	
	steve.scialabba@ripuc.state.ri.us	
	jmunoz@riag.ri.gov	
Original & 11 copies file w/: Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	Lmassaro@puc.state.ri.us	401-780-2107
	Nucci@puc.state.ri.us	
	Dshah@puc.state.ri.us	
	plucarelli@puc.state.ri.us	
	Sccamara@puc.state.ri.us	

I hereby certify that copy/copies of this LED Street Light Tariff Advice filing were served electronically on the individuals named in the above List of Recipients of Filing, this 20th day of February 20, 2013.


 Harle J Round, Notary Public
 My commission expires 7-10-2013

Attachment # 5

LED Street Light Pilot Program Placement									
Harrisville	Pole #	Existing HPS	LED	label#	Street Name	Pole #	Existing HPS	LED	label #
1 Chapel St	545	50	50	17	1 Start Of Pascoag Line by water connection	555	100	100	25
2 Chapel St	543	50	50	16	2 Pascoag Main	559	100	100	50
3 Chapel St	541	50	50	14	3 Pascoag Main	561	100	100	25
4 Chapel St. by Burr. Ambul	536	50	50	15	4 Pascoag Main	563	100	100	50
5 Chapel St	535	50	50	22	5 Pascoag Main	565	100	100	25
6 Chapel St by Aston Court	512	50	50	10	6 Pascoag Main	567	100	100	50
7 Harrisville Main/Chapel b	10	100	100	39	7 Pascoag Main Cemetery corner	568	50	50	50
8 Harrisville Main	12	50	50	3	8 Pascoag Main	571	100	100	25
9 Harrisville Main	14	50	50	4	9 Pascoag Main	572	100	100	25
10 Harrisville Main	17	50	50	2	10 Pascoag Main By Bradford court corner	574	100	100	50
11 Harrisville Main	18	50	50	1	11 Pascoag Main	575	100	100	25
12 Harrisville Main by Niko's	8	50	50	5	12 N main/ Pascoag Main	1	100	50	54
13 Harrisville Main	4/354	50	50	6	13 Pascoag Main	576	150	150	25
14 Harrisville Main	2/352	50	50	7	14 Pascoag Main	577	100	100	50
15 Harr main/ Central	67/350	50	50	8	15 Pascoag Main	580	150	150	52
16 East Ave	485	100	100	38	16 Pascoag Main	582	150	150	44
17 East Ave	484	100	100	41	17 Pascoag Main	583	150	150	33
18 East Ave	482	100	100	43	18 Pascoag Main	584	150	150	34
19 East Ave	480	100	100	45	19 Pascoag Main	585	150	150	35
20 East Ave	478	50	50	9	20 South Main	2	100	50	48
21 East Ave	475	50	50	11	21 South Main	5	50	25	28
22 East Ave	474	50	50	12	22 South Main	10	100	50	50
23 East Ave	471	100	100	40	23 South Main	13	50	25	18
24 East Ave	468	100	100	42	24 South Main	16	50	25	25
25 East Ave	465	100	100	47	25 South Main	18	50	25	27
26 East Ave	462	100	100	37	26 South Main	22	50	25	24
27 East Ave	459 1/2	100	100	36	27 South Main	26	50	25	21
28 East Ave By Bills Driveway	456	100	100	13	28 South Main	28	50	25	26
Harrisville					Pascoag				
10- 100 HPS replaced with 50W LED					5-150HPS replaced with 50W Led				
17- 50 HPS replaced with 25W LED					1-150 HPS Replaced with 25W Led				
1 100 HPS replaced with a 25W LED					8-100HPS replaced with 50 W Led				
28 LED Street Lights					6- 100 HPS replaced with 25 W Led				
					1-50 HPS replaced with 50W LED				
					7-50 HPS replaced with 25W LED				
					28 LED Street Lights				

Attachment # 6

Lighting - Savings Calculations

50w HPS vs AEL ATB0 LED 25w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	<u>\$137.70</u>	= 1.0 hrs/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	<u>4323</u>	
Cost of Energy per kwh	<u>\$0.092</u>	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
50W HPS	66	AEL ATB0 E35	26
Energy \$/yr =	\$26.16	Energy \$/yr =	\$10.30
		Energy Savings / Year =	\$15.85

40 watts saved
172.92 kwh saved per year

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1 = total number of fixtures	
0.25 = Number of lamps to replace per year	
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$52.78



Replacement Fixture	Number	Price Each	Total Cost
ATB1	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			4.82

Lighting - Savings Calculations

70w HPS vs AEL ATB0 LED 50w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	<u>\$137.70</u>	= 1 hr/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	<u>4323</u>	
Cost of Energy per kwh	<u>\$0.092</u>	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
70W HPS	88	AEL ATB0 E70	51.3
Energy \$/yr =	\$34.87	Energy \$/yr =	\$20.33
		Energy Savings / Year =	\$14.54

36.7 watts saved
158.65 kWh saved per year

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1 = total number of fixtures	
0.25 = Number of lamps to replace per year	
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$51.47



Replacement Fixture	Number	Price Each	Total Cost
ATB0/photo eye	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			4.95

Lighting - Savings Calculations

70w HPS vs AEL ATB0 LED 25w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	\$137.70	= 1 hr/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	4323	
Cost of Energy per kwh	\$0.092	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
70W HPS	88	AEL ATB0 E35	26
Energy \$/yr =	\$34.87	Energy \$/yr =	\$10.30
		Energy Savings / Year =	\$24.57

62 watts saved
268.03 kWh saved per year

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1	= total number of fixtures
0.25	= Number of lamps to replace per year
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$61.49



Replacement Fixture	Number	Price Each	Total Cost
ATB0/photo eye	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			4.14

Lighting - Savings Calculations

100w HPS vs AEL ATB0 LED 25w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	<u>\$137.70</u>	= 1 hr/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	<u>4323</u>	
Cost of Energy per kwh	<u>\$0.092</u>	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
100W HPS	130	AEL ATB0 E35	26
	Energy \$/yr = \$51.52		Energy \$/yr = \$10.30
		Energy Savings / Year =	\$41.21

104 watts saved
449.59 kWh saved per year

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1 = total number of fixtures	
0.25 = Number of lamps to replace per year	
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$78.14



Replacement Fixture	Number	Price Each	Total Cost
ATB0/photo eye	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			3.26

Lighting - Savings Calculations

100w HPS vs AEL ATB0 LED 50w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	\$137.70	= 1 hr/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	4323	
Cost of Energy per kwh	\$0.092	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
100W HPS	130	AEL ATB0 E70	51.3
Energy \$/yr =	\$51.52	Energy \$/yr =	\$20.33
		Energy Savings /	
		Year =	\$31.19

78.7 watts saved
340.22 kWh saved per

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1	= total number of fixtures
0.25	= Number of lamps to replace per year
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$68.11



Replacement Fixture	Number	Price Each	Total Cost
ATB0/photo eye	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			3.74

Lighting - Savings Calculations

150w HPS vs AEL ATB0 LED 50w LED

Assumptions in yellow (modify to fit your utility)

Lamp Replacement Labor	\$137.70	= 1 hr/lamp - 2 men @ \$48.85/hr loaded labor + \$40 truck/hr
Lamp hours/year	4323	
Cost of Energy per kwh	\$0.092	

Existing Fixture	Energy Use in Watts	LED Replacement	Energy Use in Watts
150W HPS	193	AEL ATB0 E70	51.3
Energy \$/yr =	\$76.48	Energy \$/yr =	\$20.33
		Energy Savings / Year =	\$56.15

141.7 watts saved
612.57 kWh saved per year

Lamp & Labor Savings	
Assuming replacement HPS lamp cost = \$10.00/e	
Assume HPS lamp lasts 4 years	
1	= total number of fixtures
0.25	= Number of lamps to replace per year
Using Lamp Replacement Labor at page top	
the lamp replacement labor cost per year =	\$36.93
Annual Energy and Labor Savings =	\$93.08



Replacement Fixture	Number	Price Each	Total Cost
ATB0/photo eye	1	\$ 254.64	\$ 254.64
Return on Investment Period (years) =			2.74

Attachment # 7

Street light Survey Results

Question

1	How did you experience the LED Street Lights.		
	53 by Car/Truck	79%	
	2 by Motorcycle	3%	
	12 as Pedestrians	18%	
2	Location of LED Street Lights that you experienced		
	Pascoag Main Street		
	South Main Street		
	Harrisville Main		
	Chapel Street		
3	Do you Believe the new LED Street lights have improved road/sidewalk visibility?		
	56 have improved	97%	
	2 have not improved	3%	
4	How did you feel?		
	a. Could you see further?		
	52 could see further	93%	
	1 could not see further	2%	
	3 did not notice	5%	
	b. Were there fewer dark spots?		
	43 said there were fewer dark spots	78%	
	3 said there were not fewer dark spots	5%	
	9 didn't notice	16%	
	c. Could you be better seen?		
	42 could be seen better	75%	
	2 could not be seen better	4%	
	12 didn't notice	21%	
	d. Could you distinguish colors better?		
	36 could distinguish colors better	64%	
	2 could not distinguish colors better	4%	
	18 didn't notice	32%	
5	How do you feel about the amount of glare of the new LED Lights at eye level?		
	52 felt the glare was comfortable	90%	
	6 felt there was too much glare	10%	
6	How do you feel about the amount of brightness of the new LED lights at eye level?		
	52 were comfortable with the brightness	90%	
	6 said it was too bright	10%	
7	Compare the quality of light of the new white LED lights to the existing yellow High Pressure Sodium's:		
	54 preferred the white LED Lights	95%	
	3 preferred the existing yellow HPS lights	5%	
8	If the LED Street Lights were installed town wide, do you think they would make the area feel:		
	49 of 61 feel safer	80%	
	31 of 61 they are more inviting	51%	
	29 of 61 felt they are more attractive	48%	
	4 too bright	7%	

Additional comments regarding the evaluation:

- * The street lighting is badly needed and greatly appreciated.
- * Better than the yellow.
- * PUD is doing a great Job.
- * Do the whole town!
- * I really like them!
- * Great Program!
- * Nice
- * Great Idea, very happy about the cost savings
- * Would like to have all the lights changed to the LED lights.
- * I would like to change my flood orange light to the LED Lights
- * LED lights give a richer feel to the area. As I stated it also gives a better color recognition. Do the whole town.
- * The test included a lot of ambient light. Would like to see a yellow HPS light with an LED light on a dark narrow road (e.g. West Rd) I would also be curious to see the difference in light output vs. ambience in the street light in front of my house. Not sure how the LED lights would work on more rural roads (Too Bright?)
- * The LED lights that have been installed on East Ave, Chapel St, and Pascoag Main St. are fine. However I am concerned that they would be too bright in neighborhoods where houses are close to poles and streets. A lesser wattage maybe needed for LED lights in these areas. Also, Many businesses have high pressure sodium spotlights, would they have the option to change to LED Lights? It would look better if all lighting was the same style.
- * I love the new lights! Not only do they light up the area better, they also make the area more inviting and more in line with the town!
- * I'd be happy with these lights if there is no impact to the taxpayer what so ever and would result in lower electric bills.
- * I think the new LED lights are a great improvement over the old yellow lights. The yellow light have too much glare and make you see spots if you look at them. Also they should save the town a lot of money because they will be much more energy efficient!
- * Love the LED lights!
- * The Lights are excellent! Thanks
- * IF old lights are cheaper - stay with them. If new lights cost taxpayers more - then no. If new lights are cheaper - then yes.
- * A+
- * Lights need to be shaded like indoor lights to provide best visibility. If Town were to embrace the principle of light conservation (no unshielded flood lights on public or private property) & the dark skies technology, our town would be safer & more appealing as a rural community.
- * Drove through without noticing the change of light, went back to check them to evaluate the difference. They are brighter but do like the Bridge way lights for there old look. Those lights are really nice even though not as bright.
- * The clean, white light makes everything in the lighted area seem more visible and natural.
- * The Lights are very nice but some of the spacing on South Main Street need to be reevaluated. Especially on the top of the hill and on the corner near the garage.
- * In high commercial areas yellow lights are sufficient. Feel that in outer areas the white lights would provide better viewing.
- * Not only brighter on street but brighter over personal property. Better Security and visibility around the home looking from inside house and being outside in yard.

The survey was included in the June billing as an insert. As of August 20, 2013, 61 Surveys were returned and this was the finding.



LED STREET LIGHT SURVEY

The Pascoag Utility District is in the process of installing LED (Light Emitting Diode) Street lights in the Village of Harrisville along Harrisville Main Street, East Avenue and Chapel Street and in the Village of Pascoag along Pascoag Main Street and South Main Street. The LED pilot program is being funded with Demand Side Management funds approved by the RIPUC in 2012 which allowed the District to purchase 56 LED Street Lights. Please help us evaluate the program by completing this survey.

1. Did you experience the LED street lights by?

- Car/Truck
- Motorcycle
- Bicycle
- Pedestrian

2. Please give the Street location of the LED Street Lights that you experienced.

3. Do you believe that the new LED street lights have improved road/sidewalk visibility?

- Have improved
- Have not improved

4. How did you feel?

A. Could you see further?	B. Were there fewer dark spots?	C. Could you be better seen?	D. Could you distinguish colors better?
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No
<input type="checkbox"/> Didn't Notice	<input type="checkbox"/> Didn't Notice	<input type="checkbox"/> Didn't Notice	<input type="checkbox"/> Didn't Notice

5. How do you feel about the amount of glare of the new LED lights at eye level?

- Do you feel comfortable with glare
- Do you feel there is too much glare

6. How do you feel about the amount of brightness of the new LED lights at eye level?

- Comfortable with the brightness
- Too bright

7. Compare the quality of the new white LED lights to the existing yellow High Pressure Sodium (HPS) lights:

- I Prefer the new LED white lights
- I prefer the existing yellow HPS lights

8. If the LED Street lights were installed Town wide, do you think they would make the area feel:

(please check all that apply)

- Safer
- More inviting
- More attractive
- Too bright
- None of the above

9. Please feel free to provide additional comments regarding this evaluation:

Thank you for assisting the Pascoag Utility District in its evaluation of the Pilot LED Street Light Project. Please return the Survey to: Pascoag Utility District, 253 Pascoag Main Street, Pascoag RI 02859 or by fax at (401) 568-0066 or by email to hround@pud-ri.org

7. Compare the quality of the new white LED lights to the existing yellow High Pressure Sodium (HPS) lights:

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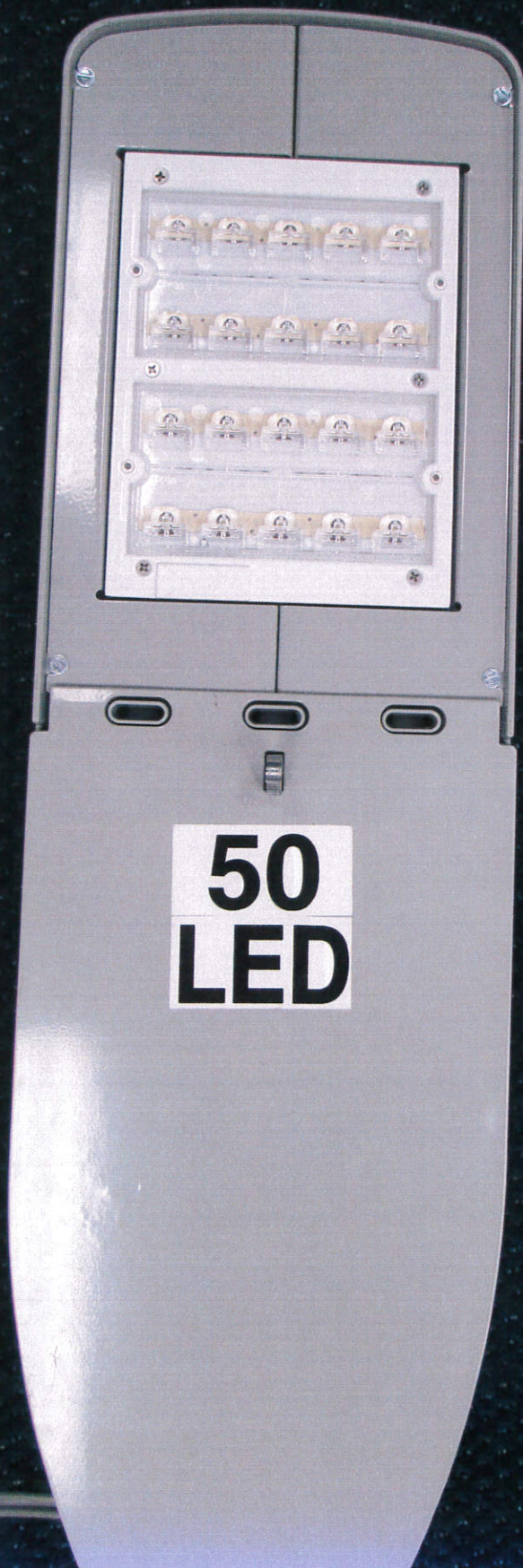
Photos



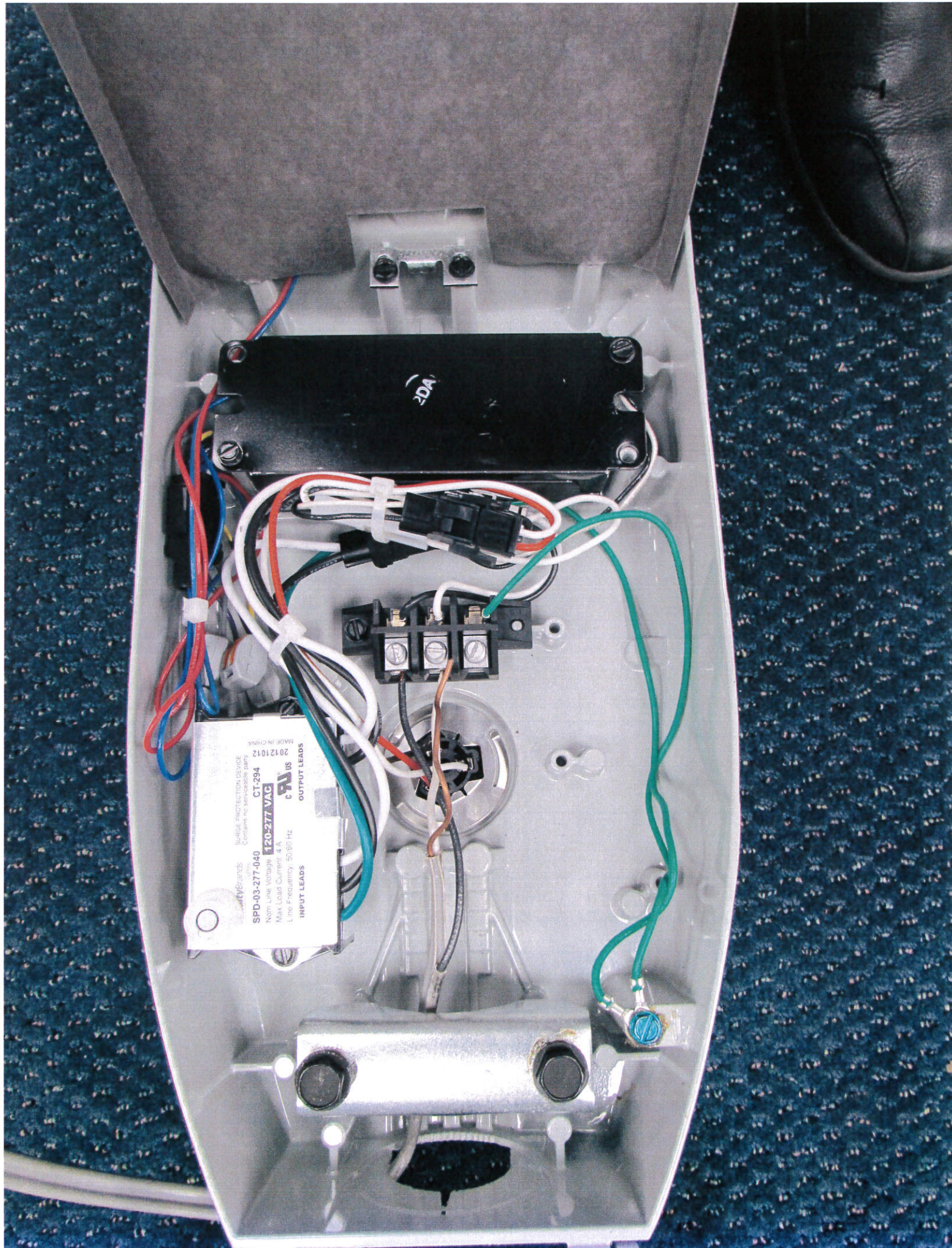








**50
LED**



SURGE PROTECTION DEVICE
 Contains no serviceable parts
 20121012
 MADE IN CHINA
 SPD-03-277-040
 Nom. Line Voltage **120-277 VAC**
 Max. Load Current 4 A
 Line Frequency 50/60 Hz
 INPUT LEADS
 OUTPUT LEADS
 CUL
 RA US

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